

**Instruction for Use**

**English**

# **Tasy EMR**

## **Version 5.04**

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## **1 Introduction**

This chapter contains important information that must be read first.

### **1.1 Description**

Tasy EMR is an information management system for health care (HC) and health plan (HP) organizations.

For HC organizations, it aims to:

- Support and manage non-clinical and clinical workflows by integrating activities, roles, areas, and other necessary pieces of software and hardware, providing a unified information flow.
- Make available the patient electronic record data to health care professionals in a single and integrated manner.
- Support clinical decision-making, combining general medical information and algorithms with patient-specific data.
- Support and manage workflows in ancillary areas such as pharmacy, laboratory, radiology, oncology, nutrition, and blood bank.
- Support and manage workflows of operational, administrative, and managerial processes such as bed occupancy, patient management, billing, controlling, finance, business intelligence, and stock/warehouse.

For HP organizations, it aims to:

- Support and manage administrative and operational workflows by integrating activities, areas, and stakeholders, providing a unified information flow. The processes and activities include the management of health plans, contracts and beneficiary portfolios, sales and sellers, accredited networks portfolio and reimbursement, beneficiary support, billing invoices, beneficiary health expenditures, and communication with beneficiaries, customers, and networks.

For both organizations, Tasy EMR aims to:

- Support operational and administrative decision-making via rules and algorithms.
- Enable the process communication between the stakeholders (patients, beneficiaries, health care professionals, providers, and entities) via portable and remote tools, such as portals and mobile applications (e.g., tablet, smartphone, etc.).

The Tasy EMR existing capabilities/ functionalities may be available for HC and/or HP organizations, according to specific business needs, workflows, and privilege accesses.

### **1.2 Intended Use**

Tasy EMR is intended to support professionals and stakeholders of health care and health plan organizations in recording and managing clinical, operational, and administrative data, integrating, activities, roles, and areas into a unified information flow.

### **1.3 Indications for Use**

Tasy EMR comprises an information management system indicated for health care (HC) and/or health plan (HP) organizations.

For HC organizations, the information management system displays, stores, exchanges, and processes clinical, operational, and administrative data. The system allows manual data input or via other devices interfaces. It manages single or multiple patient care delivery, embracing inpatient and outpatient care. It assists health care professionals in diagnosing, monitoring, predicting, prognosticating, treating or alleviating

diseases or conditions. It is indicated to support clinical decision making, combining general medical information and algorithms with patient-specific data. The referred capabilities embrace rules and calculations that may be configurable, encoded fixed, or based on interfacing with other external applications. Tasy EMR is not indicated to be the sole source of information or replace clinical judgment.

For HP organizations, the information management system displays, stores, exchanges, and processes clinical, administrative, and operational data from beneficiaries, health care professionals and providers. The system allows manual data input or via software interfaces.

#### **1.4 Contraindications**

Based on the nature of the device, there are no contraindications related to Tasy EMR. Cautions and warnings associated with the device are available in this Instructions for Use.

#### **1.5 General Guidance**

In addition to information about Tasy EMR features and their use, this guide contains Warnings, Cautions, and Notes:



##### **WARNING**

Warnings are directions, which if not followed, could cause moderate to serious injury to a user, patient or any other person, or could lead to a misinterpretation, and/or loss or damage of patient-related data.



##### **CAUTION**

Cautions are directions, which if not followed, could cause damage to the product described in this Instructions for Use and/or any other device.

Directions, which if not followed, could cause damage to the product and to a person, are documented as a warning.

**NOTE** Notes highlight unusual aspects in order to help operators.

#### **1.6 Limitations for Use**



##### **WARNING**

Only use the system for purposes that are specified in the scope of this Instructions for Use document.



##### **WARNING**

Verify that the software version (e.g., 5.01) corresponds to the version of this Instructions for Use document before continuing.



##### **WARNING**

Do not use this system until you have received proper training. If you are unsure of your ability to operate this software safely and effectively, do not use it.

## **1.7 Intended User Population**

For HC organization, the target user population consists of:

Health care clinical professionals

- Physicians
- Nurses and nurse practitioners
- Pharmacists
- Dietitians
- Physiotherapist
- Psychologists
- Specialists

Health care non-clinical professionals

- Managers and administrators
- Accounting and financial professionals
- Clerks
- Technicians

Patients and/or caregivers - limited access to specific features through the patient portal (My Companion).

For HP organizations, the target user population consists of:

The target user population for the health insurance capabilities consists of

- Beneficiaries
- Health care professionals
- Providers

## **1.8 Patient Target Group**

All patients who supply their personal and health related data to a healthcare institution, either directly or by an authorized party.

## **1.9 Clinical Benefits**

- Facilitates better coordination of patient care delivery
  - The patient will have encounters with their doctors, specialists, nurses, lab technicians, and other clinicians. Each encounter will result in vital information, which, when taken as a whole, gives a true picture of a patient's total health. When all care providers have access to the same data, they can avoid ordering duplicate tests, prescribing contraindicated medications, and they can improve the overall quality of care. Having a single, continuous record for a patient provides a holistic view of overall health for better diagnosis and treatment.
- Facilitates better support for healthcare professionals
  - Having facilitating tools for the daily activities, they can execute the care-related tasks with more quality and efficiency.
- More empowered patients
  - When patients have access to their health records, they can take an active role in managing their outcomes and overall well-being. The patient portal allows patients to schedule appointments and find out their test results from any location.

### 1.10 Claims

The system provides capacity to enable and configure clinical decision support (CDS) tools to trigger medication-related prescribing alerts such as drug interaction, allergy alerts, and dosing error detection to promote use of evidence-based recommendations for medication prescriptions.

Clinical scoring tools and probability calculators assist the clinician with diagnosis and treatment decisions and allow intervention earlier in the course of disease.

Clinical parameters (e.g., vital signs, test results) contained within the system can be used to create alerts that notify the clinician or even trigger predetermined orders or order sets, or clinical pathways to support clinical decision making and actions.

### 1.11 Potential/Residual Risks

Risks include but are not limited to the following:

- Patient exposure to Data / Incorrect Data Not Associated with Patient
- Patient exposure to Data / Incorrect Patient Identification
- Patient exposure to Function / Device Unavailable for Use
- Patient exposure to Function / Deterioration of Function
- Patient exposure to Data / Data Confidentiality
- Patient exposure to Interfaces / software and network
- Patient exposure to Data / Data Availability

All risks fall into the zone of acceptable risks according to the company's Policy and are consistent with the current state of the art.

### 1.12 Incident Reporting

Any serious incident that has occurred in relation to this product must be reported to Philips and other relevant authorities in which the user and/or patient is established. For details on how to submit a request and interact with Philips, refer to the Service Guide.

### 1.13 Infrastructure Requirements

Windows is the most common corporate desktop use operating system, so market investments have been mainly on this platform. Tasy EMR has interface with other components, devices, and market resources that are available exclusively on the Windows platform.



#### **CAUTION**

**Tasy EMR must be operated in an environment where the minimum specified requirements for hardware and network performance are met.**

For more detailed requirements information refer to Infrastructure Requirements Guide available in the Customer Portal.

### 1.14 Technical Support

If you encounter difficulty using the product, contact the Philips technical support group that is serving your area. To obtain contact information for this group, contact your local Philips Representative.

When contacting Philips EMR technical support, please have the following information available:

- Caller name, client organization name, and location.
- Site number, if applicable.
- Detailed description of the problem, including any history of troubleshooting efforts completed before or after the problem first occurred.

For contact details refer to the last page of this Instructions for Use.

### 1.15 Compatibility

Tasy EMR should not be used in combination with other software, equipment, or components unless Philips EMR expressly recognizes such other software, equipment, or components as compatible. Philips EMR is not responsible for running compatibility validation of non-supported third-party software. If there is a need to use Tasy EMR in combination with other software, equipment, or components please contact Philips EMR.

Changes and/or additions to the system should be carried out only by Philips EMR, or by third parties expressly authorized by Philips EMR to do so. Such changes and/or additions will comply with all applicable laws and regulations, which have the force of law within the jurisdictions concerned, and with best engineering practice.

Changes and/or additions to the system that are carried out by personnel without appropriate training may lead to the product warranty being void.

Philips EMR is not responsible for any malfunction of Tasy EMR if it is run on hardware that is not in accordance with the Infrastructure Requirements.

For more detailed information, please refer to the **Tasy EMR Interoperability Guide** available on the Customer Portal.

### 1.16 Security Requirements

For more detailed information related to network safety, security, and privacy, refer to the Cyber Security Guide available on the Customer Portal.

### 1.17 Service Information

At the customer's request, a service engineer may connect to a client computer from a remote location to assist with issues and perform service actions. Remote Service may help reduce system downtime and improve investigation and closure of systemic issues. The remote connection must be granted by the client, after which the service can be provided by Philips personnel or a Philips authorized representative.



#### **CAUTION**

**Tasy EMR does not offer a native feature for remote connections. Software, which offers strong encryption mechanisms, will be used for remote service.**

For more detailed information refer to the Service Guide available on the Customer Portal.

### 1.18 Business Continuity Planning

The customer's continuity plan should be aware of the role of cyber-security as one part of the continuity planning. Refer to the Cyber Security Guide available on the Customer Portal for some topic areas to consider during creation of the continuity plan.

## 2 Features

This section describes the capabilities of the software product, also known as features, which combined form a comprehensive information system. The system uses a set of standard navigational components to achieve a unified user experience across the entire system. Refer to the Quick Reference Guide, available in the Customer Portal, for details about general navigation.

### 2.1 Clinical features

A group of features that help to manage data related to the clinical activities of healthcare professionals.



#### **WARNING**

**Before attempting to use a Tasy EMR medical device feature in a clinical setting, it must be properly configured by a system administrator, taking into consideration the manufacturer's instructions, local laws and regulations applicable to the client, as well as medical guidelines and best practices to guarantee safe and effective operation.**

**NOTE** Check if the scale, score or index is available in your region. Copyrights, official bibliography for translation and cross-cultural adaptation may impact their availability. Contact your Philips representative for further information.

#### 2.1.1 Clinical orders composition and view

This section presents a subgroup of clinical features related to creating and viewing medical orders for basic treatment, medicines and other substances.



#### **WARNING**

**All aspects of the clinical ordering process must be performed by qualified professionals and any information generated by the Tasy EMR system must be verified by those professionals. Facilities offered by the system are never a substitute for clinical judgement.**

**Orders made by clinical professionals are generally accompanied by a time element. Users who are responsible for clinical orders must always verify the time or times for administering a clinical order, which were generated by the Tasy EMR system.**

##### 2.1.1.1 Nutrition ordering and calculations

This feature supports the ordering of fasting, oral diets, enteral diets, supplements, Total Parenteral Nutrition (TPN), infant milk and formulas into the patient's care plan.

In the "CPOE" function, the mentioned options are requested in the Nutrition group. Depending on the type of nutrition (fasting, oral diets, enteral diets, supplements, infant milk and formulas, adult and pediatric/neonatal TPN), the system presents different field options to the user (context-sensitive information).

Fasting can be ordered by selecting the type of fasting (such as absolute fasting, fasting with permission for oral medication, or fasting with water permission), the reason for fasting (such as due to laboratory test collection and surgical procedure), and the start and finish dates.

Oral diets can also be ordered using autocomplete or the user can select one type of diet. When the diet needs to be tailored for one patient due to specific needs, the clinician can select the diet by composition

and consistency, which requires a previous configuration. Oral supplements also use the autocomplete option, and the user informs route, dose, unit of measurement, interval, and type of administration (as start time, per doctor's order, or Pro Re Nata [PRN]).

To order enteral diet and supplements, use the autocomplete and then inform the dose, administration mode (continuous or intermittent infusion), frequency, unit of measurement, and duration of the infusion stage. The system calculates the infusion rate according to the information provided. For example, the patient needs to continuously receive 1500 mL of the enteral diet for 24 h. In that case, the system calculates and presents the result of the infusion rate (62.5 mL/h or 20.83 drops/min). This result depends on the selected unit of measurement. Conversely, if the user selects the intermittent infusion, it is necessary to input the stage duration, and the system calculates the infusion rate. For example, the patient needs to continuously receive 1500 mL of the enteral diet for 24 h. In that case, the system calculates and presents the result of the infusion rate (62.5 mL/h or 20.83 drops/min). This result depends on the selected unit of measurement. Conversely, if the user selects the intermittent infusion, it is necessary to input the stage duration, and the system calculates the infusion rate. For example, if the patient needs to receive 1500 mL in four stages of 4 h over a 24-hour period, the system calculates and presents the result of the infusion rate (375 mL in 4 h of each one of the four stages).

In the 'infant milk/formulas' group, the user can select infant formula, breast milk, and human milk. The user can choose the infant formula's solubility, suction device, and temperature. Solubility record is a pre-condition that the user needs to configure before ordering the milk formula. For example, to prepare 100 mL of milk formula, it is necessary to add 15 g of powder over 90 mL of water, which results in a solubility of 15%. This is the quantity of powder to be diluted in the water. Suppose the user orders 120 mL in the same solubility, the quantity of powder and water changes (18 g of powder and 108 mL of water). If the clinician selects breast milk, it is possible to order "breast milk on demand."

The "CPOE" function allows the clinician to place orders for parenteral nutrition according to the patient's calorie requirements and clinical needs. It is possible to order products for nutrition and specify the quantity of a product that needs to be prepared according to the nutrients requested for the patient.

To order adult TPN, the user selects a pre-configured set of products and elements, which can be edited as needed for the patient. The user can adjust aspects of the nutrition order such as, the percentage of protein, lipid, and carbohydrate, number of bags for infusion, duration of infusion and infusion device.

To order pediatric or neonatal TPN, a prior setting is necessary considering the age and weight of the patient to adapt the workflow process with the appropriate fields related to a pediatric or neonatal order. The user can adjust the products and elements shown on the screen and fill in the number of bags, water requirement (mL/Kg/day), calories requirement (Kcal/Kg/day), infusion duration, and infusion device.

After selecting oral, enteral, parenteral nutrition, supplement, milk/formula, breast milk or human milk, interval, or stages, and the first administration time, the system generates the schedule of the administration times. For example, if the user enters two times a day, starting today at 8 a.m., the system generates 8 a.m. and 8 p.m. as administration times.

Description of the formulas used in the process described above (not necessarily in the presentation sequence):

- Harris Benedict Basal Metabolic Rate (Kcal/day):
- $BMR\ Men = 66.5 + 13.75 \times \text{weight (Kg)} + 5.003 \times \text{height (cm)} - 6.775 \times \text{age (years)}$
- $BMR\ Women = 655.1 + 9.563 \times \text{weight (Kg)} + 1.850 \times \text{height (cm)} - 4.676 \times \text{age (years)}$
- Total Caloric Value (Kcal/day):  $TCV = BMR \times \text{activity factor} \times \text{stress factor}$
- Kcal per weight kilogram per day (Kcal/Kg/day) =  $TCV / \text{weight}$



- $\text{Kcal carbohydrate} = \text{TCV} \times \% \text{ carbohydrate} / 100$
- $\text{Kcal protein} = \text{TCV} \times \% \text{ protein} / 100$
- $\text{Kcal lipid} = \text{TCV} \times \% \text{ lipid} / 100$ 
  - Nonprotein calorie to nitrogen gram – NPC:N
  - $\text{Protein (g)} / 6.25 = X$
  - $\text{NPC:N} = \text{TCV} / X$
- $\% \text{ per kilocalorie per carbohydrate gram} = \% \text{ Protein/Kcal/g} - \% \text{ Lipids/Kcal/g}$
- Glucose Infusion Rate (mg/kg/min):  $\text{GIR} = \text{grams of glucose} / (\text{Weight} \times 1.44)$
- Osmolarity (mOsm/L):
  - $(\text{qty Protein} \times 10) + (\text{qty Lipid} \times 0.27) + (\text{qty Glucose} \times 5) + [(\text{qty Sodium} + \text{qty Potassium} + \text{qty Magnesium} + \text{qty Calcium}) \times 2] / (\text{total volume} \times 1000)$
  - $[(\text{qty Protein} \times 11) + (\text{qty Glucose} \times 5.5) + (\text{qty Lipid} \times 0.3) + (\text{qty Sodium} + \text{qty Potassium} + \text{qty Magnesium} + \text{qty Calcium} + \text{qty Phosphorus})] \times 1000$
  - $[(\text{qty AddProtein} \times 11) + (\text{qty AddGlucose} \times 5.5) + (\text{qty Lipid} \times 0.3) + (\text{qty Sodium} + \text{qty Potassium} + \text{qty Magnesium} + \text{qty Calcium}) \times 2] / (\text{total volume} \times 1000)$
  - $[(\text{qty AddProtein} \times 11) + (\text{qty AddGlucose} \times 5.5) + (\text{qty Lipid} \times 0.3) + (\text{qty Sodium} + \text{qty Potassium} + \text{qty Magnesium} + \text{qty Calcium}) \times 2] / (\text{total volume} + 30 \times 1000)$
  - *The parameter # 1080 of CPOE function is used to define the osmolarity formula to be used in adult TPN calculation.*
- Concentration:
  - $\% \text{ protein} = \Sigma \text{ Kcal ptn} / (\Sigma \text{ ptn} + \Sigma \text{ cho} + \Sigma \text{ lip})$
  - $\% \text{ carbohydrate} = \Sigma \text{ Kcal cho} / (\Sigma \text{ cho} + \Sigma \text{ ptn} + \Sigma \text{ lip})$
  - $\% \text{ lipid} = \Sigma \text{ Kcal lip} / (\Sigma \text{ lip} + \Sigma \text{ ptn} + \Sigma \text{ cho})$
- Infusion rate:
  - $\text{Milliliters per hour} = \text{Total volume (mL)} / \text{duration (h)}$
  - $\text{Drops per minute} = \text{Total volume (mL)} / \text{duration (min)} / 3$

**NOTE** Rules and calculations that support the nutrition ordering process are configured in “Patient Chart Settings”, “Nutrition Record”, “Material Record”, and “Core Table Settings” functions.

#### 2.1.1.2 Medication and medical fluids ordering, calculation, and decision support

This feature supports clinicians in ordering medicines and infusions for the patient and processes data using rules and algorithms.

In the “CPOE” function, in the Infusions and Medicines group, it is possible to order all infusions or medicines in different routes and infusion modes, such as conventional, variable infusion rate and Patient-controlled Analgesia (PCA) mode. In this group, the information is context-sensitive according to the user’s choices. Some tools support the order process, for example, therapeutic calculators, dose calculations considering a correction factor or the glucose infusion rate, and more, mentioned below.

Order a new medicine by typing the name in the autocomplete search box or select from preconfigured options, such as routines, protocols (order sets), favorites, and previous orders. When the medicine is added using routine or protocol options, the institution can configure the medicine in the specific protocol with the dose per kilogram, and the system considers the patient’s weight and displays the final dose to the user. When a physician orders a new medicine via autocomplete, they need to inform the administration route, dose, unit of measurement, and frequency. Institutions can configure the system to automatically populate these fields with default values; the user can edit the content if needed. In addition, depending on the item

selected by the user, the system only presents the appropriate fields (context-sensitive information). For example, for an oral medication tablet, no diluent option is available.

**NOTE** The rules and calculations to support the medication and medical fluids ordering process are configured in the “Material Records”, “Medicine”, “Core Tables Settings”, “Patient Chart Settings”, “Protocol Records” and “Nutrition Records” functions, and also in the CPOE parameters.

When applicable, the user can select on which side of the body to apply the drug. A previous configuration of each drug is necessary for having the suitable options displayed on the screen (for example, left, right, or bilateral for cases such as eye drops).

When the patient brings their own medication from home to the institution and keeps using it during the admission, the Health Care Professional (HCP) can flag the option that refers to this situation, avoiding unnecessary pharmacy supplies.

Based on previously configured rules, the system can validate the data from the medical order and alert the user of inconsistencies, such as, maximum and minimum dose limits, therapeutic duplication, non-standardized medication, medication allergies, and drug interactions. Some validation, such as the maximum and minimum dose limits and drug interactions, can also be a result of an interface with external content providers.

In the “CPOE” function, when the HCP orders antimicrobials, the system presents specific fields related to the number of days, source of infection, sample material, topography, and microorganism. This information can be managed and approved by the nosocomial infection surveillance team for authorization and infection control.

### **Ordering, preparation, and administration guide of intravenous medicines**

Intravenous drugs can be ordered as an **infusion** (ongoing administration) or **medicine** (discrete administration). When flagged as an infusion, in the “Electronic Medication Administration Record” (eMAR) function there is an infusion control by the nursing team, which means that the nurse records the start, the pause, the change of infusion rate, and the end of the infusion. When flagged as a medicine, the nursing team only records the moment the drug was administered, without the time checking mentioned above.

The system considers the current order information to create preparation and administration instructions to support the nursing team. One example using the drug’s dose and diluent, the total volume, interval/stages, infusion rate and infusion set volume.

*Example: Separate 2.4 mL from Fentanyl 50 mcg/mL Injection with 2 mL over 117.6 mL from Sodium Chloride 0.9 % flask 100 mL. Administer 100 mL (one-stage) up to 4.16 mL/h (total volume = 100 mL). Considered 20 mL of infusion device during preparation.*

For intravenous drugs (discrete administration) that may require reconstitution, dilution, and re-diluent (e.g., neonatal), the physician can add them during the ordering process, or the institution can preconfigure them. The options commonly used are displayed when selecting the main drug in the autocomplete. Adjustments can be made if necessary.

For intravenous infusions (ongoing administration), the physician must inform its mode, whether Conventional, variable infusion rate, or PCA. The main differences are described below:

**Conventional:** infusions administered in continuous or intermittent mode, depending on the calculation reference selected and information provided by the prescriber.

*There are four calculation reference types available for selection: interval, number of stages, total volume, and infusion rate. Depending on the selected type, the system will request that the prescriber fill in different information to calculate the other required information. If “interval” is selected, the prescriber will provide the infusion bag duration. If “stages” are selected, the prescriber will provide the number of stages and infusion bag duration. For “infusion rate”, the prescriber will provide the total rate and infusion time. And for “total volume,” the prescriber will provide the total volume and infusion time.*

*As examples: A 100ml solution with an interval of 12 hours and an infusion bag duration of 12 hours will have a total volume of 200ml, and an infusion rate of 8.3ml/h, behaving continuously.*

*A 100ml solution with an interval of 12 hours and an infusion bag duration of 8 hours will have a total volume of 200ml, an infusion rate of 12.5ml/h, and a 4-hour gap between each bag, behaving intermittently.*

**Variable infusion rate:** infusions that vary their infusion rate according to the patient’s clinical response. They are widely used in intensive care units for vasoactive medicines, as per doctor’s order.

**PCA:** infusions that are controlled by the patient for analgesic purposes.

### **Therapeutic dose calculators**

During the process of ordering intravenous medicines, the physician can open the therapeutic calculator, clicking the icon on the dose field to assist in calculating the final dose.

The physician may also use a therapeutic calculator to assist in the final dose and infusion rate calculation when ordering an infusion. As a pre-requisite, the “CPOE” function parameter #29 must be set to NO, with this setting the diluent will be visible on the user’s screen. In addition, “CPOE” function parameter #1151 allows two options for viewing the infusion calculator, one for use with adults and the other for neonatal/pediatric patients.

The adult option calculates the infusion rate, considering the weight, height, body surface area, body mass index, therapeutic proposition, and measurement unit.

*Example: If the infusion has 100 mcg of fentanyl (2 mL) and 98 mL of saline (100 mL in total) and the physician types 10 mcg/h in the dose therapeutic proposition, then the system generates an infusion rate of 10 mL/h and an administration time of 10 h.*

The neonatal/pediatric option calculates the dose of medication and diluent to prepare the infusion, considering the weight, height, body surface area, body mass index, infusion rate, infusion duration, therapeutic proposition, and measurement unit. *Example: If the infusion has 100 mcg of fentanyl (2 mL) and 98 mL of saline (100 mL in total) and the physician types 10 mcg/h in the dose therapeutic proposition, 10 mL/h in the infusion rate and 24 h in the duration, then the system generates 4.8 mL of fentanyl and 235.2 mL of saline (240 mL in total) to cover 24 h of administration time.*

### **Intravenous Rehydration Therapy**

Intravenous Rehydration Therapy aims to maintain or restore the normal volume and composition of body fluids.

The “CPOE” function allows the ordering of Intravenous Rehydration Therapy, which facilitates the selection of products and elements that will compose the infusion, as well as the calculations that are performed. Enable CPOE parameter #767 “Allows prescribing Intravenous Rehydration Therapy” to activate the icon on the prescription screen of the “Solutions and Medicines” group.

By clicking on the “Intravenous Rehydration Therapy” icon, the system opens a prescription screen of the elements and products that compose this infusion. To further facilitate the process, use the “Nutrition Registration” function to predefine which elements and products to use in these types of clinical orders.

To calculate the dose of elements and products, the user must inform the patient's weight, since the doses are specific for each individual. By informing the weight, the system can calculate the water intake, which will inform the total amount of liquid needed to compose the infusion, and the need for kilocalories per day. The system also calculates the glucose infusion rate (GIR).

With these results and information, the system brings up the elements and products. Depending on the patient's weight, the system calculates the daily amount of electrolytes. For glucose, the system considers the GIR value (mg/kg/min), completing the volume of the infusion with water, fulfilling the patient's water supply.

### **Glucose infusion rate**

When ordering a medicine diluted in glucose, the system displays the GIR field for the user. In this field, it is possible to enter the GIR value in mg/Kg/min to generate the dose of the glucose diluent. When only a glucose product is ordered, the user can access the GIR field via the icon on the glucose dose field, and the system generates the glucose dose according to the GIR value in mg/Kg/min.

Two things are necessary to use this functionality. The glucose products must be identified correctly in the “Order” tab of the “Material Record” function, and the parameter #29 of the “CPOE” function must be set as YES.

### **Ordering nutrients**

In the “CPOE” function, when the physician orders medicines or infusions that provide macronutrients and micronutrients to the patient, the system displays the quantity of nutrients provided in the ordered dose. Use the “Nutrition Record” function to predefine the equivalent quantity of the nutritional element for each product, this also applies for parenteral nutrition ordering.

### **Correction factor**

The physician can select the loading, additional, and differentiated doses and flag the option of the correction factor to consider the volume disregarded in the device line (infusion set) by the formula: *correction factor = total infusion volume + volume of the infusion set / total infusion volume*. The correction factor is multiplied by each dose (volume of medicine, volume of diluent) to define the final volume to be dispensed. Considering the final volume, the system generates the preparation instructions and calculates the dispensing materials.

### **Schedule generation**

Finally, when selecting the drug intervals or infusion stages and the first time of the administration, the system generates the schedule of the administration times. For example: if the user selects the interval “every 12 h”, starting today at 8 a.m., then the system generates 8 a.m. and 8 p.m. as administration times.



## **WARNING**

**The precise configuration of the ordering time interval options and their properties is critical for the correct behavior of the system, and every orderable item, such as drugs, procedures and exams, must be linked to the proper applicable intervals.**

Beyond that, using the “CPOE” function, the physician can select the loading, additional, and differentiated doses, and define different administration intervals (every day, just a few days a week, once a week, at a specific time, or after a specific meal).

If the user orders a continuous drug that does not have a time for discontinuation (e.g., thyroxine), the option “Kept until further notice” must be flagged. If there is a duration use limit (such as antimicrobials and anti-inflammatory drugs), the “Scheduled” option must be flagged and the end date of the treatment set. There are additional options for single-dose, PRN, and as per doctor’s discretion.

### **2.1.1.3 Medical gases ordering**

This feature supports gas therapy ordering in the context of the patient’s therapeutic plan.

Using the “CPOE” function, the clinical user selects the “gas therapy” group. Then, it is possible to define the respiration type, such as bubbling non-invasive mechanical ventilation, non-invasive mechanical ventilation, invasive mechanical ventilation, invasive mechanical ventilation with barrier filters, or spontaneous.

It is also possible to select the type of gas (oxygen or nitrous oxide), the flow rate, and the frequency (continuous or intermittent). When spontaneous breathing is selected, the HCP can inform the device (e.g., nasal catheter) and the FiO<sub>2</sub> (%).

For mechanical ventilation, the ventilation parameters suitable for the patient can be informed, such as programmed frequency (cycles/min), scheduled current volume (mL), FiO<sub>2</sub> (%), PIP (cmH<sub>2</sub>O), IPAP (cmH<sub>2</sub>O), EPAP (cmH<sub>2</sub>O), PEEP (cmH<sub>2</sub>O), CPAP (cmH<sub>2</sub>O), support pressure (cmH<sub>2</sub>O), PEEP low (cmH<sub>2</sub>O), PEEP high (cmH<sub>2</sub>O), MAP (cmH<sub>2</sub>O), inspiratory flow (L/min), inspiratory time (%), inspiratory time (s), inspiratory time/expiratory time, time low (s), time high (s), high-frequency respiratory rate (Hz), amplitude (%), amplitude (cmH<sub>2</sub>O), sensitivity (cmH<sub>2</sub>O), sensitivity (L/min), and type of wave.

### **2.1.1.4 Laboratory, anatomic pathology, image and procedures request**

This feature supports the HCP in ordering laboratory and image exams, procedures, and anatomic pathology exams in the context of the patient’s therapeutic plan.

Using the “CPOE” function, images (x-ray and tomography), laboratory exams (blood count, urinalysis, and feces), and procedures (such as nebulization, glycemic control, and dressing) can be requested. Use the autocomplete text field to locate items in the “Exams and Procedures” group, results vary depending on information already entered into the other data fields. Mandatory fields include the type of exam and procedure, “topography”, “side”, “clinical indication” and “interval”. The HCP can also continue to order any additional medication required to perform the exam/procedure (for example, a contrast in tomography or a laxative in a colonoscopy).

In the “CPOE” function there is a specific group called “anatomic pathology exams”, which also allows search using autocomplete. This particular group has fields such as removal/collection date, the number of samples, main sample, location of the anatomical site and the number of specimen containers. It is possible to add information about the specimen, through the button “procedure parts”.

Depending on the anatomic pathology exams requested, the system presents specific questions/fields related to the process. In order for the system to recognize the specific type of anatomical pathology exam being requested, it must be preconfigured in the “Internal Exams and Procedures” function. For example, if the exam is configured as cervical cytopathological, the clinician can fill in the information as follows:

- Has previous preventive exam (Pap smear)?
- On what date was the last exam?
- Do you use IUD?
- Is she pregnant?
- Do you use birth control pills?
- Take hormones or medicines to menopause?
- Have you ever undergone radiotherapy?
- Knows the date of last menstrual period?
- On what date was the last menstrual period?

#### **2.1.1.5 Blood, blood products and related therapies ordering**

This feature supports the ordering of blood, blood products, blood therapy procedures, and specific blood tests in the context of the patient’s therapeutic plan. For example, concentrated red blood cells, platelets, plasma, platelet-rich plasma, therapeutic phlebotomy, and apheresis.

The physician can request the blood and blood products, or only reserve them, indicating that they can be used if the patient needs it during or after a procedure.

Use the “CPOE” function and select the “Blood and Blood Products” group to choose the desired blood, blood products, blood therapy procedures, or specific blood tests. At this time, the user can inform the frequency for reoccurring requests, justify the clinical indication, enter the results of related laboratory tests and request some drug that must be infused during the process of hemotherapy (e.g., antihistamine or steroids).

#### **2.1.1.6 Chemotherapy and radiotherapy ordering**

This feature supports the ordering of chemotherapy and radiotherapy treatments and planning of the treatment application.

The user opens the “Electronic Patient Chart” (EPC) function in the “Cancer Treatment/Chemotherapy” item to order chemotherapy. The user defines the protocol according to the diagnosis and staging of the tumor. The user can modify the items in the protocol, changing or adding information, for example, in which sequence to administer the infusion, medication, dose, unit of measurement, route of administration, infusion time, interval, infusion device, day and cycle of application, category (medication, pre or post medication), recommendation and the administration facility (hospital, outpatient, or home). The user can still delete items from the treatment protocol, if necessary. The user can generate the order in the same function after filling in the required information. If necessary, the user can change any patient information, such as weight, height, creatinine, or AUC.

It is still possible to adjust and modify information for each medication, according to days and treatment cycles after the protocol generation. Nevertheless, changes in three fields require dose recalculation: the dose directly, the unit of measurement (mg/m<sup>2</sup> or mg/Kg), and the type of weight (current, optimal, or adjusted optimal weight). For adjusted optimal weight, it is necessary to inform the medication correction factor. For outpatient treatment, the order is sent to the pharmacy to be delivered to the patient.

Based on previously configured rules, the user can receive feedback on medication inconsistencies, such as dose above or below the limit, drug concentration is outside recommended limits, non-standardized medication, and medication allergy after generating an order.

The physician can order radiotherapy on the “EPC” function in the item Cancer Treatment/Radiotherapy, according to the patient's diagnosis. To execute the clinical order, the user needs to provide information such as type of treatment (conventional radiotherapy or brachytherapy), responsible physician and physicist, locoregional or International Classification of Disease (ICD-10, ICD-11) and ICD-O, side of the body, purpose, protocol, and duration (days). Once the physician records the necessary information, the physicist can plan the treatment in the “Radiotherapy Management” function.

In the same “Radiotherapy Management” function, the physicist adds information in the physician’s previously defined radiotherapy protocol in the “EPC”. The information includes treatment start date, total dose and dose per fraction (cGy), amount of check film, days of application, applicator, insertion number, total dose for insertions (cGy), interval, and the volume of the treatment. The process of determining the volume of the treatment has several steps. Two volumes need to be defined before the planning begins. These volumes are GTV (Gross Tumor Volume) and CTV (Clinical Target Volume). Then, two more volumes are defined during the planning process: PTV (Planning Target Volume) and Organ at Risk.

#### **2.1.1.7 Dialysis request and calculation**

This feature supports the ordering of hemodialysis or peritoneal dialysis for the patient and processes data input using rules and algorithms.

The configuration of the types of solutions for each type of dialysis (hemodialysis or peritoneal) is performed in the “Dialysis” option of the “Patient Chart Settings” function. Both types require the following fields: component, volume, unit of measurement, infusion time (h/min), temperature, infusion device, and infusion speed. In addition, for hemodialysis solutions, it is possible to configure a rule for the dose field using the “calculate dose per Kg” field and the formula: dose (informed in the “dose” field) x patient weight. According to the patient’s clinical condition, this suggested value can be edited by the physician in the “CPOE” function.

For peritoneal dialysis, solution protocols for each type can be configured in the function “Patient Chart Settings,” option “Dialysis,” sub-option “Peritoneal Dialysis” with the respective fields for each solution: solution, infusion time, stay time, drainage time, and start and end times. In addition, the sodium and bicarbonate profiles are configured in the “Core Table Settings” function, with the respective values for each informed period (0-1 h/1-2 h/2-3 h/3-4 h/4-5 h/ 5-6 h), but the physician can later edit these values in “CPOE” function.

When using the “CPOE” function, the “Dialysis” group allows the selection of hemodialysis or peritoneal dialysis. Depending on the chosen dialysis type, different field options are displayed.

#### **Hemodialysis**

To order a hemodialysis session, the user opens the “CPOE” function in the “Dialysis” group. The user can request one or more dialysis solutions and determine the weekdays the patient should undergo the procedure. In addition, the user informs whether it is a routine or an emergency condition, continuous or intermittent, and its specific type, such as Continuous Veno-venous Hemodiafiltration (CVVHDF), Continuous Veno-venous Hemodialysis (CVVHD), Intermittent Hemodialysis (IHD), Sustained Low-efficiency Dialysis (SLED), Daily Hemodiafiltration (HDF), Slow Continuous Ultrafiltration (SCUF), and Therapeutic Plasma Exchange (TPE).

After selecting the hemodialysis type, the physician fills out the following fields: Number of sessions (only for “intermittent” type hemodialysis), duration of the procedure (h/min), blood flow (mL/min) of dialysis, dialyzer model, blood flow (mL/L/min), type of access, post hemodialysis weight, current and dry/ideal of the patient, ultrafiltration, maximum ultrafiltration, ultrafiltration profile, sodium profile, bicarbonate profile, sodium (mEq/L), and bicarbonate (mEq/L). For each type of infusion, such as dialysate, anticoagulation, post

or pre-capillary replacement, the user can fill out the additional fields: type of hemodialysis solution, hemodialysis solution, components, dose, unit of measurement, solution flow, unit of measurement, and appropriate temperature (°C) for infusing the solution. The system calculates the “total volume” field for each type of solution according to the following formula: dialysis duration x infusion rate (flow).

## **Peritoneal**

To order a peritoneal dialysis session, the user opens the “CPOE” function in the “Dialysis” group. The user can request one or more dialysis solutions and determine the weekdays the patient should undergo the procedure. In addition, the user selects the type of dialysis (outpatient continuous, automated, or intermittent). Depending on the selected option, the system presents only the context-related fields. The system performs the calculation of the respective fields according to the following formulas, but it is possible to configure the CPOE to not calculate and allow the fields to be filled in manually.

- Cycle per stage = solution volume (mL) / cycle volume (mL)
- Cycle (h/min) = infusion time + stay time + drain time
- Total of cycle = dialysis duration (h/min) / cycle (h/min)
- Stage (steps) = total cycles / cycles per stage
- Total volume = cycle volume (mL) X total cycles

### **2.1.1.8 Recommendations and complementary medical orders**

This feature supports requesting recommendations encompassing general care and other prescribed guidelines to ensure complete care for the patient. For example, change of body position, bath frequency, request for walks, check vital signs or other patient information.

Using the “CPOE” function, the HCP selects the “Interventions and Recommendations” group to find, using autocomplete, the desired recommendation and the activity repetition frequency. Some recommendations can be configured as routines to be easily searched.

### **2.1.1.9 Collective orders**

This feature supports requesting the same exams and procedures for a group of patients instead of requesting them one by one. For example, surveillance culture (nasal swab) in all patients admitted to the ICU.

The user accesses the “Collective Orders” function and then, applying the filter, selects the patients or departments and the specific exam protocol. The request can be directly submitted to all selected patients or can still be pending individual submission.

If the ordered items have any inconsistencies, the system displays them. The user can then access the “CPOE” function to adjust, remove, or justify them. If there are no inconsistencies, the orders are released. The released orders are displayed in the “CPOE” function and follow the same workflow as “CPOE” ordered items.

## **2.1.2 Management and administration of specific and general orders**

This section presents a subgroup of clinical features related to managing orders for medicine and treatment.

### **2.1.2.1 General plan and medications administration**

This feature supports the nursing team to record and manage administration and checking of several ordered items, such as drugs, nutrition, and procedures. A timeline displays all ordered items, administration times, and their status, such as pending administration, suspended, or administered.



The highly configurable “eMAR” function is used to support this feature. For example, in the “System Administration” function, the user can configure several properties, such as defining user privileges, right-click button options, linking the closed-loop administration process, and integrating the information with other system functions such as “Chemotherapy”, “Blood management”, and “Exams management”.

Using the “eMAR” function, the user can record the administration, cancellation, and patient’s refusal of medicines, oral diets, infant milk, and formulas, as well as checking fasting periods, lab and non-lab exams, services and procedures, nurse interventions, recommendations, and complementary orders. It is also possible to reschedule, save the scheduled time as a default, and perform new dispensing requests. In the case of PRN or per doctor’s discretion, the user can schedule them when receiving the physician order.

Through the configuration of the function’s parameters, “Material Records” and “Core Table Settings” functions, the system can inform the user whenever there is a new order that is pending the nurse’s acknowledgment, as well as identify which of the medicines requires double-checking by the nursing staff. When administering an oral diet, the user can record its amount and the patient’s satiety. According to a previous configuration, it is possible to display the nutrition as oral diets or simply as breakfast, lunch, and dinner. When administering infant milk and formulas, the user can record the gastric residue and the administered and residual volumes and their characteristics. When checking non-lab exams, services, and procedures, it is also possible to record associated items, such as medicines or infusions.

Nurse interventions from “EPC” function and recommendations from the care plan of the “CPOE” function can be checked according to the scheduled time. If there is no time scheduled, the user can schedule or suspend them.

Every action performed regarding the administration process is recorded in the system, and the user has access to the logs via a screen option or a right-click button option “View item events.”



**WARNING**

**To avoid safety issues related to the patient therapeutic plan and its details displayed on the “eMAR” function, in cases of discrepancies or doubt, the user must double-check the primary source of the ordering process, on the CPOE function.**



**WARNING**

**The precise configuration of the ordering time interval options and their properties is critical for the correct behavior of the system, and every orderable item, such as drugs, procedures and exams, must be linked to the proper applicable intervals.**

#### **2.1.2.2 Medical fluids infusion process**

This feature helps the nursing team to manage the infusion administration process.

In the “CPOE” function, the physician can order conventional, PCA (Patient controlled analgesia) and infusions with variable infusion speed. The user can also order intravenous rehydration therapy filling in all information needed for the correct administration by the nursing team. For greater precision regarding infusion rate, it is possible to activate a parameter to apply two decimal places in the data.

In the “eMAR” function, the nursing team records the infusion’s start according to the scheduled time. In the case of PRN or infusions per doctor’s discretion, the user can schedule when receiving an order from the physician. When starting an infusion, the user can associate it with a patient’s existing device. New devices

(tubes and lines) can be added in the “EPC” function, in the “Device” section. If it is necessary to pause the infusion, the user informs the reason, the partial infused volume, and the discarded volume, when applicable.

When larger volumes of infusion are ordered, the user can pause the infusion, register the bottle change, and resume the infusion with the new bottle until the requested volume of infusion is complete. When starting an infusion with a variable dripping rate, the HCP records the time and the initial infusion rate that will be changed according to the patient’s clinical parameters, decreasing or increasing it, as necessary. When starting a PCA infusion, the user can define the patient an existing device (or add a new one in the “Devices used by the patient” function) and double-check the information coming from the “CPOE” function, such as infusion components, lockout interval (min), type of analgesia, mode, final concentration, bag volume (mL), initial dose, flow, bolus, four hours limit and one hour limit.

According to a previous configuration and the information filled in the “CPOE” function, it is possible to view the infusion titles in the “eMAR” function, usually used when physicians want to condense the infusion components. There are different icons for each infusion status: started, interrupted, resumed, and finished. Other actions available in the “eMAR” function include, assign an infusion pump to a patient, compare between drug information received from the infusion pump and prescribed order, inform which channel of the infusion pump is being used, change the infusion, reschedule, and suspend the infusions. All actions performed regarding the infusion process are recorded in the system, and the user has access to all logs via the screen or right-click option “View item events”.

#### **2.1.2.3 Medical gases administration**

This feature supports the nursing team in recording and managing the administration of medical gases.

In the “eMAR” function, the HCP records the start of the medical gas administration and fills in the appropriate information according to the breathing type. For example, if the breathing is spontaneous, the user checks the amount of gas, the device, and the FiO<sub>2</sub>%. If it is mechanical, the user checks the ventilatory parameters, the amount of gas, and the equipment.

The user can also schedule, reschedule, stop the administration process (by informing the reason), finish, or suspend the administration based on user privileges. In addition, if the gas therapy has been ordered as PRN or Per Doctor’s order, the user can schedule it when the physician defines the right moment to start it. For mechanical ventilation, it is possible at any time to view the ventilation parameters ordered in the “CPOE” function using a right-click option.

#### **2.1.2.4 Glycemic control**

This feature supports the user in managing the patients' blood glucose (BG) level checks, processing data using rules and algorithms, displaying therapeutic instructions, aiming for tight blood glucose control. The rules and algorithms are based on scientific literature or configured by the customers.

The processes and workflows related to this feature are separated into two procedures in the system: Conventional Glucose Control (CGC) and Intensive Glucose Control (IGC). CGC is based on fewer periodic BG checks and does not require continuous insulin intravenous administration. IGC, also known as Intensive Insulin Therapy, is generally applied for patients in critical care units, requiring more frequent BG checking (commonly every one or two hours) with continuous intravenous insulin administration to achieve and maintain an adequate glycemic control with a low risk of hypoglycemia.

**NOTE** The Conventional and Intensive glucose protocols defined by the institution are configured in the "Patient Chart Settings" function in the option "Glycemia Protocols". Also, in the "Internal Exams and Procedures" function under configuration for eMAR, it is necessary to set the "Glycemia" field to CGC or IGC.

**NOTE** When ordering a procedure in the "CPOE" function, which is linked to a glucose control protocol, the items associated with the order will be classified as either CGC or IGC based on the procedure selected. When using the function "eMAR", the items are then grouped by CGC and IGC, in different lists to be managed separately.

For the CGC procedure, the user can select one of several different schemes, then review and modify the ranges and instructions in the "CPOE" function before submission. There are three possible options regarding IGC: Goldberg, Modified, and Institution-defined protocols. The definition of the option available to the end-user is based on previous settings in the "eMAR parameters" function. For the intensive control schemes, the HCP cannot edit the glycemic ranges and instructions.

The conventional and intensive glucose protocols defined by the institution are configured in the "Patient Chart Settings" function in the option Glycemia Protocols. For conventional protocols, based on if-then rules, it is necessary to define ranges with initial and final levels of BG, the equivalent insulin or glucose default dose, medication administration instructions, miscellaneous instructions / guidelines, the schedule, and rules for additional measurements. For intensive protocols, as mentioned before, there are two hard-coded protocols and one configurable by the institution. For a configurable protocol, it is necessary to define the initial and final levels of BG to start the protocol and the suggested dose of intravenous insulin. In the same function, the user configures the maintenance phase with the suggested doses of insulin or glucose equivalent to the BG increase, decrease, and percentage of variation.

For the hard-coded IGC protocols, the system's default option is the Goldberg Protocol (parameter #400 of "eMAR parameters" function). See below the Goldberg algorithm, according to the publication *Goldberg, P. A., Roussel, M. G., & Inzucchi, S. E. (2005). Clinical Results of an Updated Insulin Infusion Protocol in Critically Ill Patients. Diabetes Spectrum, 18(3), 188–191. Doi:10.2337/diaspect.18.3.188.*

Target blood glucose (BG) levels: 90-119 mg/dL

Bolus & initial insulin infusion rate: If initial BG  $\geq 150$  mg/dL, divide by 70, then round to nearest 0.5 units for bolus AND initial drip rate. If initial BG  $< 150$  mg/dL, divide by 70 for initial drip rate only (i.e., NO bolus). Examples: Initial BG = 335 mg/dL:  $335 \div 70 = 4.78$ , round  $\uparrow$  to 5: 5 units IV bolus + start infusion @ 5 units/h; initial BG = 148 mg/dL:  $148 \div 70 = 2.11$ , round  $\downarrow$  to 2: start drip @ 2 units/h (NO bolus).

Changing the insulin infusion rate:

If BG  $< 50$  mg/dL: Discontinue the insulin infusion and give 1 ampoule (25 g) of Dextrose 50 IV and recheck BG every 15 min. When BG  $\geq 90$  mg/dL, wait 1 hour and recheck BG. If still  $\geq 90$  mg/dL, restart insulin infusion at 50% of most recent rate.

If BG 50-69 mg/dL: Discontinue the insulin infusion and, if symptomatic (or unable to assess), give 1 ampoule of (25 g) Dextrose 50 IV and recheck BG every 15 min; If asymptomatic, give 1/2 ampoule (12.5 g) of Dextrose 50 IV or 8 ounces (240 mL) juice and recheck BG every 15-30 minutes; when BG  $\geq 90$  mg/dL, wait 1 hour and recheck BG. If still  $\geq 90$  mg/dL, restart infusion at 75% of most recent rate.

If BG  $\geq$  70 mg/dL:

Step 1 - determine the current BG level and identify the corresponding column in the table below.

Step 2 - determine the rate of change from the prior BG level, identify the corresponding cell in the table, then move right for instructions.

**NOTE** If the last BG was measured 2-4 h before the current BG, calculate the hourly rate of change.  
**Example:** If the BG at 2 p.m. was 150 mg/dL and the BG at 4 p.m. is now 120 mg/dL, the total change over 2 h is 30 mg/dL. However, the hourly change is  $30 \text{ mg/dL} \div 2 \text{ h} = -15 \text{ mg/dL/h}$ .

Current BG level				Instructions
BG 70-89 mg/dL	BG 90-119 mg/dL	BG 120-179 mg/dL	BG $\geq$ 180 mg/dL	*
		BG $\uparrow$ by $> 40$ mg/dL/h	BG $\uparrow$	$\uparrow$ infusion by "2 $\Delta$ "
	BG $\uparrow$ by $> 20$ mg/dL/h	BG $\uparrow$ by 1-40 mg/dL/h or BG unchanged	BG unchanged or BG $\downarrow$ by 1-40 mg/dL/h	$\uparrow$ infusion by " $\Delta$ "
BG $\uparrow$	BG $\uparrow$ by 1-20 mg/dL/h, BG unchanged or BG $\downarrow$ by 1-20 mg/dL/h	BG $\downarrow$ by 1-40 mg/dL/h	BG $\downarrow$ by 41-80 mg/dL/h	No infusion change
BG unchanged or BG $\downarrow$ by 1-20 mg/dL/h	BG $\downarrow$ by 21-40 mg/dL/h	BG $\downarrow$ by 41-80 mg/dL/h	BG $\downarrow$ by 81-120 mg/dL/h	$\downarrow$ infusion by " $\Delta$ "
BG $\downarrow$ by $> 20$ mg/dL/h see below†	BG $\downarrow$ by $> 40$ mg/dL/h	BG $\downarrow$ by $> 80$ mg/dL/h	BG $\downarrow$ by $> 120$ mg/dL/h	Hold x 30 min, then $\downarrow$ infusion by "2 $\Delta$ "

† Discontinue insulin infusion and check BG every 30 min. When BG  $\geq$  90 mg/dL, restart infusion at 75% of most recent rate.

\*Changes in infusion rate (" $\Delta$ ") are determined by the current rate:

Current Rate (units/h)	$\Delta$ = Rate Change (unit/h)	2 $\Delta$ = 2x Rate Change (unit/h)
$< 3$	0.5	1
3 - 6	1	2
6.5 – 9.5	1.5	3
10 – 14.5	2	4
15 – 19.5	3	6
20 – 24.5	4	8
$\geq 25$	$\geq 5$	10 (consult medical doctor)

The second hard-coded IGC protocol is a modified version of the Goldberg Protocol (parameter #426 of “eMAR parameters” function), according to the publication of the Handbook of Practical Critical Care Medicine of the Brazilian Society of the Intensive Care – Segmento Farma Editores, 2009.

In the “eMAR” function, the nurse can schedule, reschedule, start, pause, cancel, and finish the glucose procedure. After each BG measurement, the nurse records the BG level and receives the corresponding instruction based on the pre-defined rules. Finally, the nurse records the action taken.

#### **2.1.2.5 Laboratory sample collecting**

This feature supports the management of the patient sample collection for requested laboratory exams.

The “eMAR” function displays the patient's therapeutic plan, including requested laboratory exams. The user can check the schedule, modify it, cancel the collection execution or register the collection. It is also possible to confirm samples by barcode using a right-click option.

After the collection, the samples are managed using the “Laboratory Management/LIS” function. Orders in the pre-analytical and post-analytical stages are organized by status, use standard or advanced filter options to locate specific orders. Results for exams, tests and microbiology tests are organized and displayed separately.

#### **2.1.2.6 Blood, blood products and related therapies execution**

This feature supports the administration of blood and blood products.

In the “eMAR” function, the user can access the patient’s blood bag information. It presents the requested blood product and detailed information such as blood product, dose, interval, and infusion device.

**NOTE The patient's blood bag is listed in the "Blood Management" tab of the "eMAR" function only after the request is submitted via the “Blood Management” function.**

Using the “eMAR” function, the user can choose one of the already submitted blood products to record the infusion’s start, pause, and end. The user can also record transfusion reactions and events using a right-button mouse option in the same function.

It is also possible to check the blood products by barcode scan, perform first and second checks of the blood bags and record the cancellation of the infusion.

#### **2.1.2.7 Chemotherapy administration**

This feature supports checking chemotherapy medication information (for example, medication, dose, unit of measurement, route of administration, interval, application time, infusion device, day, and the cycle of application) before administering them.

Using the “eMAR” function, the HCP accesses the patient medication information. Filters can be applied for searching in the patient worklist. After choosing a specific patient, the user selects the item “Oncology” and check the detailed data in the filter (for example, day, chemotherapy cycle, period of hours). The system brings the medication the patient needs to receive according to the time, day, and cycle of application.

Before choosing one of the medications presented, the HCP can verify if the medication was dispensed and is ready to be administered. It is possible to visualize the status of the manipulation process of each chemotherapy drug (in preparation, prepared and dispensed), actions that are reflected from the Chemotherapy Function.

When clinical users have mobile devices homologated by Philips, it is possible to perform a bedside check of the medication administration in the item "Oncology Check". First, the user accesses the platform's link in the browser and select "Oncology Check" item using the mobile device. Then, at the bedside, the user checks the patient's wristband or the order number (according to the previous configuration) to see the list of medications for the day.

Using the mobile device, the clinical user can choose one of the medications, confirm the production order and the order number in the "Oncology Check" function. The medication status changes to "Administered" in the "Oncology Check" and in the "eMAR" functions.

Chemotherapy drugs are considered high surveillance, and in this case, the system allows double checking/validation at the time of administration, registering the two professionals involved in this process. This configuration can be parameterized by medication.

In this feature, the safety of the process involving the administration of chemotherapy drugs is enhanced, with the due verification of information such as: right patient, right drug/diluent, right dose, right route, right time and right record.

#### **2.1.2.8 Dialysis execution**

This feature supports the process of documenting the dialysis session.

The user accesses the "Kidney Failure Management" function in the "Reception" sub-tab and selects the patient. Register the arrival or absence of the patient, inform the pre-dialysis weight and generate the hemodialysis. Before starting the dialysis session, the user accesses the "Kidney Failure Management" sub-tab, in the same function, and selects the patient. It is possible to view the prescription, generated in the "CPOE" function, with the defined treatment, type of dialysis prescribed, and other information included in the dialysis prescription (drugs, solutions and recommendations).

In the same "Kidney Failure Management" sub-tab, the user defines the dialyzer and the dialysis point, starts the dialysis, and documents the progression of the dialysis session. During the dialysis, blood flow, transmembrane pressure, arterial and venous pressure, temperature, heart rate, blood glucose and other vital signs are recorded.

It is also possible to control the dialysis process through the "eMAR" function, with reduced functionality. In the "eMAR" function, the user can view the dialysis solutions and their respective schedules (or schedule it if it is ordered as PRN), start and end a dialysis solution, and record other actions, such as performing a first and second check, changing the infusion rate, and registering a filter change.

#### **2.1.2.9 Bladder irrigation**

This feature supports the user in managing the bladder irrigation procedure, which is the washing method of the mucosa that lines the bladder, to remove sediments, clots, urine decomposition, or for any other therapeutic purposes.

In the "CPOE" function, the HCP orders the procedure of bladder irrigation and the washing fluids.

In the "eMAR" function, after selecting a patient, the user records the start of the continuous bladder irrigation. In the "Bladder irrigation" tab it is possible to record the washing process several times, informing the infusing volume and drained volumes with their appearance until the end of the procedure. In addition, according to user privileges, it is possible to schedule, reschedule, and suspend the irrigation process.

#### **2.1.2.10 Bedside checking process**

This feature supports the bedside checking process using mobile devices such as smart phones, tablets, laptops, PDAs, and barcode readers.

The bedside checking process can be performed by confirming the ordered items in one of two ways, either in the “eMAR” function or in the “Closed Loop Medicine Administration Process - CLMAP” function, both using bedside mobile devices.

According to a previous configuration (“System Administration” function and the function parameters “eMAR” function), the “CLMAP” function is accessed via “eMAR” function, by double-clicking the scheduled time or item, or by the right-click button option. Using barcode readers, the “CLMAP” allows the user to check medicines, infusions, nutrition and milk, blood products, bladder irrigation, materials and procedures’ associated items. The user can also record the cancellation, the patient’s refusal, and the first and second checks of high-risk medications. In addition, according to a previous configuration, it is possible to record the separation, sanitization, preparation, and administration steps.

All actions performed regarding the administration process are recorded in the system. The user has access to all logs by the screen or right-click button option: “View item events”.

### **2.1.3 Clinical records charting and view**

A subgroup of features related to documenting and charting the patient’s clinical history during the care delivery process.

#### **2.1.3.1 Health history**

This feature supports the HCP in managing the social and health information patient history.

In the “Health History” item of the “EPC” function, the user can record and check the patient’s health history information. This structured information is separated into several categories, such as medications in use, comorbidities, allergies, social history, previous surgeries and transfusions, orthosis and prothesis, and vaccines. A right-click option can be configured to facilitate the recording of health history information in a single screen, information which would normally be located among several different screens.

The information recorded in the “Health History” item of the “EPC” function may be used in other clinical workflows, such as data about allergies is used during the medication ordering in the “CPOE” function. In addition, based on the same configuration rules, information from health history can be presented in the “Safety Warnings” function, which can be shown in different moments of the clinical workflow. The allergy information is also presented in the allergy icon of the patient bar.

#### **2.1.3.2 Clinical notes**

This feature supports HCP in creating and checking patient clinical records in a free-text format or structured forms. Admission and progress notes, assessments, and medical opinions are examples of these documents.

**NOTE For structured forms, refer to the item "Templates" in “EPC”, “EOC” and “PEPC”.**

In the “Patient Chart Setting” function, the user can configure sentences and standard texts and define macros to expedite the fulfillment of the information. According to user privileges, access, and use can be defined at an institutional, departmental, specialty, or user level.

In the item “Clinical note” of the “EPC” function, the user can enter a new clinical note and check all the existing ones sorted by period, type of notes, or HCP category. In addition, using the mouse’s right-click button, it is possible to “enter a clinical note with consultation” to support users in inputting information viewing other sources of information simultaneously (split-screen mode).

### 2.1.3.3 Vital signs and clinical parameters

This feature supports the HCP to input and view data derived from vital signs and clinical parameters and processes the data using rules and algorithms.

To access this feature, open the "EPC" function and select the "Vital Signs and Monitoring" patient tree option. The user can view different tabs, such as vital signs and general monitoring, respiratory and hemodynamic monitoring, analgesic, portable biochemical analyzer, portable urinalysis, bioimpedance, and lung function. Beyond the grid view, a graphical visualization option is available in the vital signs and general monitoring, respiratory, and hemodynamic monitoring sections.

**NOTE** In the context of this feature, the word "monitoring" means only the tab's label. This feature is not intended for real-time patient monitoring. It is intended to record data from the monitoring processes (bedside monitors and devices) for documentation purposes.

Integration with bedside monitors and devices is possible. When configured properly, data can be transmitted directly from bedside monitors and other devices to the appropriate fields and can be reviewed by an HCP (parameters #1493 and 1494 of the "EPC" function).

Retroactively importing vital signs data is possible by clicking in the notification icon, located above the patient's name, in patient bar of the "EPC" function. Within the "Retrospective data" option, it is possible to select which data will be imported from the retrospective data and stored in the patient chart.

Most of the data are derived from clinical examination or at the bedside. The data input is manual or via an interface, charted from the original system function or by "Multiparameter Flowsheet" function. Data charted by "Multiparameter Flowsheet" function will maintain predefined rules and calculations from the original system function. Sometimes available data can be used to generate new data via calculations, such as the mean arterial pressure, using the systolic and diastolic values or via rules application such as comparing data with standard thresholds. In the latter case, information that is out of range may be highlighted on the screen according to the configuration. In essence, new values can be calculated by the bedside monitor device, the user, or the system. The clinical information derived from calculations executed is listed in the sections below.

**NOTE** The rules related to the comparison with the clinical data with standard thresholds are configured in the "System Administration" function.

#### "Vital Signs and Monitoring" group

This tab supports the HCP in recording information related to the main and general patient's vital signs and clinical parameters. Description of the formulas displayed in this group (not necessarily in the presentation sequence):

- Mean Arterial Pressure (mmHg):  $MAP = [SBP + (DBP \times 2)] / 3$
- Delta weight (Kg) = Last weight - current weight
- Arm Muscle Circumference (cm):  $AMC = (3.14 \times \text{triceps skinfold (mm)}) / 10$
- Body Mass Index (Kg/m<sup>2</sup>):  $BMI = \text{weight (Kg)} / [\text{height (m)}]^2$
- *Regarding BMI, different result classifications and descriptions are possible (World Health Association 2000, Pan American Health Organization 2002, Brazilian SISVAN 2004, Brazilian MoH 2004). The user needs to define*



the default options in the "Core Tables Settings" function (Patient management -> Electronic patient chart -> Default BMI rule).

- Body Surface Area (BSA):
  - Mosteller: square root of (weight x height / 3600)
  - Du Bois & Du Bois:  $0.007184 \times \text{height}^{0.725} \times \text{weight}^{0.425}$
  - Haycock:  $0.024265 \times \text{weight}^{0.5378} \times \text{height}^{0.3964}$
  - Gehan & George:  $0.0235 \times \text{weight}^{0.51456} \times \text{height}^{0.42246}$
  - Boyd:  $0.03330 \times \text{weight} (0.6157 - 0.0188^{\log_{10}\text{weight}}) \times \text{height}^{0.3}$

Regarding BSA, the user needs to define the default option in the Core Tables Settings function (Main Application -> Physician -> Electronic patient chart parameters -> BSA formula (m<sup>2</sup>)).

## Pain Assessment

Part of the "Vital Signs and Monitoring" group, this feature supports HCP in recording patient pain information. The use of a proper and validated pain assessment scale is key to evaluate pain level. The system has several pain scales available. Some scales are a simple choice of a number or a similar option without any calculation or data processing. Other scales combine different parameters to define the level of pain.

**NOTE** Check if the Scale, Score or Index is available in your region. Copyrights, official bibliography for translation and cross-cultural Adaptation may impact their availability. Contact your Philips representative for further information.

- **Behavioral Pain Assessment:** The Behavioral Pain Assessment is used to assess the pain of patients unable to provide a pain report themselves. It consists of assessing five aspects: face, anxiety, muscle tone, vocalization, and consolability. The pain is rated in four levels: no pain evidence = 0, mild pain = 1-3, moderate pain = 4-6, and severe pain  $\geq 6$ . *The John Hopkins Hospital PACU Behavioral Pain Rating Scale cited in Mateo, OM., & Krenzischeck, DA (1992).*
- **Behavioral Pain Scale (BPS):** BPS is used to assess pain in sedated and unconscious patients on mechanical ventilation. It consists of assessing three aspects: facial expression, body movements, and tolerance to mechanical ventilation. Pain intensity can be defined between 3 (no pain) and 12 (the highest pain intensity) scores. *Payen JF, Bru O, Bosson JL, et al. Assessing pain in critically ill sedated patients by using a behavioral pain scale. Crit Care Med. 2001 Dec;29(12):2258-63.*
- **Critical Care Pain Observation Tool (CPOT):** CPOT evaluates the pain of adult patients in intensive care units with or without intubation. The scale is applied through answers to five questions. For items such as "Adequacy to the Respirator" and "Vocalization of extubated patients", it is possible to select only one of them (intubated or extubated). The minimum pain score is 0, and the maximum score is 8 points. *Gels C, Fortier M, Viens C, Fillion L, Puntillo KA. Pain assessment and management in critically ill intubated patients: a retrospective study. Am J Crit Care. 2004; 13: 126-135.*
- **Face, Legs, Activity, Cry, Consolability (FLACC) scale:** This behavioral pain scale was developed in 1997 to facilitate the assessment of pain in children ages 0-19. The scale presents indicators of facial expression, movement of the legs, activity, crying, and consolation. Each one is measured from 0-2 points with a possible total score ranging from zero to ten points. The higher the value, the more severe the pain. *Merkel SI, Voepel-Lewis T, Shayevitz JR, Malviya S. The FLACC: a behavioral scale for scoring postoperative pain in young children. Pediatr Nurs. 1997;23:293-297.*
- **Modified Behavioral Pain:** The Modified Pain Behavior Scale is indicated for use in young children. It can be used to monitor the effectiveness of interventions to reduce pain. It comprises three groups, divided into Facial Expression, Crying, and Transactions. The score ranges from 0-8 points. The higher the value, the more severe the pain. Facial expression (Positive 0, Neutral 1, Negative 2), Crying (Smiling 0, Not crying 1, Moaning 2, Crying a lot or sobbing 3), Transactions (Usual 0, Neutral without movement 1, Removal attempted 2, Complex agitation involving head or limbs 3). *Koren G. Use of the eutectic mixture of local anesthetics in young children for procedure-related pain. J Pediatr. 1993; 122: S30-S35.*

- **Modified Objective Pain Score (MOPS):** MOPS is a modified version of the Objective Pain Score (OPS) to assess pain in children. The scale is designed to assess postoperative pain for preschool and school children aged 2 to 11 years. Through 5 parameters, the scale assesses the level of crying, movement, agitation, posture, and verbal communication, scoring from 0 to 10. The higher the value, the more severe the pain. *Wilson GAM Doyle E. Validation of three pediatric pain scores for use by parents. Anaesthesia. 1996; 51: 1005-1007.*
- **Neonatal Facial Coding System (NFCS):** NFCS is used to assess pain responses by analyzing the newborn's facial activity up to 18 months. It consists of eight parameters (brow bulge, stretched mouth (horizontal/vertical), eyelids squeezed shut, taut tongue, deepening of naso-labial fold, tongue protrusion, open lips and chin quiver) allowing a score ranging from 0 to 8 points. The higher the value, the more severe the pain. *Grunau RV, Craig KD. Pain expression in neonates: facial action and cry. Pain. 1987;28(3):395-410. Pinheiro I, Lima F, Magalhães F, Farias L, Sherlock M. Pain evaluation in newborns using the Neonatal Facial Activity Coding scale during blood gases analysis Rev Dor. São Paulo, 2015 jul-sep;16(3):176-80.*
- **Neonatal Infant Pain Score (NIPS):** NIPS is used in the pain evaluation of the non-intubated newborns. It is composed of six indicators of pain, by the evaluation of the facial expression, crying, breathing movements, movements of the legs and arms, and the waking state. The total score ranges from zero to seven points. The higher the value, the more severe the pain. *Lawrence J, Alcock D, McGrath P et al. — The development of a tool to assess neonatal pain. Neonatal Netw, 1993;12:59-66.*
- **Pain Assessment In Advanced Dementia Scale (PAINAD):** PAINAD was developed to provide a universal method of analyzing the pain experienced by patients in the advanced stage of dementia. It contains five criteria for evaluation (breathing independent of vocalization, negative vocalization, facial expression, body language, and consolability); the score ranges from 0 to 10. The score interpretation is mild pain (1-3), moderate pain (4-6), and severe pain (7-10). *Warden V, Hurley AC, Volicer L. Development and psychometric evaluation of the Pain Assessment in Advanced Dementia (PAINAD) scale. J Am Med Dir Assoc. 2003;4(1):9-15.*
- **Post-Operative Neonatal Pain Scale (CRIES):** The CRIES (Crying Requires increased oxygen administration Increased vital signs Expression Sleeplessness) scale was developed for pain assessment in infants, aged six months or less, and is widely used in the context of neonatal intensive care for postoperative neonatal pain. This scale comprises five categories (cry, oxygenation, vital signs, facial expression, and sleep) with an individual variation of 0 to 2 points per category, totaling 0 to 10 points. The higher the value, the more severe the pain. *Krechel SW, Bildner J. CRIES: a new neonatal postoperative pain measurement score. Initial testing of validity and reliability. Paediatric Anaesthesia, Oxford, vol. 5, p. 53-61, 1995.*
- **Faces (Claro):** This scale was developed and validated by Claro in 1993 and aims to facilitate the assessment of pain of school-age children. The scale follows the same principle of facial expression transformation, using characters familiar to Brazilian children's culture. Five facial expressions are presented: no pain, mild pain, moderate pain, severe pain, and unbearable pain. *CLARO. M.T. Escala de faces para avaliação da dor em crianças: etapa preliminar. Ribeirão Preto. 1993, 60 p. Dissertação (Mestrado) - Escola de Enfermagem de Ribeirão Preto. Universidade de São Paulo.*
- **Faces (Wong-Baker):** The Wong-Baker FACES ® Pain Rating Scale was developed for children to communicate about their pain in order to be effectively treated and supported. Their evaluation is through images (faces) that provide an indicative score according to the selected face. The scale evolved from a score of 0 to 5 for a score of 0 to 10. <http://wongbakerfaces.org/us/wong-baker-faces-history/>.
- **Numeric Pain Rating Scale - NPRS (categorical):** The NPRS is indicated for assessing pain in adult patients using a numerical value that varies according to the intensity, generally used from (0 to 10). Grade 0 corresponds to the absence of pain, while grade 10 is the highest possible intensity. The patient is asked to rank the severity of pain perception using numbers. *Childs JD, Piva SR, Fritz JM. Responsiveness of the numeric pain rating scale in patients with low back pain. Spine 2005;30:1331-4. Jensen MP, McFarland CA. Increasing the reliability and validity of pain intensity measurement in chronic pain patients. Pain 1993;55: 195-203. Rodriguez CS. Pain measurement in the elderly: a review. Pain Manag Nurs 2001;2:38-46*

- **Visual Analogue Scale (VAS):** The VAS is an instrument that measures a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured. For example, the amount of pain that a patient feels ranges across a continuum from none to an extreme amount of pain. From the patient's perspective this spectrum appears continuous without taking discrete jumps, as a categorization of none, mild, moderate and severe would suggest. It was to capture this idea of an underlying continuum that the VAS was devised. VAS can be presented in several ways, including scales with a middle point, graduations or numbers (numerical rating scales), meter-shaped scales (curvilinear analogue scales), "box-scales" consisting of circles equidistant from each other (one of which the subject has to mark), and scales with descriptive terms at intervals along a line (graphic rating scales or Likert scales). The choice of terms to define the anchors of a scale has also been described as important. [https://www.physio-pedia.com/Visual\\_Analogue\\_Scale](https://www.physio-pedia.com/Visual_Analogue_Scale). Huskisson EC. Measurement of pain. *Lancet* 1974;2:1127–31. Downie WW, Leatham PA, Rhind VM, Wright V, Branco JA, Anderson JA. Studies with pain rating scales. *Ann Rheum Dis* 1978;37:378–81.
- **Visual Numeric Pain Scale (VNS):** The VNS aims to inform a numerical value of pain, which may vary according to the intensity, generally used from (0 to 10). Grade 0 corresponds to the absence of pain, while grade 10 is the highest imaginable intensity. The VNS combines the features of a NPRS with solid visual clues, including size and shading. These include the height and shading of bars associated with each numeral and can thus be considered a combination scale with visual and numeric components. *Measurement of pain using the visual numeric scale*. Philip L Ritter, Virginia M González, Diana D Laurent, Kate R Lorig. *The Journal of Rheumatology* Mar 2006, 33 (3) 574-580;

Regarding the numeric pain rating scales (categorical and numerical), the user needs to define the default option in the "Core Tables Settings" function (Patient management > Electronic patient chart > Rule for pain scale)

### "Respiratory" group

This tab supports the HCP in recording information derived from respiratory monitoring, mainly related to mechanical ventilation. The formulas displayed in this group are described below (not necessarily in the presentation sequence):

- Static pulmonary compliance (mL/cmH<sub>2</sub>O):  $C_{st} = \text{current volume} / \text{plateau pressure} - \text{PEEP}$
- Dynamic compliance (mL/cmH<sub>2</sub>O):  $C_{dyn} = \text{current volume} / \text{peak pressure} - \text{PEEP}$
- PaO<sub>2</sub>/FiO<sub>2</sub> ratio (mmHg/%):  $P/F = \text{PaO}_2 / \text{FiO}_2$
- Pulmonary resistance (cmH<sub>2</sub>O/L/s):  $R_{sr}/R_{aw} = (\text{peak} - \text{plateau pressure}) / \text{O}_2 \text{ flow}$

### "Hemodynamics" Group

This tab supports HCP to record information derived from hemodynamic monitoring. Description of the formulas displayed in this group (not necessarily in the presentation sequence):

- Mean pulmonary artery pressure (mmHg):  $MPAP = (SPAP + [2 \times DPAP]) / 3$
- Mean femoral arterial pressure (mmHg):  $MFAP = (SFAP + [2 \times DFAP]) / 3$
- Cardiac index (L/min/m<sup>2</sup>):  $CI = CO / BSA$
- Systolic volume (mL/heartbeat):  $SV = (CO / HR) \times 1000$
- Systolic index (mL/beat/m<sup>2</sup>):  $SI = (CI / HR) \times 1000$
- Systemic Vascular Resistance (dynes.sec.cm<sup>-5</sup>):  $SVR = 80 \times (MAP - CVP) / CO$
- Systemic Vascular Resistance Index (dynes.sec.cm<sup>-5</sup>/m<sup>2</sup>):  $SVRI = 80 \times (MAP - CVP) / CI$
- Pulmonary Vascular Resistance (dynes.sec.cm<sup>-5</sup>):  $PVR = 80 \times (MPAP - PAOP) / CO$
- Pulmonary Vascular Resistance Index (dynes.sec.cm<sup>-5</sup>/m<sup>2</sup>):  $PVRI = 80 \times (MPAP - PAOP) / CI$
- Left ventricle systolic work (g.min):  $LVSF = SV \times (MAP - PAOP) \times 0.0136$
- Left ventricle systolic work index (g/m/m<sup>2</sup>):  $LVSFI = SI \times (MAP - PAOP) \times 0.0136$

- Right ventricle systolic work (g/m/m<sup>2</sup>):  $RVS\!W = SV \times (MPAP - CVP) \times 0.0136$
- Right ventricle systolic work index (g/m/m<sup>2</sup>):  $RVS\!WI = SI \times (MPAP - CVP) \times 0.0136$

### “Extracorporeal Membrane Oxygenation” group

This tab supports HCP in recording information derived from extracorporeal membrane oxygenation. There is a single formula displayed in this group:

- Trans-membrane pressure (mmHg): Pre-membrane pressure – post-membrane pressure

### “Analgesia” group

This tab supports HCP in recording information derived from analgesia control. Using a proper and validated analgesic assessment scale is key to evaluate the patient’s depth of analgesia:

- Comfort Behavior Scale (COMFORT-B): *Refer to the feature “Scales, indexes, and scores” of this document.*
- Glasgow Coma Scale (GCS) modified by Cook and Palma: This scale was described in 1987 and provides a score of the patient’s reactivity under mechanical ventilation according to response to external stimuli, considering five pieces of information: eye-opening, motricity, cough, ventilation, and spontaneous communication. The score of the scale, ranging between 4 and 18, is based on the best reactivity response and assesses a numerical score that corresponds to deep sedation when less than 8, to mild sedation when in the range between 8 and 13, and to awake status when > 13 score. *Cook S, Palma O: Propofol as a sole agent for prolonged infusion in intensive care. J Drug Dev 1989, (Suppl 2):65–67*
- Neonatal Pain, Agitation and Sedation Scale (N-PASS): *Refer to the feature “Scales, indexes, and scores”.*
- Pasero Opioid-Induced Sedation Scale (POSS): The POSS scale was developed to assess the level of sedation in patients after opiates administered for pain management. The scale is recommended to adult patients in care settings non-critical, as well as for opioid management, also for sedation assessment in the Post Anesthetic Recovery Room. The scale has five levels of sedation criteria to select such as S = Sleep, easy to arouse, 1 = Awake and alert, 2 = Slightly drowsy, easily aroused, 3 = Frequently drowsy, arousable, drifts off to sleep during conversation and, 4 = Somnolent, minimal or no response to verbal and physical stimulation. *Chris Pasero, M.S, RN – BC, FAAN. Assessment of sedation during Opioid administration for Pain Management. Journal of Ped. Anesthesia, Vol 24, No 3 (June) 2009: pp 186 – 190*

### “Bioimpedance” group

This tab supports HCP in recording information derived from bioimpedance evaluation, such as body density, mass, and water. There is a single formula displayed in this group:

- Waist-hip ratio (cm) = Abdomen circumference (cm) / hip circumference (cm)

#### 2.1.3.4 Diagnosis and problem lists

This feature allows the user to chart, manage and visualize the patient diagnosis and problems in the patient chart.

The concept diagnosis here means using specific catalogs, such as International Classification of Diseases (ICD-10) and the (ICD-11) from WHO, to assign a diagnosis for a patient. Whereas problem list refers to the patient’s health problems, and each problem may be associated or not with a diagnosis code.

The clinician can manage the patient's diagnosis by accessing the item "Diagnoses" and managing the patient problems by accessing the Problem List, both in the "EPC" function.

In the "Diagnoses" item of the "EPC" function, record information related to the diagnosis, such as ICD-10 or ICD-11 code, classification of primary or secondary diagnosis, acute or chronic, date of the diagnosis, last manifestation and duration.

In the "Problem List" item of the "EPC" function, it is possible to utilize standardized lists or catalogs (e.g., International Classification of Primary Care (ICPC), ICD-10 or ICD-11). These catalogs must first be loaded in the system using the "Loads" function. Users can link a problem with a catalog code or create a free-text description of the problem. They can define categories, status, start date, and duration of the problems. In addition, it is possible to change the status of a problem during the patient's hospitalization and create other secondary problems connected to a primary one.

#### **2.1.3.5 Laboratory results charting and view**

This feature provides the user a consolidated view of patient laboratory results, such as, serum glucose, serum or urine creatinine and microbiology cultures.

Laboratory results may be manually charted by an HCP or acquired via an interface with an external source. The user selects the item "Lab tests" in the "EPC" function to access this feature. The system displays all patient laboratory results from this encounter or even the previous ones in a list view. The list displays exam status and corresponding status icon, acknowledgment, and if the exam results are out of the normal reference range. In the filter options, the user can set a period, specific exam, or group, select a hospital unit, or only the out-of-reference range values. In the grid mode tab, it is possible to generate a graphical view of laboratory results for better analysis and management.

It is possible to visualize the laboratory results in text typed in the system and to visualize the laboratory results in pdf files that were generated through an external system and imported through integration. In this same item, the user can register an acknowledgement, marking that they are aware of the exam results.

It is possible to manually chart laboratory results by clicking the "Add" option in "Lab Tests", opening the "External Lab Result Entry" function. After defining the result date, requesting a physician, and the exam protocol (set of exams, if applicable), the user selects the exams and charts their results. These results will be available on the "EPC" function.

#### **2.1.3.6 Non-lab results (images and others)**

This feature allows HCPs to view the reports of imaging exams after the radiology physician's release.

The main functions where the professional has access to the examination reports of each patient are "EPC", "EOC" and "PEPC" functions.

When selecting the patient through the "EPC" function by accessing the "Imaging/diagnostic services" item, the user can view the requested exams and the reports. For an exam to be presented in this item, it depends on the process of ordering, performing, and releasing the report using the "EPC", "Exam Management", and "Medical Report Processing" functions.

The user can use the "External Imaging/Diagnostic Service Results Entry" function to transcribe the reports of exams that the patient performed externally. These reports can be viewed in the "Imaging/diagnostic services" item. In this same item, the HCP can mark an exam as aware, view the report and view the report images through an integration with a Picture Archiving and Communication System (PACS). Integration with an external image storage system is optional, exam images can also be manually uploaded as attachments.

The professional requesting the exam can view the orders of exams performed and their reports on the physician's portal.

In the patient's portal functionality, the patients can view their exams and reports.

#### **2.1.3.7 Intakes & outputs**

This feature supports HCPs in recording, following up, and managing liquid intakes and outputs.

The "Patient Chart Settings" function is used to configure the groups, types, and properties of the intakes and outputs, such as the unit of measurement (mL or g) or the number of times (without a unit of measurement), conversion, if they count or not in the fluid balance, and if they need additional information. It is possible to link intakes and outputs to specific devices bringing more consistency and accuracy during the recording process. Rules can be configured to notify HCPs if there is no data input for a defined time. In the "Core Tables Settings" function, the user can define the day shifts with the hour that each one starts and finishes, which impacts the fluid balance's data analysis. The user can also define the rules of automatic input, such as for infusions, diets, and blood collection.

The follow-up and management of intakes and outputs can be performed in the item "Intakes and Outputs" of the "EPC", "PEPC" and "Patient Anesthetic Form" functions. The analysis of the fluid balance is performed by different groups based on a day, shift, or admission view. The user can also check the intakes and outputs in the "Electronic Patient Summary" and "Multiparameter Flowsheet" functions. In the latter, a graphical view is available. For recording, when the user is on the "Intakes and Outputs" tab, a new function, called the "Intakes and Outputs" function, is opened. During the data input, the user selects an intake or output option from a predefined list, informing the hour, the value with the proper unit of measurement (volume, weight, or occurrence), and the patient device.

The anesthesiologist can record intakes and outputs directly from the "Surgery Graph" function in the anesthesia graph during the surgery. The information recorded in the anesthesia graph is also available in the "Intakes and Outputs" tab of PEPC.

Some information recorded in the "eMAR" function can automatically feed certain information to the patient intakes and outputs process. For example, when the nurse records an infused volume, liquid diet, blood loss, or collection, it can automatically generate a new input. The same case applies to the bladder irrigation procedure and some nursing interventions ordered in the "Care Plan" function, where some fluid outputs can be recorded, such as the ones related to drains and tubes.

#### **2.1.3.8 Multiparameter charting and graphs**

This feature displays the patient's clinical data recorded in different system applications and sections on a single flowsheet, such as vital signs, clinical parameters, intakes and outputs, medication dripping rates, scores and indexes, blood glucose levels and other lab results.

There are two system alternatives of the multiparameter charting and graphs feature, the read-only flowsheet and the chartable flowsheet, both are located in the "Multiparameter Flowsheet" function. The read-only and the chartable options can be found in the "Multiparameter Flowsheet" and "Flowsheet" tabs respectively. The "Multiparameter Flowsheet" function can be accessed as a separate function (via external call) or preferably by its item in the patient tree of the "Electronic Patient Chart" function.

**NOTE** Health care institutions should define only one of the options for use within the entire institution. This restriction can be implemented with usage configurations in the "System Administration" function.

#### **Read-only Multiparameter Flowsheet**

This option consolidates different types of patient's clinical data, acquired from several system functions, and organizes it into different sections where the information is in a read-only mode.

#### Configuration:

The user must open the "Records" tab of the "Multiparameter Flowsheet" function to configure the flowsheet model. The flowsheet model is like a template for how the data will be displayed on screen. On this tab, it will define a group and group title to display a subset of the clinical information listed above. Then, for each group, select the specific variables and items with the respective attributes, such as display minimum, maximum, average, and total values. Each model can be defined for use base on establishment, department, profile, and professional role. The model can be shown in a cumulative 24 h period or by nurse shifts (configured in the "Core Tables Settings" function). If there is more than one model, it is possible to define the default model for a department in the "Organizational Structure" function.

#### Operation:

The user must access the "Multiparameter Flowsheet" tab to view alphanumeric clinical data from the last twenty-four hours displayed in either a grid or graph view. The y-axis of the flowsheet shows the groups and variables, the unit of measurement, minimum, maximum, average values, totals, and shifts defined by the institution. The x-axis shows time in full hours. According to the information in the legend, some symbols are used to highlight different conditions, for example, when there is more than one value of a variable in the full hour period.

### **Chartable Multiparameter Flowsheet**

This option consolidates different types of patient's clinical data that can be directly charted in the flowsheet (or indirectly via an external call of another system function), keeping the integrity with the respective system functions and sections that contain the same information.

This option consolidates different types of patient's clinical data, acquired from several system functions, and organizes it into different sections. The user can chart and store values into the original data tables of the system directly from the chartable flowsheet, such as vital signs and scores and indexes, or access directly from it into a function as an external call, for example "CPOE", "eMAR" and "Intakes and Outputs".

#### Configuration:

The user must open the "Models" tab on the "Multiparameter Flowsheet" function to configure the model. The user can register the model title and description, as well as maximum number of columns that will be rendered in the screen (16 or 24 columns) and the standard time scale (Exact; 5, 15 and 30 min; 1, 2, 3, 4, 8, 12 and 24 h). By double clicking in the model, it is possible to configure the groups of the model, such as type of display, actions of "Add new" button and scales, also the rows in each group and composed item (tree view of secondary rows grouped in a primary row) in each added row. On the row's configuration, the user can configure the graphical presentation of the value such as style, symbol, and color. Each model can have access rules defined by unit, profile, and user. The loading time of the function is directly influenced by the total number of rows visible in the model.

To configure option colors that can be used to manually highlight a value, the user must define in the "Cell highlights register (Multiparameter Flowsheet)", in the Core Table Settings.

#### Operation:

The user must access the "Chartable Flowsheet" tab and select a model to view a patient's clinical data, displayed according to model configuration. The y-axis of the flowsheet shows the groups and rows, the unit

of measurement, minimum, maximum, average values, and totals. The x-axis shows the timeline, divided according to the defined time scale and number of columns, with the option to change time range interval.

The chartable flowsheet allows vital signs, scales, indexes, and scores to be charted directly through the tabular view, whereas other data are charted by opening the specific function as an external call for that data input, keeping the patient's context, such as "EPC" function to register a clinical note, "CPOE" function for prescription orders, "eMAR" function for medicine administration. Data charted by end-users or coming from an interface can be approved by using the "pending items" option to be approved or rejected. Values charted from the flowsheet into the original table or by external call function maintain all business rules applied in the original system data tables, regarding calculations, highlight a value outside reference range or in blue for new data, and clinical decision support through Mentor function.

By the right-click button, the user can edit, highlight or describe a comment in a value, and also view the history of all values inside a cell.

In the "Actions" button, the user will find usability tools, such as expand or collapse groups and rows, disable the automatic update or highlight the timeline. In "Settings" button, it is possible to set which group or row will be visible in the model, visualize legends, and toggle between light and dark mode.

**NOTE** In the chartable multiparameter flowsheet alternative, all input information related to vital signs and scales, indexes, and scores are processed in the vital signs and scales, indexes, and scores original system tables.

**NOTE** In the chartable multiparameter flowsheet alternative, the rules related to the comparison with the clinical data with standard thresholds are configured in the "System Administration" function.

**NOTE** In the chartable multiparameter flowsheet alternative, all input information related to vital signs and scales, indexes, and scores are processed in the original vital signs and scales, indexes, and scores original system tables. Therefore, it will follow standard system behavior, all applicable rules and calculations configured in the "Clinical Decision Support – Mentor" function to support the Clinical Pathways configuration and implementation processes.

#### **2.1.3.9 Legal and audit documents**

This feature aims to manage legal documentation related to the patient for official purposes.

The official documentation required by the authorities varies depending on location. Standard documentation includes health care treatment, birth, death, authorizations, certificates, and reports. This documentation is present in several system functions and is used for clinical and legal purposes, according to local regulations.

Patient records that provide information about date of birth, death record, consent and treatment, can be found in features such as "EPS", "EPC", "EOC", "Electronic Pre-Anesthetic Assessment" ("EPAA"), "Ophthalmology", and "Medical Letter".

#### **2.1.3.10 Patient education**

This feature supports HCP in preparing, managing and providing patient educational interventions, plans, and materials related to the care process (diseases, conditions, and treatment).



The “Nursing Records” function is used to configure the educational interventions and guidelines for the patient or family members. Each nurse intervention can be linked with nursing diagnosis to support the structured care plan process via the Care Plan and SNPC functions. Using the “Standardized Nursing Care Plan (SNCP)” or “Health Professional Assistance Systematization (HPAS)” item in the “Electronic Patient Chart (EPC)” function, the HCP can define and manage the patient interventions and educational plans. The interventions can be checked and managed in the “eMAR” function. After confirming the intervention, the user can record the information content provided to the patient, the family member, the teaching method, the patient’s or companion’s level of understanding, and if it was successfully captured. All the information can also be viewed in the “EPC” and “PEPC” functions.

In the “Patient Chart Settings” function, the institution can configure the care plan models, assign professional roles, and link the patient problems to the educational goals. In the “Care Plan” function, the user can record the patient assessment according to the specific problem identified, select, and define the educational goals. Finally, the user can define the accomplishment of each educational goal supporting the management of the patient educational care plan.

In the “Patient Chart Settings” function, the institution can configure standard texts as orientation or guidance materials at a user or institutional level. Accessing the “Discharge instruction” item of the “EPC” function, the user can record guidelines.

#### **2.1.3.11 Clinical attachment archives**

This feature consolidates patient documentation into the patient’s medical chart by attaching documents from multiple sources such as computer files, scanners, and digital cameras.

In the “EPC” function, documents and images can be attached in different chart items for better organization and accessibility to information in a variety of media types. The user can view, add, and remove files in tree items of the patient chart such as, “Wounds and Dressings”, “Assessments”, “Discharge Summary”, “Lab tests”, and “Imaging/diagnostic services”.

Files can also be attached to administrative functions that impact patient care. For example, the “Surgical schedule management” and “Master person index” functions, where the users can add and view documentation related to pre-admission, health insurance, and surgical scheduling.

#### **2.1.3.12 Clinical incidents and events**

This feature allows the institution to configure, record, and manage clinical incidents and events related to patient care, such as patient falls, aggression, drug use and transfusion reactions.

Use the “Core Table Settings” function, configure the type and description of the events. According to the event type, additional information is required, such as event form, event name, classification, and type of analysis.

The user can record events and clinical incidents occurring at any time during the care process. The main functions associated with the recording of events are the “EPC”, “EOC”, “PEPC”, “Ophthalmology”, “Patient Anesthetic Form”, and “Blood management”. After selecting the patient, the user can access the “Events” item to record the incident. When adding a new record and selecting an event, the user can inform the classification, severity, describe event details, the immediate actions, and add notes. According to the previous configuration related to each type of event, the user can fill in additional information in structured forms.

Events, incidents, and their information may be used for further analysis performed in the “Quality Management” function. For example, the user can search for types of events by period and department to analyze each type of event and define the appropriate actions.

#### **2.1.3.13 Scales, indexes and scores**

This feature supports HCP in applying structured assessments to classify patients in different categories, commonly related to diagnosis, severity, and risk.

Two types of scales, indexes, and scores are offered, the hard-coded (native) and the ones that can be configured by the user. Native scores are hard-coded developed based on relevant clinical publications after the copyright assessment and agreement. Score flex and score flex II is the framework for customers to configure their own scores.

In the "Group of scores and indexes" tab of the "Core Table Settings" utility function, the institution has access to the system catalog of native scales. It is possible to create different clinical groups and assign different scores and indexes according to specialty, department, users, and also indicate the permissions such as edit, read-only. The link between specific groups with the user profiles is performed in the "System Administration" function.

In the "Core Table Settings" utility function, it is also possible to configure clinical conducts or procedures to be displayed to HCP after submitting the final scale result. It comprises natives scores, score flex, and score flex II. The institution can configure the content and the display rules.

Considering the native scales, there are some scales which are a simple choice of a number or an option without any calculation or data processing. On the other hand, other scales combine different parameters to define its result.

For the scales customizable by the user, there are two possibilities for the configuration (score flex and score flex II), which shall be performed in the "Score Flex" tab of the "Core Table Settings" utility function.

Score flex supports the configuration of basic customizable scores. It allows configuring statements to be answered by the clinician. Each answer has only two possible results, yes or no. Each "yes" result has a value to be summed in the final score. Some result ranges can be created (maximum and minimum values). The "Documentation" tab shows relevant information such as inclusion and revision dates, score concepts, and bibliographic references. It is possible to define the user profiles that have access to the score flex scale.

Score flex II supports the configuration of more complex customizable scores. It is associated with a calculation result of an assessment configured in the "Structured Assessments Settings" function. The institution can create different format types of results for the assessment, such as edit, check box, look-up, and create formulas linked to the calculation field to be considered by the score flex II. A SQL language knowledge is required for the correct formula's definition. Some result ranges can be created (maximum and minimum values). The "Documentation" tab shows relevant information such as inclusion and revision dates, score concepts, and bibliographic references. It is possible to define the user profiles that have access to the score flex II scale.

In the "EPC" function, the user needs to access the "scores and indexes" item to verify the groups available according to the user profile. In each group, each native score is displayed as a single tab. The "Score Flex" and "Score Flex II" are also shown as single tabs, where the user can access the configured scales for each profile.

Another alternative to view the scales is using the Scale Integrated View (SIV). After the previous configuration is performed in the "Patient Chart Settings" function, the user can select this option (SIV scale) and see a panel with different scores and indexes in a chronological view, filtered by month, with descriptive results or numeric values.

Pain scores are available in the "EPC" function, in the "Vital sign and monitoring" item. Anesthesia scores are available in the "PACU Scores" item of the "PEPC" function, and in the "Risk" tab in of the "Electronic Pre-Anesthetic Assessment" function.

In all use cases, after completing the required information by HCPs, the system processes the calculation based on native rules and SQL formulas or the ones defined in “Core Table Settings” utility function. After the calculation, the system displays the final score result and its description to be submitted and stored in the system and available for authorized users. After the submission, according to the previous configuration, the clinical conduct or procedure message linked to the result is promptly shown, or it can be accessed by “conducts” right-click option.

**NOTE** All native hard-coded scales, scores, and indexes available in the system are supported by published bibliography and compliant with copyrights.

**NOTE** Check if the Scale, Score or Index is available in your region. Copyrights, official bibliography for translation and cross-cultural Adaptation may impact their availability. Contact your Philips representative for further information.

**NOTE** Additional information about each scale is available via the right-click option menu.

#### **2.1.3.13.1 Abbreviated Mental Test Score (AMTS)**

**Description:** The Abbreviated Mental Test Score (AMTS) is used to quickly assess elderly patients for the possibility of dementia. The test has utility across a range of acute and outpatient settings. Questions are asked to the patient such as: how old are you?; what is the time to the nearest hour?; what year are we in?; what is the name of the hospital?; what is your home address number?; can you recognize two persons (the doctor, nurse, home help, etc.)?; what is your date of birth? (day and month sufficient); what year did first World War start?; what is the name of the current monarch/prime minister/president?; And request the patient to count backwards from 20 down to 1; give the patient an address and ask them to repeat it at the end of the test. For each correct answer, 1 point is added to the final score. Maximum score is 10 and a score of less than 7 or 8 suggests cognitive impairment. The test can differentiate normal from cognitively impaired but is not reliable in identifying delirium.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Source:**

- *Hodkinson, HM. Evaluation of a mental test score for assessment of mental impairment in the elderly. Age and Ageing. 1972 Nov; 1(4):233-8*

#### **2.1.3.13.2 ABCD2 Score**

**Description:** The ABCD2 Score helps clinicians stratify stroke risk in patients with Transient Ischemic Attack (TIA). The management of patients with TIA varies between institutions, with some advocating hospitalization and others outpatient evaluation. Consequently, there is a great interest in identifying clinical prognostic indicators that can be used to estimate stroke risk after a TIA. The ABCD2 it is a scoring system based on five parameters: age, blood pressure, clinical features, TIA duration and presence of diabetes. Each parameter corresponds to one point, except for clinical features and TIA duration, which are 2 points. Stroke risk classification score: low risk 0-3, moderate risk 4-5 and high risk 6-7.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Johnston, SC, Rothwell PM, Nguyen-Huynh MN, Giles MF, Elkins J S, Bernstein AL, Sidney S. Validation and refinement of scores to predict very early stroke risk after transient ischemic attack. Lancet. 2007*
- *Josephson SA, Sidney S, Pham TN, Bernstein AL, Johnston SC. Higher ABCD2 score predicts patients most likely to have true transient ischemic attack. Stroke. 2008*
- *Wardlaw J, Brazzelli M, Miranda H, Chappell F, McNamee P, Scotland G. et al. An assessment of the cost-effectiveness of magnetic resonance, including diffusion-weighted imaging, in patients with transient ischaemic attack and minor stroke: a systematic review, meta-analysis and economic evaluation. Health Technol Assess. 2014*

#### **2.1.3.13.3 ACC/AHA 2007 Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery**

**Description:** ACC/AHA 2007 Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery is a Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery). It includes the framework reflected in the evaluation, for determining which patients are candidates for cardiac testing before a noncardiac surgery. If the patient has one or two clinical risk factors, then it is reasonable to either proceed with the planned surgery, with heart rate control with beta blockade or consider testing if it will change management. In patients with three or more clinical risk factors, the surgery-specific cardiac risk is important. The surgery-specific cardiac risk of noncardiac surgery is related to two important factors. First, the type of surgery itself may identify a patient with a greater likelihood of underlying heart disease and higher perioperative morbidity and mortality. If the patient is undergoing vascular surgery, testing should only be considered if it will change management. Other types of surgery may be associated with similar risk to vascular surgery but have not been studied extensively. For nonvascular surgery, the degree of hemodynamic cardiac stress dictates the surgery-specific risk. The perioperative morbidity related to the procedures ranges from 1% to 5%. In these patients who are considered ready to undergo intermediate-risk surgery, there are insufficient data to determine the best strategy (proceeding with the planned surgery with tight heart rate control with beta blockade or further cardiovascular testing if it will change management).

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- *Fleisher L A, Beckman J A, Brown K A, Calkins H, Chaikof E L, Fleischmann K E, Freeman W K, Froehlich J B, Kasper E K, Kersten J R, Riegel B, John F. Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery) ACC/AHA 2007 Robb Circulation. 2007;116: e418-e500; originally published online September 27, 2007*
- <http://circ.ahajournals.org/content/116/17/e418>

#### **2.1.3.13.4 ACEF Score**

**Description:** The ACEF score is an operative mortality risk score for elective cardiac surgery patients based on a very limited number of factors. It considers only three independent predictors: Age, Creatinine and Ejection Fraction (ACEF). The ACEF score was computed as follows: [age(years) / left ventricular ejection fraction(%)] +1 (if creatinine >2.0 mg/dL). There is a univariate association (logistic regression) between ACEF score and mortality risk. The higher the score result, the higher the predicted mortality rate (%).

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- *Ranucci M, Castelvechio S, Minicanti L, Frigiola A, Pelissero G. Risk of Assessing Mortality Risk in Elective Cardiac Operations: age, creatinine, ejection fraction, and the law of parsimony. 2009 Jun 23;119(24):3053-61*

#### 2.1.3.13.5 Acute Kidney Injury Network (AKIN) Scale

**Description:** The Kidney Disease Improving Global Outcomes (KDIGO) international guideline uses Acute Kidney Injury Network (AKIN) scale for kidney injury determination. The AKIN scale is based on changes to serum creatinine and/or urinary output and divides the acute kidney failure into three categories according to severity, and into two categories reflecting the persistence of the renal function loss. An increase in serum creatinine greater than or equal to 0.3 mg/dL, or an increase of more than 50% of the basic value (an interval of at least 48 h) characterizes AKI.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- *Mehta RL, Kellum JA, Shah SV, Molitoris BA, Ronco C, Warnock DG, et al. Acute Kidney Injury Network: report of an initiative to improve outcomes in acute kidney injury. Crit Care 2007; 11: R31*
- *Machado MM, et al. Lesão renal Aguda após revascularização do miocárdio com Circulação Extracorpórea. Arq Bras Cardiol 2009; 93(3): 247-252*
- *Romano TG, Guimarães PF, Tierno MM. Injúria Renal Aguda no paciente politraumatizado. J Bras Nefrol 2013;35(1):48-56*

#### 2.1.3.13.6 Acute Respiratory Distress Syndrome (ARDS) Score

**Description:** The Acute Respiratory Distress Syndrome (ARDS) Score is a set of signs and symptoms based on increased capillary permeability, hypoxia, presence of bilateral pulmonary infiltration (pulmonary edema) on chest radiography and no clinical evidence of left heart failure. The evaluation criteria are performed by means of chest radiography, hypoxemia, compliance of the respiratory system when ventilated (cmH<sub>2</sub>O/mL) and positive end-expiratory pressure when ventilated (cmH<sub>2</sub>O). Each one the 6 evaluated criteria has scores of 0, 1 and 2, so the final score can range from 0 to 12. A score of 0 represents no lung injury, whereas a score between 0.1 and 2.5, and higher than 2.5 defined mild to moderate and severe lung injury, respectively.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- *Antoniazzi P. Síndrome da Angústia Respiratória Aguda (SARA). Medicina, Ribeirão Preto, 31: 493-506, out/dez 1998*
- *Ashbaugh DG et al, Acute respiratory distress in adults. Lancet 2: 319-323, 1967*
- *Oliveira RHR, Basille Filho A. Incidência de lesão pulmonar aguda e síndrome da angústia respiratória aguda no centro de tratamento intensivo de um hospital universitário: um estudo prospectivo. J Bras Pneumol. 2006;32(1):35-42*

#### 2.1.3.13.7 Alcohol Use Disorder Identification Test (AUDIT) Score

**Description:** The Alcohol Use Disorder Identification Test (AUDIT) Score is used to identify possible alcoholic disorders. It was developed to measure the frequency and intensity of alcohol dependence. There are 10 questions and the possible responses to each question are scored 0, 1, 2, 3 or 4, except for questions 9 and 10 which have possible responses of 0, 2 and 4. The questions refer to the last 12-month period. The first

three questions measure the quantity and frequency of regular or occasional use of alcohol, the next three investigate symptoms of addiction and the final four are about problems in life related to alcohol consumption. The score ranges from 0 to 40. According to WHO guidelines, a score of 0 indicates an abstainer who has never had any problems from alcohol while a score of 1 to 7 suggests low-risk consumption. Scores from 8 to 15 suggest hazardous or harmful alcohol consumption and a score of 16 or more indicates the likelihood of alcohol dependence (moderate-severe alcohol use disorder).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Babor TF, Fuente JR, Saunders J, Grant M. AUDIT. The alcohol use disorders identification test: guidelines for use in primary health care. WHO (World Health Organization)/PAHO. 4:1-29, 1992*

#### **2.1.3.13.8 Alcohol Withdrawal Score (AWS)**

**Description:** Patients admitted to hospitals or the emergency department should undergo screening at admission to identify those at risk of alcohol withdrawal. In hospitalized patients, early detection and treatment to prevent the development of withdrawal is the optimal approach. The Alcohol Withdrawal Score (AWS) provides a systematic measure of uncomplicated withdrawal severity by recording changes of clinical features over time. AWS does not diagnose withdrawal, but stratifies the severity of an already diagnosed withdrawal syndrome. The AWS is divided into 7 groups and the maximum possible score is 27: perspiration (0–4), tremor (0–3), anxiety (0–4), agitation (0–4), axilla temperature (0–4), hallucinations (0–4), and orientation (0–4). Withdrawal severity: < 4 mild, 5–14 moderate and > 15 severe.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources :**

- <https://www.health.nsw.gov.au/aod/professionals/Publications/clinical-guidance-withdrawal-alcohol-and-other-drugs.pdf>
- <https://www.health.nsw.gov.au/aod/professionals/Publications/handbook%20managing%20withdrawal%20alcohol%20and%20other%20drugs.pdf>
- *Mental Health and Drug and Alcohol Office. NSW Drug and Alcohol Withdrawal Clinical Practice Guidelines. Publication date 04 July 2008, Review date 18 April 2018*

#### **2.1.3.13.9 Aldrete Modified Score**

**Description:** The Aldrete Modified Score evaluates the progress of patients in the post-anesthetic period in accordance with their state of consciousness and vital signs. It has five variables: activity (ability to move four, two or no extremities), respiration (ability to inhale deeply, cough, dyspnea or superficial breathing and apnea), systemic blood pressure (change in blood pressure of just 20% in relation to pre-anesthetic values, change between 20-49% or greater than 50% in relation to pre-operative), consciousness (fully awake, arousable by calling or no response) and coloring/oximetry (normal, pale or cyanotic). Each variable is classified as 0, 1 or 2 and the patient is discharged when the score  $\geq 9$ .

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources :**

- *Aldrete JA, Kroulik D. A postanesthetic recovery score. Anesth Analg, 1970;49:924-934*
- *Castro FSF, et al. Temperatura corporal, índice Aldrete e Kroulik e alta do paciente da Unidade de Recuperação Pós-Anestésica. Rev. esc. enferm. USP vol.46 no.4 São Paulo Aug. 2012*

#### **2.1.3.13.10 American Society of Anesthesiology (ASA) Classification**

**Description:** The American Society of Anesthesiology (ASA) Classification is used for over 60 years. The purpose of the classification is to assess a patient's pre-anesthetic medical comorbidities. The ASA alone does not predict perioperative risks, but used with other factors (type of surgery, frailty, level of deconditioning), it can be useful in predicting perioperative risks. Assigning a physical status rating level is a clinical decision based on several factors. Although the physical status classification can be initially determined at various times during the patient's preoperative classification, the final assignment of the physical status classification is made on the day of anesthesia care by the anesthesiologist after patient evaluation. The ASA ranges from I to VI. ASA I: normal healthy patient; ASA II: patient with mild systemic disease; ASA III: patient with severe systemic disease; ASA IV: patient with severe systemic disease that is a constant threat to life; ASA V: moribund patient who is not expected to survive without the operation; ASA VI: declared brain-dead patient whose organs are being removed for donation purposes.

**System functions:** Electronic Pre-Anesthetic Assessment -> Risk

#### **Sources:**

- *Moreno R P, Pearse R, Rhodes A (2015) American Society of Anesthesiologists Score: still useful after 60 years? Results of the EuSOS Study. Rev Bras Ter Intensiva (2015); 27(2):105-112*

#### **2.1.3.13.11 American Spinal Injury Association (ASIA) Impairment Scale**

**Description:** The American Spinal Injury Association (ASIA) Impairment Scale derived from the International Standards for Neurological Classification of Spinal Cord Injury and is used in the neurologic evaluation of spinal cord injuries. The sensory examination evaluates 28 specific dermatomes bilaterally for light touch and pinprick sensation. Each examination component is recorded for each dermatome and laterality. A grade of 0 denotes absent sensation, 1 denotes impaired or altered sensation, and 2 denotes normal sensation. Total bilateral sensory score ranges from 0 (inability to distinguish pinprick sensation from light touch) to 224 (fully normal). The motor examination consists of grading five specific muscle groups in the upper extremities and in the lower extremities. Motor strength is graded using a universal six-point scale (from 0 to 5) for each muscle group bilaterally. The maximum bilateral motor score in a healthy individual is 100. The additional anorectal examination evaluates for the presence of spinal shock. It is examined for voluntary motor contraction and the ability to sense deep anal pressure. Both are graded in a binary fashion, 0 for absent and 1 for present.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- *American Spinal Injury Association (1982) Standard for Neurological Classification of Spinal Injured Patients. ASIA, Chicago.*
- *Cohen, M., Jr, J., Donovan, W. et al. A test of the 1992 International Standards for Neurological and Functional Classification of Spinal Cord Injury. Spinal Cord 36, 554–560 (1998). <https://doi.org/10.1038/sj.sc.3100602>*
- *BARROS FILHO TEP. Avaliação padronizada nos traumatismos raquimedulares. Rev Bras Ortop. 1994;29(3):.*

#### **2.1.3.13.12 Ann Arbor Classification for Non-Hodgkin Lymphoma**

**Description:** The Ann Arbor Classification for Non-Hodgkin Lymphoma is the staging system for lymphomas, both in Hodgkin's lymphoma (formerly designated Hodgkin's disease) and non-Hodgkin lymphoma (NHL). It was initially developed for Hodgkin's but has some use in NHL. It has roughly the same function as TNM

staging in solid tumors. The stage depends on both the place where the malignant tissue is located (as located with biopsy, CT scanning, gallium scan and increasingly positron emission tomography) and on systemic symptoms due to the lymphoma ("B symptoms": night sweats, weight loss of > 10% or fevers). The stage is defined for designations applicable to any stage, according to symptoms (A - no symptoms) or (B - fever for temperature > 38 °C, drenching night sweats, unexplained loss of > 10% of body weight within the preceding 6 months), bulky disease (E-Involvement of a single extra nodal site that is contiguous or proximal to the known nodal site) or (S-Splenic involvement). After selecting to the options of symptoms and bulky disease, the stage can be defined according to: I-Involvement of a single lymphatic site (i.e., nodal region, Waldeyer's ring, thymus, or spleen) (I); or localized involvement of a single extra lymphatic organ or site in the absence of any lymph node involvement (IE). II-Involvement of two or more lymph node regions on the same side of the diaphragm (II); or localized involvement of a single extra lymphatic organ or site in association with regional lymph node involvement with or without involvement of other lymph node regions on the same side of the diaphragm (IIE). III-Involvement of lymph node regions on both sides of the diaphragm (III), which also may be accompanied by extra lymphatic extension in association with adjacent lymph node involvement (IIIE) or by involvement of the spleen (IIIS) or both (IIIE, S). IV-Diffuse or disseminated involvement of one or more extra lymphatic organs, with or without associated lymph node involvement; or isolated extra lymphatic organ involvement in the absence of adjacent regional lymph node involvement, but in conjunction with disease in distant site(s). Stage IV includes any involvement of the liver or bone marrow, lungs (other than by direct extension from another site), or cerebrospinal fluid.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Carbone PP, Kaplan HS, Musshoff K, et al: Report of the Committee on Hodgkins Disease Staging Classification. *Cancer Res* 31:1860-1861, 1971
- Lister TA, Crowther D, Sutcliffe SB, et al: Report of a committee convened to discuss the evaluation and staging of patients with Hodgkin's disease: Cotswolds Meeting. *J Clin Oncol* 7:1630-1636, 1989
- Bruce D. Cheson, Richard I. Fisher, Sally F. Barrington, et al: Recommendations for Initial Evaluation, Staging, and Response Assessment of Hodgkin and Non-Hodgkin Lymphoma: The Lugano Classification. *J Clin Oncol* 32:3059-3067, 2014

#### 2.1.3.13.13 APACHE II Score

**Description:** The Acute Physiology and Chronic Health Evaluation (APACHE) II Score aims to classify the severity of the critical patient's alterations. The main objective is to quantify the degree of organ dysfunction using a numerical value from the existing clinical and laboratory changes or the type/number of procedures used. It is applied in the first 24 h of a patient's admission to an ICU. The score is calculated using 12 routine physiological measurements: blood pressure, body temperature, heart rate, breathing rate, arterial pH, sodium, potassium, creatinine, hematocrit, white blood cells, gradient A-aO<sub>2</sub> or PaO<sub>2</sub> and Glasgow Coma Scale (GCS). The minimum score is 0 with a maximum of 100, and a cutoff point of greater severity at 35 points. The predicted mortality rate according to APACHE II scores is: 4% for 0-4 points, 8% for 5-9 points, 15% for 10-14 points, 25% for 15-19 points, 40% for 20-24 points, 55% for 25-29 points, 75% for 30-34 points and 85% for > 34.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Willian AK, Elizabeth AD, Douglas PW, Zimmerman JE, Jack. APACHE II: A severity of disease classification system. October – 1985 – Volume 13.



- *Headley J, Theriault R, Smith TL. Independent validation of APACHE II severity of illness score for predicting mortality in patients with breast cancer admitted to the intensive care unit. Cancer. 1992 Jul 15;70(2):497-503. DOI: 10.1002/1097-0142(19920715)70.*
- *Capuzzo M, Valpondi V, Sgarbi A, Bortolazzi S, Pavoni V, Gilli G, Candini G, Gritti G, Alvisi R. Validation of severity scoring systems SAPS II and APACHE II in a single-center population. Intensive Care Med. 2000, Dec;26(12):1779-85. Doi: 10.1007/s001340000715.*

#### **2.1.3.13.14 APACHE IV Score**

**Description:** The APACHE IV Score is an improved tool based on APACHE III containing new variables and different statistical modelling to evaluate the severity of the illness and the prognosis in the ICU. This version of the APACHE IV is calculated based on 129 clinical variables derived in the first 24 hours of admission to the ICU. Some studies have suggested the superior advantage of APACHE IV compared to other risk scoring systems. The score is calculated using the following routine physiological measurements: age, temperature (°C), MAP (mmHg), HR (beats/min), RR (breaths/min), mechanical ventilation, FiO<sub>2</sub> (%), PO<sub>2</sub> (mmHg), pCO<sub>2</sub> (mmHg), arterial pH, sodium (mEq/L), urine output (mL/24 h), creatinine (mg/dL), Blood Sugar Level (mg/dL), albumin (g/L), bilirubin (mg/dL), hematocrit (%), WBC (x1000/mm<sup>3</sup>), GCS, chronic health conditions, Pre-ICU LOS (days), origin, readmission, emergency surgery and admission diagnosis (non-surgical or post-surgical). The APACHE IV score sums APS points (Acute Physiology Score, with scores of 0, +1, +2, +3, +4) depending on the range of each vital sign evaluated + Age (less than 44 years:0, 45 to 54:2, 55 to 64:3, 66 to 74:5, 75 or greater:6 points) + Chronic Health (if the patient has a history of severe organ system insufficiency or is immuno-compromised). APACHE IV score ranges from 0 to 286 points, 0 being the best prognosis and lowest mortality and 286 being the worst prognosis and the highest mortality rate.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- *Zimmerman JE, Kramerr AA, McNair ES, Malila FM. Acute Physiology and Chronic Health Evaluation (APACHE) IV: hospital mortality assessment for today's critically ill patients. Crit Care Med. 2006 May;34(5):1297-310*
- *Mihye K, Miyoung S, Sang-Min L, Yujin K, Soyoung Y. Performance of APACHE IV in Medical Intensive Care Unit Patients: Comparisons with APACHE II, SAPS 3, and MPM0 III. Acute Crit Care. 2018 Nov; 33(4): 216–221. Doi:10.4266/acc.2018.00178*

#### **2.1.3.13.15 Apfel Score to Predict Postoperative Nausea and Vomiting**

**Description:** The Apfel score to predict Postoperative Nausea and Vomiting is a score for evaluating and monitoring the intensity of post-operative nausea and vomiting. Four risk factors are evaluated: female gender, non-smoker, history of kinetosis or post-operative nausea and vomiting, and plan for post-operative use of opioids. The probability of post-operative nausea and vomiting corresponds to 10% with no risk factor, 21% with one, 39% with two, 61% with three and 78% with four.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- *Apfel CC, Laara E, Koivuranta M, Greim CA, Roewer N. A simplified risk score for predicting postoperative nausea and vomiting: conclusions from cross-validations between two centers. Anesthesiology. 1999;91:693-700*

- *Weilbach C, et al. Náuseas e vômitos (NVPO): utilidade do Apfel-score para a identificação de pacientes de alto risco para NVPO. Acta Anaesthesiol Belg. 2006;57(4):361-3*
- *Lages N, Fonseca C, Neves A, Landeiro N, Abelha FJ. Náuseas e Vômitos no Pós-Operatório: Uma Revisão do “Pequeno-Grande” Problema. Revista Brasileira de Anestesiologia. Vol. 55, Nº 5, Setembro – Outubro, 2005*

#### **2.1.3.13.16 Apgar Score**

**Description:** The Apgar Score is a quick way to evaluate the health of newborns. It consists of five signs of the newborn in the first, fifth, and tenth minute after birth. A score of 0 to 2 is used to assess the newborn's condition per each one of the five components: heart rate, breathing, muscle tone, reflex irritability and skin color. The final score can vary from 0 to 10. An Apgar Score of 0 to 2 indicates severe asphyxia, 3 to 4 moderate asphyxia, 5 to 7 mild asphyxia and 8 to 10 indicates a newborn without asphyxia.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Apgar V. The Newborn (Apgar) Scoring System. V Apgar – Pediatr Clin North Am, 1966 – 130.14.81.9*
- *Apgar V. A proposal for a new method of evaluation of the newborn infant. Curr. Res. Anesth. Analg. 1953;32(4): 260-7. DOI:10.1213/00000539-195301000-00041. PMID 13083014*

#### **2.1.3.13.17 Assessment of Alcohol Abstinence Syndrome – revised (CIWA-Ar)**

**Description:** The Assessment of Alcohol Abstinence Syndrome - revised (CIWA-Ar) assesses the severity of the patient's alcohol abstinence syndrome and the need for medicine administration. It was created from the CIWA-A (1981) and uses 10 of the 15 items which are: nausea/vomiting (0, 1, 4 and 7), tremor (0, 1, 4 and 7), paroxysmal sweats (0, 4 and 7), anxiety – ask “Do you feel nervous?” (0, 1, 4 and 7), agitation (0, 1, 4 and 7), tactile disturbances (0, 1, 2, 3, 4, 5, 6 and 7), auditory disturbances (0, 1, 2, 3, 4, 5, 6 and 7), visual disturbances (0, 1, 2, 3, 4, 5, 6 and 7), headache/fullness in head (0, 1, 2, 3, 4, 5, 6 and 7), orientation/clouding of sensorium (0, 1, 2, 3 and 4). Classification: minimal to mild withdrawal 0-20, moderate withdrawal 20-24, severe withdrawal > 24 points.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Sullivan J, Sykora M, Schneiderman J, et al. Assessment of alcohol withdrawal: the revised Clinical Institute Withdrawal for Alcohol Scale (CIWA-Ar). Br J Addict 1989; 84: 1353-7*
- *Laranjeira R, Nicastri S, Jeronimo C, Marques AC, et al. Consenso sobre a Síndrome de Abstinência do Álcool (SAA) e o seu tratamento. Rev Bras Psiquiatr 2000;22(2):62-71*

#### **2.1.3.13.18 Assistance Complexity Classification System**

**Description:** The Assistance Complexity Classification System categorizes the healthcare complexity of payments in accordance with the quantity and quality of care.

The estimation of the staff number is a process that requires knowledge of the existing workload at inpatient units and this work depends, in turn, on the patients' healthcare needs, and on the expected standard of care. The use of objective patient classification systems allows the HCP to distribute work more evenly among subordinate professionals. These point totals sort patients into distinct categories. The institution can use one or more bibliographical sources and even adapt them to their own local needs.

The 13 critical indicators considered to compose the instrument are: mental state and level of consciousness; oxygenation; vital signs; nutrition and hydration; motility; locomotion; body care; eliminations; therapy; health education; behavior; communication and cutaneous-mucosal integrity. Each of the indicators is scored from 1 to 5. The value 1 corresponds to the lowest level of nursing care and the value 5 to the maximum level of care complexity. The patient is classified in all indicators to one of the five levels that best describes their situation in relation to nursing care. The individual values are then added and the total is classified to a category of care as follows: minimal care (13 to 26 points), intermediate care (27 to 39 points), semi-intensive care (40 to 52 points) and intensive care (53 to 65 points).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources :**

- *De Groot, H.A-J. Nurs.Adm. v.19, n.7, p.24-30, 1989*

#### **2.1.3.13.19 Average Severity of Illness Index (ASIS Index)**

**Description:** Average Severity Index Score (ASIS) is a method used to assess the patient's clinical conditions and the occurrence of infections related to healthcare. It can range from A to E, in proportion to the observed severity. To characterize the clinical severity of patients, the clinical severity index was adopted at patient admission according to the ASIS criteria, divided into five categories: A (Patients in the postoperative period not requiring intensive medical or nursing care; discharge from the unit within 48 hours); B (Physiologically stable patients, requiring prophylactic observation, not requiring intensive medical or nursing care); C (Physiologically stable patients requiring intensive nursing care and monitoring); D (Physiologically unstable patients requiring medical and nursing care intensive with the frequent need for reassessment and therapy adjustment); E (Physiologically unstable patients, in coma or shock, or requiring cardio-pulmonary resuscitation or medical care and intensive nursing and with frequent need for reassessment).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Starling, C.E.F., Pinheiro S.M.C. Couto, B.R.G.B. (1993) "Vigilância Epidemiológica das Infecções hospitalares na prática diária (ensaios)". Edições Cuatiara, 488*
- *CDC, 1994. NNIS Manual National Nosocomial Infections Surveillance System. Atlanta: U.S. Department of Health & Human Services*

#### **2.1.3.13.20 Bariatric Analysis and Reporting Outcome System (BAROS)**

**Description:** The Bariatric Analysis and Reporting Outcome System (BAROS) evaluates the quality of life of patients in the late postoperative period after bariatric surgery. The BAROS combines quality of life questionnaire responses with self-esteem (-1; -0.5; 0; +0.5; +1), willingness to exercise (-0.5; -0.25; 0; +0.25; +0.50), ability to relate socially (-0.5; -0.25; 0; +0.25; +0.50), interest in sex (-0.5; -0.25; 0; +0.25; +0.50), willingness to work (-0.5; -0.25; 0; +0.25; +0.50), clinical conditions (-1; 0; +1; +2, +3), percentage of weight loss (-1; 0; +1; +2, +3), surgical complications (+0.2; +1), surgical intervention (+1). The final score can vary from -3 to 9, with -3 being the worst result and 9 being the best in quality of life. Classification: quality of life greatly decreased (-3 to -2.1), decreased (-2 to -1.1), unchanged (-1 to 1), improved (1.1 to 2) and increased significantly (2.1 to 9).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Oria HE, Moorehead MK. *Bariatric analysis and reporting outcome system (BAROS)*. 1998 Oct;8(5):487-99
- Barros LV, Moreira RAN, Frota NM, Caetano JA. *Mudanças na qualidade de vida após a cirurgia bariátrica*. Rev enferm UFPE online, Recife, 7(5):1365-75, maio, 2013

#### 2.1.3.13.21 Barthel Index (BI)

**Description:** The Barthel Index (BI) assesses the patient's independence to perform basic life activities, such as: 1- feeding (0, 1, 2 points); 2- bathroom (0, 1 point); 3- personal care (0, 1 point); 4- ability to get dressed (0, 1, 2 points); 5- intestinal rhythm (0, 1, 2 points); 6- urinary rhythm (0, 1, 2 points); 7- use of toilet (0, 1, 2 points); 8- transportation (0, 1, 2, 3 points); 9- mobility (0, 1, 2, 3 points); 10- climb stair (0, 1, 2 points). Each item is rated in terms of whether the patient can perform the task independently, with some assistance, or is dependent based on observation (0 = unable, 1 = needs help, 2 = independent). The final score is multiplied by 5 to get a number on a 100-point score. Proposed guidelines for interpreting Barthel Index are that scores of 0-20: total dependency, 21-60: severe dependency, 61-90: moderate dependency, and 91-99: slight dependency.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- Mahoney FI, Barthel D. *"Functional evaluation: The Barthel Index."* Maryland State Medical Journal 1965; 14:56-61
- Araújo F, Ribeiro JLP, Oliveira A, Pinto C. *Validação do Índice de Barthel numa amostra de idosos não institucionalizados*. Vol. 25, Nº 2, Julho/Dezembro, 2007

#### 2.1.3.13.22 Baylor Rating Scale

**Description:** The Baylor Rating Scale allows the clinician to assess the presence and level of muscle spasm and movement. The scale ranges from 0 to 4, where zero corresponds to normal, 1 to discrete spasm without functional deficit, 2 to moderate spasm with minimal functional deficit, 3 to moderate spasm with moderate functional deficit and 4 to intense spasm with severe functional impairment.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- Lucci LMD. *Blefaroespasma essencial benigno*. Arq Bras Oftalmol. 2002;65(5):585-9
- Molho E, Jankovic J, Lew Mark. *Role of botulinum toxin in the treatment of cervical dystonia*. Neurol Clin 2008;26(Suppl 1):43-53
- Joseph Jankovic, Kenneth Schwartz, Donald T Donovan. *Botulinum toxin treatment of cranial-cervical dystonia, spasmodic dysphonia, other focal dystonias and hemifacial spasm*. Journal of Neurology, Neurosurgery, and Psychiatry 1990;53:633-639

#### 2.1.3.13.23 Behavioral Pain Assessment Scale

**Description:** Refer to the feature "Vital signs and clinical parameters calculation" of this document.

#### 2.1.3.13.24 Behavioral Pain Scale – BPS

**Description:** Refer to the feature "Vital signs and clinical parameters calculation" of this document.

#### 2.1.3.13.25 Berg Balance Scale

**Description:** The Berg Scale is a validated instrument for the functional assessment of balance composed by 14 tasks with five items each and a score from zero to 4 for each task (zero for unable to perform the task and 4 for task performed independently). This scale serves mainly to determine risk factors for loss of independence and for falls by the elderly, serving several purposes: quantitative decision of the ability of functional balance, monitoring of patients' progress and evaluation of the effectiveness of interventions in clinical practice and in research.

The total score ranges from zero to 56 points. The lower the score, the greater the risk for falls; the higher the score, the better the performance. The scale was adapted for application in Brazil by Miyamoto et al. presenting scores from zero to 4 for each item and a determined time for each task. Scores below 45 points are considered a risk of falling.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources :**

- *Berg KO; Norman, KE. Functional assessment of balance and gait. Clinics in Geriatrics Medicine, v. 12, n. 4, p. 705-723, 1996*
- *Miyamoto ST, Lombardi Junior L, Berg KO, Ramos LR, Natourn J. Brazilian version of the Berg balance scale. Braz. Med. Biol. Res., Ribeirão Preto, v. 37, n. 9, p. 1411-1421, abr. 2004*
- *Lusardi MM,(2004). Functional Performance in Community Living Older Adults. Journal of Geriatric Physical Therapy, 26(3), p.14-22.*

#### 2.1.3.13.26 Bishop Score

**Description:** The Bishop Score was originally developed to predict the likelihood of a woman going into labor naturally. The items evaluated as part of the score are dilation (cm), effacement (%), station, consistency and position. The score ranges from 0 to 13. If a woman has a score  $\leq 1$ , it is not expected she will go into labor within 3 weeks. If the score  $\leq 6$ , the chances of having a vaginal birth are low and the cervix is considered unfavorable or "not mature" for induction. If the score  $\geq 8$ , the chances of having a vaginal birth are good and the cervix is considered favorable or "ripe" for induction. A score  $\geq 10$  indicates that the patient could go into labor naturally within a few days. Although the Bishop's score was originally used to assess the likelihood of vaginal birth in women who gave birth before (multipara), it is now also used for women who have never given birth (nullipara) and are being considered for induction of labor.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Bishop EH. Pelvic scoring for elective induction. Obstet Gynecol. 1964;24: 266-8. PMID 14199536*
- *Newman RB, Goldenberg RL, Iams JD et al. Preterm Prediction Study: Comparison of the Cervical Score and Bishop Score for Prediction of Spontaneous Preterm Delivery. Obstet Gynecol. 2008;112 (3): 508-15. DOI:10.1097/AOG.0b013e3181842087. PMID 18757646*
- *Laughon SK, Zhang J, Troendle J, Sun L, Reddy UM. Using a Simplified Bishop Score to Predict Vaginal Delivery. Obstetrics and Gynecology 2011;117(4):805-11. DOI:10.1097*

#### 2.1.3.13.27 Braden Q Scale

**Description:** The Braden Q scale is a tool for evaluation of the risk of pressure ulcers in pediatric patients. The scale consists of seven subscales, which are: mobility, activity, sensory perception, humidity,

friction/shearing, nutrition and perfusion/oxygenation of tissue. Each subscale is classified from 1 to 4 where the lower the number the greater the risk. The total Braden Q scale score ranges from 7 (highest risk) to 28 (lowest risk), with a score of 16 or less identified as a patient at risk for pressure ulcers.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Acarm, M, et al. Tradução para a língua portuguesa e validação da escala de Braden Q para avaliar o risco de úlcera por pressão em crianças. Rev Paul Pediatr 2011;29(3):406-14*
- *Curley, M.A.Q., Razmus, I.S., Roberts, K.E., Wypij, D. Predicting Pressure Ulcer Risk in Pediatric Patients: The Braden Q Scale. Nursing Research. 52(1):22-33, January/February 2003*

#### **2.1.3.13.28 Braden Scale**

**Description:** The Braden Scale is used to determine the risk of developing pressure ulcers in patients who spend a long time in bed. It consists of six subscales: sensory perception, moisture, physical activity, mobility, nutrition and, friction and shear. The total score can vary between 6 and 23 points, with patients classified as follows considering the development of pressure ulcers: very high risk (scores less than or equal to 9), high risk (scores from 10 to 12 points), moderate risk (scores from 13 to 14 points), low risk (score from 15 to 18 points) and no risk (score from 19 to 23 points).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Ayello EA, Braden B. How and why to do pressure ulcer risk assessment. Adv Skin & Wound Care. 2002;15(3):125-33*
- *Paranhos WY, Santos VLCG. Avaliação de risco para úlceras de pressão por meio da Escala de Braden, na língua portuguesa. Rev Esc Enferm USP. 1999; 33:191-206*

#### **2.1.3.13.29 Bristol Stool Form Scale (BSFS)**

**Description:** The Bristol Stool Form Scale (BSFS) allows the assessment of changes in intestinal transit based on the identification of stool forms. Through observation, the user selects from 7 options: Type 1 - separate hard lumps such as walnuts (difficult to pass), Type 2 - Sausage-shaped but irregular, Type 3 - Like a sausage but with cracks on the surface, Type 4 - Like a sausage or snake, smooth and smooth, Type 5 - Soft blisters with sharp edges, Type 6 - Fluffy chunks with jagged edges, a doughy stool, and Type 7 - Watery, in solid pieces, totally liquid. It is a useful diagnostic tool for physicians working with patients with gastrointestinal disorders, including an Irritable Bowel Syndrome (IBS).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Heaton, K. W.; Lewis, S. J. Stool form scale as a useful guide to intestinal transit time. Scandinavian Journal of Gastroenterology, 1997*

#### **2.1.3.13.30 Candida Score**

**Description:** The Candida Score is intended to help physicians to differentiate patients that could benefit from early antifungal treatment from those in whom invasive candidiasis is highly improbable. The characteristics evaluated for the score are: 1-Multifocal colonization by Candida sp (0, 1 point); 2- Surgery or admission to ICU (0, 1 point); 3- total parenteral nutrition (0, 1 point); 4- severe sepsis (0, 1, 2 points). The score ranges from 0 to 5 points. The Candida score is used to differentiate between ICU patients who have

severe hospital acquired sepsis or septic shock and would benefit from early antifungal treatment (score > 3) from those for whom invasive candidiasis is highly improbable (score ≤ 3).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- León C, Ruiz-Santana S, Saavedra P, Almirante B, Nolla-Salas J, Álvarez-Lerma, F, Garnacho-Montero J, Ángeles León M, EPCAN Study Group, *Crit Care Med* 2006 Vol. 34, No. 3 731
- Leroy G, et al. Evaluation of "Candida score" in critically ill patients: a prospective, multicenter, observational, cohort study. *Intensive Care*. 2011; 1:50

#### **2.1.3.13.31 Caprini Risk Assessment**

**Description:** The Caprini Risk Assessment for venous thromboembolism (VTE) was developed by Dr. Joseph A. Caprini in 1991, followed by newly updated and validated versions. The 2010 published version has 40 risk factors, and the weight of each risk factor varies from 1, 2, 3, and 5 points each. The total sum score is presented in four categories (low, moderate, high, and highest risk), each one with a recommended prophylactic regimen. The total score ranges from 1 to 40 points, where the higher the score, the higher the risk.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- J Caprini JA, Arcelus JJ, Hasty JH, Tamhane AC, Fabrega F. Clinical assessment of venous thromboembolic risk in surgical patients. *Semin Thromb Hemost*. 1991;17 Suppl 3:304-12 Joseph A. Caprini, M.D. Risk assessment as a guide for the prevention of the many faces of venous thromboembolism 2010 –The American Journal of Surgery
- Caprini JA. Risk assessment as a guide for the prevention of the many faces of venous thromboembolism. *Am J Surg* 2010; 199(1Suppl):3-10

#### **2.1.3.13.32 Capurro Somatic Method**

**Description:** The Capurro Somatic Method is a simplified method for diagnosis of gestational age in the neurologically depressed newborn. It uses 5 somatic criteria: nipple formation, skin texture, ear shape, mammary gland size, and plantar creases. The total score ranges from 0 to 94. The gestational age in weeks is obtained by adding 204 to the total score and dividing by 7 and it is classified as preterm (under 37 weeks), term (37 to 41 weeks) and post term (above 42 weeks).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Capurro H, Konichezky S, Fonseca D, Caldeyro-Barcia R. A simplified method for diagnosis of gestational age in newborn infant. *Journal of Pediatrics*. 1978. 93:120-122

#### **2.1.3.13.33 Capurro Somatic and Neurologic Method**

**Description:** The Capurro Somatic and Neurologic Method is a simplified method for diagnosis of gestational age in the newborn infant. It uses 5 somatic criteria (nipple formation, skin texture, ear shape, mammary gland size, and plantar creases) and 2 neurological (scarf sign and head). The total score ranges from 0 to 94. The gestational age in weeks is obtained by adding 204 to the total score and dividing by 7 and it is classified as preterm (under 37 weeks), term (37 to 41 weeks) and post term (above 42 weeks).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Capurro H, Konichezky S, Fonseca D, Caldeyro-Barcia R. A simplified method for diagnosis of gestational age in newborn infant. Journal of Pediatrics. 1978. 93:120-12*

#### **2.1.3.13.34 CHADS2 Score**

**Description:** The CHADS2 Score is a method of cardiovascular risk assessment, based on the prediction of cerebrovascular events through a set of individualized risk factors. The CHADS2 score allocates a point for congestive heart failure, arterial hypertension, age  $\geq 75$  years, or diabetes mellitus and two points for previous stroke or TIA. The greater the number of points assigned to a patient, the greater the probability of having a thromboembolic complication. A score 0: Low risk (1.9% per annum), score 1: Intermediate risk (2.8% per year) and score  $\geq 2$ : High risk (12.5% per year). The history of stroke has its own value of 2 points, in consensus to move these patients directly to the high-risk group ( $>8.5\%$  per year), because the predicted stroke is a history of severity for new strokes.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Singer DE, Albers GW, Dalen JE, Fang MC, Go AS, Halperin JL, Lip GY, Manning WJ. Antithrombotic therapy in atrial fibrillation: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition). American College of Chest Physicians. Chest. 2008 Jun;133(6 Suppl):546S-592S*
- *Santos C, Pereira T, Conde J. O Escore de CHADS2 na Predição de Eventos Cerebrovasculares – Uma Metanálise. Arq Bras Cardiol. 2013;100(3):294-301*

#### **2.1.3.13.35 CHA2DS2 – VASc Score**

**Description:** The CHA2DS2-VASc Score are clinical prediction rules for estimating the risk of stroke in patients with non-rheumatic atrial fibrillation (AF), a common and serious heart arrhythmia associated with thromboembolic stroke. The score is used to determine whether or not treatment is required with anticoagulation therapy or antiplatelet therapy, since AF is a known risk factor for stroke. The CHA2DS2-VASc Score is a refinement of CHADS2 Score and extends the latter by including additional common stroke risk factors, that is, age 65–74, female gender, and vascular disease. In the CHA2DS2-VASc Score, age greater than or equal 75 contributes 2 points. Major guidelines have used the fixed annual stroke risk as a guideline for starting anticoagulant treatment; ischemic stroke risk  $> 1\%$  is considered an indication to start an anticoagulant therapy.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Gregory YHL, Nieuwlaar R, Pisters R, Deirdre A L, Harry JG. Refining Clinical Risk Stratification for Predicting Stroke and Thromboembolism in Atrial Fibrillation Using a Novel Risk Factor-Based approach. The Euro Heart Survey on Atrial Fibrillation. CHEST 2010; 137(2):263-272*
- *Olesen JB, Lip GY, Hansen ML, Hansen PR, Tolstrup JS, Lindhardsen J, Selmer C, Ahlehoff O, Olsen AM, Gislason GH, Torp-Pedersen C. Validation of risk stratification schemes for predicting stroke and thromboembolism in patients with atrial fibrillation: nationwide cohort study. BMJ. 2011 Jan 31;342*



- *Coppens M, et al. The CHA2DS2-VASc score identifies those patients with atrial fibrillation and a CHADS2 score of 1 who are unlikely to benefit from oral anticoagulant therapy. European Heart Journal. Volume 34, Issue 3, Ap 170-6*

#### **2.1.3.13.36      Charlson Comorbidity Index**

**Description:** The Charlson score considers the severity of each patient, in each institution's database, important information to adjust performance indicators by risk among service providers. Institutional performance indicators can use this score to assist in the assessment between service providers (for example, nursing) using the individual score of each patient considering their comorbidities. The evaluation criteria are the following diseases: myocardial infarction; peripheral vascular disease; Cerebrovascular disease; insanity; chronic lung disease; connective tissue disease; ulcer; chronic liver disease and cirrhosis; uncomplicated diabetes; hemiplegia or paraplegia; severe or moderate kidney disease; complicated diabetes; tumor; leukemia; lymphoma; severe or moderate liver disease; malignant tumor, metastasis and AIDS. The index assigns weights of 1, 2, 3 and 6 diseases to obtain a total value ranging from 0 to 37 points, where 0 is the best survival and 37 the worst survival. Scores greater than 4 points are those that have a greater indication of comorbidities, so that the higher the index presented in the Charlson Comorbidity Index at admission, the greater the chances of presenting death as an outcome.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources :**

- *Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. J Chronic Dis 1987; 40:373-83*
- *Charlson ME, et al. The Charlson comorbidity index is adapted to predict costs of chronic disease in primary care patients. 2008 Dec;61(12):1234-40*
- *Martins M, Blais R, Miranda NN. Avaliação do índice de comorbidade de Charlson em internações da região de Ribeirão Preto, São Paulo, Brasil. Cad. Saúde Pública, Rio de Janeiro, 24(3):643-652, mar, 2008*

#### **2.1.3.13.37      Child Pugh Score**

**Description:** The Child Pugh Score is used to assess the prognosis of patients with chronic liver disease, particularly cirrhosis. Originally developed to predict mortality during surgery, it is currently used to determine the prognosis, as well as the intensity of treatment and the need for a liver transplant. There are 5 clinical criteria for scoring the liver disease: (1) total bilirubin (mg/dL): points at +1, +2, +3; (2) serum albumin (g/dL): points at +1, +2, +3; (3) prothrombin time (INR): points at +1, +2, +3; (4) ascites: points at +1, +2, +3; (5) hepatic encephalopathy: points at +1, +2, +3. For the final score, the scores for each criterion evaluated are added. The score is divided into 3 severity classes: Child class A for 100% survival in 1 year (5-6 points), Child class B for 80% survival in 1 year (7-9 points) and Child class C for 45% survival in 1 year (10 - 15 points).

**System functions:** Perioperative Electronic Patient Chart -> PACU Scores and Electronic Pre-Anesthetic Assessment -> Risk

#### **Sources:**

- *Kollia Z, Patelarou E, Vivilaki V, Kefou F, Elefsiniotis I, Dourakis SP, Brokalaki H. Translation and validation of the Greek chronic liver disease questionnaire. 2010 Dec 14;16(46):5838-44*
- *Durand F, Valla D. Assessment of the prognosis of cirrhosis: Child-Pugh versus MELD. J Hepatol. 2005;42(suppl 1):100-7.*

#### 2.1.3.13.38 Chung Score

**Description:** The Chung Score is used to assess the post-surgical patient's recovery in the anesthetic recovery room who will be released to complete their recovery at their home. The purpose of this score is to ensure clinical stability for its release, according to medical discharge. The Score is composed of the items: vital signs, activity level, nausea and/or vomiting; pain assessment, as well as the level of post-surgical bleeding. Chung has a total score of 10 points, with the patient being safe for home discharge only if the score is >9 points.

**System functions:** Perioperative Electronic Patient Chart -> PACU Scores

#### Sources:

- *Gignoux B, Gosgnach M, Lanz T, Vulliez A et.al. Short-term outcomes of Ambulatory Colectomy for 157 Consecutives Patients. Annals of Surgery, Volume 270, Number 02, 2019. PMID: 29727328 DOI: 10.1097/SLA.0000000000002800.*

#### 2.1.3.13.39 Cincinnati Prehospital Stroke Scale (CPSS)

**Description:** The Cincinnati Prehospital Stroke Scale (CPSS) is used for pre-hospital evaluation of potential strokes where three physical changes are observed and applied in a time of less than one minute. The criteria are established in the facial droop, arm drift and abnormal speech where the presence of one of the three findings indicates a 72% probability of a stroke and the presence of all three findings indicates an 85% probability of a stroke.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- *Kothari RU, Pancioli A, Liu T, Brott T, Broderick J. Cincinnati Prehospital Stroke Scale: reproducibility and validity. Ann Emerg Med 1999 Apr;33(4):373-8*
- *AHA American Heart Association/ ACLS Emergências em Cardiologia. Suporte avançado de vida em cardiologia. Barbara Aehlert. Tradução da 3ª edição. Edição/reimpressão: 2009*

#### 2.1.3.13.40 Clavien Score

**Description:** The Clavien Score is used to classify surgical complications. It includes 7 assessment levels (I, II, IIIa, IIIb, IVa, IVb, V). Through observation and description of the grades, the user selects the appropriate grade from Grade I to Grade V. Grade I corresponds to any deviation from the normal postoperative course without the need of pharmacological treatment or surgical, endoscopic or radiologic interventions. Grade II corresponds to pharmacological treatment with other drugs allowed for grade I complications, blood transfusions and total parenteral nutrition. Grade III has two subgroups corresponding to the presence or absence of general anesthesia (grade IIIa and grade IIIb) and grade IV has two subgroups corresponding to single organ dysfunction or multiple organ dysfunction (grade IVa and grade IVb). The suffix "d" is added to the respective degree of complications when the patient experiences a complication, indicating the need for follow-up to fully assess complications.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- *Dindo D, Demartines N, Clavien Pierre-Alain. Classification of surgical complications. Annals of Surgery, volume 240, Number 2, August 2004*

- R. Kazan, D. Bracco and T. M. Hemmerling. *Reduced cerebral oxygen saturation measured by absolute cerebral oximetry during thoracic surgery correlates with postoperative complications*. British Journal of Anaesthesia 103 (6): 811-16 (2009)

#### **2.1.3.13.41 Clinical Global Impression – Schizophrenia Scale Severity of Illness (CGI-SCH SI)**

**Description:** The Clinical Global Impression – Schizophrenia Scale Severity of Illness (CGI-SCH SI) is used to assess the severity of symptoms, the response to treatment, and the effectiveness of therapeutic interventions for schizophrenia. The severity of illness measures the patient's clinical situation throughout the week prior to the evaluation and is sub-divided into five categories that reflect the dimensions of the schizophrenia: positive symptoms, negative symptoms, depressive symptoms, cognitive symptoms and overall symptoms. The scores for each of the evaluated criteria are scored from 1 to 7 points and the higher the score, the greater the severity of the schizophrenia. This scale does not generate a total score at the end, only assigns severity to each of the evaluated symptoms.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- Guy W. *Clinical global impression (CGI)*. In: ECDEU Assessment Manual for Psychopharmacology. US Department of Health and Human Services, Public Health Service, Alcohol Drug Abuse and Mental Health Administration, NIMH Psychopharmacology Research branch. Rockville, MD: National Institute of Mental Health; 1976. P.218-22-1
- Haro JM, et al. *The Clinical Global Impression-Schizophrenia scale: a simple instrument to measure the diversity of symptoms present in schizophrenia*. Acta Psychiatr Scand Suppl. 2003;(416):16-23

#### **2.1.3.13.42 Clinical Pulmonary Infection Score (CPIS)**

**Description:** The Clinical Pulmonary Infection Score (CPIS) was developed to increase the accuracy of the clinical diagnosis of pneumonia in relation to mechanical ventilation in patients with respiratory distress syndrome and chronic obstructive disease. The evaluated criteria used in this score are tracheal secretions, chest X Ray, temperature in Celsius, leukocytosis, PaO<sub>2</sub>/FiO<sub>2</sub>, criteria for progression of pulmonary infiltrates, microbiology. The final score is the sum of the individual values and ranges from 0 to 12 points, where 0 to 6 is a low probability of pneumonia related to mechanical ventilation and 7 to 12 is a high probability of pneumonia related to mechanical ventilation.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- Pugin J, Auckenthaler R, Mili N, Janssens JP, Lew PD, Suter PM. *Diagnosis of ventilator-associated pneumonia by bacteriologic analysis of bronchoscopic and nonbronchoscopic "blind" bronchoalveolar lavage fluid*. Am Rev Respir Dis 1991;143(5 Pt 1):1121-9

#### **2.1.3.13.43 Clinical Pulmonary Infection Score (CPIS) Modified**

**Description:** The Clinical Pulmonary Infection Score (CPIS) Modified was developed to increase the accuracy of the clinical diagnosis of pneumonia in relation to mechanical ventilation in patients with respiratory distress syndrome and chronic obstructive disease. The evaluated criteria used in this score are temperature in Celsius, leukocytosis, type, and quality of tracheal secretions, PaO<sub>2</sub>/FiO<sub>2</sub> and chest X Ray. The difference for CPSI is the culture of tracheal secretion, for the CPSI Modified do not need to wait until the laboratory result to know the type of germ and quantity to perform the evaluation. The final score is the sum of all result values, that goes from 0 to 10. If the final score is 0 to 5 points, the patient is less likely to have pneumonia, if it is from 6 to 10, the patient is most likely to have pneumonia.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Luna CM, Aruj P, Niederman MS, Garzon J, Violi D, Prignoni A, Rios F, Baquero S, Gando S. Appropriateness and delay to initiate therapy in ventilator-associated pneumonia. For the Grupo Argentino de Estudio de la Neumonía Asociada al Respirador (GANAR) group. *Eur Respir J* 2006; 27: 158-164

#### **2.1.3.13.44 Clinical-Functional Vulnerability Index (IVCF-20)**

**Description:** The Clinical-Functional Vulnerability Index (IVCF-20) is a multidimensional index that assesses eight dimensions considered predictive of functional decline and/or death in the elderly: 1- age; 2- health self-perception; 3- functional disabilities; 4-cognition; 5-mood/behavior; 6- mobility (grasp, hold and clamp; aerobic capacity/ muscle; gait and sphincter function); 7- communication (vision and hearing); 8- presence of multiple comorbidities, represented by poly pathology, polypharmacy and/ or recent hospitalization. The score varies between 0 and 40 points. Score from 0 to 6 points: elderly at low risk of functional clinical vulnerability; Score from 7 to 14 points: elderly at moderate risk of functional clinical vulnerability; Score  $\geq$  15 points: elderly at high risk of functional clinical vulnerability.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Carmo AS. *Proposta de um índice de vulnerabilidade clínico-funcional para Atenção Básica: um estudo comparativo com a avaliação multidimensional do idoso*. Belo Horizonte; 2014. Orientador: Edgar Nunes de Moraes. *Dissertação (mestrado): Universidade Federal de Minas Gerais, Faculdade de Medicina*
- <https://www.ivcf-20.com.br>

#### **2.1.3.13.45 Comfort-Behavior Scale**

**Description:** The Comfort-Behavior Scale (Comfort-B) is derived from the Comfort scale. In 2005, this scale was validated in critically ill pediatric patients without mechanical ventilation, in order to assess the suffering of children in the ICU. Containing only behavioral variables, the scale has seven evaluation items which are: readiness, calm/agitation, respiratory response, crying, physical movement, muscle tonus and facial tension. Each item receives a value between 1 and 5 points. The scale ranges from 7 to 35 points, where a value of  $\leq$  10 corresponds to super sedation and  $\geq$  23 to little sedation. Intermediate values (11-22) may not predict the degree of sedation, requiring more careful observation.

**System functions:** Electronic Patient Chart -> Scores and Indexes and Vital Signs and General Monitoring.

**Sources:**

- Ambuel B, Hamlett KW, Marx CM, Blumer JL. Assessing distress in pediatric intensive care environments: The COMFORT scale. *Journal of Pediatric Psychology*, 1992; 17(1), 95-109
- Amoretti CF, Rodrigues GO, Carvalho PRA, Trotta EA. Validação de escalas de sedação em crianças submetidas à ventilação mecânica internadas em uma unidade de terapia intensiva pediátrica terciária. *Rev Bras Ter Intensiva*. 2008;20(4):325-330

#### **2.1.3.13.46 Confusion Assessment Method (CAM)**

**Description:** The Confusion Assessment Method (CAM) is a standardized evidence-based assessment that enables non-psychiatrically trained clinicians to identify and recognize delirium quickly and accurately in both clinical and research settings. Therefore, patients should be assessed frequently using the CAM to facilitate

identification and management of delirium and underlying etiology. It is composed of four items: (1) acute onset or fluctuating course; (2) lack of attention; (3) disorganized thoughts, (4) altered level of consciousness. Each question has a yes/no answer. The patient is considered in delirium state (CAM positive) when characteristics 1 and 2 plus characteristics 3 or 4 are present.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Mori S, Kashiba KI, Silva DV, Zanei SSV, Whitaker IY. Confusion assessment method para analisar delirium em unidade de terapia intensiva. Revisão de literatura. Revista Brasileira de Terapia Intensiva. 2009; 21(1): 58-6*

#### **2.1.3.13.47 Confusion Assessment Method for the Intensive Care Unit (CAM-ICU)**

**Description:** The Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) was adapted in 2001 for the assessment of critically ill patients intubated under mechanical ventilation (MV) in intensive care environments. This is composed of four items present in CAM: 1 - acute onset, 2 - attention disorder, 3 - disorganized thinking, and 4 - change in the level of consciousness. The proposed evaluation comprises the observation of the patient's non-verbal response pattern through the response to simple commands, the recognition of figures by applying the Attention Screening Examination (ASE), surveillance and logical answers with yes or no to simple questions. The patient is considered in delirium state (CAM positive) when characteristics 1 and 2 plus characteristics 3 or 4 are present. For example: if features 1, 2 and 3 are present, there is no need to evaluate feature 4. If features 1 or 2 are absent, there is no need to continue because the patient cannot be CAM-ICU positive without them. Do not apply the CAM-ICU in comatose/unconscious patients (RASS -4/-5).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources :**

- *Ely EW. Vanderbilt University. Confusion Assessment Method for the ICU (CAM-ICU). Revised Edition: October 2010*
- *Faria RSB, Moreno RP. Delirium na unidade de cuidados intensivos: uma realidade sub diagnosticada. Rev Bras Ter Intensiva, 2013*

#### **2.1.3.13.48 Confusion Assessment Method for the Intensive Care Unit modified (CAM – ICU)**

**Description:** Confusion Assessment Method for the Intensive Care Unit modified (CAM – ICU) was developed in 2001 to evaluate intubated patients on mechanical ventilation in ICUs. This assessment allows a quick and accurate measurement in critically ill patients, just assessing the level of consciousness. The difference between CAM-ICU and CAM-ICU Modified is that the second are there validated expressions for Brazil. It has four items for assessing level of consciousness: 1-Acute onset or fluctuating course; 2-Lack of attention; 3-Disorganized thoughts; 4-Altered level of consciousness. The evaluation corresponds to the patient's non-verbal response via response to simple commands, recognition of figures, surveillance and logical responses. The result is simply criteria for delirium depending on the answers and observation of the patient. Criteria for delirium diagnosis is considered present when the answer is yes for items 1 and 2 and when the answer is yes for either trait 3 or 4.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Ely EW, Margolin R, Francis J, et al – Evaluation of delirium in critically ill patients: validation of the Confusion Assessment method for the Intensive Care Unit (CAM-ICU). Crit Care med, 2001;29:1370-1379
- Mori S, Khachiba KI, Silva DV, Zanei SSV, Whitaker IY. Confusion assessment method para analisar delirium em unidade de terapia intensiva. Revisão de literatura. Rev Bras Ter Intensiva. 2009; 21(1):58-64
- Ely EW and Vanderbilt University. Confusion Assessment Method for the ICU (CAM-ICU). Revised Edition: October 2010

#### **2.1.3.13.49 Contrast Induced Nephropathy (CIN) Risk Score**

**Description:** The Contrast Induced Nephropathy (CIN) Risk Score is used for patients undergoing percutaneous coronary intervention and predicts the risk of contrast-induced nephropathy. The score includes patient-related characteristics [age > 75 years (4 points), diabetes mellitus (3 points), chronic congestive heart failure or admission with acute pulmonary edema (5 points), hypotension (5 points), anemia (3 points), and chronic kidney disease] and procedure-related characteristics [use of IABP (5 points) or increasing volumes of contrast (1 point for each 100 mL of contrast)]. The final score predicts the risk of CIN and the risk of dialysis. To score the chronic kidney disease, the HCP can consider the serum creatinine (4 points if > 1.5 mg/dL) or the estimated glomerular filtration rate (eGFR) in mL/min/1.73 m<sup>2</sup> (0 points for eGFR ≥ 60, 2 points for 40 ≤ eGFR < 60, 4 points for 20 ≤ eGFR < 40, and 6 points for eGFR < 20).

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- Mehran R, et al. A simple risk score for prediction of contrast-induced nephropathy after percutaneous coronary intervention: Development and initial validation. Journal of the American College of Cardiology. V. 44, Issue 7, 6 October 2004, pg. 1393-1399

#### **2.1.3.13.50 COPD Assessment Test (CAT)**

**Description:** The COPD Assessment Test (CAT) is a patient-completed questionnaire that can assess the impact of Chronic Obstructive Pulmonary Disease (COPD) on a patient's health status. The content of the CAT questionnaire comprises simple questions that most patients should be able to understand and easily answer. CAT is used to assess current status and for long-term follow-up of COPD-related health status. It is not a diagnostic tool, it supplements information obtained from lung function measurement and exacerbation risk assessment. The questionnaire consists of eight items with a total score varying from 0 to 40. Higher scores denote a more severe impact of COPD on a patient's life.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- Jones PW, Harding G, Berry P, Wiklund I, Chen W-H, Kline N. Development and first validation of the COPD Assessment Test. Eur Respir J, 2009

#### **2.1.3.13.51 Cormack-Lehane (CL) Classification**

**Description:** The Cormack-Lehane (CL) classification is a tool used to describe laryngeal view during direct laryngoscopy and correlates with measures of difficulty with intubation. This tool aims to classify patients according to the one of the four categories described and exemplified by images, which are grade 1 (most of the glottis is visible), grade 2 (at best almost half of the glottis is seen, at worst only the posterior tip of the arytenoids is seen), grade 3 (only the epiglottis is visible) and grade 4 (no laryngeal structures are visible). The higher the classification, the more difficult can be the intubation.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Cormack RS, Lehane J. Difficult tracheal intubation in obstetrics. Anaesthesia 1984; 39: 1105-11*
- *Khol LK, Kong CE, IP-Yam PC. The modified Cormack-Lehane score for the grading of direct laryngoscopy: evaluation in the Asian population. 2002 Feb;30(1):48-51*
- *R. Krage, et al. Cormack-Lehane classification revisited. British Journal of Anaesthesia 105 (2): 220-7 (2010)*

#### **2.1.3.13.52 CRB-65 Score**

**Description:** The CRB-65 Score is a tool used to stratify patients with community acquired pneumonia (CAP) into three risk groups. It is based only on clinical observations, in cases when laboratory exams are not available (refer to CURB-65 when serum urea is available). Each of the following risk factor scores one point: confusion of new onset, RR  $\geq 30$ /min, low blood pressure (SBP  $< 90$  mmHg or DBP  $\leq 60$  mmHg), and age  $\geq 65$  years. The maximum score is 4. Patients with scores 0 are at low risk of mortality (1.2%) and might be suitable for home treatment. Patients with a score of 1 or 2 are at intermediate risk of mortality (8.15%), likely need hospital referral and assessment and should be considered for hospital supervised treatment. Patients with a score of 3 or 4 are at high risk of mortality (31%) and need urgent hospital admission.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Lim WS, Van der Eerden MM, Laing R, et al. Defining community acquired pneumonia severity on presentation to hospital: an international derivation and validation study. Thorax 2003; 58:377-382*
- *Dwyer R, Hedlund J, Henriques-Normark B, et al. Improvement of CRB-65 as a prognostic tool in adult patients with community acquired pneumonia. BMJ Open Resp Res 2014;1: e000038. DOI:10.1136/bmjresp-2014-000038*
- *Lim W S, Baudouin S V, George R C, et al. British Thoracic Society guidelines for the management of community acquired pneumonia in adults: update 2009. Thorax 2009; 64(Suppl III) -55. DOI:10.1136/thx.2009.121434*

#### **2.1.3.13.53 Creatinine Clearance Rate Equations**

**Description:** The Creatinine Clearance Rate Equation is used to estimate the glomerular filtration (GF) based on the serum creatinine value (mg/dL) and other patient's attributes, such as weight (Kg), height (cm), age (years), African descentance, and premature newborn. The formulas available in the system are described below.

For adult patients:

##### **Cockcroft-Gault Equation**

$GF \text{ (mL/min)} = (140 - \text{age}) \times \text{weight} \times (0.85 \text{ if woman}) / (72 \times \text{serum creatinine})$

##### **Simplified Modification of Diet in Renal Disease (MDRD) equation**

$GF \text{ (mL/min/1.73 m}^2\text{)} = 186 \times \text{serum creatinine}^{-1.154} \times \text{age}^{-0.203} \times (0.742 \text{ if female}) \times (1.210 \text{ if African descentance})$

##### **Jelliffe Modified**

$GF \text{ (mL/min)} = \{98 - [0.8 \times (\text{age} - 20)]\} / \text{serum creatinine} \times [0.007184 \times (\text{height})^{0.725} \times (\text{weight})^{0.425}] / 1.73 \text{ m}^2 \times (0.9 \text{ if woman})$

For pediatric patients up to 18 years old:

#### **Counahan-Barratt Equation**

$GF \text{ (mL/min/1.73 m}^2\text{)} = 0.43 \times \text{height} / \text{serum creatinine}$

#### **Schwartz Formula**

$GF \text{ (mL/min)} = k \times \text{height} \times \text{serum creatinine}$

i.  $k = 0.33$  premature

ii.  $k = 0.45$  term to 2 years

iii.  $k = 0.55$  female 2-16 years

iv.  $k = 0.70$  male 2-16 years

**System functions:** Electronic Patient Chart -> Scores and Indexes and Oncology Treatment, Electronic Pre-Anesthetic Assessment -> Risks

#### **Sources:**

- Cockcroft DW, Gault MH. Prediction of creatinine clearance from serum creatinine. *Nephron*. 1976; 16:31-41
- Levey AS, Bosch JP, Lewis JB, Greene T, Rogers N, Roth D: A more accurate method to estimate glomerular filtration rate from serum creatinine: a new prediction equation. Modification of Diet in Renal Disease Study Group. *Ann Intern Med* 130:461-470, 1999
- Jelliffe R. Estimation of creatinine clearance in patients with unstable renal function, without a urine specimen. *Am J Nephrol*. 2002; 22(4):320-4
- Counahan R, Chantler C, Ghazali S, Kirkwood B, Rose F, Barratt TM: Estimation of glomerular filtration rate from plasma creatinine concentration in children. *Arch Dis Child* 51:875-878, 1976
- Schwartz GJ, Feld LG, Langford DJ: A simple estimate of glomerular filtration rate in full-term infants during the first year of life. *J Pediatr* 104:849-854, 1984

#### **2.1.3.13.54 Clinical Risk Index for Babies (CRIB)**

**Description:** The Clinical Risk Index for Babies (CRIB) was designed by the International Neonatal Network in the United Kingdom in 1993 and is used to predict mortality for infants born at less than 32 weeks gestation. The clinical severity in preterm infants was based on six variables such as birthweight, gestational age (weeks), maximum and minimum fraction of inspired oxygen and maximum base excess during the first 12 h, and presence of congenital malformations. The final score is based on a weighted sum of these six factors, and the maximum score obtained in the assessment is 23 points. A higher score indicates an increased risk of mortality.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- The CRIB (clinical risk index for babies) score: a tool for assessing initial neonatal risk and comparing performance of neonatal intensive care units. *Lancet* 1993; 342:193-8



#### 2.1.3.13.55 Clinical Risk Index for Babies (CRIB II)

**Description:** The Clinical Risk Index for Babies (CRIB II) is an update of the first CRIB version. It is a tool developed to predict initial mortality risk amongst low-birth-weight babies (newborn at 32 weeks' gestation) after 1 h of admission to the ICU. The index contains 5 variables such as gender, gestational age, birth weight (g), temperature at admission and base excess (mmol/L). The CRIB II score ranges from 0 to 27. Lower scores indicate a better prognosis.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- Parry G, et al. CRIB II: an update of the clinical risk index for babies score. 2003 May 24;361(9371):1789-91
- Mohkam M, et al. A comparison of CRIB, CRIB II, SNAP, SNAPII and SNAP-PE scores for prediction of mortality in critically ill neonates. Vol. 24, No.4, February 2011, pp. 193-9
- Zahraa Mohamed Ezz-Eldin, Tamer A. Abdel Hamid, Meray Rene Labib Youssef, and Hossam El-Din Nabil Clinical Risk Index for Babies (CRIB II) Scoring System in Prediction of Mortality in Premature Babies. 2015 Jun; 9(6): SC08–SC11.

#### 2.1.3.13.56 Critical Care Pain Observation Tool (CPOT)

**Description:** Refer to the feature "Vital signs and clinical parameters calculation" of this document.

#### 2.1.3.13.57 CRUSADE Score

**Description:** The CRUSADE score is used to estimate the patient's baseline risk of major bleeding during the in-hospital phase of a myocardial infarction treatment without ST-T segment elevation. The bundles observed are: basal hematocrit (%), creatinine clearance (mL / min), HR (bpm), SBP (mmHg), severe vascular disease, diabetes mellitus and signs of HF on admission. The score was created by assigning weighted integers corresponding to the coefficient of each variable. It ranges from 1 to 100 points. Major bleeding rate increased by bleeding risk score quintiles: 3.1% for those at very low risk (score ≤ 20); 5.5% for those at low risk (score 21-30); 8.6% for those at moderate risk (score 31-40); 11.9% for those at high risk (score 41-50); and 19.5% for those at very high risk (score >50).

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- Abu-Assi E, et al. Evaluating the Performance of the Can Rapid Risk Stratification of Unstable Angina Patients Suppress Adverse Outcomes with Early Implementation of the ACC/AHA Guidelines (CRUSADE) bleeding score in a contemporary Spanish cohort of patients with non-ST-segment elevation acute myocardial infarction. 2010 Jun 8;121(22):2419-26
- Subherwal S, et al. The CRUSADE (Can Rapid risk stratification of Unstable angina patients Suppress Adverse outcomes with Early implementation of the ACC/AHA guidelines) Bleeding Score. Circulation, 2009; 119:1873-82

#### 2.1.3.13.58 CURB-65 Score

**Description:** The CURB-65 Score is a tool used in the emergency department to stratify patients with community acquired pneumonia (CAP) into three management groups. Each of the following risk factor scores one point: confusion of new onset, serum urea > 7 mmol/L, RR ≥ 30 breaths/min, low blood pressure (SBP < 90 mmHg or DBP ≤ 60 mmHg), and age ≥ 65 years. The maximum score is 5. Patients with scores 0 and 1 are at low risk of mortality (< 2%) and might be suitable for management as hospital outpatients or by their

general practitioner. Patients with a score of 2 are at intermediate risk of mortality (9%) and should be considered for hospital supervised treatment. Patients with a score of > 2 are at high risk of mortality (> 19%), corresponding to those patients who meet the criteria for severe CAP and should be treated in hospital.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Lim WS, Van der Eerden MM, Laing R, Boersma WG, Karalus N, Town GI, Lewis SA, Macfarlane JT. Defining community acquired pneumonia severity on presentation to hospital: an international derivation and validation study. Thorax, 2003*

#### **2.1.3.13.59 Delirium Risk Assessment in Post-Operative Period of Non-Cardiac Elective Surgery**

**Description:** The Delirium Risk Assessment in Post-Operative Period of Non-Cardiac Elective Surgery uses data available in the preoperative period to stratify patients into risk groups for developing delirium. Several clinical findings are evaluated, such as over 70 years of age, alcohol abuse, previous cognitive dysfunction, severe illness, preoperative metabolic disorder, aortic aneurysm surgery and thoracic surgery. The risk of delirium is evidenced by the scoring: 0 represents a risk of delirium of 2%, between 1-2 represents a risk of 11%, and 3 or more represents 50% of postoperative delirium risk.

**System functions:** Perioperative Electronic Patient Chart -> PACU Scores and Electronic Pre-Anesthetic Assessment -> Risk

**Sources:**

- *Marcantonio ER, Goldman L, Mangione CM et al. A Clinical Prediction Rule for Delirium After Elective Noncardiac Surgery. JAMA. 1994;271(2):134-9*

#### **2.1.3.13.60 Detsky Modified Preoperative Cardiac Risk Index**

**Description:** The Detsky Modified Preoperative Cardiac Risk Index is well publicized in clinical practice by the American College of Physicians (ACP) based on the Modified Detsky Index. This method consists of scoring age, clinical cardiac and laboratory variables present for the patient. The index results presented are classified as: Class I for 0-15 points (5% cardiac risk). Class II for 20-30 points (27% cardiac risk). Class III for > 30 points (60% cardiac risk).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Palda AV, Detsky AS. Guidelines for Assessing and Managing the Perioperative Risk from Coronary Artery Disease Associates with Major Noncardiac Surgery. Report of the American College of Physicians. Ann Intern Med 1997; 127: 309-12*

#### **2.1.3.13.61 Dialysis Malnutrition Score (DMS)**

**Description:** The Dialysis Malnutrition Score (DMS) was developed by Kalantar-Zadeh and coworkers (1999) with the aim to assess the level of malnutrition for patients undergoing dialysis treatment. The score is an accumulative test with 7 variables divided between two groups: clinical history - 5 variables (weight loss, change in food intake, gastrointestinal symptoms, functional capacity, and associated comorbidity) and clinical exam - 2 variables (subcutaneous fat loss and muscle mass loss). Each variable has a value of 1 (normal) to 5 (very severe) points. The sum of all scores determines the patient's degree of nutrition, which can range from 7 points (normal) to 35 points (severely malnourished).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Kalantar-Zadeh K, et al. *A modified quantitative subjective global assessment of nutrition for dialysis patients*. Nephrol Dialysis Transplant. 1999; 14:1732-8
- Huarte-Loza E, et al. *Grupo de Consenso de la Sociedad Española de Diálisis y Trasplante- SEDYT. Nutrición en pacientes en diálisis. Consenso SEDYT. Revista Diálisis y Trasplantes*. 2006;27(4):138-61
- Yaffé M, Barozzi C. *Desnutrición en la enfermedad renal crónica. Tendencias en Medicina*. Junio; Año XXVI Nº 50: 163-170

**2.1.3.13.62 Dimensions of Anger Reactions (DAR-5)**

**Description:** The Dimensions of Anger Reactions (DAR-5) is a brief and psychometrically sound measure of anger. It is a five-point Likert scale ranging from 1 to 5 that assesses anger frequency, intensity, duration, aggression and impact on a person's social functioning over the preceding 4-week period. Items are summed to provide a total severity score (range 5 to 25). Higher scores indicate worse symptomatology, and a score  $\geq 12$  indicates an anger problem.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Goulart AC et al. *Dimensions of Anger Reactions (DAR-5) and its validity associated with anxiety and depression in Brazilian adults*. 2016 -"The Spanish Journal of Psychology"
- Forbes D, Alkemade N, Mitchell D, Lewis V. *Utility of the Dimensions of Anger Reactions-5 (DAR-5) scale as a brief anger measure*. Depress Anxiety. 2014 Feb;31(2):166-73. Epub 2013 Jun 25

**2.1.3.13.63 DINI Scale**

**Description:** The DINI scale allows for the classification of pediatric patients in degrees of dependence on nursing. It makes it possible to improve the decision-making process of nurses in managerial and care practice. Obtained after four phases of the Delphi technique, it is composed of 11 indicators: activity, control measurement interval, drug therapy, oxygenation, mucosal skin integrity, mobility and ambulation, body hygiene, nutrition and hydration, elimination, companion participation and support. Scale results ranging from 13 to 26 points indicate minimal care; 27 to 39 points intermediate care; 40 to 52 points semi-intensive care and  $> 53$  indicate intensive care.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Akins RB, Tolson H, Cole BR. *Stability of response characteristics of a Delphi panel: application of bootstrap data expansion*. 2005 Dec 1; 5:37
- Dini, AP, Fugulin FMT, Veríssimo MDLOR et al. *Sistema de Classificação de Pacientes Pediátricos: construção e validação de categorias de cuidados*. Rev Esc Enferm USP 2011; 45(3): p. 575-80

**2.1.3.13.64 Distress Thermometer**

**Description:** The Distress Thermometer is used to identify distress levels and possible causes for oncologic patients. It takes in consideration personal, family, emotional and physical problems. It ranges from 0 (no distress) to 10 (extreme distress), for which patients indicate their level of distress over the course of the week prior to assessment.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- *Bergerot CD, et al. Termômetro de Distress: validação de um instrumento breve para avaliação diagnóstica de pacientes oncológicos. Universidade de Brasília, Brasília. Brasil. Psico-USF, v. 14, n. 3, p. 253-260, Set/Dez 2009*

#### 2.1.3.13.65 Douleur Neuropathique 4 (DN4) Questionnaire

**Description:** The Douleur Neuropathique 4 (DN4) questionnaire was developed by the French Neuropathic Pain Group and is a simple and objective tool, with the ability to distinguish nociceptive from neuropathic pain (NPP). It was derived from a list of signs and symptoms associated with NPP and includes a series of 4 groups of questions consisting of 7 sensory descriptors and 3 signs related to a sensorial exam. If the score is 4 or higher, then the pain is likely to be NPP; if the score is less than 4 then the pain is unlikely to be NPP.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- *Bouhassira D, Attal N, Alchaar H, Boureau F, Brochet B, Bruxelle J, Cunin G, Fermanian J, Ginies P, Grun-Overdyking A, Jafari-Schluep H, Lanté'ri-Minet M, Laurent B, Mick G, Serrie A, Valade D, Vicaut E: Comparison of pain syndromes associated with nervous or somatic lesions and development of a new neuropathic pain diagnostic questionnaire (DN4). Pain 114:29-36, 2005*
- *Jamile G. Santos, Jacilene O. Brito, Daniel C. de Andrade, Viviane M. Kaziyama, Karine A. Ferreira, Israel Souza, Manoel J. Teixeira, Didier Bouhassira and Abrahao F. Baptista: Translation to Portuguese and Validation of the Douleur Neuropathique 4 Questionnaire. The Journal of Pain, Vol 11, No 5 (May), 2010: 484-490*

#### 2.1.3.13.66 Downton Index

**Description:** The Downton Index was created in 1993 and aims to assess the risk of falls in patients. It is used for inpatients of all ages at risk of falling. The variables evaluated are previous falls (score of 0 and 1); administration of medicines (scores between 0, 1, 2, 3, 4 and 5); walking (score of 0 and 1) and mental status (score of 0 and 1). The Index ranges from 0 to 9. The results for the Downton Index are: no risk (score 0); low risk (score 1); medium risk (score 2) and high risk (score 3 or more).

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- *Downton JH. Falls in the elderly. London: Editor British Library Cataloguing in Publication Data, 1993. 158 p*
- *Rosendahl E, Lundin-Olsson L, Kallin K, Jensen J, Gustafson Y, Nyberg L. Prediction of falls among older people in residential care facilities by the Downton index. Aging 15: 142-147, 2003*

#### 2.1.3.13.67 Downton Modified Index

**Description:** Downton Modified Index aims to assess the risk of falls in patients. It is used for inpatients of all ages at risk of falling. Downton Modified Index uses a different method of scoring the use of multiple drugs: 1 point if using 1 or more drugs (the Downton Index score can be from 0 to 4 points, depending on the number of drugs used and for what purpose). The classification of the index corresponds to the evaluation of previous falls (score of 0 or 1); administration of medicines (scores of 0 or 1); visual deficit (score of 0 or 1), hearing deficit (score of 0 or 1); extremity deficit (score of 0 or 1); walking (score of 0 or 1) and mental status (score of 0 or 1). The index ranges from 0 to 7. The results for the Downton Modified Index are: no risk (score 0); low risk (score 1); medium risk (score 2) and high risk (score  $\geq 3$ ).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Downton JH. *Falls in the elderly*. London: Editor British Library Cataloguing in Publication Data, 1993. 158 p
- Machado TR, Oliveira CJ, Costa FBC, Araujo TL. *Avaliação da presença de risco para queda em idosos*. As. Eletr. Enf. [Internet]. 2009;11(1):32-8
- [Http://www.fen.ufg.br/revista/v11/n1/v11n1a04.htm](http://www.fen.ufg.br/revista/v11/n1/v11n1a04.htm)
- Pinho T, et al. *Avaliação do risco de quedas em idosos atendidos em Unidade Básica de Saúde*. As Esc Enferm USP 2012; 46(2):320-7

**2.1.3.13.68 Durie e Salmon Scale**

**Description:** The Durie e Salmon Scale is based on the combination of factors such as hemoglobin (low hemoglobin levels mean that the person is anemic and may indicate that the myeloma cells occupy a large part of the bone marrow), serum calcium (the bone normally contains a large amount of calcium and the destruction of the bone riggers the submission of calcium into the blood), concentration of the monoclonal component (a large quantity of monoclonal immunoglobulin indicates that many malign plasmatic cells are present and that they are producing abnormal protein) and bone involvement (the advanced multiple myeloma stage in bone area is seen on x-rays). There are three phases established in accordance with the tumoral mass: stage I which equates to low cellular mass, stage II which equates to intermediate cellular mass, and stage III which equates to high cellular mass.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Durie BG, Salmon SE. *A clinical staging system for multiple myeloma. Correlation of measured myeloma cell mass with presenting clinical features, response to treatment, and survival*. Cancer 1975; 36:842-54
- Martinez GA. *Fatores prognósticos no Mieloma Múltiplo*. Rev. bras. hematol. hemoter. 2007;29(1):27-30

**2.1.3.13.69 Eastern Cooperative Oncology Group (ECOG) Performance Status**

**Description:** The Eastern Cooperative Oncology Group (ECOG) Performance Status is a tool for the clinician to assess cancer patients for self-care, daily activities, and physical ability. The scale ranges from 0 (no restrictions) to 5 (dead).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Machado L, Saad IAB, Honma HN, Morcillo AM, Zambon L. *Evolução do status de performance, índice de massa corpórea e distância percorrida no teste de caminhada de seis minutos em pacientes com câncer de pulmão avançado submetidos à quimioterapia*. J Bras Pneumol. 2010;36(5):588-594
- Shvarts O, Lam JS, Han KR, Figlin R, Belldegrun A. *Eastern Cooperative Oncology Group performance status predicts bone metastasis in patients presenting with renal cell carcinoma: implication for preoperative bone scans*. 2004 Sep;172(3):867-70

#### 2.1.3.13.70 Eating Assessment Tool (EAT-10)

**Description:** The Eating Assessment Tool (EAT-10) is a symptom-specific outcome instrument for dysphagia. It consists of ten statements that a patient rates on a scale of 0 (no problem) to 4 (severe problem). If the score is  $\geq 3$ , the patient may have swallowing and safety issues.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Belafsky PC, Mouadeb DA, Rees CJ, Pryor JC, Postma GN, Allen J, Leonard RJ.* The validity and reliability of EAT-10 has been determined. Validity and Reliability of the Eating Assessment Tool (EAT-10). *Annals of Otology, Rhinology & Laryngology* 2008;117(12): 919-924
- <https://www.nestlenutrition-institute.org/resources/nutrition-tools/details/swallowing-assessment-tool>

#### 2.1.3.13.71 Edmonton Symptom Assessment System – Brazilian Version (ESAS-Br)

**Description:** The Edmonton Symptom Assessment System (ESAS-Br) is a simple method for the assessment of symptoms in patients admitted to a palliative care unit. It is a translation and the cross-cultural adaptation to Brazilian Portuguese, of a revised version of the instrument Edmonton Symptom Assessment System (ESAS-r) for use in palliative care. The ESAS-Br It is a combination of physical and psychological symptoms and addresses ten symptoms frequently found in patients with cancer such as pain, tiredness, nausea, depression, anxiety, drowsiness, appetite, well-being, shortness of breath and sleep. The severity at the time of assessment of each symptom is rated from 0 to 10 on a numerical scale, with 0 meaning that the symptom is absent and 10 that it is the worst possible severity. The assessment can be completed by the patient, by the family or by the healthcare team. It allows the frequency and intensity of the symptoms presented by the patients to be known, allowing healthcare teams to make suitable decisions for offering the necessary care.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Watanabe SM, Nekolaichuk C, Beaumont C, Johnson L, Myers J, Strasser F.* A multicenter study comparing two numerical versions of the Edmonton Symptom Assessment System in palliative care patients. *J Pain Symptom Manage.* 2011; 41:456–468.
- *Bruera E, Kuehn N, Miller MJ, Selmsler P, Macmillan K.* J Palliat Care. The Edmonton Symptom Assessment System (ESAS): a simple method for the assessment of palliative care patients. 1991 Summer; 7 (2):6-9
- *Paiva CE, Manfredini LL, Paiva BSR, Hui D, Bruera E.* The Brazilian version of the Edmonton Symptom Assessment System (ESAS) is a feasible, valid and reliable instrument for the measurement of symptoms in advanced cancer patients. *PLoS ONE.* 2015;10(7):e0132073. Doi: 10.1371/journal.pone.0132073

#### 2.1.3.13.72 Edmonton Symptom Assessment System (ESAS)

**Description:** The Edmonton Symptom Assessment System (ESAS) is a simple method for the assessment of symptoms in patients admitted to a palliative care unit. It is a combination of physical and psychological symptoms and addresses nine symptoms frequently found in patients with cancer such as pain, tiredness, nausea, depression, anxiety, drowsiness, appetite, well-being, and shortness of breath. The severity at the time of each symptom assessment is rated from 0 to 10 on a numerical scale, with 0 meaning that the symptom is absent and 10 that it is the worst possible severity. The assessment can be completed by the

patient, by the family or by the healthcare team. It allows the frequency and intensity of the symptoms presented by the patients to be known, allowing healthcare teams to make suitable decisions for offering the necessary care.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Bruera E, Kuehn N, Miller MJ, Selmsler P, Macmillan K. *J Palliat Care. The Edmonton Symptom Assessment System (ESAS): a simple method for the assessment of palliative care patients.* 1991 Summer; 7 (2):6-9

#### **2.1.3.13.73 Epworth Sleepiness Scale (ESS)**

**Description:** Epworth Sleepiness Scale (ESS) is a method used to measure the level of daytime sleepiness. Patients are asked to rate the likelihood (0-3) of falling asleep during eight daily activities. The higher the score the patient assigns to an activity the more likely they are to fall asleep. The final score is a sum of all answer values, and ranges from 0 to 24. The higher the ESS score, the higher that person's average sleep propensity in daily life and the more likely a sleep disorder is present.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Johns MW. *A new method for measuring daytime sleepiness: the Epworth Sleepiness Scale.* Sleep. 1991; 14:540-5
- Johns MW. *Sleepiness in different situations measured by the Epworth Sleepiness Scale.* Sleep. 1994; 17:703-10
- Bertolazi AS. *Validação da escala de sonolência de Epworth em português para uso no Brasil.* J. bras. Pneumol. Vol.35 no.9 São Paulo Sept. 2009

#### **2.1.3.13.74 Estimated Body Fat Percentage (BFP) Assessment**

**Description:** The Estimated Body Fat Percentage (BFP) Assessment is a generic tool that allows the institution to configure different protocols to estimate the patient's BFP based on skinfolds, additional anthropometric measurements, gender, and age. The institution can configure an internal or a published protocol (such as Faulkner equation) in the "Body fat protocol" item on the "Core Table Settings" function. The references below are related to this assessment's applicability and a comparison between different formulas and methods.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- Rezende FAC, Lima Rosado LEFP, Priore SE, Franceschini SCC. *Aplicabilidade de equações na avaliação da composição corporal da população brasileira.* As. Nutr., Campinas, 19(3):357-367, maio/jun., 2006
- Buscariolo FF, Catalani MC, Domingues Dias LCG, Navarro AM. *Comparação entre os métodos de bioimpedância e antropometria para a avaliação da gordura corporal em atletas do time de futebol feminino de Botucatu/SP.* Rev. Simbio-Logias. V.1, n.1, mai/2008

#### **2.1.3.13.75 European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core-30 (EORTC QLQ-C30)**

**Description:** European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core-30 was developed to assess the quality of life of patients with cancer. It has 30 questions related to five functional scales (physical, functional, emotional, social and cognitive), a scale on the overall state of health, three symptom scales (fatigue, pain, nausea/vomiting) and six additional symptom items (dyspnea, insomnia, loss of appetite, constipation, diarrhea, financial difficulties). Each question has 4 possible answers, from 0 (no) to 4 (a lot). All EORTC QLQ-C30 scale scores range from 0 to 100. A high score for a functional scale represents a high level of functioning.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- Arraras J, Arias F, Tejedor M, Pruja E, Marcos M, Martínez E, Valerdi J. *The EORTC QLQ-C30* (version 3.0) QoL questionnaire: Validation study for Spain with head and neck cancer patients. *Psycho-Oncology*, 11, 249-256
- Franceschini J, et al. *Reprodutibilidade da versão em português do Brasil do European Organization for Research and Treatment of Cancer Core Quality of Life Questionnaire em conjunto com seu módulo específico para câncer de pulmão. J. bras. Pneumol. Vol.36 no.5 São Paulo Sept./Oct. 2010*

#### **2.1.3.13.76 European System for Cardiac Operative Risk Evaluation (EuroSCORE)**

**Description:** The European System for Cardiac Operative Risk Evaluation (EuroSCORE) is designed to predict 30-day mortality in patients undergoing cardiac surgery. It is also used to predict other useful parameters, including long-term mortality, length of stay in ICU, and complications. The criteria for evaluation are age (1 point for patients over 60 years old and add 1 more point for every additional 5 years), gender (1 point for female), chronic lung disease (1 point), extracardiac arteriopathy (2 points), neurological dysfunction (2 points), previous cardiac surgery (3 points), preoperative creatinine > 2.3 mg/dL (2 points), active endocarditis (3 points), critical preoperative status (3 points), factors related to cardiovascular status such as unstable angina (2 points), previous acute myocardial infarction (2 points), left ventricle ejection fraction (1 or 3 points) and pulmonary artery systolic pressure > 60mmHg (2 points), surgery-related factors such as emergency surgery (2 points), aortic surgery (3 points), post-infarction septal rupture (4 points), operation other than isolated CABG (2 points). The EuroSCORE results are: low risk (0-2); medium risk (3-5); high risk (> 6).

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- Samer AMN, Francois R, Bradley GH, et al. *Validation of European System for Cardiac Operative Risk Evaluation (EuroSCORE) in North American cardiac surgery. European Journal of Cardio-thoracic Surgery 22 (2002) 101-105*

#### **2.1.3.13.77 Extended Barthel Index (EBI)**

**Description:** The Extended Barthel Index (EBI), consisting of the original Barthel Index plus cognitive items, provides a tool to monitor patients' outcomes in rehabilitation regarding need for help with activities of daily living. The original BI evaluates 10 motor activities of daily living items. The BI extension consists of 6 additional cognitive items. Although originally intended for multiple sclerosis patients, the EBI was validated and is often applied to other neurological patients, including stroke, traumatic brain injury or Parkinson's disease. Similar to the Barthel Index, not all items represent all categories from 0–4, such as item 1-Feeding that can be scored 0, 2, 3 or 4 (category 1 is missing) or item 13-Social interaction with categories 0, 2, 4



(categories 1 and 3 are missing). The total score of cognitive items is 24 and the total score of the EBI ranges of 0-64.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Maritz R, Tennant A, Fellinghauer CS, Stucki G, Prodinger B (2019). The Extended Barthel Index (EBI) can Be Reported as a Unidimensional Interval-Scaled Metric – A Psychometric Study. *Phys Med Rehab Kuror* 2019; 29: 224–232
- Janša J, Pogačnik T, Gompertz P. An Evaluation of the Extended Barthel Index with Acute Ischemic Stroke Patients. *Neurorehabilitation and Neural Repair*. 2004;18(1):37-41

#### **2.1.3.13.78 Face, Legs, Activity, Cry, Consolability Scale (FLACC)**

**Description:** Refer to the feature “Vital signs and clinical parameters calculation” of this document.

#### **2.1.3.13.79 Faces (Claro)**

Refer to the feature “Vital signs and clinical parameters” in the IFU of HIS document.

#### **2.1.3.13.80 Fagerström Score**

**Description:** The Fagerström Score estimates the level of nicotine dependence in tobacco smoking and aids in treatment decisions for tobacco dependence. The score consists of six simple choice questions regarding cigarette consumption profile. Two questions vary from 0 to 3 points and four questions from 0 to 1 point, the total score ranges from 0 to 10. Scores 1 and 2 mean low dependence on nicotine, scores 3 and 4 mean low to moderate dependence, scores 5 to 7 mean moderate dependence and more than 8 means high dependence. The treatment is recommended by the author based on the dependence level.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Fagerström KO. Measuring degree of physical dependence to tobacco smoking with reference to individualization of treatment. *Addict Behav*. 1978;3(3-4):235-41
- Fagerstrom KO, Schneider NG. Measuring nicotine dependence: a review of the Fagerstrom Tolerance Questionnaire. *J Behav Med*. 1989;12(2):159-82

#### **2.1.3.13.81 Fat percentage estimation based on the body density**

**Description:** The Fat percentage estimation based on the body density allows the institution to set the parameters to be added to generate the estimated body fat percentage, in accordance with the referential chart adopted.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Petroski EL, Pires-Neto CS. Validação de equações antropométricas para a estimativa da densidade corporal em mulheres. *Revista Brasileira de Atividade Física e Saúde*. V.1, Nº2, pág. 65-73, 1995
- Petroski EL. *Antropometris: Técnicas e Padronizações*. Porto Alegre: Palotti, pág. 144, 1999

#### **2.1.3.13.82 Fibromyalgia Impact Questionnaire (FIQ)**

**Description:** The Fibromyalgia Impact Questionnaire (FIQ) is an assessment designed to measure the status, evolution and outcomes of patients with fibromyalgia (FM). It is designed to measure the health status

components believed to be most affected by FM. It has 19 questions that are related to functional capacity, professional status, psychological disorders and physical symptoms. Each answer has a value, and the final score is the sum of all values on the questionnaire. The score ranges from 0 to 100, and the higher the score, the higher the impact of fibromyalgia on patient's quality of life.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Burckardt CS, Clark SR, Bennett RM. The Fibromyalgia Impact Questionnaire: Development and Validation. J Rheumatol 18:728-33, 1991*
- *Marques AP, et al. Validação da versão brasileira do Fibromyalgia Impact Questionnaire (FIQ). Rev Bras Reumatol, v. 46, n. 1, p. 24-31, jan/fev, 2006*

#### **2.1.3.13.83      Forrest classification**

**Description:**

Forrest classification is a classification of upper gastrointestinal hemorrhage used for purposes of comparison and in selecting patients for endoscopic treatment. It provides prognostic information on the need for endoscopic therapeutic intervention. This scale classified peptic ulcers according to features that were associated with risk of rebleeding, which are 1–3 groups, with lesions in higher groups showing a decrease in risk of recurrence, such as group 1 (actively bleeding ulcers): (1a) vessels that are either spurting or (1b) (oozing); group 2 (non-actively bleeding ulcers): (2a) non-bleeding but visible vessel, (2b) ulcer with surface clot, or (2c) ulcer with pigmented spots and group 3 includes ulcers with a clean base.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Block, Berthold; Schachschal, Guido; Schmidt, Hartmut H. (2004-01-01). Endoscopy of the Upper GI Tract: A Training Manual. Thieme. ISBN 9783131367310*
- *T. Deist, A. Freytag. "Stomach: Forrest classification in Atlas of Gastroenterological Endoscopy by A. Freytag, T. Deist". [www.endoskopischer-atlas.de](http://www.endoskopischer-atlas.de)*
- *Hadzibulic, Edvin; Svjetlana Govedarica. "Significance of Forrest Classification, Rockall's and Blatchford's Risk Scoring System in Prediction of Rebleeding in Peptic Ulcer Disease". Archived from the original (PDF) on June 3, 2013. Retrieved 2008-08-11*
- *Heldwein W; Schreiner J; Pedrazzoli J; Lehnert P (Nov 21, 1989). "Is the Forrest classification a useful tool for planning endoscopic therapy of bleeding peptic ulcers?". Endoscopy. 21 (6): 258-62. PMID 2693077. DOI:10.1055/s-2007-1010729*
- *Forrest, JA, Finlayson, ND, Shearman, DJ (Aug 1974). "Endoscopy in gastrointestinal bleeding." Lancet 2 (7877): 3947. PMID 4136718*

#### **2.1.3.13.84      Framingham Risk Score (FRS)**

**Description:** The Framingham Risk Score (FRS) was derived from the Framingham Heart Study as a prediction model to estimate 10-year and lifetime risks for atherosclerotic cardiovascular disease. The information required to calculate the risk includes age, gender, race, total cholesterol, HDL cholesterol, SBP, hypertension medication, diabetes, and smoking. The final result represents the 10-year risk for cardiovascular disease, defined as coronary death or nonfatal myocardial infarction, or fatal or nonfatal stroke.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Wilson PW, D'Agostino RB, Levy D, Belanger AM, Silbershatz H, Kannel WB. Prediction of coronary heart disease using risk factor categories. *Circulation*. 1998; 97: 1837-47
- <https://framinghamheartstudy.org/fhs-risk-functions/cardiovascular-disease-10-year-risk/>

#### **2.1.3.13.85 Framingham - ATP III Score**

**Description:** The Framingham - ATP III score is used to estimate 10-year risk for myocardial infarction and death due to atherosclerotic cardiovascular disease in adults without cardiopathy and without diabetes. This version of the Framingham Risk Score was published by the Adult Treatment Panel III (ATP III), an expert panel of the National Heart, Lung, and Blood Institute, which is part of the USA National Institutes of Health (NIH). The first Framingham Risk Score included age, gender, LDL cholesterol, HDL cholesterol, BP (and also whether the patient is treated or not for hypertension), diabetes, and smoking. The updated version was modified to include dyslipidemia, age range, hypertension treatment, smoking, and total cholesterol, and it excluded diabetes, because Type 2 diabetes meanwhile was considered to be a coronary heart disease (CHD) Risk Equivalent, having the same 10-year risk as individuals with prior CHD. Patients with Type 1 diabetes were considered separately with slightly less aggressive goals. While at increased risk, no study had shown them to be at equivalent risk for CHD as those with previously diagnosed coronary disease or Type 2 diabetes. The information required to calculate the risk includes age, gender, race, total cholesterol, HDL cholesterol, SBP, hypertension medication use, and smoking status. The final result represents the 10-year risk for cardiovascular disease, defined as coronary death or nonfatal myocardial infarction, or fatal or nonfatal stroke.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Executive Summary of the Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III)*. *JAMA*. 2001; 285 (19): 2486-2497
- Sposito AC, Caramelli B, Fonseca FAH, Bertolami MC, Souza, Aguinaldo D, Chacra AP, Faludi AA, IV Diretriz Brasileira Sobre Dislipidemias e Prevenção da Aterosclerose (2007). *Departamento de Aterosclerose da Sociedade Brasileira de Cardiologia*. *Arq. Bras. Cardiol*. 2007; 88 (Supl. I):1-19

#### **2.1.3.13.86 Framingham AF Risk Score**

**Description:** The Framingham AF risk score predicts the 5-year risk of stroke or death in individuals with new-onset atrial fibrillation (AF) in the community. The information required to calculate the risk includes age, SBP, diabetes, smoking, prior myocardial infarction or congestive heart failure, significant murmur, and electrocardiographic left ventricular hypertrophy. The final result represents the 5-year risk for stroke or death (the higher the score, the higher the risk of atrial fibrillation).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Wang TJ, Massaro JM, Levy D, et al. A risk score for predicting stroke or death in individuals with new-onset atrial fibrillation in the community. *JAMA*. 2003; 290:1049-1056
- <https://framinghamheartstudy.org/fhs-risk-functions/stroke-or-death-after-atrial-fibrillation/>

- Schnabel, Renate & Sullivan, Lisa & Levy, Daniel & Pencina, Michael & Massaro, Joseph & D'Agostino, Ralph & Newton-Cheh, Christopher & Yamamoto, Jennifer & Magnani, Jared & Tadros, Thomas & Kannel, William & Wang, Thomas & Ellinor, Patrick & Wolf, Prof & Vasan, Ramachandran & Benjamin, Emelia. (2009). Development of a risk score for atrial fibrillation (Framingham Heart Study): A community-based cohort study. *Lancet*. 373. 739-45. 10.1016/S0140-6736(09)60443-8.

#### 2.1.3.13.87 Fujinaga Scale

**Description:** The Fujinaga Scale also called Preterm Oral Feeding Readiness Assessment Scale assists HCP to initiate preterm feeding in view of promoting safe and objective breastfeeding. It consists of five categories, with a total of 18 items: corrected gestational age ( $\leq 32$  weeks; 32-34 weeks and  $\geq 34$  weeks), behavioral organization state (state of consciousness, posture and global tone), oral posture (lips and tongue posture), oral reflexes (seeking reflex, suction, biting and vomiting) and non-nutritive sucking (tongue movement, tongue canopy, jaw movement, suction force, paused suction, maintenance of paused suction rhythm, maintenance of alertness and signs of stress). The performance of preterm infants in each item varies from 0 to 2. The maximum final scoring is 36 points, and a higher score indicates the preterm readiness to start oral feeding.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- Fijunaga CI, et al. *Prontidão do prematuro para início da alimentação oral: proposta de um instrumento de avaliação*. Universidade de São Paulo: Escola de enfermagem de Ribeirão Preto. 2002
- Fujinaga et al. *Confiabilidade do instrumento de avaliação da prontidão do prematuro para alimentação oral*. *Pró-Fono Revista de Atualização Científica*, v. 19, n. 2, abr.-jun. 2007

#### 2.1.3.13.88 Functional Independence Measure (FIM)

**Description:** The Functional Independence Measure (FIM) is a tool for assessing the incapacity of patients with a variety of functional restrictions. Its main objective is to assess quantitatively the load of care demanded by one person for the completion of a series of daily motor and cognitive tasks. The tool is comprised of 18 items, grouped into 2 subscales - motor and cognition. The motor subscale includes items such as eating, grooming, bathing, dressing, (upper body), dressing, (lower body), toileting, bladder management, bowel management, transfers - bed/chair/wheelchair, transfers - toilet, transfers - bath/shower, walk/wheelchair, and stairs. The cognition subscale includes comprehension, expression, social interaction, problem solving, and memory. Each item is scored on a 7-point ordinal scale, ranging from a score of 1 to a score of 7. The higher the score, the more independent the patient is in performing the task associated with that item. The total FIM (the sum of the motor and cognition subscale scores) ranges from 18 to 126.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- Linacre JM, Heinemann AW, Wright BF, Granger CV, Hamilton BB. *The structure and stability of the Functional Independence Measure*. *Arch Phys Med Rehabil* 1994;75: 127-32
- Granger CV, Hamilton BB, Keith RA, Zielezny M, Sherwin FS. *Advances in functional assessment for rehabilitation*. In *Topics in geriatric rehabilitation*. Rockville, MD: Aspen; 1986

#### 2.1.3.13.89 Glasgow Coma Scale (GCS)

**Description:** The Glasgow Coma Scale (GCS) is used to evaluate the level of consciousness in the acutely ill trauma and non-trauma patient and assists with predictions of neurological outcomes and mortality. Three

criteria are evaluated: best eye response (score ranges from 1 to 4), best verbal response (score ranges from 1 to 5), and best motor response (score ranges from 1 to 6). The total score varies from 3 points (severe encephalic injury) to 15 points (normality). Mild head injuries are generally defined as those associated with a GCS score of 13-15, and moderate head injuries are those associated with a GCS score of 9-12. A GCS score of 8 or less defines a severe head injury.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Jennett B. *Assessment of the Severity of Head Injury*. Lancet, V.13, n7, p.81-3, 1974

#### **2.1.3.13.90 Glasgow Coma Scale (GCS) 2018**

**Description:** The Glasgow Coma Scale (GCS) 2018 is a scale used to evaluate the level of consciousness in the acutely ill trauma and non-trauma patient and assists with predictions of neurological outcomes and mortality. The criteria evaluated are best eye response (score ranges from 1 to 4), best verbal response (score ranges from 1 to 5), and best motor response (score ranges from 1 to 6). In the 2018 version, if any criteria cannot be tested, then "Non testable (NT)" shall be marked. Furthermore, there is possibility for assessment of pupil reaction, called GCS Pupils Score or GCS-P. It summarizes information about loss of pupil reactivity to light and decreases from total score: 0 points if both pupils are normal (reactive to light), -1 point if one pupil is unreactive to light, and -2 points if both pupils are unreactive to light. The total score varies from 1 to 15 points, and the lower the score, the higher the mortality and unfavorable outcome.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- <https://www.glasgowcomascale.org/downloads/GCS-Assessment-Aid-Brazilian.pdf>
- <http://www.glasgowcomascale.org>
- American College of Surgeons Committee on Trauma. Advanced Trauma Life Support; ATLS. 10 ed., 2018
- Brennan PM, Murray GD, Teasdale GM: *Simplificando o uso de informações prognósticas em lesão cerebral traumática. Parte 1: A pontuação GCS-Pupils: um índice estendido de gravidade clínica*. J Neurosurg : 2018

#### **2.1.3.13.91 Global Assessment of Functioning Scale (GAF)**

**Description:** The Global Assessment of Functioning (GAF) scale is used to rate how serious a mental illness may be. It's designed to help mental health providers understand how well the person can do everyday activities. The score can help figure out what level of care someone may need and how well certain treatments might work. It measures how much a person's symptoms affect their day-to-day life on a scale of 0 to 100. It's broken into 10 sections. These are known as anchor points. The higher your score, the better the score, the better the patient is able to handle daily activities.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Sá Junior, AR, Souza MC. Avaliação do comprometimento funcional na esquizofrenia. Rev. Psiquiatr. Clín. Vol.34 suppl.2 São Paulo 2007

- *American Psychiatric Association; Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition, Washington, DC, American Psychiatric Association, 1994

#### **2.1.3.13.92 Global Initiative for Chronic Obstructive Lung Disease (GOLD) Group Classification**

**Description:** The Global Initiative for Chronic Obstructive Lung Disease (GOLD) is a program that produces recommendations for management of Chronic Obstructive Pulmonary Disease (COPD) based on the available scientific information. The assessment includes four variables: 1) GOLD classification regarding the airflow limitation in spirometry based on post-bronchodilator FEV<sub>1</sub>, 2) exacerbation history, 3) dyspnea status, and 4) COPD assessment test (CAT). The result classifies the patient in one of four groups (A, B, C, D) with specific different therapies based on the GOLD report.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Global Strategy for the Diagnosis, Management, and Prevention of COPD (2017 Report)* from [www.goldcopd.org](http://www.goldcopd.org). The tables and figures in this Pocket Guide follow the numbering of the 2017 Global Strategy Report for reference consistency

#### **2.1.3.13.93 Global Risk Classification (GRC)**

**Description:** The Global Risk Classification (GRC) is a combination of the EuroSCORE and SYNTAX scores. It can be used to predict two-year cardiac mortality in de-novo left main coronary artery (LMCA) disease patients undergoing percutaneous coronary intervention (PCI).

The GRC combines the results of the EuroSCORE and SYNTAX scores to classify patients into three risk groups. The low-risk group is composed of patients with low/intermediate EuroSCORE and low/intermediate SYNTAX score. The intermediate risk group is composed of patients with an intermediate/high EuroSCORE or intermediate/high SYNTAX score. The high-risk group is composed of patients with a high EuroSCORE and a high SYNTAX score.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Global Risk Score and Clinical SYNTAX Score as Predictors of Clinical Outcomes of Patients Undergoing Unprotected Left Main Percutaneous Catheter Intervention*, *Cardiol. Res.* 2017;8(6): 312-318
- *Global risk classification and clinical SYNTAX (synergy between percutaneous coronary intervention with TAXUS and cardiac surgery) score in patients undergoing percutaneous or surgical left main revascularization*, *JACC. Cardiovasc. Interv.* März 2011, 4(3): 287-297. DOI: 10.1016/j.jcin.2010.10.013

#### **2.1.3.13.94 Goldman Index**

**Description:** The Goldman Index was developed in 1977 by Goldman and associates. It is used to establish the risk of cardiovascular morbidity and mortality in patients who would undergo non-cardiac surgery. High age, history of heart or valve diseases, changes in ventilatory parameters or biochemical markers, as well as surgical history contribute to the increased risk of complications. Risk points allow perioperative estimation of cardiac risk and determine the likelihood of complications such as acute myocardial infarction, acute lung edema, ventricular tachycardia, and cardiac death. The estimated risk of death is classified according to the following values: class I for 0.2% (0-5 points), class II for 2.0% (6-12 points), class III for 2.0% (13-25 points) and class IV for 56%. (> 25 points).

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- Goldman L, Calderal DL, Nussbaum SR et al – Multifactorial index risk in noncardiac surgical procedures. *N Engl J Med*, 1977;20;297:845-850
- Ramos G, Assis CH, et al. Avaliação Pré-Operatória do Pneumopata. *As Bras Anesthesiol*, 2003; 53: 1: 114 – 126

#### 2.1.3.13.95 GRACE Score

**Description:** The GRACE Score is a prospectively studied scoring system to stratify patients with at-risk Acute Coronary Syndrome (ACS). The score was derived from the Global Registry of Acute Coronary Events study, a massive international database of ACS from 94 hospitals in 14 countries and aims to estimate in-hospital mortality from 6 months to 3 years and is composed of eight variables. Five of the variables are computed semi quantitatively, that is, different weight for each age stratum, SBP, HR, plasma creatinine and class of Killip (Killip I - no dyspnea, third sound or lung rales; Killip II - dyspnea and lung rales in the lower thirds of the chest; Killip III - acute lung edema; Killip IV - cardiogenic shock). In addition, three variables are computed dichotomously related to ST-segment depression, a marker of myocardial necrosis, and cardiac arrest on admission. The final score ranges from 0 to 372 points and determines the percentage of mortality risk. The higher the score, the higher the mortality risk.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- Fox KAA, Goodman SG, Klein W, Brieger D, Steg PhG, Dabbous O, Avezum A, for the GRACE Investigators. Management of acute coronary syndromes. Variations in practice and outcome. Findings from the Global Registry of Acute Coronary Events (GRACE). *Eur Heart J* 2002; 23:1177-89
- Granger CB, Goldberg RJ, Dabbous O, Pieper KS, Eagle KA, Cannon CP, et al; Global Registry of Acute Coronary Events Investigators. Predictors of hospital mortality in the Global Registry of Acute Coronary Events. *Arch Intern Med*. 2003;163(19):2345-53. doi: 10.1001/archinte.163.19.2345.

#### 2.1.3.13.96 GRACE 2.0 Score

**Description:** As the previous GRACE Score version, the GRACE 2.0 Score is used to help clinicians assess the risk of death or myocardial infarction (MI) and serves as a guide to treatment options for patients with ACS. Although accurate, a major limitation to the widespread use of the GRACE Risk Score is the inclusion of several variables, including Killip class and creatinine values at the time of the patient's hospital presentation. GRACE Risk Score 2.0 was developed to address these limitations and to evaluate the short- and long-term risk for dying after an ACS, including up to 3 years after discharge. GRACE 2.0 is an improved and refined list of outcomes from GRACE, and instead of using score ranges to calculate outcomes like in-hospital mortality, it is possible to calculate a mortality for every score. The higher the score, the higher the probability of death from admission to 6 months.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- Fox KA, Dabbous OH, Goldberg RJ, Pieper KS, Eagle KA, Van de Werf F, Avezum A, Goodman SG, Flather MD, Anderson FA, Jr., Granger CB. Prediction of risk of death and myocardial infarction in the six months after presentation with acute coronary syndrome: prospective multinational observational study (GRACE). *BMJ*. 2006;333:1091

- *Granger CB, Goldberg RJ, Dabbous O, Pieper KS, Eagle KA, Cannon CP, Van De Werf F, Avezum A, Goodman SG, Flather MD, Fox KA. Predictors of hospital mortality in the global registry of acute coronary events. Arch Intern Med. 2003;163:2345–2353*
- *Eagle KA, Lim MJ, Dabbous OH, Pieper KS, Goldberg RJ, Van de Werf F, Goodman SG, Granger CB, Steg PG, Gore JM, Budaj A, Avezum A, Flather MD, Fox KA. A validated prediction model for all forms of acute coronary syndrome: estimating the risk of 6-month postdischarge death in an international registry. JAMA. 2004;291:2727–2733*
- *Fox KA, Fitzgerald G, Puymirat E, Huang W, Carruthers K, Simon T, Coste P, Monsegu J, Gabriel Steg P, Danchin N, Anderson F. Should patients with acute coronary disease be stratified for management according to their risk? Derivation, external validation and outcomes using the updated GRACE risk score. BMJ Open. 2014;4:e004425*

#### **2.1.3.13.97 Gross Motor Function Measurement (GMFM)**

**Description:** The Gross Motor Function Measurement (GMFM) is an instrument that quantitatively assesses broad motor skills, aimed at children with cerebral palsy and assists in the treatment plan aimed at improving function and quality of life. In 1990, the GMFM was modified, including 3 new items from the original 85 items, totaling 88. These 88 items are measured by observation of children and rated on an original scale from 0 to 4 points for each item evaluated. They are grouped into 5 dimensions which are classified as: “A” for lying and rolling, “B” to sit, “C” to crawl and kneel, “D” standing, and “E” walking, running and jumping. The purpose of the assessment is to generate a percentage of functional motor skills in a patient with neuromuscular disease.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Lane, M. Apostila do curso de Medição da Função Motora Grossa – GMFM. Reabilitação Especializada. São Paulo: GMFM; 2000*
- *Pina LV, Loureiro APC. O GMFM e sua aplicação na avaliação motora de crianças com paralisia cerebral. Fisioterapia em Movimento, Curitiba, v.19, n.2, p. 91-100, abr./jun., 2006*

#### **2.1.3.13.98 Hamilton Depression Rating Scale (HDRS)**

**Description:** The Hamilton Depression Rating Scale (HDRS), also known as the Ham-D, is a widely used depression assessment scale that aims to measure the frequency and intensity of depressive symptoms in individuals with major depressive disorder. The scale contains 17 variables: depressed mood, feelings of guilt, suicide, early night insomnia, middle of the night insomnia, early morning insomnia, work and activities, slowness of thought and speech, impaired ability to concentrate, decreased motor activity, agitation, psychic anxiety, somatic anxiety (physiological concomitants of anxiety such as: dry mouth, somatic gastro-intestinal symptoms, general somatic symptoms), genital symptoms (symptoms such as loss of libido, menstrual disturbances), hypochondriasis, loss of weight, and insight. The variables are measured either on five-point or three-point scales, the latter being used where quantification of the variable is either difficult or impossible. No distinction is made between intensity and frequency of symptoms, the rater having to give due weight to both in making his judgment. The scale result is the simple sum of all answers given: normal (0 to 7), mild depression (8 to 13), moderate depression (14 to 18), severe depression (19 to 22), and very severe depression (> 23).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**



- *Hamilton M. A rating scale for depression. J Neurol Neurosurg Psychiatry 1960*

#### 2.1.3.13.99 HAS-BLED Score

**Description:** The HAS-BLED Score is recommended to be used in association with CHA2DS2-VASc to support the anticoagulation indication for a specific patient. The score takes in consideration 9 items, which are hypertension, renal disease, liver disease, stroke history, prior major bleeding or predisposition, labile INR, age above 65 years old, medication usage predisposing to bleeding and alcohol usage. Each attended item is graded as 1, and the final score is the sum of all items, with a total of 9. Results  $\geq 3$  suggests to the clinician to take into consideration alternatives to anticoagulation being used.

**System functions:** Electronic Patient Chart->Scores and Indexes

#### Sources:

- *Pisters R, Lane DA Nieuwlaet R, de Vos CB, Crijns HJ, Lip GY. A novel user-friendly score (HAS-BLED) to assess 1-year risk of major bleeding in patients with atrial fibrillation: the Euro Heart Survey. Chest. 2010 Nov;138(5):1093-100. Epub 2010 Mar 18*
- *Lip GY, Frison L, Halperin JL, Lane DA. Comparative validation of a novel risk score for predicting bleeding risk in anticoagulated patients with atrial fibrillation: the HAS-BLED (Hypertension, Abnormal Renal/Liver Function, Stroke, Bleeding History or Predisposition, Labile INR, Elderly, Drugs/Alcohol Concomitantly) score. J Am Coll Cardiol. 2011 Jan 11;57(2):173-80. Epub 2010 Nov 24*
- [Http://www.mdcalc.com/has-bleed-score-for-major-bleeding-risk](http://www.mdcalc.com/has-bleed-score-for-major-bleeding-risk)

#### 2.1.3.13.100 Helios Kliniken Preoperative Assessment of Cardiopulmonary Risk

**Description:** The Helios Kliniken Preoperative Assessment of Cardiopulmonary Risk is a preoperative assessment form to stratify cardiovascular surgical risk. It was developed by the Helios Kliniken medical team and consists of two classifications, one by the anesthesiologist and one by the surgeon. The anesthetist's assessment consists of four different scores (0 – no increased risk, 1 – low risk, 3 – medium risk or 5 – high risk) depending on the patient's previous health conditions, and the surgeon's assessment consists of 3 scores (2 – low risk, 3 – medium risk or 5 – high risk) depending on the type of surgery. The two assessments are summed to obtain the result: from 2 to 5 points, the patient is considered approved for the surgery, 6 points the patient is approved for the surgery only if the exercise capacity is higher than climbing two or more flights of stairs, from and 7 to 10 points the patient is considered at risk for the procedure in question.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- *Sebastian K, Arkadiusz K, Paweł R, Maciej Ż. Preoperative evaluation; new attempt, Polski Przegląd Chirurgiczny 2015, 87, 12, 644–654*
- [Https://issuu.com/mwv-berlin/docs/20\\_jahr\\_helios\\_burgard/5](https://issuu.com/mwv-berlin/docs/20_jahr_helios_burgard/5)

#### 2.1.3.13.101 Hospital Anxiety and Depression Scale

**Description:** The Hospital Anxiety and Depression Scale is a self-assessment scale developed and found to be a reliable instrument for detecting states of depression and anxiety in the setting of an hospital medical outpatient clinic. The anxiety and depressive subscales are also valid measures of severity of the emotional disorder. The questionnaire consists of 14 items (7 depression and 7 anxiety questions) . For each question there are 4 answer options with a score of 0, 1, 2 or 3. For both Anxiety and Depression subscales the results represent: normal from 0 to 7 points, borderline (doubtful) cases from 8 to 10 points, and definite cases (abnormal) from 11 to 21.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Zigmond, AS; Snaith, RP. "The hospital anxiety and depression scale". Acta Psychiatrica Scandinavica. 1963. 67 (6): 361-370*

#### **2.1.3.13.102 House-Brackmann Scale**

**Description:** The House-Brackmann Scale is a tool to grade the degree of nerve damage in a facial nerve palsy. The measurement is determined by measuring the upwards movement of the mid-portion of the top of the eyebrow, and the outwards movement of the angle of the mouth. The result is the simple assessment level from six possibilities, ranging from normal facial function in all areas (grade I) to total facial paralysis, that means no movement (grade VI).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *House JW, Brackmann DE. Facial nerve grading system. Otolaryngol Head Neck Surg. 1985;15:146-147*
- *Tessitore A, Magna LA, Paschoal JR. Medida angular para aferição do tônus muscular na paralisia facial. Pró-Fono R. Atual. Cient. vol.22 no.2 Barueri Apr/June 2010*
- *Ferreira MAA. Paralisia facial periférica e gestação: abordagem e tratamento. Rev Bras Ginecol Obstet. 2013; 35(8):368-72*

#### **2.1.3.13.103 Humpty Dumpty Scale**

**Description:** The Humpty Dumpty Scale is used for risk assessment and prevention of falls in infant patients. It has 7 parameters with specific criteria for scoring related to age, gender, diagnosis, cognitive disabilities, environmental factors, response to surgery/sedation/anesthesia and use of medicines. The minimum score is 7, and the maximum is 23. A scale result  $\geq 12$  indicates a risk of fall.

**System functions:** Electronic Patient Chart->Scores and Indexes

**Sources:**

- [Pauley BJ](#), [L Houston S](#), [Cheng D](#), [Johnston DM](#). Clinical relevance of the Humpty Dumpty Falls Scale in a pediatric specialty hospital. *Pediatr Nurs*, May-Jun 2014;40(3):137-42
- *The Humpty Dumpty Falls Prevention Program™*

#### **2.1.3.13.104 Hunt and Hess Scale**

**Description:** The Hunt and Hess Scale is a graded scale used to classify and establish the severity of non-traumatic subarachnoid hemorrhage (SAH), predict the mortality rate based on clinical characteristics observed in a patient, and is also used to determine the surgical risk of patients undergoing surgery for SAH. The scale consists of five grades ranging from minimally symptomatic to coma. Each grade corresponds to a specific set of clinical examination findings from 3 areas (level of arousal, reflexes, and meningeal irritation), such as grade I (asymptomatic or minimal headache and slight nuchal rigidity), with a 70% survival; grade II (moderate to severe headache, no nuchal rigidity other than cranial nerve palsy), with 60% survival; grade III (drowsiness, confusion, or mild focal deficit), with 50% survival; grade IV (stupor, moderate to severe

hemiparesis, possible early decerebrate rigidity and vegetative disturbances), with 20% survival; and grade V (deep coma, decerebrate rigidity, moribund appearance), with 10% survival.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Hunt WE, Hess RM. Surgical risk as related to time of intervention in the repair of intracranial aneurysms. Journal of Neurosurgery 1968 Jan;28(1):14-20*
- *Hunt WE, Meagher JN, Hess RM. Intracranial aneurysm. A nine-year study. Ohio State Medical Journal 1966 Nov;62(11):1168-71*
- *Lantigua H, Ortega-Gutierrez S, Schmidt JM, Lee K, Badjatia N, Agarwal S, Claassen J, Connolly ES, Mayer SA. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4556224/> Crit Care. 2015 Aug 31;19(1):309.*

**2.1.3.13.105 Insomnia Severity Index (ISI)**

**Description:** The Insomnia Severity Index (ISI) is a 7-item self-report questionnaire assessing the nature, severity, and impact of insomnia. The usual recall period is the “last month” and the dimensions evaluated are severity of sleep onset, sleep maintenance, early morning awakening problems, sleep dissatisfaction, interference of sleep difficulties with daytime functioning, noticeability of sleep problems by others, and distress caused by the sleep difficulties. A 5-point Likert scale is used to rate each item (e.g., 0 = no problem; 4 = very severe problem), yielding a total score ranging from 0 to 28. The total score is interpreted as follows: no clinically significant insomnia (0-7); subthreshold insomnia (8-14); moderate insomnia (15-21); and severe insomnia (22-28).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Morin CM, Belleville G, Bélanger L, Ivers H. The Insomnia Severity Index: Psychometric Indicators to Detect Insomnia Cases and Evaluate Treatment Response. Sleep. 2011 May 1; 34(5): 601–608*
- *Bastien CH, Vallières A, Morin CM. Validation of the Insomnia Severity Index as an outcome measure for insomnia research. Sleep Med. 2001 Jul;2(4):297-307. doi: 10.1016/s1389-9457(00)00065-4. PMID: 11438246.*

**2.1.3.13.106 Intensive Care Delirium Triage Checklist (ICDSC)**

**Description:** The Intensive Care Delirium Triage Checklist (ICDSC) was created in 2001 and can be applied by a clinician or a nurse in a busy critical care setting to screen all patients even when communication is compromised. The tool can be utilized quickly and helps to identify delirious patients. It includes the evaluation of eight items such as altered level of consciousness, inattention, disorientation, hallucination or delusion, psychomotor agitation or retardation, inappropriate mood or speech, sleep/wake cycle disturbance, and symptom fluctuation. For each item, obvious manifestation of an item = 1 point, no manifestation of an item or no assessment possible = 0 point. The score ranges from 0 to 8 and the higher final score indicates greater severity.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources :**

- *Bergero N, et al. Intensive Care Delirium Screening Checklist: evaluation of a new screening tool. Intensive Care Med. 2001 May;27(5):859-64*

- *Gusmao-Flores D, Salluh JJ, Dal-Pizzol F, Ritter C, Tomasi CD, Lima MA, et al. The validity and reliability of the Portuguese versions of three tools used to diagnose delirium in critically ill patients. Clinics (As Paulo). 2011;66(11):1917-22*
- *Carvalho JPLM, Almeida ARP, Flores DG. Escalas de avaliação de delirium em pacientes graves: revisão sistemática da literatura. Rev Bras Ter Intensiva. 2013 ;25(2) :148-154*

#### **2.1.3.13.107 International Prostate Symptom Score (IPSS)**

**Description:** International Prostate Symptom Score (IPSS) assists in the diagnose and evaluation of symptoms of benign prostatic hyperplasia (BPH). The score consists of 4 questions related to obstructive symptoms and 3 related to irritative symptoms. IPPS values range from 0 to 7, 8 to 19 and 20 to 35 represent mild, moderate and severe symptoms, respectively.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- *Junior PNL, et al. Correlation between urinary flow rate, quality of life and international prostate symptom score (I-PSS) in patients with benign prostatic hyperplasia (BPH). Braz J Urol, 27: 353-357, 2001*

#### **2.1.3.13.108 International Staging System (ISS)**

**Description:** International Staging System (ISS) is a tool used to assess the prognosis of patient with multiple myeloma. Based exclusively on the  $\beta_2$  microglobulin and albumin levels at diagnosis, the ISS relies on simple and available lab parameters, and thus may be more objective than previous staging systems, including the Salmon-Durie system based on clinical variables. Multiple Myeloma ISS interpretation: stage I (Serum  $\beta_2$  microglobulin <3.5 mg/L AND serum albumin  $\geq$  3.5 g/dL), stage II (either serum  $\beta_2$  microglobulin <3.5 mg/L, but serum albumin <3.5 g/dL or serum  $\beta_2$  microglobulin 3.5 – 5.4 mg/L irrespective of the serum albumin), and stage III (serum  $\beta_2$  microglobulin  $\geq$ 5.5 mg/L). his model classified patients in 3 risk groups: stage I (median overall survival 62 months), stage II (45 months), and stage III (29 months).

**System functions:** Electronic Patient Chart>Scores and Indexes

#### **Sources:**

- *Greipp PR, San MJ, Durie BG et al. International staging system for multiple myeloma. J Clin Oncol. 2005;23(15):3412-20*
- *Maiolino A et al. Avaliação de risco em mieloma múltiplo: resultados preliminares do grupo brasileiro de estudos de mieloma. Rev. Bras. Hematol. Hemoter. Vol.30 suppl.2 São Paulo June 2008*

#### **2.1.3.13.109 International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI)**

**Description:** The International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI) was developed and is maintained by the American Spinal Injury Association (ASIA). The ISNCSCI is the most well-established assessment to characterize the neurological impairment after a spinal cord injury. It describes a person's functional impairment as a result of a spinal cord injury (SCI). The ISNCSCI consists of two major parts; neurological evaluation and a subsequent classification. The classification is performed based on the sensory examination of light touch appreciation and pin prick discrimination along 28 dermatomes per body side, as well as the manual muscle test for 10 key muscles per body side and an anorectal examination for deep anal pressure sensation and voluntary anal contraction. For the sensory group the total score is 112 and for the motor group the score is 100.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *American Spinal Injury Association. Worksheet International standards for neurological classification of spinal cord injury (ISNCSCI); Revised version November 2015*

**2.1.3.13.110 Interstroke Stress Scale**

**Description:** Interstroke Stress Scale is used for psychologic stress evaluation. Self-perceived psychological stress as a risk factor for coronary arterial disease (CAD) was evaluated in men without previous myocardial infarction. For this scale, stress was defined as a feeling of tension, irritability or anxiety, or having sleeping difficulties as a result of conditions at work or at home. The scale presents the following options to be selected: (1) never experienced stress, (2)  $\geq 1$  period of stress, (3) some period of stress during the last 5 years, (4) several periods of stress during the last 5 years, (5) permanent stress during the last year or (6) permanent stress during the last 5 years.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- *Rosengren, Annika. et al. Self-Perceived Psychological Stress and Incidence of Coronary Artery Disease in Middle-Aged Men. Am J. Cardio 1991; 98: 1171-1175*

**2.1.3.13.111 Japan Coma Scale (JCS)**

**Description:** The Japan Coma Scale (JCS) is a grading system to evaluate disturbed consciousness. It was first published in 1974 and is certified as a standard field tool assessing the level of consciousness by the Japan Fire and Disaster Management Agency. The scale is composed of four main categories: 0 and one-, two-, and three-digit codes corresponding with alert, awake without stimuli, arousable with some stimuli (but reverts to previous status if stimulus stops), and unarousable by any forceful stimuli, respectively. Each code is further divided into three subcategories: 1, 2 and 3 in the one-digit code, 10, 20, and 30 in the two-digit code, and 100, 200, and 300 in the three-digit code. Hence, there are 10 grades in total. As note, the user can select also if there is restlessness (R), incontinence (I) and apallic state or akinetic mutism (A). The result is shown as 30R or 20I, for example.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Yumoto, T., Naito, H., Yorifuji, T. et al. Association of Japan Coma Scale score on hospital arrival with in-hospital mortality among trauma patients. BMC Emerg Med 19, 65 (2019). <https://doi.org/10.1186/s12873-019-0282-x>*

**2.1.3.13.112 Johns Hopkins Fall Risk Assessment Tool (JHFRAT)**

**Description:** The Johns Hopkins Fall Risk Assessment Tool (JHFRAT) was developed by the Johns Hopkins University in 2005 and revised in 2007. The risk assessment areas consist of: category of the fall risk factor (high or low) and, if an option is completed, enables the rest of the scale; age (1 or 2 or 3 points); history of fall in the 6 months prior to admission (5 points); intestinal and vesical eliminations (2 or 4 points); medications: including PCA pump/opioids, anticonvulsants, anti-hypertensives, diuretics, hypnotics, laxatives, sedatives and psychotropics (3 or 5 or 7 points); patient care equipment: any equipment that compromises the patient's mobility such as infusion IV, chest tube, catheters, pneumatic compressors (1 or 2 or 3 points); mobility (2 points for each option, allows multiple choices) and cognition (1 – 2 – 4 points for each option, allows multiple choices). The final score defines risk: low risk (0-5 points), moderate risk (6 – 13 points) and high risk (>13 points). The criteria for application of the scale are during the first eight hours following the patient's admission, once a day thereafter and as per changes to the patient's clinical condition or risk condition.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Poe SS, et al. An Evidence-based Approach to Fall Risk Assessment, Prevention, and Management. Journal of Nursing Care Quality/April-June 2005*
- *Poe SS, et al. The Johns Hopkins Fall Risk Assessment Tool. Journal of Nursing Care Quality/October-December 2007*

**2.1.3.13.113 Karnofsky Performance Scale Index**

**Description:** The Karnofsky Performance Scale Index is used in oncology, hematology and related areas in order to attempt to qualify the overall wellbeing of patients and determine the possibility of receiving chemotherapy, the need of adjusting the doses of these medications. The tool classifies patients on a scale of 0 to 100 where the lower the Karnofsky score, the worse the survival for most serious illnesses, the patient is unable to care for self; requires equivalent of institutional or hospital care; disease may be progressing rapidly. The rating 100% corresponds to perfect health, the patient can carry on normal activity and to work, no special care needed.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- *Karnofsky DA, Burchenal JH. (1949). "The Clinical Evaluation of Chemotherapeutic Agents in Cancer." In: MacLeod CM (Ed), Evaluation of Chemotherapeutic Agents. Columbia Univ Press. Page 196*
- *Schag CC, Heinrich RL, Ganz PA. Karnofsky performance status revisited: Reliability, validity, and guidelines. J Clin Oncology. 1984; 2:187-193*
- *O'Toole DM, Golden AM. Evaluating cancer patients for rehabilitation potential. West J Med. 1991; 155:384-387*

**2.1.3.13.114 Katz Index of Independence in Activities of Daily Living**

**Description:** The Katz Index of Independence in Activities of Daily Living, commonly referred to as the Katz ADL, is an instrument used to assess functional status as a measurement of the patient's ability to perform activities of daily living independently. It has been used gerontological literature to assess the functionality of the elderly in basic daily living activities. The presentation of the result in this index was modified by The Hartford Institute for Geriatric Nursing in 1998. The Index ranks adequacy of performance in the six functions of bathing, dressing, toileting, transferring, continence, and feeding. Patients are scored yes/no for independence in each of the six functions. A score of 6 indicates full function (patient independent), 4 indicates moderate impairment, and  $\leq 2$  indicates severe functional impairment.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. Studies of illness in the aged. The index of ADL: a standardized measure of biological and psychosocial function. JAMA. 1963; 185 (12):914-9*
- *The Hartford Institute for Geriatric Nursing. Katz Index of Independence in Activities of Daily Living (ADL) [1998]. [text on the Internet]. New York; 2005*

#### 2.1.3.13.115 Kendall Scale

**Description:** The Kendall Scale is used to evaluate muscle strength. It is a numerical scale graduated in: 0 – null (absence of contraction), 1 – trace (there is a slight contraction, but incapable of produce movement), 2 – weak (there is movement only in the absence of gravity), 3 – regular (can move by overcoming gravity), 4 – good (can move by overcoming gravity and also an external resistance) and 5 – normal (can perform movement overcoming a resistance greater than the good muscle).

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- Kendall FP, McCreary EK, Provance PG. *Músculos: prova e funções com postura e dor*. 4. Ed. São Paulo: Manole, 1995
- Silva MB, et al. *Análise dos instrumentos de avaliação na miopatia*. Revista de neurociências. V14 N2 – ABR/JUN, 2006 (029-043)

#### 2.1.3.13.116 Kidney Failure Classification (RIFLE)

**Description:** Acute Kidney Injury (AKI) is a common medical condition in critically ill patients and is well recognized for its impact in the intensive care unit setting. To establish a uniform AKI definition and scoring, the Acute Dialysis Quality Initiative (ADQI) formulated the RIFLE (Risk, Injury, Failure, Loss and End-stage kidney disease) classification. The RIFLE classification is based on creatinine values or glomerular filtration rate and urinary output determinants, and considers three severity classes of AKI (Risk, Injury and Failure), according to the variations in the determinants, and two outcome classes (Loss of kidney function and End-stage kidney disease). The patient shall be classified according to the worst classification (maximum RIFLE).

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- Santos ER. *Associação do RIFLE com letalidade e tempo de internação em pacientes críticos com lesão renal aguda*. Rev Bras Ter Intensiva. 2009; 21(4):359-368
- Uchino, S, Bellomo, R, Goldsmith, D, et al. An assessment of the RIFLE-criteria for acute renal failure in hospitalized patients. Crit Care Med 2006; 34:1913

#### 2.1.3.13.117 Killip Classification

**Description:** The Killip classification is a system used in individuals with an acute myocardial infarction (heart attack), taking into account physical examination and the development of heart failure in order to predict and stratify their risk of mortality. Killip class I includes individuals with no clinical signs of heart failure, Killip class II includes individuals with rales or crackles in the lungs, an S3 gallop, and elevated jugular venous pressure, Killip class III describes individuals with frank acute pulmonary edema, and Killip class IV describes individuals in cardiogenic shock or hypotension (measured as systolic blood pressure <90 mmHg), and evidence of low cardiac output (oliguria, cyanosis, or impaired mental status). The expected mortality rate of class I is 6%, class II of 17%, class III of 38%, and class IV of 81%.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- Killip T, Kimball JT. *Treatment of myocardial infarction in a coronary care unit: a two year experience of 20 patients. Am J Cardiol. 1967*
- Pesaro AEP, et al. *Infarto Agudo do Miocárdio – Síndrome Coronariana Aguda com Supradesnível do Segmento ST. Rev Assoc Med Bras 2004; 50(2): 214-20*
- Torres MA. *Estratificação de Risco Pós-Infarto Agudo do Miocárdio. Revista da Sociedade de Cardiologia do Rio Grande do Sul. Ano XVI nº 13 Jan/Fev/Mar/Abr 2008*

#### 2.1.3.13.118 LATCH Score

**Description:** The LATCH score is an assessment tool to evaluate the effectiveness of early breast-feeding. A numerical value of 0, 1, or 2 is assigned to the five evaluated items: latching of infant onto the breast, amount of audible swallowing, type of nipple, comfort of mother, help needed by mother to hold baby to breast. The final score is the sum of the five evaluated items, ranged from 0 to 10. Scores between 9-10 means breastfeeding is successful thereby indicating minimum or no support, scores between 6-8 means breastfeeding can display problems and requires assistance, and scores  $\leq 5$  mean breastfeeding displays problems and strongly requires assistance.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- Jensen D, Wallace S, Kelsay P. *Latch: a breastfeeding charting system and documentation tool. J. Obstet. Gynecol. Neonatal Nurs., 1994*
- Riordan J, Bibb DD, Miller M, Rawlins T. *Predicting breastfeeding duration using the LATCH breastfeeding assessment tool. J Hum Lact 2001; 17:20-3*

#### 2.1.3.13.119 LEE Cardiac Risk Index

**Description:** The LEE Cardiac Risk Index is used to estimate the risk of peri-operative cardiac complications in patients. The index evaluates six variable (high intrinsic risk operation, coronary artery disease, congestive heart failure, cerebrovascular disease, diabetes and, preoperative creatinine  $> 2,0\text{mg/dl}$ ), which are identified as an increased risk of cardiac complications. Based on the final index, it informs the clinician about risk class classification and percentage of complications. The risk of peri-operative cardiac complications is given according to the score: score 0 corresponds to classification I – 0.5%; score 1 corresponds to classification II – 1,3%; score 3 corresponds to classification III with 4% and  $\geq$  score 3 corresponds to classification IV – 9%. The final classification (presented in %) is a risk of the patient having perioperative cardiac complications.

**System functions:** Electronic Pre-Anesthetic Assessment -> Risk; Electronic Patient Chart -> Scores and Indexes

#### Sources:

- Lee TH, Marcantonio ER, Mangione CM, Thomas EJ, Polanczyk CA, Cook EF, Sugarbaker DJ, Donaldson MC, Poss R, Hoo KK, Ludwig LE, Pedan A, Goldman L. *Derivation and prospective validation of a simple index for prediction of cardiac risk of major noncardiac surgery. 1999 Sep 7;100(10):1043-9*
- Goldman L, Caldera DL, Nussbaum SR, et al. *Multifactorial index of cardiac risk in noncardiac surgical procedures. N Engl J Med.1977; 297(16):845-50*
- Buitrago FJ, Santana AS, Guimarães LF, Henriques MD, Júnior WMA. *Avaliação cardiovascular perioperatória para cirurgia não cardíaca. As Med Minas Gerais 2011; 21(2 Supl 3): S9-S27*



#### 2.1.3.13.120 Maddrey's Discriminant Function (MDF) Score

**Description:** The Maddrey's Discriminant Function (MDF) Score is a model for evaluating the severity and prognosis in patients with alcoholic hepatitis. It takes into consideration the Prothrombin time (PT), PT control and serum bilirubin to generate the final score. The score is calculated by the formula:  $[4.6 \times (PT - PT \text{ control})] + \text{serum bilirubin in mg/dL}$ , and a score  $\geq 32$  means the patient likely has severe alcoholic hepatitis.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- <https://www.mdcalc.com/maddreys-discriminant-function-alcoholic-hepatitis>
- [https://en.wikipedia.org/wiki/Modified\\_Maddrey%27s\\_discriminant\\_function](https://en.wikipedia.org/wiki/Modified_Maddrey%27s_discriminant_function)
- [https://www.oneta.ch/images/pdf/Child\\_und\\_andere\\_Scores.pdf](https://www.oneta.ch/images/pdf/Child_und_andere_Scores.pdf)
- <http://gihep.com/calculators/hepatology/maddrey-discriminant-score/>

#### 2.1.3.13.121 Malnutrition Screening Tool (MST)

**Description:** The Malnutrition Screening Tool (MST) was developed to allow quick and easy performance of nutritional screenings in adult patients upon hospital admission. The MST is a questionnaire comprising two main issues considered to have high specificity and sensitivity for detecting early nutritional risk when compared to the considered gold standard Subjective Global Assessment. These two issues include reducing food intake due to loss of appetite and unwanted weight loss. The tool is made up of 3 questions, each with a different score, for example: Have you had any recent unintentional weight loss? (If yes = 2 points); How many kg? (1-5 Kg = 1 point; 6-10 Kg = 2 points; 11-15 Kg = 3 points; > 15 Kg = 4 points); Are you eating less due to loss of appetite? (If yes = 1 point). After applying the MST questionnaire, results with scores > 2 mean that the patient is at nutritional risk.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Henderson S, Moore N, Lee E, Witham MD. Do the malnutrition universal screening tool (MUST) and Birmingham nutrition risk (BNR) score predict mortality in older hospitalised patients. BMC Geriatrics 2008, 8:26
- Stratton RJ. *Malnutrition Universal Screening Tool predicts mortality and length of hospital stay in acutely ill elderly*. British Journal of Nutrition (2006), 95, 325-330

#### 2.1.3.13.122 Malnutrition Universal Screening Tool (MUST)

**Description:** The Malnutrition Universal Screening Tool (MUST) is a triage tool with five steps for identifying adults with risk of malnutrition or obesity. The tool evaluates the BMI, the involuntary weight loss percentage in the last 6 months and the effect of an acute illness.

The tool consists of the assessment of 3 criteria: BMI, weight loss and reduced food intake. If BMI > 20 (0 points) 18.5-20 (1 point), < 18.5 (2 points). If the percentage of weight loss in the last 3 to 6 months is < 5% (0 points), 5-10 (1 point), and > 10 (2 points). If the patient had a drastic reduction in food intake (2 points). The total sum indicates the risk of malnutrition or obesity: low risk = 0, medium risk = 1, high risk  $\geq 2$ .

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Kondrup J, Allison SP, Elia M, et al. ESPEN Guidelines for Nutrition Screening 2002; Clinical Nutrition 2003, 23 (4) p.415-421*

#### **2.1.3.13.123 Manchester Risk Classification System**

**Description:** The Manchester Risk Classification System was developed by nurses and physicians in the United Kingdom as a strategy to establish, based on clinical criteria, the priority of care among patients in emergency departments. The methodology starts with the patient's main complaint, which drives the nurse to different flowcharts. Each flowchart contains discriminators that support the triage process, and, finally, a classification of severity or clinical risk is presented.

These are the Patient classification flowcharts available: aggression, allergy, behavior change, asthma, self-aggression, crying baby, headache, seizures, sexually transmitted diseases, adult abdominal pain, abdominal pain in child, neck pain, sore throat, backache, testicular pain, chest pain, apparent drunkenness, rash, exposure to chemical agents, wounds, pregnancy, digestive hemorrhage, local infections and abscesses, adult malaise, malaise in neonates (up to 28 days), baby malaise (from 29 days to 12 months), malaise in children (from 12 months to 14 years old), bites and stings, overdose and poisoning, concerned parents, palpitations, extremity problems, problems on the face, eye problems, ear problems, dental problems, urinary problems, burns, falls, vaginal bleeding, traumatic brain injury, major trauma, thoracoabdominal trauma, multiple victims situation – primary assessment and multiple victims situation – secondary assessment.

The classification is described by colors, which indicate the maximum time until the first medical examination. Red indicates an emergency condition, suggesting immediate care. Orange indicates very urgent conditions with suggested time  $\leq 10$  minutes. Yellow is for urgent condition with time  $\leq 60$  minutes. The conditions classified as green are low urgency with suggested time  $\leq 120$  minutes. Blue is considered non-urgent and the suggested time is  $\leq 240$  minutes.

**System functions:** Manchester Risk Score (available for German and Brazilian localization)

#### **Sources:**

- *Risk Classification in Urgency and Emergency, 2<sup>nd</sup> Brazilian edition (2017), being the translation of the book: Emergency Triage/Manchester Triage Group; edited by Kevin Mackway-Jones, Janet Marsden, Jill Windle, 3<sup>rd</sup> edition (2014) and validated by the technical team of GBCR – Brazilian Risk Rating Group (<http://gbc.org.br>)*
- *Emergency Triage: Manchester Triage Group 3.7 ed, Wiley Verlag, 2013 and for the German edition First assessment in the emergency room: the Manchester Triage System 5<sup>th</sup> edition, Hogrefe Verlag 2020*

#### **2.1.3.13.124 Maximum Response to Botulinum Toxin Rating Scale (Jankovic)**

**Description:** The Maximum Response to Botulinum Toxin Rating Scale (Jankovic) was created by Jankovic assessing the degree of clinical response (at the maximum action moment after the application - peak effect) of the botulinum toxin in a study of the treatment of cranial-cervical dystonia, spasmodic dysphonia, other focal dystonia and hemifacial spasm. The “peak effect” was rated on a 0 to 4 scale (0= no effect; 1 = mild improvement; 2 = moderate improvement, but no change in functions; 3 = moderate improvement in severity and functions; 4 = marked improvement in severity and function).

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- *Botulinum toxin treatment of cranial-cervical dystonia, spasmodic dysphonia, other focal dystonias and hemifacial spasm.* Joseph Jankovic, Kenneth Schwartz, Donald T Donovan. Journal of Neurology, Neurosurgery, and Psychiatry 1990;53:633-639
- *Jankovic J, Brin MF. Therapeutic uses of botulinum toxin. New Engl J Med 1991, 324:1186-1194*

#### 2.1.3.13.125 Medical Outcomes Study (MOS) 36-Item Short-Form Health Survey (SF-36)

**Description:** The Medical Outcomes Study (MOS) 36-Item Short-Form Health Survey (SF-36) was constructed to survey health status in clinical practice and research. It includes one multi-item scale that assesses eight health concepts with 36 items, such as limitations in physical activities because of health problems, limitations in social activities because of physical or emotional problems, limitations in usual activities because of physical health problems, bodily pain, general mental health (psychological distress and well-being), limitations in usual activities because of emotional problems, vitality (energy and fatigue), and general health perceptions. The scoring established is 0 to 100 where zero corresponds to the worse state of general health and 100 to the best state of health.

**System functions:** Electronic Patient Chart>Scores and Indexes

#### Sources:

- *WARE, J. E. Sherbourne CD: The MOS 36 Item Short-Form Health Survey (SF-36). I. Conceptual framework and item selection. Med Care, n. 30, p. 473-483, 1992.*
- *Ciconelli RM, Ferraz MB, Santos W. Meinão I, Quaresma MR. Tradução para língua portuguesa e validação do questionário genérico de avaliação de qualidade de vida SF-36 (Brasil SF-36). Rev Bra. Reumatol – Vol.39 – Nº3 – Mai/Jun, 1999.*
- *VILAGUT Gemma et al. El Cuestionario de Salud SF-36 español: una década de experiencia y nuevos desarrollos. Gac Sanit vol.19 no.2 Barcelona Mar./abr. 2005.*

#### 2.1.3.13.126 Mini Mental Health Exam Score

**Description:** The Mini Mental Health Exam Score assesses the presence of cognitive impairment, and it is commonly used for screening for dementia, estimating the severity of cognitive impairment at a given time and to monitor the course of an individual's cognitive changes over time. The exam measures orientation in terms of time and place (knowing where you are, and the season or day of the week), short-term memory (remembering), attention and problem solving (how to spell a simple word backwards), language (identify common objects by name) and comprehension and motor skills (draw a somewhat complicated shape like two pentagons crossing each other). The score has a maximum of 30 points and ranks normal cognition or no dementia if the score  $\geq 24$  points, mild dementia between 19 - 23 points, moderate dementia between 10 - 18 points, and severe dementia with a result  $\leq 9$ .

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- *Folstein MF, Folstein SE, McHugh PR. "Mini-mental state". A practical method for grading the cognitive state of patients for the clinician. Journal of Psychiatric Research 12 (3): 189-1998*
- <https://www.dementiacarecentral.com/mini-mental-state-exam>

#### 2.1.3.13.127 Mini Nutritional Assessment (MNA®) Long form

**Description:** The Mini Nutritional Assessment (MNA®) Long form is a nutritional assessment tool that can identify patients aged  $\geq 65$  years who are malnourished or at risk of malnutrition. This assessment includes

screening (MNA® Short form) and global assessment. It is necessary to answer the screening prior to the global assessment. It is divided into four parts: anthropometric assessment (BMI, arm circumference, calf circumference, and weight loss); global assessment (questions related to lifestyle, medication, mobility and psychological problems); dietary assessment (questions related to the number of meals, food and liquid intake and autonomy in eating); and self-assessment (the self-perception of health and nutritional status).

If the screening result is between 8-11, it is suggested to perform the global assessment (MNA® Long form). The final assessment is the sum of the screening and global assessment and is interpreted as: malnourished (< 17), at risk of malnutrition (17-23.5) and normal nutritional status (24-30).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Guigoz Y, Vellas B, Garry PJ. Mini Nutritional Assessment: A practical assessment tool for grading the nutritional state of elderly patients. Facts and Research in Gerontology, 1997, pp 15-60*
- *Rubenstein LZ, Harker J, Guigoz Y and Vellas B. Comprehensive Geriatric Assessment (CGA) and the MNA: An Overview of CGA, Nutritional Assessment, and Development of a Shortened Version of the MNA. In: "Mini Nutritional Assessment (MNA): Research and Practice in the Elderly". Nestle Nutr Workshop Ser Clin Perform Programme 1999; 1:101-15; 115-6. DOI: 10.1159/000062958*

**2.1.3.13.128 Mini Nutritional Assessment (MNA®) Short form**

**Description:** The Mini Nutritional Assessment MNA® Short form can identify patients aged ≥ 65 years that are malnourished or at risk of malnutrition. It is a nutritional screening tool consisting of questions concerning changes in food intake (due to loss of appetite, digestive problems or difficulty in chewing or swallowing), weight loss, mobility, occurrence of psychological stress or acute illness, neuropsychological problems and BMI. If the BMI cannot be recorded, it is necessary to record the calf circumference. The final assessment is interpreted as: malnourished (0-7), at risk of malnutrition (8-11) and normal nutritional status (12-14).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Guigoz Y, Vellas B, Garry PJ. 1994. Mini Nutritional Assessment: A practical assessment tool for grading the nutritional state of elderly patients. Facts and Research in Gerontology. Supplement 2:15-59*
- *Vellas B. Comprehensive Geriatric Assessment (CGA) and the MNA: An Overview of CGA, Nutritional Assessment, and Development of a Shortened Version of the MNA. In: "Mini Nutritional Assessment (MNA): Research and Practice in the Elderly". Nestle Nutr Workshop Ser Clin Perform Programme 1999; 1:101-15; 115-6. DOI: 10.1159/000062958*

**2.1.3.13.129 Mirels Score**

**Description:** Mirels Score is useful in the management of bone tumors, by identifying patients who could benefit from prophylactic fixation if they have a high enough risk of pathological fracture. It analyzes and combines four clinical and radiographical risk factors in one single score in accordance with the location (upper limbs, lower limbs and peritrochanteric), level of pain caused by the injury (light, moderate, and intense) type of injury (lytic, blastic, mixed) and the extent of the lesion – size (< 1/3, 1/3-2/3, > 2/3). The final score is a sum of the values. If the score is greater than 8, it suggests prophylactic internal fixation prior to irradiation is beneficial.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Mirels H. Metastatic Disease in long bones. A proposed Scoring System for diagnosing impending pathologic fracture. Clin Orthop Rel Res 1989; 249: 256-264*

**2.1.3.13.130 Model for End-Stage Liver Disease (MELD)**

**Description:** The Model for End-stage Liver Disease (MELD) is a tool used to assess patient's liver conditions (the seriousness of liver disease), and consequently, the urgency for liver transplant. The calculation is performed using a formula based on laboratory results for bilirubin, creatinine and International Normalized Ratio (INR), and dialysis at least twice in the past week. The final score ranges from 6 to 40. The higher the score, the more serious is the disease, and the more urgent becomes patient's need for a liver transplant.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *SH, Christein J, Donohue J, Que F, Kendrick M, Farnell M, et al. Hepatic resection of hepatocellular carcinoma in patients with cirrhosis: Model of end-stage liver disease (MELD) score predicts perioperative mortality. J Gastrointest Surg. 2005; 9: 1207-1215*
- *Biggins SW, Bambha K. MELD-based liver allocation: Who is underserved? Semin Liver Dis. 2006; 26: 211-220*
- *Cholongitas E, Senzolo M, Patch D, Kwong K, Nikolopoulou V, Leandro G, et al. Risk factors, sequential organ failure assessment and model for end-stage liver disease scores for predicting short-term mortality in cirrhotic patients admitted to intensive care unit. Aliment Pharmacol Ther. 2006; 23: 883-893*
- *Kamath, Patrick S. MELD Score (Model for End-Stage Liver Disease) (12 and older). MD+CALC. 2021. Available at: <https://www.mdcalc.com/meld-score-model-end-stage-liver-disease-12-older#pearls-pitfalls>*

**2.1.3.13.131 Modified Ashworth Scale**

**Description:** The Modified Ashworth Scale aims to assess the grade of muscle spasticity (tonus abnormality) in patients with neurological conditions, applicable to both the upper and lower body limbs. The rater should extend the patient's limb from a position of maximal flexion to maximal extension until the first soft resistance is felt. The Modified Ashworth Scale is used in pre and post treatment condition. The score ranges from 0 to 4 for each analyzed muscle, where lower score represents normal muscle tone, and higher score represent affected rigid part in bending or extension. Refer to "spasticity management" feature in this document for more details related to the workflow that includes this scale use (neuromuscular block).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Ashworth B. Preliminary trial of carisoprodol in multiple sclerosis. Practitioner 1964; 192: 540-2*
- *Bohannon RW, Smith MB. Inter rater reliability on modified Ashworth scale of muscle spasticity. Phys Ther; 1967: 659-61*
- *Espasticidade. Protocolo Clínico e Diretrizes Terapêuticas. Portaria SAS/MS no 377, de 10 de novembro de 2009*

**2.1.3.13.132 Modified Behavioral Pain**

**Description:** Refer to the feature "Vital signs and clinical parameters calculation" of this document.

#### **2.1.3.13.133 Modified Early Warning Score (MEWS)**

**Description:** The Modified Early Warning Score (MEWS) is a versatile tool based on physiological parameters such as HR, RR, body temperature, SBP and level of consciousness. All these variables are capable of alerting physicians and other members of the healthcare team about patients at risk of clinical deterioration. This score can be used in the wards to guide the continued follow-up of patients, identifying those with altered scores and progressive increase, who need more attention from the responsible team. Values above 3 mean the need for team intervention and above 5 are considered critical.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- *Morgan RJM; Williams F, Wright MM. An early warning scoring system for detecting developing critical illness. Clinical Intensive Care, 1997*
- *Subbe CP, Kruger M, Rutherford P, et al. Validation of a modified early warning score in medical admissions. QJM, 2001;94:521-526*
- *Burch VC, Tarr G, Morroni C. Modified early warning score predicts the need for hospital admission and in hospital mortality. Emerg Med J 2008; 25:674-678*

#### **2.1.3.13.134 Modified Objective Pain Score (MOPS)**

**Description:** Refer to the feature "Vital signs and clinical parameters calculation" of this document.

#### **2.1.3.13.135 Modified Rankin Scale (MRS)**

**Description:** The Modified Rankin Scale (MRS) is used to categorize level of incapacity or functional independence in the daily activities of people who suffer a stroke or other causes of neurological disability and is compared over time to check for recovery and degree of continued disability. The scale consists of 6 categories from 0 to 6: 0) no symptoms, 1) no significant disability, 2) slight disability, 3) moderate disability, 4) moderately severe disability, 5) Severe disability, and 6) dead. The categories are intuitive and easily grasped by both clinician and patient, it has concurrent validity and is demonstrated by strong correlation with measures of stroke pathology (e.g., infarct volumes) and agreement with other stroke scales.

**System functions:** Electronic Patient Chart>Scores and Indexes

#### **Sources:**

- *Rankin J. "Cerebral vascular accidents in patients over the age of 60." Scott Med J 1957;2:200-15*
- *Bonita R, Beaglehole R. "Modification of Rankin Scale: Recovery of motor function after stroke." Stroke 1988 Dec;19(12):1497-1500*
- *Saver JL, Filip B, Hamilton S, et al. "Improving the reliability of stroke disability grading in clinical trials and clinical practice: the Rankin Focused Assessment (RFA)." Stroke 2010; 41 (5): 992-95*

#### **2.1.3.13.136 Morse Fall Scale (MFS)**

**Description:** The Morse Fall Scale (MFS) is a rapid and simple method of assessing a patient's likelihood of falling and helps prevent falls and their consequences. The MFS is used widely in acute care settings, both in the hospital and long-term care inpatient settings. The tool consists of 6 fall risk items such as history of falling (immediate or previous), if the patient has a secondary diagnosis (meaning 2 or more diagnoses in the patient chart), ambulatory aid, intravenous therapy/ heparin lock, gait, and mental status. The sum of the items gives a score ranging from 0 to 125 points. Three types of fall risk are presented such as low (< 25 point), moderate (25 – 45 points) and high (> 45 points) and each of these has a different recommendation for intervention.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Morse, JM. Predicting Patient Falls. CA: Sage Publications, 1997*
- *Morse, JM. Morse Fall Scale. University Park, PA: The Pennsylvania State University School of Nursing, 1985*
- *Urbanetto JS, et al. Morse Fall Scale: tradução e adaptação transcultural para a língua portuguesa. Rev Esc Enferm USP. 2013; 47(3):569-75*

#### **2.1.3.13.137 Mucositis Scale**

**Description:** The Mucositis Scale was proposed by the WHO and it is a simple classification system for patient's oral toxicity related chemotherapy. The assessment considers objective signs (redness or erythema, and development of ulcers) and the subjective signs (ability to swallow, and mucosal sensitivity). After the evaluation, the user selects among four classes: level 0 (none) - no signs and symptoms, level 1 (mild) - oral pain and erythema, level 2 (moderate) - oral erythema, ulcers, tolerated solid diet, level 3 (severe) - oral ulcers, liquid diet only and level 4 (life-threatening) - oral feeding impossible.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Kowanko, I.H., Brent; Long, Lesley; Evans, David, Prevention And Treatment Of Oral Mucositis In Cancer Patients. Best Practice, 1998. 2(3)*
- *Miller, A. B ; Hoogstraten, B ; Staquet, M. et al. Reporting results of cancer. Cancer. N. 47, 207 – 214, 1981*
- *Peterson, D., New Strategies for Management of Oral Mucositis in Cancer Patients. Supportive Oncology, 2006. 4: pg 9, 14*
- *Hajisalem, Telka & Ghaffary, Saba & Nejati, Babak & Mashayekhi, Simin & Fathiazad, Fatemeh & Shokri, Javad & Bateni, Amin. (2019). Effect of Achillea millefolium Mouthwash on Oral Mucositis Induced by Chemotherapy in AML Patients. Jundishapur Journal of Natural Pharmaceutical Products. In Press. 10.5812/jjnpp.14077.*

#### **2.1.3.13.138 Multinational Association for Supportive Care in Cancer (MASCC) Risk Index**

**Description:** The Multinational Association for Supportive Care in Cancer (MASCC) risk index is used to assess for risk of serious complications of febrile neutropenia in patients with cancer. The variables are symptoms severity, age, hypotension (systolic blood pressure < 90 mmHg), chronic obstructive pulmonary disease, solid tumor (or hematologic malignancy without prior fungal infections), rehydration requiring parenteral fluids, and the status at onset of neutropenic fever. The maximum score is 26, and a score greater than or equal to 21 indicates low-risk patients and less than 21 high-risk patients for poor outcomes.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Klastersky J, et al. The Multinational Association for Supportive Care in Cancer Risk Index: A Multinational Scoring System for Identifying Low-Risk Febrile Neutropenic Cancer Patients. Journal of Clinical Oncology, Vol 18, No 16 (August), 2000: pp 3038-3051*

- *Klastersky J, Paesmans M. The Multinational Association for Supportive Care in Cancer (MASCC) risk index score: 10 years of use for identifying low-risk febrile neutropenic cancer patients. 2013 May;21(5):1487-95. Doi: 10.1007/s00520-013-1758-y. Epub 2013 Feb 27*
- *Almarie Uys, Bernardo L. Rapoport & Ronald Anderson. Febrile neutropenia: a prospective study to validate the Multinational Association of Supportive Care of Cancer (MASCC) risk-index score. Supportive Care in Cancer. Vol 12, 2004: pp 555–560*
- *Klastersky, Jean. MASCC Risk Index for Febrile Neutropenia. 2021. Available at: <https://www.mdcalc.com/mascc-risk-index-febrile-neutropenia>*

#### **2.1.3.13.139 Multiple Organ Dysfunction Score (MODS)**

**Description:** The Multiple Organ Dysfunction Score (MODS) uses physiological measurements of dysfunction in six organ systems and is related to the hospital mortality risk. Used on patients in the intensive care unit (ICU) during admission, calculated every 48 h until discharge. It comprises the following variables: PaO<sub>2</sub>/FiO<sub>2</sub>; platelet count, serum bilirubin, blood pressure (min/max/mean), heart rate, central venous pressure, Glasgow Coma Scale, and serum creatinine. Each value generates a score (from 0 to 4) for each system (respiratory, cardiovascular, renal, hepatic, hematologic and central nervous system), therefore the maximum score is 24 points. Higher scores are associated with higher hospital mortality and ICU mortality rates, and longer ICU length of stay.

- *Marschall JC et coll. Multiple Organ Dysfunction Score: A reliable descriptor of a complex clinical outcome. Crit Care med.1995; 23:1638-1652*
- *Peres Bota D, Melot C, Lopes Ferreira F, Nguyen Ba V, Vincent JL. The Multiple Organ Dysfunction Score (MODS) versus the Sequential Organ Failure Assessment (SOFA) score in outcome prediction. 2002 Nov;28(11):1619-24. Epub 2002 Sep 6*

#### **2.1.3.13.140 National Early Warning Score (NEWS)**

**Description:** The National Early Warning Score (NEWS) is used in hospitalized patients to allow early detection of clinical deterioration and the potential need for a higher level of care. The NEWS is based on a simple aggregate scoring system in which a score is allocated to physiological measurements that are routinely recorded in clinical practice. Six simple physiological parameters form the basis of the scoring system such as RR, oxygen saturation, supplemental oxygen, pulse rate, temperature, level of consciousness. The score ranges from 0 to 20. A score of 0-4 indicates: low clinical risk, 5-6: medium clinical risk, and > or equal to 7: high clinical risk. A red score is assigned when extreme variation in a single physiological parameter is present (a score of 3 in any physiological parameter).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Royal College of Physicians. National early warning score (NEWS): Standardising the assessment of acute illness severity in the NHS. Report of a working party. London: RCP, 2012*

#### **2.1.3.13.141 National Early Warning Score 2 (NEWS 2)**

**Description:** The National Early Warning Score 2 (NEWS 2) is used in hospitalized patients to allow early detection of clinical deterioration and the potential need for a higher level of care. NEWS 2 is the latest version of the National Early Warning Score (NEWS), first produced in 2012 and updated in December 2017, which advocates a system to standardize the assessment and response to acute illness. The NEWS is based on a simple aggregate scoring system in which a score is allocated to physiological measurements, that are routinely recorded in clinical practice. Six simple physiological parameters form the basis of the scoring



system such as respiratory rate (RR), oxygen saturation, supplemental oxygen, pulse rate, level of consciousness or new confusion and temperature. Differently from NEWS, NEWS 2 scores has different parameters and provides clinical recommendations for each result. The score ranges from 0 to 24. A score of 0 to 4 indicates low risk; 5-6: medium risk and, > or equal to 7 high risk. The red score continues to be assigned when extreme variation in a single physiological parameter is present (i.e., a score of 3 in any physiological parameter).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Royal College of Physicians. National Early Warning Score (NEWS 2): Standardising the assessment of acute illness severity in the NHS. Updated report of a working party. London: RCP; 2017*
- *Echavarría PAE, Bush OAP, Ambriz JB. Implementación de las escala de gravedad para la activación del equipo de respuesta rápida: NEWS 2. Med Crit 2019;33(2):98-103*

#### **2.1.3.13.142 National Health Service Falls Risk Assessment Scale**

**Description:** The National Health Service Falls Risk Assessment Scale aims to identify risk related to fall for elderly patients. It evaluates a patient's age, gender, gaiting style, mobility, history of falls, sensory deficits, medications in use, health history and memory. The higher the score, the higher the fall risk of the patient, with a total maximum score of 40.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Falls prevention and management program guidelines for elderly people within the community – Redditch and Bromsgrove Primary Care Trust – NHS*

#### **2.1.3.13.143 National Institute of Health Stroke Scale (NIHSS)**

**Description:** The National Institute of Health Stroke Scale (NIHSS) is a tool for systematic use that allow a quantitative assessment of neurological deficits related to stroke. This scale measures the initial neurological state in the acute phase of stroke. The scale is composed of 15 neurological exam items assessing the level of consciousness (questions and commands), extraocular movements, visual fields, facial palsy, motor strength (right, left leg and arm), limb ataxia, sensory, language/aphasia, dysarthria, and neglect. The total score ranges from 0 to 42, where zero means no stroke symptoms, 1–4 minor stroke, 5–15 moderate stroke, 16–20 moderate to severe stroke, and 21–42 severe stroke.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources :**

- *Goldstein LB, Bertels C, Davis JN. Interrater reliability of the NIH stroke scale. Arch Neurol. 1989, 46 :660-662*
- *Lyden P, Brott T, Tilley B, et al. Improved reliability of the NIH Stroke Scale using video training. Stroke 1994; 25:2220-26*
- *Brott T, Adams HP Jr, Olinger CP, Marler JR, Barsan WG, Biller J, Spilker J, Holleran R, Eberle R, Hertzberg V, et al. Measurements of acute cerebral infarction: a clinical examination scale. Stroke. 1989 Jul; 20(7) :864-70*

#### **2.1.3.13.144 Neonatal Facial Coding System for pain evaluation (NFCS)**

**Description:** *Refer to the feature “Vital signs and clinical parameters calculation” of this document.*

#### **2.1.3.13.145 Neonatal infant pain score (NIPS)**

**Description:** *Refer to the feature “Vital signs and clinical parameters calculation” of this document.*

#### **2.1.3.13.146 Neonatal Therapeutic Intervention Scoring System (NTISS)**

**Description:** The Neonatal Therapeutic Intervention Scoring System (NTISS) measures severity of illness by quantifying the intensity and complexity of care received and has proven valuable in assessing clinical outcomes and resource consumption in neonatal intensive care. The National Therapeutic Intervention Scoring System (NTISS) was created by modifying the Therapeutic Intervention Scoring System (TISS), where 42 items were deleted from the 76 original items of the TISS and 28 new items were added. Each item assigns scores from 0 to 4 for various intensive care therapies (some of which are grouped). NTISS scores compute the most intense level for each therapy (respiratory, monitoring, cardiovascular, medication, metabolic/nutritional, procedures, transfusions and vascular access) during a 24h period. The first scoring period usually begins on admission. It is also important to delineate during subsequent administrations of the score whether scores are based on initiation of therapy or continuation. NTISS is a valid measure of therapeutic intensity that is independent of birth weight and can be used as an indicator of neonatal illness severity and resource utilization (the higher the score, the more illness severity and resource utilization).

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- Gray JE, Richardson DK et al. Neonatal Therapeutic Intervention Scoring System: a therapy-based severity-of-illness index. *Pediatrics*. 1992; 90:561-7

#### **2.1.3.13.147 New Ballard Score (NBS)**

**Description:** New Ballard Score (NBS) is used to determine gestational age (GA) via a neuromuscular and physical assessment of the newborn, where 6 neurological parameters are considered (posture, square window/wrist, arm recoil, popliteal angle, scarf sign, heel to ear) and 6 physical parameters (skin, lanugo, plantar surface, breast, eye/ear, male genital, female genital). To each parameter a score is assigned which in the sum determine the estimated gestational age (-10 is the minimum score and the maximum is 50). The total score allows an estimation of ages between 26 and 44 weeks of gestation and can be applied in up to 96 h of the newborn's life.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- Ballard, J. L., Novak, K. K., & Driver, M. (1979). A simplified score for assessment of fetal maturation of newly born infants. *The Journal of Pediatrics*, 95(5), 769–774.
- Ballard, J. L., Khoury, J. C., Wedig, K., Wang, L., Eilers-Walsman, B. L., & Lipp, R. (1991). New Ballard Score, expanded to include extremely premature infants. *The Journal of Pediatrics*, 119(3), 417–423.
- Donovan, E. F., Tyson, J. E., Ehrenkranz, R. A., Verter, J., Wright, L. L., Korones, S. B., ... Papile, L.-A. (1999). Inaccuracy of Ballard scores before 28 weeks' gestation. *The Journal of Pediatrics*, 135(2), 147–152.

#### **2.1.3.13.148 New York Heart Association (NYHA) Functional Classification**

**Description:** The NYHA functional classification is a tool that provide a simple way of classifying the extent of heart failure. It classifies patients in one of four categories based on their limitations during physical activity.

The limitations and symptoms evaluated are related to normal breathing and varying degrees in shortness of breath and or angina pain, which are (Class 1) no limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea (shortness of breath); (Class 2) Slight limitation of physical activity. Comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea (shortness of breath); (Class 3) Marked limitation of physical activity. Comfortable at rest. Less than ordinary activity causes fatigue, palpitation, or dyspnea and (Class 4) Unable to carry on any physical activity without discomfort. Symptoms of heart failure at rest. If any physical activity is undertaken, discomfort increases.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- *The Criteria Committee of the New York Heart Association. Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels. 9th ed. Boston, Mass: Little, Brown & Co; 1994:253-256*

#### **2.1.3.13.149 Nitrogen Balance (NB) Equation**

**Description:** Nitrogen Balance (NB) Equation is the calculation of the difference between the ingested nitrogen (IN) and the excreted nitrogen (EN) of proteins, allowing identification of a patient's catabolic or anabolic state. A negative nitrogen balance indicates an unfavorable clinical condition.

$$NB = IN - EN$$

$$IN = (\text{ingested protein} + \text{infused protein})/6.25$$

$$EN = \text{urinary urea nitrogen (UUN) 24 h} + \text{non-urea urinary nitrogen (NUN)} + \text{fecal nitrogen (FN)} + \text{skin nitrogen} + \text{nasogastric probe nitrogen} + \text{fistula nitrogen}$$

$$NUN = \text{urinary urea nitrogen (UUN)} \times 0.2$$

$$UUN = \text{urinary urea 24 h} \times 0.47$$

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Maicá AO Schweigert ID. Avaliação nutricional em pacientes graves. As Bras Ter Intensiva. 2008; 20(3):286-295*
- *Acosta Escribano J, Gomez-Tello V, Ruiz Santana S. Nutritional assessment of the severely ill patient. Nutr Hosp. 2005;20 Suppl 2:5-8. Spanish*

#### **2.1.3.13.150 Numeric Categorical Pain Scale**

**Description:** Refer to the feature "Vital signs and clinical parameters calculation" of this document.

#### **2.1.3.13.151 Numeric Pain Rating Scale (categorical)**

Refer to the feature "Vital signs and clinical parameters".

#### **2.1.3.13.152 Nursing Activities Score (NAS)**

**Description:** The Nursing Activities Score (NAS) is a tool developed by Miranda and colleagues and aimed to measure nursing workload based on the consumption of nursing time at the patient level in the ICU. The tool consists of 7 categories and 23 items. The total score results from the sum of each item scored that corresponds to the patients' direct and indirect care needs. This score represents how much time the patient required from a nursing professional in the last 24 h. If the score is 100, it is interpreted that the patient required 100% of the time of a nursing professional in their care in the last 24 h.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Miranda DR, Nap R, Rijk A, Schaufeli W, Iapichino G. Nursing activities score. Crit Care Med. 2003;31(2):374-82*
- *Padilha KG, Sousa RMC, Queijoa AF, Mendes AM, Miranda DR. Nursing Activities Score in the intensive care unit: Analysis of the related factors. Intensive and Critical Care Nursing (2008) 24, 197-204*
- *Padilha KG, Sousa RMC, Garcia PC, Bento ST, Finardi EM, Hatahashi RHK. Nursing workload and staff allocation in an intensive care unit: A pilot study according to Nursing Activities Score (NAS). Intensive and Critical Care Nursing (2010) 26, 108-113*

**2.1.3.13.153 Nutrition Care Level Classification**

**Description:** The Nutrition Care Level Classification is used to define the patient nutrition care level. It is performed after the assessment of the patient's situation, regarding the main disease, the need for dietary therapy and the potential presence of associated nutritional risk factors. The classification is made selecting the presence of two conditions, the dietary therapy need and risk factors, defining the care level of nutrition (primary, secondary and tertiary).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Cardoso, Isosaki, Nazima et al. Manual de Dietoterapia e Avaliação Nutricional. Ed Atheneu capítulo 1: 4-8, 1997*
- *Cardoso E, Isosaki M, Nazima M.K.N, Nakasato M. Anamnese e diagnóstico na assistência nutricional ao cardiopata. As Soc Cardiol Estado de São Paulo. V. 7, n.5. p. 63-8, 1997*
- <https://www.asbran.org.br/storage/arquivos/PRONUTRI-SICNUT-VD.pdf>

**2.1.3.13.154 Nutrition Risk Screening (NRS-2002)**

**Description:** The Nutritional Risk Screening 2002 (NRS-2002) is used to perform nutritional risk screening of hospitalized patients. It is considered by the European Society for Clinical Nutrition and Metabolism (ESPEN) to be the gold standard method for identifying malnutrition or the risk of developing it and classifies patients according to the deterioration of nutritional status and disease severity.

The screening tool considers five criteria: BMI, unintentional weight loss over a period of one to three months, reduction in appetite and food intake, metabolic changes, disease severity and age < 70 years old. The last two criteria being considered as the ones that most influence the worsening of the nutritional status and the increased risk of malnutrition.

The NRS-2002 is divided into three parts. The first part or initial screening consists of four questions that can indicate the possibility of nutritional risk, without indicating whether the patient is at risk or not. If the answer is "no" to any question, the patient is classified as "No risk", and must be re-screened in 7 days; however, if the answer is "yes" to any of the questions, the screening should move on to the second part.

In the second stage of the screening or final screening, the patient's nutritional status and disease severity are assessed, being scored from 0-3 for each category and an additional point for age. Nutritional status is assessed using three variables: BMI, percentage of weight loss and change in food intake, with the variable with the greatest impairment being used to categorize the patient. To classify the severity of the disease, the

tool considers the underlying pathology, complications developed, the functional capacity and the demand for nutritional therapy, in addition to the APACHE II > 10.

At the end of the screening, one point is added to the score obtained if the patient age is  $\geq 70$  years old.

If the score  $\geq 3$ , the patient is nutritionally at-risk, and a nutritional care plan is initiated. For a score < 3, weekly rescreening of the patient is needed. If the patient is scheduled for a major operation, a preventive nutritional care plan is considered to avoid the associated risk status.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Kondrup J, Alisson SP, Elia M, Vellas B, Plauth M. *ESPEN Guidelines for Nutrition Screening 2002. Clinical Nutrition (2003) 22(4): 415-421*

#### **2.1.3.13.155 Ontario Modified Stratify Falls Risk Screen (Sydney Scoring)**

**Description:** The Ontario Modified Stratify Falls Risk Screen (Sydney Scoring) is used for forecasting fall in hospitalized elderly patients. It evaluates history of falls, mental status, vision, urination urgency and frequency, movement from bed to chair and mobility. The total score ranges from 0 to 30, with values  $\geq 9$  indicating a high risk of fall.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Papaioannou A, et al. *Previsão de quedas usando uma ferramenta de avaliação de riscos no ambiente de cuidados intensivos. BMC Med. 2004; 2:1*
- [Http://www.ncbi.nlm.nih.gov/pmc/articles/pmc333435](http://www.ncbi.nlm.nih.gov/pmc/articles/pmc333435)

#### **2.1.3.13.156 Oswestry Disability Index (ODI)**

**Description:** Oswestry Disability Index (ODI) is a tool used for assessing disorders of the spinal column, common in patients with low back pain. It is a self-administered questionnaire divided into ten sections designed to assess limitations of various activities of daily living. Each section is scored on a 0–5 scale, 5 representing the greatest disability. The index is calculated by dividing the summed score by the total possible score, which is then multiplied by 100 and expressed as a percentage. Higher scores represent higher disturbance of activities of daily living due to chronic back pain.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- Cook C, et al. *Cross-Cultural Adaptation and Validation of the Brazilian Portuguese Version of the Neck Disability Index and Neck Pain and Disability Scale. SPINE Volume 31, Number 14, 2006, pp 1621-7*
- Mehra A, et al. *Oswestry Disability Index Scoring Made Easy. 2008 September; 90(6): 497-9*
- Vigatto R, Alexandre NMC, Filho HRC. *Development of a Brazilian Portuguese Version of the Oswestry Disability Index. SPINE Volume 32, Number 4, 2007, pp 481-6*

#### **2.1.3.13.157 Pain assessment scale in advanced dementia (PAINAD)**

**Description:** Refer to the feature “Vital signs and clinical parameters calculation” of this document.

#### **2.1.3.13.158 Palliative Performance Scale (PPS)**

**Description:** The Palliative Performance Scale is a modification of the Karnofsky Performance Scale. It is used for measurement of performance status in palliative care. The scale is observer-rated and includes five domains: ambulation, self-care, activity level and evidence of disease, intake, and level of consciousness. It is possible to select the patient's general condition in a scale of 0% (death) to 100% (normal), in increments of 10%.

**System functions:** Electronic Patient Chart>Scores and Indexes

#### **Sources:**

- *Anderson F, Downing GM, Hill J. Palliative Performance Scale (PPS): a new tool. J Palliat Care. 1996 ; 12(1) : 5-11*
- *Morita T, Tsunoda J, Inoue S, et al. Validity of the Palliative Performance Scale from a survival perspective. J Pain Symp Manage. 1999; 18(1):2-3*
- *Ho F, Lau F, Downing MG, Lesperance M. A reliability and validity study of the Palliative Performance Scale. BMC Palliat Care. 2008; 7: 10*

#### **2.1.3.13.159 Palliative Prognostic Index Modified (PPI)**

**Description:** The Palliative Prognostic Index (PPI) is an extension of the Karnofsky Index and was validated as a prognostic tool for individuals with advanced oncologic disease. It is defined through oral ingestion and the presence or absence of dyspnea, edema and delirium. The scoring ranges between 0 and 14, whereby sick people are divided into three predictive groups: a PPI > 6 estimates a survival of less than 3 weeks, a PPI > 4 indicates less than 6 weeks of life and a PPI ≤ 4 suggests survival of more than 6 weeks.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- *Morita T, Tsunoda J, Inoue S, Chihara S. The palliative prognostic index: a scoring system for survival prediction of terminally ill cancer patients. Supportive Care in Cancer 1999; 7: 128-33*
- *Morita T, Tsunoda J, Inoue S, Chihara S. Survival prediction of terminally ill cancer patients by clinical symptoms: development of a simple indicator. Jap J Clin Oncol 1999; 29:156-59*
- *Chow E, et al. How Accurate are Physicians' Clinical Predictions of Survival and the Available Prognostic Tools in Estimating Survival Times in Terminally Ill Cancer Patients? A Systematic Review. Clinical Oncology 2001; 13: 209-18*

#### **2.1.3.13.160 Pasero Opioid-Induced Sedation Scale (POSS)**

**Description:** Refer to "Vital signs and clinical parameters" feature, "analgesia" group.

#### **2.1.3.13.161 Patient Health Questionnaire (PHQ-9)**

**Description:** The Patient Health Questionnaire (PHQ-9) is used for evaluating signs of depression. It consists of 9 questions with 4 options each. The final score ranges from 0 to 27, which 27 means the highest risk of depression.

**System functions:** Electronic Patient Chart -> Scores and Indexes.

#### **Sources:**

- *Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med. 2001 Sep;16(9):606-13*

- Santos IS (1), Tavares BF, Munhoz TN, Almeida LS, Silva NT, Tams BD, Patella AM, Matijasevich A.(Sensitivity and specificity of the Patient Health Questionnaire-9 (PHQ-9) among adults from the general population, Cad Saúde Pública, Rio de Janeiro, 29(8):1533-1543, ago, 2013

#### **2.1.3.13.162 Pediatric Early Warning Score (PEWS)**

**Description:** The Pediatric Early Warning Score (PEWS) was developed in 2001 to identify pediatric patients at risk for clinical deterioration. The scoring system covers three components of child assessment, which are related to behavior, cardiovascular state and respiratory state, adding two questions about quarter-hourly nebulizers (every 15 min) and persistent vomiting following surgery. The score value indicates the patient's reassessment interval:  $\geq 7$  indicate a reassessment need every 30 min, 6 every 1 h, 5 every 1-2 h, 0-4 every 4 h.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- Monaghan A. *Detecting and managing deterioration in children.* Paediatr Nurs. 2005;17(1): 32:35
- Quist-Therson E and the Hertfordshire Partnership NHS Trust. *Acute Children's Services: Guidelines Services: Guidelines for using paediatric early warning scoring tool.* National Health System, Hertfordshire Partnership, England. August 2006
- Tucker KM, et al. *Prospective evaluation of a pediatric inpatient early warning scoring system.* J Spec Pediatr Nurs. 2009 Apr;14(2):79-85
- *Sensitivity of the Pediatric Early Warning Score to Identify Patient Deterioration (Mari Akre, Marsha Finkelstein, Mary Erickson, Meixia Liu, Laurel Vanderbilt and Glenn Billman)* Pediatrics 2010;125; e763; originally published online March 22, 2010

#### **2.1.3.13.163 Pediatric Index of Mortality (PIM 2)**

**Description:** The Pediatric Index of Mortality (PIM 2) estimates the mortality risk of a pediatric patient, collecting data since patient ICU admission. It evaluates if the admission was elective, surgery or procedure recovery, heart surgery (bypass), select high or low risk diagnosis, mechanical ventilation, PaO<sub>2</sub>, FiO<sub>2</sub>, SBP and base excess. Based on the results and evaluations it generates a mortality percentage for the patient.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- Slater et al. *PIM 2: a revised version of the Paediatric Index of Mortality.* Intensive Care Med 2003; 29:278-85

#### **2.1.3.13.164 Pediatric Index of Mortality (PIM 3)**

**Description:** The Pediatric Index of Mortality (PIM 3) was developed using PIM 2 through records of pediatric admissions in ICU, which estimates the mortality risk of a pediatric patient. It evaluates if the admission was elective, surgery or procedure recovery, base excess, select high or low risk diagnosis, mechanical ventilation, PaO<sub>2</sub>, FiO<sub>2</sub>, SBP and heart surgery (bypass). The consideration of cardiac surgery with or without by-pass and the entry of very high-risk diagnoses are variables evaluated differently from PIM 2. Based on the results and evaluations mortality percentage is generated for the patient.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- Straney L, Clements A, Parslow RC, Pearson G, Shann F, Alexander J, Slater A, for the ANZICS Pediatric Study Group and the pediatric intensive care audit network. Pediatric Index of Mortality 3: an updated model for predicting mortality in pediatric intensive care. September 2013, volume 14, number 7

#### **2.1.3.13.165 Pediatric Logistic Organ Dysfunction (PELOD) Score**

**Description:** The Pediatric Logistic Organ Dysfunction (PELOD) Score is used to assess the severity of multiple organ dysfunction syndrome in pediatric Intensive Care Units (ICU). The score includes six key organ dysfunctions: cardiovascular, respiratory, hematological, neurological, renal, and hepatic. To calculate the score, each organ dysfunction receives points (0, 1, 10 or 20) for the variable associated with the highest points. PELOD score is the sum of points for each organ system. The maximum number of points for an organ is 20, and the maximum PELOD score is 71. Higher scores indicate higher likelihood of multiple organ dysfunction and increased hospital mortality rate.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Leteurtre S. et al. Development of a pediatric multiple organ dysfunction score: use of two strategies. Med Decis Making 1999; 19:399-410*
- *Leteurtre S. et al. Validation of the paediatric logistic organ dysfunction (PELOD) score: prospective, observational, multicentre study. Lancet. 2003 Jul 19;362 (9379):192-7*

#### **2.1.3.13.166 Pediatric Logistic Organ Dysfunction (PELOD 2) Score**

**Description:** Pediatric Logistic Organ Dysfunction (PELOD 2) score was adapted from PELOD and is a tool to assess the severity of multiple organ dysfunction syndrome in pediatric Intensive Care Units (ICU) using a continuous scale. The PELOD 2 score includes mean arterial pressure and lactatemia in the cardiovascular dysfunction and does not include hepatic dysfunction. To calculate the score, 10 variables involving five organ dysfunctions are evaluated (cardiovascular, respiratory, hematological, neurological, and renal). For each variable, the severity level ranges from 0 (normal) to 6, and different from PELOD score, all variables of each system sum to the final score, with a maximum of 33 points. Higher scores indicate higher likelihood of multiple organ dysfunction and increased hospital mortality rate.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Leteurtre S, et al. PELOD-2: An Update of the Pediatric Logistic Organ Dysfunction Score. Pediatric Critical Care. July 2013, Volume 41, Number 7*
- *Hendra, Runtunuwu AL, Manoppo JIC. Pediatric Logistic Organ Dysfunction (PELOD) Score as prognosis of multiple organ failure in sepsis. Vol. 50, Nº 4, July 2010*

#### **2.1.3.13.167 Pediatric Patient Classification Tool (ICPP)**

**Description:** Pediatric Patient Classification Tool (ICPP) is an instrument that allows the classification of pediatric patients in degrees of dependence on nursing. It favors better allocation of human resources for improvement of the quality of care. Consisting of 11 indicators, each with four situations of care dependence, graded from one to four points, increasing the demand for care and enabling the classification of patients into five categories of care. Results are categorized in the following manner: 11-17 points is minimum, 18- 23 points is intermediate, 24-30 points is high dependency, 31-36 points is semi-intensive and 37-44 points is intensive.



**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Dini AP, Guirardello EB. Pediatric Patient Classification System: Improvement of an instrument. Rev Esc Enferm USP 2014; 48(5):787-93*
- *Dini, AP, Fugulin FMT, Veríssimo MDLOR, et al. Sistema de classificação de pacientes pediátricos: construção e validação de instrumento. Rev Esc Enferm USP 2011; 45(3):575-80*
- *Dini AP, Guirardello EB. Construction and validation of an instrument for classification of pediatric patients. Acta Paul Enferm. 2013;26 (2):144-9*

**2.1.3.13.168 Pediatric Risk of Mortality Score (PRISM)**

**Description:** Pediatric Risk of Mortality Score (PRISM) is a tool used in the first 24 hours of patient's pediatric intensive care admission, developed to reduce the number of physiologic variables required for pediatric ICU mortality risk assessment. It evaluates 14 variables, such as vital signs which includes heart rate and respiratory rate, laboratory results like potassium and glycemia, breastfeeding, pupillary reactions and Glasgow Coma Score. Each of the evaluated items generates a partial score, summed to the final score. The risk of death is calculated by a logistic regression equation using the value of the PRISM, patient age and need of surgery on admission to the PICU. Higher scores represent greater mortality rate. PRISM scores 5-10 (risk of mortality 11-23%), 15-20 (risk of mortality 40-61%), and 25-30 (risk of mortality 78-89%).

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Pollack MM, Ruttimann UE, Getson PR. Pediatric risk of mortality (PRISM) score. 1988 Nov;16(11):1110-6*
- *Khajeh, Ali & Noori, MD & Reisi, Mohsen & Fayyazi, Afshin & Mohammadi, PhD & Miri-Aliabad, Ghasem. (2013). Mortality Risk Prediction by Application of Pediatric Risk of Mortality Scoring System in Pediatric Intensive Care Unit. Iran J Pediatr. 23.*

**2.1.3.13.169 Pediatric Sepsis Early Detection Tool**

**Description:** The Pediatric Sepsis Early Detection Tool supports clinicians in the early identification of pediatric inpatients with signs and symptoms of sepsis, which can influence clinical outcomes.

A previous configuration is required in the "Sepsis" item of the "Patient Chart Settings" function to activate the tool. On the "Sepsis triggering variables" tab, the user needs to filter for "Pediatric sepsis" to see all variables and the default configuration provided by Philips, five alerts for sepsis, and five signs of organic dysfunction. The variables are heart rate, respiratory rate, fever in the last 4 h, temperature, and white blood cell count. The types of organic dysfunction are hypotension, desaturation, oliguria, impaired perfusion, and acute change in the neurologic state. For each variable, the institution must configure the rules, the specific vital sign, event, laboratory test, intake, output, and the number of lookback hours that are valid. If the institution does not want to use all ten default variables, it is possible to configure in the tab "Sepsis Client" the desired variables, the threshold and, the patient's age.

It is mandatory to configure rules using the "Clinical Decision Support – Mentor" function to activate the system alerts and notifications regarding pediatric sepsis. In the function, on the "Triggering events" tab, the user selects the option "Scores and indexes" to define the rules and actions, including professional roles and submission. Then, when an event is registered in the "Electronic Patient Chart" function, and it matches all

conditions defined in the “Clinical Decision Support – Mentor” function, a notification is triggered to inform the event, which will be validated by the clinician.

All data regarding the Pediatric Sepsis Early Detection Tool is recorded in the “Pediatric Sepsis” tab, on the “Scores and Indexes” item of the “Electronic Patient Chart” function. A new record can be manually created or automatically triggered according to the rules, followed by the user’s confirmation. Finally, the user can follow an ongoing investigation, record a medical assessment that automatically generates a new clinical note, and define the time the patient needs to be reassessed.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Dellinger R, et al. Surviving Sepsis Campaign: International Guidelines for Management of Severe Sepsis and Septic Shock: 2012. CritCareMed 2013 Vol 41, No. 2 2*
- *Brierley J, et al. Clinical practice parameters for hemodynamic support of pediatric and neonatal septic shock: 2007 update from the American College of Critical Care Medicine. Crit Care Med 2009 Vol. 37, No. 2 3*
- *Goldstein B, et al. International pediatric sepsis consensus conference: Definitions for sepsis and organ dysfunction in pediatric. PediatrCrit Care Med 2005 Vol. 6, No. 1*
- *Instituto Latino-Americano de Sepse; ILAS. Campanha de sobrevivência a Sepse Protocolo clínico pediátrico; 2016 ([www.ilas.org.br](http://www.ilas.org.br))*

#### **2.1.3.13.170 Phlebitis Rating Scale (Maddox)**

**Description:** The Phlebitis Rating Scale (Maddox) is indicated for the assessment of peripheral venous access to monitor peripheral venipuncture and prevent phlebitis. The degree of severity of phlebitis allows classifying it as no reaction (0), sensitivity to touch on the access (1+), continuous pain without erythema (2+), continuous pain with erythema and edema, palpable hard vein less than 8 cm above the access site (3+), continuous pain, with erythema and edema, palpable hard vein more than 8 cm above the access site (4+), and apparent venous thrombosis (5+). The scale result is the single selected option, by the user, from 0 to 5.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Ray R. Maddox, David R. Rush, Robert P. Rapp, Thomas S. Foster, Vincent Mazella, Harlley E. McKean, Double-blind study to investigate methods to prevent cephalothin-induced phlebitis, American Journal of Hospital Pharmacy, Volume 34, Issue 1, 1 January 1977, Pages 29-34*
- *PHILLIPS, L. D. Complicações da Terapia Intravenosa. In: PHILLIPS, L. D. Manual de Terapia Intravenosa. Porto Alegre: Artmed, 2001. P. 236-268*

#### **2.1.3.13.171 Phlebitis Scale**

**Description:** The Phlebitis Scale aims to indicate to clinicians the first stages of phlebitis in patients with intravenous access devices. This scale categorizes this clinical complication in five levels of progress, which are level zero (no symptoms), level 1 (erythema with or without local pain), level 2 (pain with erythema and or edema), level 3 (pain with erythema and or edema, with hardening and palpable fibrous cord), level 4 (pain with erythema and or edema, with hardening and palpable fibrous cord longer than 1 cm and purulent drainage). The scale result is the single selected option by the user.

**System functions:** Electronic Patient Chart>Scores and Indexes

## Sources :

- *Intravenous Nurses Society*. Infusion nursing standards of practice. J Intraven Nurs. 2011. 34(1S): 47-565
- *Lucilene Reno Ferreira, Mavilde da Luz GonÁalves Pedreira, Solange Diccini*. Flebite no pré e pós-operatório de pacientes neurocirúrgicos. Acta Paul Enferm 2007;20(1):30-6

### 2.1.3.13.172 Pneumonia Severity Index (PSI)

**Description:** The Pneumonia Severity Index (PSI) is a prediction rule that stratifies patients with community-acquired pneumonia into five classes, with respect to the risk of death within 30 days following onset of symptoms. The prediction rule assigns points based on age, if the patient is a nursing home resident, presence of coexisting diseases (malignancy, liver disease, congestive heart failure, cerebrovascular disease, and renal disease), abnormal physical findings (mental status, heart rate, respiratory rate, temperature, blood pressure), and abnormal laboratory/image findings (arterial pH, urea level, serum sodium, glucose level, hematocrit, partial pressure of oxygen and pleural effusion on x-ray) at presentation. Each answer can add 10, 15, 20, or 30 points to the total score, which are summed and added to the patient age (minus 10 if woman). The mortality risk increases as the score increases.

**System functions:** Electronic Patient Chart -> Scores and Indexes

## Sources:

- *Fine MJ, Auble TE, Yealy DM, Hanusa BH, Weissfeld LA, Singer DE, et al*. A prediction rule to identify low-risk patients with community-acquired pneumonia. N Engl J Med. 1997;336 (4):243-50

### 2.1.3.13.173 Portsmouth Physiological and Operative Severity Score (P-POSSUM)

**Description:** The Physiological and Operative Severity Score for the enumeration of Mortality and Morbidity (POSSUM) uses a physiological score and an operative severity score to calculate risks of mortality and morbidity when there is a need for an accurate comparison of surgical outcomes regardless of case mix. It is based on 12 physiological variables measured before surgery and on six operative and postoperative variables, with each variable being scored by a four-grade exponential scale as 1, 2, 4, and 8. Although POSSUM surgical scoring system is an evidence-based scoring system, it has been found that it may overpredict mortality by a factor of two in high-risk patients, a factor of six in low-risk patients (those with a death risk  $\leq 10\%$ ), and a factor of seven in very low-risk patients (those with a death risk  $\leq 5\%$ ). To correct the overprediction in mortality, Whiteley and coworkers (1996) used logistic regression and modified the equation accordingly. The revised scoring system, named Portsmouth Physiological and Operative Severity Score (P-POSSUM), when implemented prospectively, provided an expected mortality very close to the in-hospital observed or actual mortality. Default values are the lowest score for the category of a fit young patient having a minor operation. The higher the score result, the higher the percentage of morbidity and mortality risk. The 'riskier' the procedure, the more accurate the predicted risk.

**System functions:** Perioperative Electronic Patient Chart -> PACU Scores and Electronic Pre-Anesthetic Assessment -> Risk

## Sources:

- *Copeland GP, Jones D, Walters M*. POSSUM: A scoring system for surgical audit. Br J Surg. 1991;78:355–60. [PubMed] [Google Scholar]
- *Whiteley MS, Prytherch DR, Higgins B, Weaver PC, Prout WG*. An evaluation of the POSSUM surgical scoring system. Br J Surg. 1996;83:812–5. [PubMed] [Google Scholar]

- Prytherch DR, Whiteley MS, Higgins B, Weaver PC, Prout WG, Powell SJ. POSSUM and Portsmouth POSSUM for predicting mortality. Physiological and operative severity score for the enumeration of Mortality and morbidity. Br J Surg. 1998;85:1217–20. [PubMed] [Google Scholar] Neary WD, Heather BP, Earnshaw JJ. The Physiological and Operative Severity Score for the enumeration of Mortality and morbidity (POSSUM). 2003 Feb;90(2):157-65
- Fassoulaki A, Chondrogiannis K, Staikou C. Physiological and operative severity score for the enumeration of mortality and morbidity scoring systems for assessment of patient outcome and impact of surgeons' and anesthesiologists' performance in hepatopancreatic biliary surgery. Saudi J Anaesth. 2017;11(2):190-195. Doi:10.4103/1658-354X.203025
- Smith, Jason. P-Possum Scoring. Risk Prediction in Surgery. 2021. Available at: <http://www.riskprediction.org.uk/index-pp.php>

#### 2.1.3.13.174 Post-Anesthetic Discharge Scoring System (PADSS)

**Description:** The Post-Anesthetic Discharge Scoring System (PADSS) was developed to assess patients after anesthesia in an outpatient surgery unit. Upon discharge from the outpatient surgery unit, the patient should be ready to return home, clinically stable, and able to rest at home under the care of a responsible adult. PADSS is based on five main criteria: vital signs (blood pressure, heart rate, respiratory rate, and temperature), activity and mental status, pain or nausea and/or vomiting, surgical bleeding, and intake/output. The PADS score consists of 5 items, each scored from 0 to 2, where the higher the score, the greater the degree of the patient's recovery and readiness to be discharged.

**System functions:** Perioperative Electronic Patient Chart -> PACU Scores

#### Sources:

- Frances Chung, FRCPC, Vincent W.S. Ghan, FRCPC, Dennis O. (1995), A Post-Anesthetic Discharge Scoring System for Home Readiness after Ambulatory Surgery, Journal of Clinical Anesthesia, 1995, 7:500-506

#### 2.1.3.13.175 Postoperative Kidney Failure Risk

**Description:** The Postoperative Kidney Failure Risk tool was developed to assess the risk of acute kidney failure in the pre-operative phase. The risk prediction can be accurately quantified based on readily available preoperative data. The presence of serum creatinine > 2mg/dl or estimated creatinine clearance < 30 ml/min defines a high-risk patient. There is moderate risk when two or more minor predictors are present. Minor predictors are estimated clearance between 30 and 50 ml/min, heart failure, diabetes, jaundice, dehydration and serum urea/creatinine ratio > 40. The presence of one minor predictor defines a low-risk patient.

**System functions:** Electronic Patient Chart>Scores and Indexes and Electronic Pre-Anesthetic Assessment

#### Sources:

- Chertow GM, Lazarus JM, Christiansen CL, Cook EF, Hammermeister KE, Grover F, et al. Preoperative renal risk stratification. Circulation. 1997;95(4):878-84
- Sachin Kheterpal, Kevin K. Tremper, Michael J. Englesbe, Michael O'Reilly, Amy M. Shanks, Douglas M. Fetterman, Andrew L. Rosenberg, Richard D. Swartz; Predictors of Postoperative Acute Renal Failure after Noncardiac Surgery in Patients with Previously Normal Renal Function. Anesthesiology 2007; 107:892–902
- Aronson S, Fontes ML, Miao Y, Mangano DT; Investigators of the Multicenter Study of Perioperative Ischemia Research Group; Ischemia Research and Education Foundation. Risk index for perioperative

renal dysfunction/failure: critical dependence on pulse pressure hypertension. *Circulation*. 2007 Feb 13;115(6):733-42

#### **2.1.3.13.176 Post-Operative Neonatal Pain Scale (CRIES)**

**Description:** The CRIES (Crying Requires increased oxygen administration Increased vital signs Expression Sleeplessness) scale was developed for pain assessment in infants, aged six months or less, and is widely used in the context of neonatal intensive care for postoperative neonatal pain. This scale comprises five categories (cry, oxygenation, vital signs, facial expression, and sleep) with an individual variation of 0 to 2 points per category, totaling 0 to 10 points. The higher the value, the more severe the pain.

#### **Sources:**

- Krechel SW, Bildner J. CRIES: a new neonatal postoperative pain measurement score. Initial testing of validity and reliability. *Paediatric Anaesthesia, Oxford*, vol. 5, p. 53-61, 1995

#### **2.1.3.13.177 Post-Ureteroscopic Lesion Scale (PULS)**

**Description:** The Post-Ureteroscopic Lesion Scale (PULS) aims to offer a simple grading system for the description of ureteral lesions after ureteroscopy. In this scale, lesions are graded independently on their location and extent. In cases of multiple lesions, the most severe lesion defines the PULS grading. The clinician can classify the patient according to six grades, which are grade 0 (No lesion), grade 1 (Superficial mucosal lesion and/or significant mucosal edema/hematoma), grade 2 (Submucosal lesion), grade 3 (Perforation with less than 50 % partial transection), grade 4 (More than 50 % but less than 100 % partial transection) and grade 5 (Complete transection, open or laparoscopic reconstruction is mandatory).

**System functions:** Electronic Patient Chart>Scores and Indexes

#### **Sources:**

- Schoenthaler, M., Buchholz, N., Farin, E. et al. The Post-Ureteroscopic Lesion Scale (PULS): a multicenter video-based evaluation of inter-rater reliability. *World J Urol* **32**, 1033–1040 (2014).

#### **2.1.3.13.178 Pulmonary Embolism Rule-out Criteria (PERC)**

**Description:** The Pulmonary Embolism Rule-out Criteria (PERC) is a tool that can identify patients who can safely be discharged from the emergency department without further investigation for pulmonary embolism (PE). It is composed of eight “yes or no” questions which evaluate age, heart rate, SaO<sub>2</sub>, unilateral leg swelling, hemoptysis, recent surgery or trauma, prior PE or deep vein thrombosis (DVT), and hormone use. Pulmonary embolism workup can be avoided if (1) none of the above eight variables is positive and (2) there is a less than 15% (very low) pretest probability that the patient has a pulmonary embolism. A PERC evaluation is considered positive if any one of the eight criteria are met.

**System functions:** Electronic Patient Chart>Scores and Indexes

#### **Sources:**

- KLINE, J. A.; MITCHELL, A. M.; KABRHEL, C.; RICHMAN, P. B.; COURTNEY, D. M. Clinical criteria to prevent unnecessary diagnostic testing in emergency department patients with suspected pulmonary embolism. *J Thromb Haemost* 2004
- Kline, J. A.; Courtney, D. M.; Kabrhel, C.; Moore, C. L.; Smithline, H. A.; Plewa, M. C.; Richman, P. B.; O’Neil, B. J.; Nordenholz, K. Prospective multicenter evaluation of the pulmonary embolism rule-out criteria. *J Thromb Haemost*. 2008

#### 2.1.3.13.179 Pulmonary Risk

**Description:** The Pulmonary Risk identifies the risk of pneumonia in non-cardiac surgical patients, helping to guide perioperative respiratory care. It considers age and type of surgery performed such as abdominal aortic aneurysm repair, thoracic surgery, upper abdominal surgery, neck surgery, vascular surgery and neurosurgery. It also evaluates if the patient has undergone general anesthesia, if the procedure was an emergency, if the patient was transfused more than 4 units of blood, the functional status between fully dependent or partially dependent, if there was a 10% weight reduction in the last 6 months, history of COPD, history of stroke, decreased consciousness, urea value (mg/dL), chronic use of corticosteroids (regular use for 1 month), smoking and alcohol use status (2 drinks/day in the last 2 weeks). Each assigned variable has a value, and the final score is generated by the sum of all values, indicating the classification between: class I (0-15 points) and II (16-25 points) = low pulmonary risk, class III (26-40 points) moderate pulmonary risk and class IV (41-55 points) and V (> 55 points) high pulmonary risk.

**System functions:** Electronic Pre-Anesthetic Assessment -> Risk; Electronic Patient Chart>Scores and Indexes

#### Sources:

- *Ahsan M. Arozullah, et al. Development and Validation of a Multifactorial Risk Index for Predicting Postoperative Pneumonia after Major Noncardiac Surgery. Intern Med. 20 November 2001;135(10):847-857*

#### 2.1.3.13.180 Ramsay Sedation Scale

**Description:** The Ramsay Sedation Scale is used to measure the level of sedation and it is the most simplistic and it is an intuitively obvious scale and therefore lends itself to universal use, not only in the ICU, but wherever sedative drugs or narcotics are given. It divides a patient's level of sedation into six categories: 1) patient is anxious and agitated or restless, or both, 2) patient is co-operative, oriented, and tranquil, 3) patient responds to commands only, 4) patient exhibits brisk response to light glabellar tap or loud auditory stimulus, 5) patient exhibits a sluggish response to light glabellar tap or loud auditory stimulus, and 6) patient exhibits no response.

**System functions:** Electronic Patient Chart>Scores and Indexes

#### Sources:

- *Mondello E, et al. Bispectral index in ICU: correlation with Ramsay score on assessment of sedation level. Journal of Clinical Monitoring and Computing. 2002. Vol 17, No 5*
- *Nascimento JS. Clonidina na cineangiocoronariografia: efeitos sedativos sobre a pressão arterial e frequência cardíaca. Arq Bras Cardiol 2006; 87 : 603-608*
- *Ramsay MA, Savage TM, Simpson BR, Goodwin R. Controlled sedation with alphaxone-alphadone. BrMed J 1974; 2: 656-659*

#### 2.1.3.13.181 Ranson Criteria

**Description:** The Ranson Criteria are used to predict the severity and mortality of patients with acute pancreatitis, and are classified into 11 parameters. Five parameters are assessed on admission, and the other six are assessed at 48 h post-admission. One point is given for each positive parameter for a maximum score of 11, such as age (years), glycemia, leukocyte count, serum LDH and serum AST. At 48 h of admission, the remaining 6 parameters are: hematocrit fall, serum calcium, base deficit, increase in BUN, fluid sequestration and PAO<sub>2</sub>. The mortality is evaluated using the percentage of 0 to 2 criteria for 2%; 3 to 4 criteria for 15%; 5 to 6 criteria for 40% and > 6 criteria for 100%.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- *Ranson JH, Rifkind KM, Roses DF, Fink SD, Eng K, Spencer FC (1974). "Prognostic signs and the role of operative management in acute pancreatitis". Surgery, Gynecology & Obstetrics 139 (1): 69-81*
- *Abu-Ehy AS, Abolfotouh MA, Nawar E, Sabib AHA. Ranson's Criteria for Acute Pancreatitis in High Altitude: Do they Need to be Modified? Saudi J Gastroenterol. 2008 January; 14(1): 20-23*

**2.1.3.13.182 Revised Piper Fatigue Scale (PFS-R)**

**Description:** The Revised Piper Fatigue Scale (PFS-R) scale is used to assess perceived fatigue of patients with chronic disease such as cancer. It is a 22-item scale that measures four subscales: behavior (6 items), affect (5 items), sensory (5 items) and cognition/mood (6 items). Each item has 11 response categories valued from 0 to 10, with verbal descriptors anchoring the endpoints. Each subscale is scored individually and then aggregated as a mean for the overall score, which ranges from 0 to 10. The higher the score is, the greater the patient's fatigue.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Piper BF, Dibble SL, Dodd MJ, Weiss MC, Slaughter RE, Paul SM. The revised Piper Fatigue Scale: psychometric evaluation in women with breast cancer. Oncol Nurs Forum 1998; 25 (4): 677-84*
- *Mota DDCF, Pimenta CAM, Piper BF. Fatigue in Brazilian cancer patients, caregivers, and nursing students: a psychometric validation study of the Piper Fatigue Scale-Revised. Support Care Cancer 2009; 17(6): 645-5*
- *Mota DD, Pimenta CA, Piper BF. Fatigue in Brazilian cancer patients, caregivers, and nursing students: a psychometric validation study of the Piper Fatigue Scale-Revised. Support CareCancer. 2009 Jun;17(6):645-52*

**2.1.3.13.183 Richmond Agitation-Sedation Scale (RASS)**

**Description:** The Richmond Agitation and Sedation Scale (RASS) is a validated and reliable method to assess patients' level of sedation in the intensive care unit. Developed by a multidisciplinary team from University of Richmond, Virginia, this scale is mostly used in mechanically ventilated patients in order to avoid over and under-sedation. The RASS is a 10-point scale ranging from -5 to +4. Levels -1 to -5 denote 5 levels of sedation, starting with "awakens to voice" and ending with "unarousable." Levels +1 to +4 describe increasing levels of agitation. The lowest level of agitation starts with apprehension and anxiety, and peaks at combative and violent. RASS level 0 is "alert and calm." RASS scoring and interpretation should be based on the sedation protocol being used.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- *Antonio Paulo Nassar Junior; Ruy Camargo Pires Neto; Walquiria Barcelos de Figueiredo; Marcelo Park Validity, reliability and applicability of Portuguese versions of sedation-agitation scales among critically ill patients:*
- [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S1516-31802008000400003](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1516-31802008000400003)  
<https://doi.org/10.1590/S1516-31802008000400003>

- Sessler CN, Gosnell M, Grap MJ, Brophy GT, O'Neal PV, Keane KA et al. The Richmond Agitation-Sedation Scale: validity and reliability in adult intensive care patients. *Am J Respir Crit Care Med* 2002; 166:1338-1344
- Ely EW, Truman B, Shintani A, Thomason JWW, Wheeler AP, Gordon S et al. Monitoring sedation status over time in ICU patients: the reliability and validity of the Richmond Agitation Sedation Scale (RASS). *JAMA* 2003; 289:2983-2991

#### **2.1.3.13.184 Risk Assessment Scale for the Development of Injuries Resulting from Surgical Positioning (ELPO)**

**Description:** Risk Assessment Scale for the Development of Injuries Resulting from Surgical Positioning (ELPO) was developed and validated according to the anatomical and physiological implications of the surgical positions. The purpose of using the ELPO associated with the professional's skill is to provide support for decision making on the best care to be implemented for each patient, with implications for the prevention of complications and for improving the quality of care provided. The ELPO evaluates seven items as follows: type of surgical position, surgery time, anesthesia type, support surface, position of the limbs, comorbidities, and patient's age. The scale ranges from 7 to 35 points, and the higher the score, the greater the risk of developing lesions caused by the surgical positioning of the patient. Classification of the results: 7 to 19 (lower risk of lesions development); 20 to 35 (greater risk of lesions development).

**System functions:** Electronic Patient Chart ->Scores and Indexes

#### **Sources:**

- Lopes CMM, Hass VJ, Dantas Ras, Oliveira CG, Galvão CM. Scale for assessment of risk for development of lesions caused by surgical positioning. *Rev Latino\_Am Engermagem*. Forthcoming 2016.

#### **2.1.3.13.185 Robson Classification**

**Description:** The Robson classification, also known as the 10-groups classification or ten groups classification system (TGCS), is a system for classifying pregnant women who undergo childbirth. It was developed to allow more accurate comparison of caesarean section rates between different settings, whether they be individual hospitals or entire regions or countries. Endorsed by the World Health Organization in 2015, it differs from other classification systems in that it accounts for all women who undergo delivery, and not just those who proceed to cesarean section. The ten mutually-exclusive groups were first described by the obstetrician Michael Robson in 2001, and are defined based on the category of the pregnancy, the woman's previous obstetric record, the course of the labor and delivery, and the gestational age at delivery: 1) Nulliparous, single cephalic pregnancy, at least 37 weeks' gestation, spontaneous labour, 2) Nulliparous, single cephalic pregnancy, at least 37 weeks' gestation, with either induced labour or a cesarean section prior to the onset of spontaneous labour, 3) Multiparous, no previous caesarean section, single cephalic pregnancy, at least 37 weeks' gestation, spontaneous labour, 4) Multiparous, no previous caesarean section, single cephalic pregnancy, at least 37 weeks' gestation, with either induced labour or a cesarean section prior to the onset of spontaneous labour, 5) Previous caesarean section, single cephalic pregnancy, at least 37 weeks' gestation, 6) Nulliparous, single breech pregnancy, 7) Multiparous, single breech pregnancy, 8) Multiple pregnancy, 9) Single pregnancy with transverse or oblique lie, and 10) Single cephalic pregnancy, 36 weeks' gestation or less. The classification is increasingly used to monitor and compare rates of caesarean section in many countries, and some further subdivisions of the ten groups have been proposed.

**System functions:** Electronic Patient Chart>Scores and Indexes

#### **Sources:**



- Robson, Michael (2001). *Classification of Caesarean Sections*. *Fetal and Maternal Medicine Review* February 2001, pp 23 – 39
- Vogel JP, Betr  n AP, Vindevoghel N, Souza JP, Torloni MR, Zhang J, Tun  alp   , Mori R, Morisaki N, Ortiz-Panozo E, Hernandez B, P  rez-Cuevas R, Qureshi Z, G  lmezoglu AM, Temmerman M; WHO Multi-Country Survey on Maternal and Newborn Health Research Network. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. *Lancet Glob Health*. 2015 May;3(5):e260-70. doi: 10.1016/S2214-109X(15)70094-X. Epub 2015 Apr 9. PMID: 25866355.

#### 2.1.3.13.186 Rockall Risk Scoring System

**Description:** The Rockall Risk Scoring System attempts to identify patients at risk of adverse outcome following acute upper gastrointestinal bleeding. Rockall et al. identified independent risk factors in 1996 which were later shown to predict mortality accurately. The scoring system uses clinical criteria (increasing age, co-morbidity, shock) as well as endoscopic finding (diagnosis, stigmata of acute bleeding). A convenient mnemonic is ABCDE - i.e. Age, Blood pressure fall (shock), Co-morbidity, Diagnosis and Evidence of bleeding. Total score is calculated by simple addition. A score less than 3 carries good prognosis but total score more than 8 carries high risk of mortality.

**System functions:** Electronic Patient Chart>Scores and Indexes

#### Sources:

- Rockall TA, Logan RFA, Devlin HB, Northfield TC. *Selection of patients for early discharge or outpatient care after acute upper gastrointestinal haemorrhage*. National Audit of Acute Upper Gastrointestinal Haemorrhage. *Lancet*. 1996; 347(9009):1138-40
- British Society of Gastroenterology Endoscopy Committee (2002). "Non-variceal upper gastrointestinal haemorrhage: guidelines". *Gut*. 51 Suppl 4: iv1–6
- Vreeburg EM, Terwee CB, Snel P, et al. (1999). "Validation of the Rockall risk scoring system in upper gastrointestinal bleeding". *Gut*. 44 (3): 331–5

#### 2.1.3.13.187 Roland-Morris Disability Questionnaire

**Description:** The Roland Morris Questionnaire is designed to assess self-rated physical disability caused by low back pain. It has 24 "yes or no" questions, related to the impact of low back pain on the patient's life, such as use of handrails in stairs, amount of time spent lying down, difficulty turning over in bed. The score is calculated by adding up the number of items checked, and ranges from 0 (no disability) to 24 (maximum disability).

**System functions:** Electronic Patient Chart>Scores and Indexes

#### Sources:

- Roland MO, Morris RW. *A study of the natural history of back pain. Part 1: Development of a reliable and sensitive measure of disability in low back pain*. *Spine* 1983; 8: 141-144
- Roland Morris, L. Nusbaum, J. Natour, M.B. Ferraz and J. Goldenberg. Translation, adaptation and validation of the Roland-Morris questionnaire, *Brazilian Journal of Medical and Biological Research*, 2001

#### **2.1.3.13.188 Screening Tool for Risk of Nutritional Status and Growth (STRONG)**

**Description:** The Screening Tool for Risk of Nutritional Status and Growth (STRONG) is a nutritional screening tool used in children from 1 month to 18 years old and consists of four questions: two questions to be answered by the HCP and two by the child's caregiver. The questions to be answered by the HCP are: is there an underlying illness with a risk of malnutrition or expected major surgery? Is the patient in a poor status as judged by subjective clinical assessment? The questions to be answered by the caregiver are: is one of the following items present (excessive diarrhea >5 times/day and/or vomiting >3 times/day; reduced food intake during the last few days; pre-existing nutritional intervention; inadequate nutritional intake due to pain)? Is there weight loss or no weight gain (infants < 1 year) during the last weeks/months?

Each positive answer assigns one point; the sum of these points identifies the risk of malnutrition and provides guidance to the HCP on needed intervention and necessary follow-up. Risk assignment is as follows: high risk (4-5 points); medium risk (1-3 points); low risk (0 points).

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- *Rebecca E. Ling; Victoria Hedges, Peter B. Sullivan. Nutritional risk in hospitalised children: An assessment of two instruments. ESPEN (European Society for Clinical Nutritional and Metabolism) 6 (2011) e153-e157*

#### **2.1.3.13.189 Sepsis Early Detection Tool**

**Description:** The Sepsis Early Detection Tool supports clinicians in the early identification of inpatients with signs and symptoms of sepsis, which can influence clinical outcomes.

A previous configuration is needed in the "Sepsis" item of the "Patient Chart Settings" function to activate the tool. On the "Sepsis triggering variables" tab, the user needs to filter for "Adult sepsis" to see all variables and default configuration provided by Philips, eight Systemic Inflammatory Response Syndrome (SIRS) criteria, and 15 signs of organic dysfunction. The variables of SIRS are bradycardia, hyperthermia, hypothermia, left shift in WBC count, leukopenia, leukocytosis, low PaCO<sub>2</sub>, and bradypnea. The types of organic dysfunction are unexplained metabolic acidosis, consciousness level impairment, acute oliguria, dyspnea or supplemental O<sub>2</sub> necessity, abnormalities in PaO<sub>2</sub>/FiO<sub>2</sub> ratio, serum creatinine level, MAP, SAP, aPTT, international normalized ratio (INR), O<sub>2</sub> Sat, white blood cell count, serum bilirubin level, and platelet levels. If the institution decides not to use all 28 default variables, it can configure in the tab "Sepsis Client" the desired ones, the thresholds and, the patient's age.

It is mandatory to configure rules using the "Clinical Decision Support – Mentor" function to activate the system alerts and notifications regarding sepsis. In the function, on the "Triggering events" tab, the user selects the option "Scores and indexes" to define the rules and actions, including professional roles and submission. Then, when an event is registered in the "Electronic Patient Chart (EPC)" function and matches all conditions defined in "Clinical Decision Support – Mentor" function, a notification is triggered to inform the event, which is validated by the clinician.

All data regarding the Sepsis Early Detection Tool is recorded in the "Sepsis" tab, on the "Scores and Indexes" item of the "EPC" function. A new record can be manually created or automatically triggered according to the rules of the user's confirmation. Finally, the user can follow an ongoing investigation and record a medical assessment that automatically generates a new clinical note.

**System functions:** Electronic Patient Chart > Scores and Indexes

#### **Sources:**

- *Surviving Sepsis Campaign. Educational Videos. Surviving Sepsis Campaign Responds to Sepsis-3*
- *Roteiro de implementação de protocolo assistencial gerenciado, ILAS. 4ª edição. Nova edição: 2018 revisada e atualizada*
- *Instituto Latino-Americano de Sepse ILAS; Implementação de protocolo gerenciado de sepse: protocolo clínico. Atendimento ao paciente adulto com sepse/choque séptico; 2018*

#### **2.1.3.13.190 Sequential Organ Failure Assessment (SOFA) Score**

**Description:** The Sequential Organ Failure Assessment (SOFA) Score is used to determine the level of organ dysfunction and mortality risk in intensive care unit (ICU) patients. It is based on six organ systems: respiratory, hepatic, cardiovascular, coagulation, renal, and neurological. Each evaluation criteria ranges between 0 and 4 points and are summed up to obtain the final score. The higher the score, the greater the severity of the patient's dysfunction and the expected mortality rate.

**System functions:** Electronic Patient Chart>Scores and Indexes

#### **Sources:**

- *Singer M, Deutschman CS, Seymour CW, et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). JAMA. 2016;315(8):801–810. doi:10.1001/jama.2016.0287*
- *Vincent JL, Moreno R, Takala J, Willatts S et al. The SOFA (Sepsis-related Organ Failure Assessment) score to describe organ dysfunction/failure. On behalf of the Working Group on Sepsis-Related Problems of the European Society of Intensive Care Medicine. Intensive Care Med. 1996 Jul;22(7):707-10*
- *Vincent JL, de Mendonca A, Cantraine F, et al. Use of SOFA score to assess the incidence of organ dysfunction/failure in intensive care units: results of a multicenter, prospective study. Critical Care Medicine 1998;26:1793-1800.*

#### **2.1.3.13.191 Sexual Health Inventory for Men (SHIM)**

**Description:** The Sexual Health Inventory for Men (SHIM) is a widely used tool which aids in the screening and diagnosis of Erectile Dysfunction (ED). It is a questionnaire with five questions that evaluate the symptoms of ED and each question has 5 possible answers that range from 1 to 5 points. The result is the sum of all questions and ranges from 5 to 25, representing severe ED from 1 to 7, moderate ED from 8 to 11, mild to moderate ED from 12 to 16, mild ED from 17 to 21, and no signs of ED from 22 to 25.

**System functions:** Electronic Patient Chart>Scores and Indexes

#### **Sources:**

- *Rosen RC, Cappelleri JC, Smith MD, Lipsky J, Pena BM. Development and evaluation of an abridged, 5-item version of the International Index of Erectile Function (IIEF-5) as a diagnostic tool for erectile dysfunction. International Journal of Impotence Research (1999) 11, 319-326*

#### **2.1.3.13.192 Short Alcohol Dependence Data Questionnaire (SADD)**

**Description:** The Short Alcohol Dependence Data Questionnaire (SADD) is used to evaluate the level of alcohol dependence. It is composed of 15 questions related to the consumption of alcohol. Each item is assigned a score of 0 (never), 1 (a few times), 2 (many times), or 3 (always). The 15 items are summed for a total score that can range from 0 to 45. Total scores are interpreted as follows: range 1 to 9 (slight dependence), 10 to 19 (moderate dependence) and 20 or higher (serious dependence).

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- *Raistrick, D., Dunbar, G., & Davidson, R. (1983). Development of a questionnaire to measure alcohol dependence. British Journal of the Addiction, 78, 89-95*
- *Edwards, G., Marshal, E. J. & Cook, C. H. O tratamento do alcoolismo: Um guia para profissionais da saúde. P.49, Porto Alegre, RS, Artes Médicas,1999*

**2.1.3.13.193 Silverman Scoring System**

**Description:** The Silverman Scoring System is used to evaluate the breathing performance of premature infants and to predict the need for escalation of respiratory support. It uses visual depictions to evaluate five parameters of work of breathing: (1) chest retraction as compared with abdominal retraction during inhalation; (2) retraction of the lower intercostal muscles; (3) xiphoid retraction; (4) flaring of the nares with inhalation; and (5) grunting on exhalation. Each category has three choices. The overall score determines the level of respiratory distress: a score of 0 indicates no respiratory distress; scores  $\geq 7$  indicate impending respiratory failure and a score of 10 indicates severe respiratory distress.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- *Silverman, W. A, Andersen D. H. A controlled clinical trial of effects of water mist on obstructive respiratory signs, death rate and necropsy findings among premature infants. Pediatrics, [S.l.], v. 17, p. 1-10, 1956*
- *Atenção à Saúde do Recém-Nascido. Guia dos Profissionais de Saúde: problemas respiratórios, cardiocirculatórios, metabólicos, neurológicos, ortopédicos e dermatológicos. Ministério da Saúde. Volume 3, Brasília – DF, 2011*

**2.1.3.13.194 Simplified Acute Physiology Score (SAPS II)**

**Description:** The Simplified Acute Physiology Score (SAPS II) determines the clinical severity of the patient on admission to the ICU and predicts mortality rates. The point score is calculated from 12 physiological variables and 3 disease-related variables during the first 24 hours, information about previous health status and other information obtained at admission. The parameters are age, type of admission, HR (bpm), SBP (mmHg), temperature (°C or °F), GCS, PaO<sub>2</sub> (mmHg)/ FiO<sub>2</sub> (%) if on mechanical ventilation or CPAP, diuresis (L/24h), serum urea (g/L) or BUN (mg/dL), sodium (mEq/L), potassium (mEq/L), bicarbonate (mEq/L), bilirubin (mg/dL), leukocytes (count/mm<sup>3</sup>), chronic diseases, HIV diagnosis. The final score is calculated by the sum of all result weights, and ranges from 0 to 163. The percent probability of death is then calculated based in the final scores.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- *Gall JR, Lemeshow S, Saulnier F. A new simplified acute physiology score (SAPS II) based on a European/North American multicenter study. Jama, December 22/29, 1993 – Vol 270, Nº 24*

**2.1.3.13.195 Simplified Acute Physiology Score (SAPS III-28 days)**

**Description:** SAPS III-28 days aims to estimate the patient's survival during the first 28 days following admission to the Intensive Care Unit (ICU). The variables cover characteristics of the patient before admission to the ICU (age, previous state of health, co-morbidities, patient's location before admission to the ICU and the use of therapeutic options before admission to the ICU), the circumstances of the admission to the ICU (reasons for admission to the ICU, surgery location, planning for ICU admission, surgical state and infection

in the ICU), and the presence and level of physiological perturbation upon admission to the ICU (within 1 hour before or after admission). The user responds to 29 questions grouped in three boxes and in the end, according to the weight of the responses, the system calculates the probability of death in percentage during the first 28 days following admission to the ICU.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- *Moreno RP, et al. Modeling in-hospital patient survival during the first 28 days after intensive care unit admission: a prognostic model for clinical trials in general critically ill patients. 2008 Sep;23(3):339-48*

#### **2.1.3.13.196 Simplified Acute Physiology Score 3 PIRO Score (SAPS 3 PIRO)**

**Description:** The SAPS 3 PIRO score is one of several modifications of the PIRO Score aiming to predict the mortality of patients with sepsis. In 2008, Moreno created SAPS 3 PIRO, covering the “P”, “I” and “R” of the PIRO concept (Predisposition, Infection, Response, and Organ dysfunction). Although SAPS 3 PIRO shares some prognostic variables with the PIRO model, it is more of a mixture of physiological and therapeutic variables, rather than being based on the presence and degree of organ dysfunction/failure, as is the case in PIRO. The user responds to 18 questions grouped in three boxes (predisposition, infection and response) and in the end, according to the weight of the responses, the system calculates the probability of death in percentage.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- *Rubulotta F, Marshall JC, Ramsay G, Nelson D, Levy M, Williams M. Predisposition, insult/infection, response, and organ dysfunction: A new model for staging severe sepsis. Crit Care Med. 2009;37(4):1329-35*
- *Moreno RP, Metnitz B, Adler L, Hoechtl A, Bauer P, Metnitz and SAPS 3 Investigators. Sepsis mortality prediction based on predisposition, infection and response. Intensive Care Med 2008;34:496-504.*

#### **2.1.3.13.197 Simplified Acute Physiology Score (SAPS III)**

**Description:** The SAPS III (Simplified Acute Physiology Score III) prognostic system allows the prediction of mortality for patients admitted to intensive care units (ICU). Twenty variables are used: age, comorbidities, days of previous hospitalization, origin, vasoactive drugs, scheduled and/or unscheduled admission, emergencies, type of surgery, reason for admission, admission to the ICU, Glasgow Coma Score, systolic frequency, blood pressure, oxygenation, temperature, leukocytes, platelets, PH, creatinine and bilirubin. The final score is calculated by the sum of all result variables, and ranges from 0 to 194. As the score increases mortality rate goes from 0 to 100%.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- *Aplicabilidade dos Escore Fisiológico Agudo Simplificado (SAPS 3) em Hospitais Brasileiros. Revista Brasileira de Anestesiologia. Vol. 60, nº1, janeiro a fevereiro, 2010*
- *Moreno RP, et al. SAPS 3-From evaluation of the patient to evaluation of the intensive care unit. Part 2: Development of a prognostic model for hospital mortality at ICU admission. Intensive Care Med. 2005 October; 31(10): 1345-1355*

- *Soares M., Salluh JI. Validation of the SAPS 3 admission prognostic model in patients with cancer in need of intensive care. 2006 Nov;32(11):1839-44. Epub 2006 Sep 15*

#### **2.1.3.13.198 SNAP-II and SNAPPE-II scores**

**Description:** The SNAP-II and SNAPPE-II (Score for Neonatal Acute Physiology and SNAP - Perinatal Extension - II) are empirically validated disease severity and mortality risk scores for the Neonatal Intensive Care Unit (NICU). They were developed to assess the severity of newborns within the first 12 hours of admission to the NICU. SNAP II scores show the variables for results of mean blood pressure, lowest temperature, PO<sub>2</sub> (mmHg)/FIO<sub>2</sub> (%), lowest serum pH, multiple seizures, urine output (mL/kg.h), Apgar score, birth weight (g) and if small for gestational age. The score ranges from 0 to 162 providing the predicted probability of patient mortality. The higher is the score result, greater is the estimated mortality.

**System functions:** Electronic Patient Chart>Scores and Indexes

#### **Sources:**

- *Richardson DK, et al. SNAP-II and SNAPE-II. Simplified newborn illness severity and mortality risk scores. J Pediatr 2001; 138:92-100*
- *Richardson DK, Phibbs CS, Gray JE, McCormick MC, Workman-Daniels K, Goldmann DA. Birth weight and illness severity: independent predictors of neonatal mortality. Pediatrics 1993; 91:969-75.*
- *Silveira RC, Schlabendorff M, Procianoy RS. Predictive value of SNAP and SNAP-PE for neonatal mortality. J Pediatr (Rio J). 2001; 77 (6): 455-60.*
- *Muktan D, Singh RR, Bhatta NK & Shah D. Neonatal mortality risk assessment using SNAPPE- II score in a neonatal intensive care unit. BMC Pediatrics Vol 19, Article number: 279 (2019)19*

#### **2.1.3.13.199 Steward Score**

**Description:** Steward is a scoring system that allows recording of recovery stages from general anesthesia, indicating the significant return of protective functions such as awareness, airway, body movement. Values are assigned according to level of consciousness, airway, and movement, each variable ranging from 0 to 2. The total score ranges from 0 (unresponsive, immobile patient) to 6 (fully recovered).

**System functions:** Perioperative Electronic Patient Chart>PACU Scores

#### **Sources:**

- *Steward DJ. A simplified scoring system for the postoperative recovery room. Can Anaesth Soc J. 1975; 22(1):111-3*

#### **2.1.3.13.200 Stroke Data Bank (SDB)**

**Description:** The Stroke Data Bank (SDB) is a tool to assess the probability of brain hemorrhage among patients with acute stroke based upon clinical information. It uses some demographic characteristics and risk factors as well as clinical information. The differential diagnosis between ischemic stroke and hemorrhagic stroke is a key stage for treatment in the acute phase. The assessment is performed by selecting patient's symptoms presented, considering age and gender. With the sum of all scaling criteria, it ranges from -10 to +10. Results between (-10 a +2) indicate brain hemorrhage, and (> + 2 to + 10) indicate brain infarct.

**System functions:** Electronic Patient Chart>Scores and Indexes

#### **Sources:**

- Massaro AR, Sacco RL, Scaff M, et al. Clinical discriminators between acute brain hemorrhage and infarction: a practical score for early patient identification. *Arq Neuropsiquiatr.* 2002; 60:185-91
- Caneda MAG, Fernandes JG, Almeida AG, Mugnol FE. Confiabilidade de escalas de comprometimento neurológico em pacientes com acidente vascular cerebral. *Arq Neuropsiquiatr* 2006;64(3-A):690-697

#### 2.1.3.13.201 Subjective Global Nutritional Assessment (Detsky)

**Description:** The Subjective Global Assessment (Detsky) was developed in 1987 for Detsky and coworkers. It is a routine evaluation method based on clinical judgment. It is used in hospitals as a questionnaire, considered simple, low cost and widely accepted in clinical practice. It consists of data describing weight loss in the last six months and changes in the last two weeks, changes in food intake, presence of significant gastrointestinal symptoms, evaluation of the patient's functional capacity, metabolic demand according to diagnosis and physical exam. The assessment is composed of three categories: history, physical exam and result.

In history, the HCP evaluates the patient's weight loss in the last 6 months and changes in the two weeks, food intake, gastrointestinal symptoms, functional capacity, main diagnosis and associated diseases, and metabolic demand. In physical examination, subcutaneous fat loss, muscle loss, ankle and sacral edema, and ascites are evaluated. For each item evaluated, must be added 0 = normal, +1 = light, +2 = moderate or +3 = severe.

Based on the characteristics of the history and physical exam, it is possible to identify the degree of the subjective global assessment and classify into a category: (A) well nourished, (B) moderately (or suspected to be) malnourished, and (C) severely malnourished.

**System functions:** Electronic Patient Chart>Scores and Indexes

#### Sources:

- Detsky AS, McLaughlin JR, Baker JP, Johnston N, Whittaker S, Mendelson RA, et al. What is subjective Global Assessment of nutritional status? *JPEN J Parenter Enteral Nutr* 1987;11(1):8-13
- Barbosa-Silva MCG, Barros AJD. Avaliação nutricional subjetiva: Parte 1 – Revisão de sua validade após duas décadas de uso. *Arq. Gastroenterol., São Paulo, v. 39, n. 3, p. 181-187, July 2002*

#### 2.1.3.13.202 Subjective Global Nutritional Assessment (Ottary)

**Description:** The Subjective Global Nutritional Assessment (Ottary) is a clinical method for nutritional assessment that considers not only body composition but also changes in physiological function. It is used to identify malnutrition in oncological patients treated in outpatient clinics and radiotherapy. It differs from other methods of nutritional assessment used in clinical practice as it encompasses not only changes in body composition, but also functional changes in the patient. The Patient-Produced Subjective Global Assessment (PP-SGA) allows a quick assessment of nutritional status, identification of symptoms of nutritional impact, facilitating the implementation of adequate nutritional therapy.

The assessment is divided into two parts: one part produced by the patient and the other completed by nutritionist, physician or nurse. The initial part of the form, produced by the patient, contains questions about recent changes in body weight, performs daily activities, changes in food intake and symptoms that influence it. The second part of the assessment is answered by the researcher (nutritionist, physician or nurse) with information about the patient's diagnosis, metabolic stress and physical examination.

Each question is scored from 0-4, according to category. At the end of the evaluation, the researcher sums the scores and defines the category A (well nourished), B (moderately malnourished or suspected malnutrition) or C (severely malnourished).

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- Baure J, Capra S, ferguson M. Use of the scored Patient-Generated Subjective Global Assessment (PG-SGA) as a nutrition assessment tool in patients with cancer. 2002 Aug;56(8):779-85.
- Iserning E, Bauer J, Capra S. The scored Patient-generated Subjective Global Assessment (PG-SGA) and its association with quality of life in ambulatory patients receiving radiotherapy. Eur J Clin Nutri. 2003 Feb;57(2):305-9.

**2.1.3.13.203 Subjective Global Nutritional Assessment Modified (Detsky Modified)**

**Description:** The Subjective Global Nutritional Assessment Modified (Detsky Modified) is a routine assessment method based on clinical judgment. It is used in hospitals as a questionnaire and is considered simple, low cost and widely accepted in clinical practice. It consists of data describing weight loss in the last six months and changes in the last two weeks, changes in food intake, presence of significant gastrointestinal symptoms, evaluation of the patient's functional capacity, metabolic demand according to diagnosis and physical exam. This assessment is a modified version because there are different items evaluated, such as fasting more than 5 days, changes persistent in the diet more than 30 days, dysphagia and/or odynophagia, anorexia, distention or abdominal pain. The assessment is composed of three categories: history, physical exam and results. In history, the HCP evaluates the patient's weight loss in the last six months and changes in two weeks, food intake, gastrointestinal symptoms, functional capacity, main diagnosis and associated diseases, and metabolic demand. In physical exam, subcutaneous fat loss, muscle loss, ankle and sacral edema, and ascites are evaluated. The following scoring is used per item 0 = normal; +1= light or +2= moderate. The assessment interpretation results are well nourished (< 17 points), moderately malnourished (17-22 points); severely malnourished (> 22 points).

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- Detsky AS, et al. What is Subjective Global Assessment of Nutritional Status, Journal of Parenteral and Enteral Nutr. 11:8-13, 1987
- Yamauti AK, et al. Avaliação nutricional subjetiva global em Pacientes Cardiopatas. Arq Bras Cardiol 2006; 87(6): 772-777

**2.1.3.13.204 SYNTAX Score**

**Description:** The SYNTAX score is a score that evaluates the complexity and prognosis of patients undergoing Percutaneous Coronary Intervention (PCI). The SYNTAX score is the sum of the points assigned to each individual lesion identified in the coronary tree with >50% diameter narrowing in vessels >1.5mm diameter. The coronary tree is divided into 16 segments according to the AHA classification. Each segment is given a score of 1 or 2 based on the presence of disease and this score is then weighted based on a chart, with values ranging from 3.5 for the proximal left anterior descending artery (LAD) to 5.0 for left main, and 0.5 for smaller branches. The collateral vessels before 3 months, a blunt stump, a side image of bridge in the arterial, the first segment visible beyond the total occlusion, and a side branch >1.5 diameter all receive one point. For trifurcations, one diseased segment gets three points, two diseased segments get four points, three diseased segments get five points, and four disease segments get six points. For bifurcation lesions, one point is given for types A, B, and C; two points are given for types D, E, F, and G; and one point is given for an angulation >70 degrees. Additionally, an aorto-ostial lesion is worth one point, severe tortuosity of vessel is worth two points, lesion length greater than 20 mm is worth one point, heavy calcification is worth 2 points, thrombus is worth 1 point, and diffuse disease or small vessel is at 1 point per segment involvement. For multiple lesions



less than three reference vessel diameters apart, these are scored as a single lesion. However, at distances greater than three vessel diameters, these are considered separate lesions. Segments in which bifurcations are evaluated are those involving the proximal LAD and left main, the mid LAD, the proximal circumflex, mid circumflex, and crux of the right coronary artery. With regard to trifurcation lesions, these also are additive in number of segments involved. The SYNTAX score algorithm then sums each of these features for a total SYNTAX score. A computer algorithm is then queried and a summed value is produced. A higher SYNTAX score indicates a more complex condition as well as worse prognosis in patients undergoing contemporary revascularization especially with PCI. Among patients with complex Coronary Artery Disease (CAD), Coronary Artery Bypass Grafting (CABG) remains as the standard of care for patients with high ( $\geq 33$ ) or intermediate (23–32) SYNTAX scores, whereas PCI is an acceptable alternative in patients with less complex disease (SYNTAX score  $\leq 22$ ).

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- Sianos G, Morel MA, Kappetein AR, et al. *The SYNTAX score: an angiographic tool grading the complexity of coronary artery disease.* EuroInterv. 2005;1:219-227
- Mohr FW, Morice MC, Kappetein AP, et al. *Coronary artery bypass graft surgery versus percutaneous coronary intervention in patients with three-vessel disease and left main coronary disease: 5-year follow-up of the randomised, clinical SYNTAX trial.* Lancet 2013;381:629–38

#### 2.1.3.13.205 Therapeutic Intervention Scoring System (TISS-10)

**Description:** The Therapeutic Intervention Scoring System (TISS-10) is a score that assesses nursing workload of ICU patients, partially allocated in the German system of Diagnosis Related Groups (DRG). Ten items are evaluated: mechanical ventilation, vasoactive medication, fluid intake, peripheral catheter, left atrial/pulmonary catheter, dialysis/filtration, intracranial pressure measurement, acidosis/alkalosis treatment, ICU interventions, and outside ICU interventions. The total score is the sum of the weight of all items, from 0 to 47. The higher the score result, the greater the patient's nursing workload demand.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- Guenther, U., Koegl, F., Theuerkauf, N. et al. *Pflegeaufwandsindizes TISS-10, TISS-28 und NEMS.* Med Klin Intensivmed Notfmed 111, 57–64 (2016)

#### 2.1.3.13.206 Therapeutic Intervention Scoring System-28 (TISS-28)

**Description:** The Therapeutic Intervention Scoring System-28 (TISS-28) is a score that allows measuring the nursing workload in Intensive Care Units (ICU) and estimating the severity of disease. The score consists of 7 categories: basic activities, cardiovascular support, ventilatory support, renal support, neurologic support, metabolic support, and specific interventions. Each category has specific scores according to its variables (1, 2, 3, 4, 5 or 8 points), and they are all summed up to obtain final score. Scores < 20 represent physiologically stable patients requiring prophylactic observation, scores from 20 to 35 represent physiologically stable patients, but requiring intensive nursing care and continuous monitoring, scores from 35 to 60 represent hemodynamically serious and unstable patients, and scores > 60 represent patients with compulsory indication as admission in ICU with continuous and specialized medical and nursing care.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- *Miranda DR et coll.* Simplified Therapeutic Intervention Scoring System: The TISS-28 items. Results from a multicenter study. *Crit Care Med.* 1996; 24: 64-73
- *Moreno R, Morais P.* Validation of the simplified therapeutic intervention scoring system on an independent database. *Intensive Care Med.* 1997; 23: 640-644

#### 2.1.3.13.207 Timed Up and Go (TUG)

**Description:** The Timed Up and Go (TUG) test was proposed by Podsiadlo and Richardson in 1991 and aims to assess mobility, balance, walking ability, and fall risk in older adults. and the test times a patient as they progress from sitting to standing and walking, turning and returning to sit again. The assessment is determined by the time evaluated in seconds, where 10 seconds or less indicate normal mobility, 11 to 20 seconds are within normal limits for frail elderly and disabled patients, and greater than 20 seconds means the person needs assistance and indicates further examination and intervention may be needed.

**System functions:** Electronic Patient Chart>Scores and Indexes

#### Sources:

- *Podsiadlo D, Richardson S.* The Timde Up and Go: a test of basic functional mobility for frail elderly persons. *Journal of American Geriatrics Society*, v. 39, p. 142 – 148, 1991
- *Cabral CLL.* Tradução e validação do teste Time Up and Go e sua correlação com diferentes alturas da cadeira. *Pró-Retirota de Pós Graduação e pesquisa Scritcosensu em gerontologia.* Brasília – DF, 2011

#### 2.1.3.13.208 TIMI Risk Score

**Description:** The TIMI Risk score for non-ST segment elevation myocardial infarction is a prognostication scheme that categorizes a patient's risk of death and ischemic events and provides a basis for therapeutic decision making. Seven variables are assessed: age, risk factors for coronary arterial disease (CAD), use of aspirin in prior 7 days, prior coronary stenosis of 50% or more, ST-segment deviation on electrocardiogram at presentation, at least 2 anginal events in prior 24 hours, and elevated serum cardiac markers. The result is obtained by the assignment of value of 1 when a factor was present and 0 when absent, and summing the number of factors present to categorize patients into risk strata. The score ranges from 0 to 7, higher scores represent higher rates of all-cause mortality, myocardial infarction and urgent revascularization.

The TIMI Risk score for ST-segment elevation myocardial infarction (STEMI) is an assessment tool for triage and management of fibrinolytic-eligible patients with STEMI, and for predicting 30-day mortality in these patients. Eight variables are assessed: age (2 points if age 65-74 years, 3 points if  $\geq 75$  years), history of diabetes or hypertension or angina (1 point), systolic blood pressure  $< 100$  mmHg (3 points), heart rate  $> 100$  bpm (2 points), Killip score between II-IV (2 points), weight  $< 67$  kg (1 point), anterior ST segment elevation or left bundle branch block at presentation (1 point), and time to initiation of treatment  $> 4$  hours (1 point). The result is the sum of all points, higher scores represent higher 30-day mortality rates.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- *The TIMI Risk Score for Unstable Angina/Non-ST Elevation MI. A Method for Prognostication and Therapeutic Decision Making.* Elliott M. Antman, MD; Marc Cohen, MD; Peter J. L. M. Bernink, MD; Carolyn H. McCabe, BS; Thomas Horacek, MD; Gary Papuchis, MD; Branco Mautner, MD; Ramon Corbalan, MD; David Radley, MS; Eugene Braunwald, MD. *JAMA.* 2000;284(7):835-842
- *TIMI Risk Score for ST-Elevation Myocardial Infarction: A Convenient, Bedside, Clinical Score for Risk Assessment at Presentation.* An Intravenous nPA for Treatment of Infarcting Myocardium Early II Trial

Substudy. David A. Morrow, MD; Elliott M. Antman, MD; Andrew Charlesworth, BSc; Richard Cairns, BSc; Sabina A. Murphy, MPH; James A. de Lemos, MD; Robert P. Giugliano, MD; Carolyn H. McCabe, BS; Eugene Braunwald, MD. *Circulation* 2000; 102: 2031-2037

#### **2.1.3.13.209 Tinetti-test**

**Description:** The Tinetti-test assesses gait and balance in older adults and assesses perception of balance and stability during activities of daily living and fear of falling. It is also called Performance-Oriented Mobility Assessment (POMA). It is a very good indicator of the fall risk of an individual. It has better test-retest, discriminative and predictive validities concerning fall risk than other tests including Timed Up and Go test (TUG), one-leg stand and functional reach test. It is used in various settings e.g. those diagnosed with Multiple Sclerosis, Parkinson's Disease, acquired brain injury, spinal cord injury, stroke and the elderly population. The Tinetti test has a gait score and a balance score. It uses a 3-point ordinal scale of 0, 1 and 2. Gait is scored over 12 and balance is scored over 16 totaling 28. The lower the score on the Tinetti test, the higher the risk of falling:  $\leq 18$  high risk of fall, 19-23, moderate and  $\geq 24$  low.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- *Tinetti ME, Williams TF, Mayewski R, Fall Risk Index for elderly patients based on number of chronic disabilities. Am J Med 1986;80:429-434*
- *Berg KO, Wood-Dauphinée SL, Williams JI, Maki B. Measuring balance in the elderly: validation of an instrument. Can J Public Health.1992;83(suppl 2) :S7– S11.*
- *Shumway-Cook A, Woollacott MH. Motor control: translating research into clinical practice. Philadelphia : Wolters Kluwer, 2016.*

#### **2.1.3.13.210 Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS)**

**Description:** The Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS), developed in the early 1990s, is a composite scale used to measure three aspects of cervical dystonia: severity, disability, and pain. The severity sub score is a maximum of 35 and consists of 11 items scored on scales ranging from either 0 to 1, 0 to 3, 0 to 4, or 0 to 5, also emphasizing the duration of the symptoms by weighting them with a factor of 2. The disability sub score has a maximum of 30 and consists of six items scored on scales from 0 to 5. Finally, the pain sub score has a maximum of 20 and consists of three patient-rated items, two of which are scored on a range from 0 to 5, while the third depends on patients' score of their usual pain (factored by 2), worst pain, and best pain, on a range of 0 to 10, all divided by 4 to reach a total ranging from 0 to 10. TWSTRS total score falls within the range of 0 to 85, where a higher score indicates a more severe condition.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- *Consky ES, Lang AE. Clinical assessments of patients with cervical dystonia. In: Jankovic J, Hallett M, eds. Therapy with Botulinum Toxin. New York, NY: Marcel Dekker, Inc.: 1994;211-237*
- *Tarsy D. Comparison of clinical rating scales in treatment of cervical dystonia with botulinum toxin. Mov Disord. 1997 Jan;12(1):100-2*
- *Sekeff-Sallem FA, Caramelli P, Barbosa ER. Cross-cultural adaptation of the Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS) to Brazilian Portuguese. Arq Neuropsiquiatr 2011;69(2-B):316-319*

#### **2.1.3.13.211 Toxicity Scale**

**Description:** The Toxicity Scale is used for assessing the toxicity of the treatment with antineoplastic treatment. The monitoring is performed at the beginning of the treatment and aims to ensure that the organism can withstand the toxic effects. The level of toxicity varies between 0 and 4, with level 0 for no changes and level 4 for maximum change in accordance with the sign, symptom, and laboratory result. Some adverse effects according to compromised systems can be related to toxicity, such as: hematological, cardiac, neurological, vesical, and renal, gastro-intestinal, dermatological, hepatic, in addition to reproductive and metabolic dysfunction.

**System functions:** Electronic Patient Chart>Scores and Indexes

**Sources:**

- *INCA – Instituto Nacional de Câncer, Brazilian Ministry of Health, 2021 (<https://www.inca.gov.br>)*
- *Saad EV, et al. Critérios comuns de toxicidade do instituto nacional do câncer dos Estados Unidos. Revista Brasileira de Cancerologia, 2002. 48(1): 63-96*

#### **Visual Analogue Scale**

*Refer to the feature “Vital signs and clinical parameters” in the IFU of HIS document.*

#### **2.1.3.13.212 Venous Thromboembolism(VTE) Risk Assessment Tool**

**Description:** The Venous Thromboembolism (VTE) Risk Assessment Tool aims to stratify clinical and surgical patients with risk for VTE and adequacy of prophylaxis. The assessment includes age, weight, height, reduced mobility, and creatinine clearance. Then, after assessing and selecting the risk conditions, the user identifies chemo and mechanical prophylaxis counter-indications. According to the conditions selected, the system suggests the risk classification as high, intermediate, low or not applicable and suggests the proper prophylaxis. Specifically for surgical patients the user must select surgery complexity as high, minor or other. The user can accept or not the risk classification and the suggested prophylaxis, adding justification and notes. The institution can also customize alternative responses to each therapeutic suggestion available in the system.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Guyatt GH, Akl EA, Crowther M, Gutterman DD, Schünemann HJ, for the American College of Chest Physicians. Executive Summary Antithrombotic Therapy and Prevention of Thrombosis Panel Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. CHEST/141/2/FEBRUARY, 2012 SUPPLEMENT*
- *Kahn SR, Lim W, Dunn AS, Cushman M, Dentali F, Akl EA, Cook DJ, Balekian AA, Klein RC, Le H, Schulman S, Murad MH. Prevention of VTE in Nonsurgical Patients Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. CHEST/141/2/FEBRUARY, 2012 SUPPLEMENT*
- *Gould MK, Garcia DA, Wren SM, Karanickolas PJ, Arcelus JJ, Heit JA, Samama CM. Prevention of VTE in Nonorthopedic Surgical Patients Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. CHEST/141/2/FEBRUARY, 2012 SUPPLEMENT*

- Falck-Ytter Y, Francis CW, Johanson NA, Curley C, Dahl OE, Schulman S, Ortel TL, Pauker SG, Colwell Jr CW. Prevention of VTE in Orthopedic Surgery Patients Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Prevention of VTE in Orthopedic Surgery Patients
- Geerts WH, Bergqvist D, Pineo GF, et al. Prevention of venous thromboembolism. ACCP Evidence-Based Clinical Practice Guidelines (8th Edition). Chest 2008;133:381S-453S.

#### 2.1.3.13.213 Ventilatory Weaning Index (Ferrari-Tadini)

**Description:** The Ventilatory Weaning (Ferrari-Tadini) Index aims to analyze and guide the ventilatory weaning of critically ill patients admitted to the Intensive Care Unit (ICU) with Acute Respiratory Distress Syndrome (ARDS) who need tracheal intubation. Ventilatory weaning is the process of transition from artificial ventilation to spontaneous ventilation in patients who remain on invasive mechanical ventilation for more than 24 hours. The Ventilatory Weaning Index consists of 10 parameters: Glasgow scale, tidal volume (ml/kg), FiO<sub>2</sub> (%), PaO<sub>2</sub> (mmHg), PaCO<sub>2</sub> (mmHg), respiratory rate (cycles/min), O<sub>2</sub> Sat (%), inspiratory pressure (cmH<sub>2</sub>O), support pressure (cmH<sub>2</sub>O) and age. These parameters range from 1 to 3 and the sum may reach a score ranging between 0 and 30 classifying the Ventilatory Weaning index in categories: I (indicated - 27-30), II (favorable - 23-26), III (unfavorable - 20-22) and IV (contraindicated <19).

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### Sources:

- Nemer SN, Barbas CSV. Índices de desmame: o que devemos saber? Pulmão RJ 2011;20(3):24-28
- Ferrari D, Tadine R. Índice de desmame ventilatório: IDV Ferrari-Tadini [online]. [Http://www.sobрати.com.br/trabalho3-jan-2004.htm](http://www.sobрати.com.br/trabalho3-jan-2004.htm).
- Miranda JEO, et al. Eficácia do Índice de Desmame Ventilatório Ferrari-Tadini em uma Unidade de Terapia Intensiva de um Hospital de Fortaleza/CE. Fisioterapia Brasil - volume 12 - número 3 - maio/junho 2011

#### 2.1.3.13.214 Verbal category Pain Scale

**Description:** Refer to the feature "Vital signs and clinical parameters calculation" of this document.

#### 2.1.3.13.215 Visual Numeric Pain Scale

**Description:** Refer to the feature "Vital signs and clinical parameters calculation" of this document.

#### 2.1.3.13.216 Wagner-Meggitt classification

**Description:** Developed in 1970, the Wagner-Meggitt classification (also referred as Meggitt-Wagner or only Wagner) is used to assess the severity of injuries related to the diabetic foot with six grades of lesions. The first four grades (grades 0, 1, 2, and 3) are based on the physical depth of the lesion in and through the soft tissues of the foot. The last two grades (grades 4 and 5) are completely distinct because they are based on the extent of gangrene and lost perfusion in the foot (grade 4 refers to partial foot gangrene and grade 5 refers to a completely gangrenous foot).

**System functions:** Electronic Patient Chart>Scores and Indexes

#### Sources:

- Armstrong DG, Lavery LA, Harkless LB. Validation of a diabetic wound classification system. The contribution of depth, infection, and ischemia to risk of amputation. Diabetes Care. 1998 May;21(5):855-9

- *Levin ME. Classification of diabetic foot wounds. Diabetes Care 1998; 21:681-2*
- *Oyibo SO, Jude EB, Tarawneh I, Nguyen HC, Harkless LB, Boulton AJ. A comparison of two diabetic foot ulcer classification systems: the Wagner and the University of Texas wound classification systems. Diabetes Care. 2001 Jan; 24(1):84-8*

#### **2.1.3.13.217 Waterlow Score**

**Description:** Developed in 1985 and revised in 2005, the Waterlow Score predicts the risk of developing pressure ulcer or sores based on patient characteristics, medication or special risks. The score includes clinical categories (body mass index, skin condition, sex, age, nutritional status, continence condition, and mobility), and special risk factors (tissue malnutrition, medication, major surgeries or trauma, and neurological deficit). Each category has a set value of points, and the total score is represented by the sum of all categories. A score < 10 represents little to no risk, scores 10-14 represent patients at risk of developing pressure ulcer, scores 15-19 represent high risk, and scores > 19 represent patients at a very high risk.

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- *Waterlow, J. Pressure sores: a risk assessment card. Nursing Times, 1985. 81(48): p. 49-55. Revised 2005.*

#### **2.1.3.13.218 Wells Score for Pulmonary Thromboembolism**

**Description:** Wells Score for Pulmonary Thromboembolism comprises a clinical prediction model that stratifies patients for risk of pulmonary embolism (PE) and provides estimated pre-test probability. The clinical variables are history and probability of thromboembolism, heart rate, immobilization, presence of hemoptysis and active malignant disease. The final result corresponds to three risk groups: low risk (0-1 points), moderate risk (2-6 points), and high risk (> 6 points).

**System functions:** Electronic Patient Chart -> Scores and Indexes

#### **Sources:**

- *Wells PS, ET AL. Excluding pulmonary embolism at the bedside without diagnostic imaging: management of patients with suspected pulmonary embolism presenting to the emergency department by using a simple clinical model and d-dimer. Source Division of Hematology, The Ottawa Hospital, Civic Campus, Suite 452, 737 Parkdale Avenue, Ottawa, Ontario K1Y 1J8, Canada. Ann Intern Med. 2001 Jul 17;135(2):98-107*
- *Volschan A. Diretriz de Embolia Pulmonar. Arquivos Brasileiros de Cardiologia – Volume 83, Suplemento I, agosto 2004*

#### **2.1.3.13.219 Withdrawal Assessment Tool – Version 1 (WAT-1)**

**Description:** Withdrawal Assessment Tool – Version 1 (WAT-1) is used to assess and monitor opioid and benzodiazepine withdrawal symptoms in pediatric patients due to prolonged exposure. The main objective of this tool is to improve the detection and treatment of withdrawal symptoms before they compromise the patient's clinical condition. WAT-1 advises the HCP to continue the assessment twice a day for up to 72 h after the last dose of the opioid and/or benzodiazepine. The assessment includes four steps: patient information in the previous 12 h (stools aspect, vomiting/retching/gagging and temperature), 2 min pre-stimulus observation (state, tremor, sweating, movements, yawning/sneezing), 1 min stimulus observation (startle to touch and muscle tone), and post-stimulus recovery (time to gain calm state). The three first steps score 0 to 1 point, and the last step scores 0 to 2 points. The total score ranges from 0 to 12. Higher scores represent higher intensity of withdrawal symptoms.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Franck L S, Harris S K, Soetenga D J, et al. The Withdrawal Assessment Tool – Version 1 (WAT-1): an assessment instrument for monitoring opioid and benzodiazepine withdrawal symptoms in pediatric patients. Pediatr Crit Care Med. 2008 November; 9(6): 573-80. DOI:10.1097/PCC.0b013e31818c8328*

#### **2.1.3.13.220 Yesavage Geriatric Depression Scale – Short Version (GDS-15)**

**Description:** Yesavage Geriatric Depression Scale – Short Version (GDS-15) is used for diagnosing depression in elderly patients. It consists of 15 “Yes” or “No” questions regarding depression symptoms, and each “Yes” response contributes with one point to the total scale. A final scale of 5 or more points indicates depression, and a scale equal to or greater than 11 characterizes severe depression.

**System functions:** Electronic Patient Chart -> Scores and Indexes

**Sources:**

- *Almeida OP, Almeida AS. Confiabilidade da versão brasileira da Escala de Depressão em Geriatria (GDS) versão reduzida. Arq Neuro-Psiquiatr. 1999; 57:421-6*
- *Ferrari JF, Dalacorte RR. Uso da Escala de Depressão Geriátrica de Yesavage para avaliar a prevalência de depressão em idosos hospitalizados. Scientia Medica, Porto Alegre, v. 17, n. 1, p. 3-8, jan./mar. 2007*
- *Souza MCMR, Paulucc TD. Análise da sintomatologia depressiva entre idosas institucionalizadas. R. Enferm. Cent. O. Min. 2011 jan/mar; 1(1):40-46*

#### **2.1.3.14 Detailed view of prescribed orders**

This feature provides users with more detailed information about the medicines they have ordered.

The user can access the feature by right-clicking on a specific drug, either in the “CPOE”, “eMAR” or “Therapeutic Plan Management” functions. This feature then displays additional information about the item, such as ordered doses, administered doses, pending and suspended doses, and the cumulative dose (the amount of the drug that has already been administered to the patient).

The user can follow the electronic checks made in the “eMAR” function on a single screen, consult the start and end dates of medication use, as well as the date of the last dose administered. It is also possible to consult the orders, the physician who ordered them, and the drug settings, such as reconstitution and dilution.

All this information can be displayed by active ingredient, so that if two different drugs were prescribed but they both had the same active ingredient in their composition, the user can choose to see the information separately for each item or grouped by active ingredient.

#### **2.1.3.15 Phrase builder**

This feature supports clinical data entry by promoting the use of standardized text in fields intended for free-text written by users.

Select the “Utilities” tab on the home screen, and then select the utility function “Phrase Builder”. The user can view, add, edit and delete reusable text segments or phrases, allowing them to be reutilized during the composition of larger texts that follow a standard format.

The text segments can be organized into a hierarchy, where the texts available on each level depend on the text selected on the previous level. Structuring the text segments in a hierarchy allows for greater control

over how the text segments can be combined, limiting the set of all possible combinations to a set of pre-defined combinations. The text segments and phrases are then available for use in items of the “EPC” function, such as “Clinical Notes” and “Health History”.

#### **2.1.3.16 Medical letter**

This feature supports the standardization and consolidation of patient information, aiming to share it among HCPs.

In the settings tab of the “Medical letter” function, the institution can compose templates for different specialties and departments, define the participants, the sections with rules for automatic input such as diagnosis, surgeries, comorbidities, allergies, medications, and exams that the physician reviews before the inclusion in the document. It is possible to define different layouts and logos for printing purposes.

The function supports the user to create a summary of the case or episode, bringing relevant information from EPC and CPOE functions, such as the main symptoms, findings, problems and diagnosis, exams, therapy, and recommendations.

Beyond the content, the function supports the process of composing this medical document, managing its stages of completion, participants, approvals, and signatures. When each user completes the activities, the following user is automatically assigned to continue the process of the medical letter composition. Letter templates are classified as either preliminary or final and can contain additional elements and attachments. When the user opens the function, a list of patients with medical letters in different completion stages is presented, with filter options for additional search.

#### **2.1.3.17 Meaningful summaries**

This feature supports the configuration and viewing of relevant patient information in a summarized way to be consumed by HCPs during the diagnosis and treatment processes. The summaries show concise and updated descriptions of the patient's health, considering different clinical contexts, all at a glance on a single screen.

The “Electronic Patient Summary” function can be accessed through the “EPC” or the “Clinical Panorama” functions.

Models may be configured for different specialties such as oncology, cardiology, emergency department, or even for specific diseases such as pneumonia, stroke and myocardial infarction. Different clinical stakeholders may use it, mainly nurses and physicians, in different moments of the workflow, including the shift handover, patient transfer, or discharge.

It plays an important role enabling the patient care continuum, providing quick access to relevant patient information, and communication between stakeholders. Through the “Patient Chart Settings” function, it is possible to configure different models to be used by HCP according to defined user access privileges. For each model, it is possible to configure its content, such as problem list, clinical notes, laboratory exams and image results, medicines, treatments, surgeries, recommendations, and other suitable information. For each content, it is possible to set out-of-bounds values, when applicable, and present them in numerical, graphical, and text format in a single view.

If previously configured by the user, the “Electronic Patient Summary” also presents a specific decision support functionality related to early detection of sepsis (suspected sepsis). A patient whose data triggers an alert for the potential presence of sepsis has a suspected sepsis icon in the header of the “Infectious diseases” tile on the screen. To access the current sepsis information, click on the ellipsis in the upper right corner of the tile for the options menu, and select the sepsis option.



#### **2.1.4 Surgical and anesthesia clinical records charting and view**

A subgroup of features related to the patient before, during and after the surgical and anesthesia procedures.

##### **2.1.4.1 General surgical charting**

This feature supports the configuration, recording, and viewing of the information managed by HCPs such as surgeons, anesthetists, and nurses related to surgical and anesthesia procedures.

Several pieces of information related to general surgical charting must be preconfigured in the “Perioperative Item Settings” function, such as patient positions, demarcations, time and motions, and vital signs. The sorting and availability of the items in the patient tree are defined in the “System Administration” function.

The “PEPC” is a function that supports HCPs managing information during the preoperative, intraoperative, and postoperative phases. This function brings all surgery-related information such as surgical team, times and movements, surgical delays, clinical parameters, and medicines. In addition to that, the ones coming from other functions, such as scheduling, pre-anesthetic assessment, and patient health history.

Firstly, the user can access the surgical schedule, the daily operation room census, and completed surgeries. Then, after selecting a patient, the user can record structured surgical information, such as site demarcation, asepsis, incision, dressings, positions, vital signs and clinical parameters, materials, equipment, medicines, anesthetic agents, fluid therapy, blood products, and cavity control. For more accuracy and agility, materials and medicines can be input using barcode readers. Finally, the item expenses summary consolidates all material and medicines used in the procedure, for billing purposes review.

To streamline the recording process, reduce the time and the effort for the documentation, and improve quality, interfaces with monitors, equipment, and image systems are also available.

After completing the surgery process, a complete report can be generated according to the previous configuration in the Report Management function.

For anesthesia charting, anesthesia report, surgical report, time and motions, surgical and anesthesia materials, instruments, and equipment, please refer to the further dedicated instructions of use.

##### **2.1.4.2 Pre-anesthesia assessment**

This feature supports the pre-anesthesia process regarding the patient risk documentation such as medication in use, diseases and allergies.

Using the “Electronic Pre-Anesthetic Assessment” (“EPAA”) function, the anesthesiologist documents the information collected during the interview and the patient’s physical examination before the procedure.

Main elements of the Pre-Anesthesia assessment include patient’s health history, previous anesthesia and procedures, drug and allergies, airway and dental evaluation, scores and indexes, and anesthesia warnings, particularly those that may suggest potential complications or contraindications to the planned procedure (e.g., difficult airway or coagulopathy). It is possible to configure a personalized template of pre-anesthesia assessment and assign it to a surgery, instead of using the standard process.

The information generated in the “EPAA” function can be viewed in the “PEPC” function.

##### **2.1.4.3 Anesthesia charting**

This feature allows the user to configure, record, chart, and view the information related to the anesthesia process in a single graphical screen.

The “PEPC” function allows the user to record specific anesthetic information such as vital signs, anesthesia parameters, input and outputs, anesthetic gases and fluids, drugs and dripping rates so it can be viewed in a consolidated screen.

Several surgery models can be configured in the “Perioperative Items Settings” function to be viewed in the “PEPC” function. Each model has a different set and sorting of variables, for example, vital signs and clinical parameters. In addition, the user can change the surgery models at any time during the procedure, record the necessary information and view the clinical data displayed in each section.

To access the anesthesia chart, open the “PEPC” function, select the patient, and use the “Graph” right-click option. Enable dark mode using function parameters. It is possible to select a pre-configured model, sorted by filter, and view the anesthetic information in the graphical screen. Vital signs data and clinical parameters can be obtained from an external source via an interface, or the user can manually input into the system. Using the anesthesia graph, the clinician can add or edit vital signs range scale, justify the administration of a drug with an inconsistency detected by the system, assign infusion pump for a drug and analyze patient’s data in a tabular and graphical single view. Other information related to equipment, infusion pump status, change of infusion rate, anesthetic technique, and patient devices can be accessed from the same “Graph” screen. The mentioned items are recorded and presented in the respective item of the “PEPC” function.

To maintain the continuum of care, the clinician can upload current ordered items in CPOE into the anesthesia graph such as medicines, infusions and blood products, as well as send to CPOE medications administered during the surgery. In addition, it is also possible to import patient’s devices from ICU to be available into the anesthesia graph. The physician can access the “Surgery Review” function to review, record or update information related to the anesthetic procedure such as anesthetic technique, patient devices, vital signs, anesthetic agents, solutions, medicines, blood products, surgical events, intakes, and outputs. The user can access this function via “PEPC” or directly from the anesthesia chart.

To enable anesthesia care delivery and documentation outside the surgical theatre, for short-time procedures, and others, such as cardioversion, colonoscopy, and endoscopy, the use of an alternative function, called “Patient Anesthetic Form”, is recommended. The physician can record information related to the anesthetic procedure in the same way, using the same configurations from “PEPC”, such as materials, equipment, instruments, anesthetic agents, and time and motions.

#### **2.1.4.4 Anesthesia report**

This feature supports the configuration, recording, and viewing processes of anesthetic reports.

Different kinds of information used during the anesthesia process can be preconfigured in the “PEPC” settings. In addition, the user can configure standard texts for them or the institution and structured complications.

The “PEPC” function allows the user to record anesthetic information, such as the anesthetic technique, description, and complications. The user selects the anesthesia type(s) with proper description(s), defines as the main one, enters additional description, and can use the preconfigured standard texts. In addition, the anesthetist can document the patient’s anesthetic complications related to the procedure. According to the information selected in the filter, it is possible to select one or more complications with proper comments.

#### **2.1.4.5 Surgical report**

This feature supports the configuration, recording, and viewing processes of surgical reports. The surgery report describes the surgical procedure, including the technique, surgical findings, observations, incidents, and complications.

Using the “surgery report” item in the “PEPC” function, the physician defines the surgical diagnosis and procedure codes. According to the previous configuration, the user can select and insert standard text for each procedure.

It is also possible to record related structured information in separated fields, such as complexity level, topography, blood loss control, operative findings, surgical complications, duration, and participants.

There is an option to record additional procedures to the same surgery report.

#### **2.1.4.6 Surgical and anesthesia materials, instruments and equipment**

This feature supports the users in configuring and using the surgical and anesthesia materials, instruments, and equipment, such as electric scalpel, hemostat, suction pumps, catheters, tubes, drains, and needles.

To configure the items above, the user selects the “Perioperative Items Settings” function. The user can define protocols, order sets according to procedures, and physician preferences such as equipment and materials linked to the procedure. In addition, for billing purposes in the “Equipment Fee” item, the user can define equipment rules by area, group and specialty.

In the “Materials” tab, the user can also configure the information related to the surgical and anesthesia materials, for example, the description name, display sequence, define their color in the anesthesia graph, and the professional to whom the material can be provided.

In the “PEPC” function, the user can select the preconfigured equipment and materials during the procedure, entering additional information such as quantity, topography, side, start, and end of use. In addition, some information about the materials and equipment can be entered using barcode readers.

Beyond the use in the “PEPC” function, this feature configuration data is also used in the “Patient Anesthetic form”, “EPC”, “Surgeons Schedule”, and “Surgical Schedule Management” functions.

#### **2.1.4.7 Surgical time and motion**

This feature supports the configuration, recording, and hierarchy of the surgical and anesthetic workflow steps in a time and rule-based perspective.

A typical example of a steps sequence involving a surgical procedure includes the patient enters the operation room, the anesthetic procedure starts, the surgical procedure starts, the surgical procedure ends, the anesthetic procedure ends, the patient exits from the operation room, and the patient arrives in the recovery room.

Using the “Perioperative Items Settings” function, the user can define the event label description, chronological sequence, actions and steps involved, dependency event, number of repetitions, surgery status triggered by events, and the submission and release rules by profile. In addition, other information can be configured in the same function, such as surgery events related to the administration of anesthetic agents, patient department movement, room change, interface with equipment, and surgery protocols.

The times and motions are displayed in the “Electronic Perioperative Patient Chart” function, where they can be manually or automatically recorded. In addition, the user can edit or even retrospectively enter the data before the final submission. This time and motion information is also available in another function, the “Patient Anesthetic Form”, based on the same configuration settings. For more details about “Patient Anesthetic Form”, refer to the Anesthesia Charting feature.

#### **2.1.5 Specific nursing processes**

A subgroup of features related to processes handled by nursing staff.

##### **2.1.5.1 Nursing assessment, diagnosis and intervention system**

This feature presents structured and standardized information to HCPs (e.g. physicians, Nurses, physiotherapists) when composing a care plan record for a patient.

A care plan workflow consists of the following workflow steps: perform the clinical assessment and define diagnoses/problems, goals, and interventions.

The HCP accesses the “EPC” function, selects the item related to care plan processes, add a new record, and follow the workflow steps of the supporting tools.

The primary system functions associated with this feature for configuration purposes are the “Nursing Records” and “Patient Chart Settings”. They support the user to configure the clinical content or to import it from external libraries.

The interventions are sent to the “eMAR” function to be appropriately managed and checked. The professional can review and manage the patient care plan whenever necessary, reassessing each of the steps.

#### **2.1.5.2 Wound, dressing and healing process**

This feature allows the nursing staff to configure, record, and manage patient’s wounds and dressings recording processes.

The institution needs to configure the wound recording processes in the “Core Tables Settings” function. According to each one, additional information is required such as type of wound, classification, format, location, and human body drawing. In addition, each dressing assessment contains items with possible results, such as length, depth, width, exudate, and tissue with its characteristics.

The user can record information about wounds and dressings occurring at any time during the care process. The main functions associated with recording wounds are the “EPC”, “Electronic Outpatient Chart”, “PEPC”, “Care Plan”, and “Patient Anesthetic Form”. After selecting the patient, the user can access the “Wounds and dressings” item to record and manage the wound’s care. The clinical user has several options to record wound information, such as selecting characteristics, performing an assessment or structured form, recording the materials used, defining nursing interventions according to the wound condition and progress, suggesting types of dressings for each wound, and uploading photos or drawing images. In the “wounds and dressings” tab, the user can add a new record informing the start date, wound location, type, classification format, presence of pain and pain location, if admitted with wound, previous and social history, comorbidities, tissue type, type of secretion, and discharge information.

For each wound recorded, the user can add new dressing records at any time, selecting preconfigured characteristics to each item, informing the current status or stage of the lesion. In addition, for each dressing record, it is possible to inform the materials used. The “Assessment” tab is used when the institution configures specific forms to assess wounds. Guidelines can be created to provide some instructions about the wound dressing. The user can add photos, capture an image, or select a file for each wound recorded. Human body images may be recorded via the “Images” tab, where the user can add a new record selecting a preconfigured image and defining areas with lesions.

In the “Care Plan” function, during the anamnesis and physical examination processes, the nurse can select the wound type and proceed with the wound record, use the human body drawing, and select the human area to record the main wound’s characteristics. After submitting the record, the information can be viewed and managed in the “Wounds and dressings” item of the “EPC” function.

#### **2.1.5.3 Tubes, lines and devices management**

This feature supports the management of patient’s medical devices, tubes, catheters, and lines. Their use can be temporary or permanent and needs to be carefully followed up by the care team.

The function “Devices Record” supports the user configuring information related to insertion, placement, replacement or removal of devices. In this function, the user can configure for each device, details such as

caliber, anatomical topography, duration, specific instructions, and the reason for removal. In addition, the user can link devices to dressings, events, procedures, assessments, clinical protocols, alerts, and clinical notes.

During the clinical workflows, the “Devices Used by the Patient” function interacts, as an external call, with several other clinical functions, such as “EPC”, “PEPC”, “Patient Anesthetic Form”, “Clinical panorama” and “eMAR”.

For example, in the “EPC” and the “PEPC” functions, the user can update and check the details of all patient devices and print reports. In addition, based on the previous configuration, the care team may receive updates in the “eMAR” function regarding the status of the devices installed and can set programmed interventions related to it.

#### **2.1.5.4 Targets of care**

This feature allows the user to record and manage the main targets related to patient care.

In the “Patient Chart Settings” function, the user can configure the targets and define rules for each one, such as if it is recurrent and if the goal’s achievements are manually or automatically checked based on specific conditions.

The “Care Goals” item from the “EPC” function is used to record and manage the patient’s care targets. The user can select a target from a pre-configured list, record the measurement and the status, such as achieved, partially achieved, not achieved, or pending. On the “Monitoring” tab, it is possible to follow up the last seven-day records related to the care goals targets.

#### **2.1.5.5 Pain management**

This feature allows the user to select and view patients with pain based on the main characteristics present in the filter, such as pain level, duration, site, analgesic modality and description of the pain.

By accessing the “Pain Management” function, it is possible to check information about the patient’s pain condition and treatment, which allows the follow-up of the information related to the progression of the patient’s pain and consultation of prescription such as medicines and infusions.

The information displayed is a result of the “Analgesia monitoring” assessment found in the “EPC” function, “Vital signs and monitoring” item, “Analgesia” tab, and includes the professional that performed the assessment.

In the “Pain Management” function, the user can register the results of a pain assessment at any time during a patient stay in the health institution, quantify pain, visualize the analgesia used by the patient, make the clinical note, order, and monitor the patient’s pain to manage the control of the analgesia.

#### **2.1.5.6 Duty personnel definition and shift handover**

This feature supports the processes related to allocation of the HCP responsible for the patient during the work shifts and the recording of the information exchanged during the shift handover.

Accessing the “Admission departments” item and selecting the name of the department in the “EPC” function, the user can view the list of patients in the department. The user can visualize the main patient’s information identifying the professionals responsible for each patient in the department.

Before defining the responsible professional for each patient, the professional uses assessments, and scales to identify accurate data about patient care complexity, according to pre configurable assessments and scales done by the institution.

Considering each patient's care complexity, the professional can define the name of the HCP who will be responsible for each patient. Using the "EPC" function selecting the "Specify employee responsible for patient" item and using the right-click option to open the "Professional Scheduling Management" function, to perform and manage the professionals responsible for the patient.

After selecting the department and viewing the patients, the user can select and define the professional responsible for each patient. The professional's options include nursing technicians, nurses, physicians, psychologists, pharmacists, and physical therapists.

Accessing the "Nursing-Pending" item in the "EPC" function, the user can record and manage the pending items for the nursing team during the work shift.

In addition to selecting the pending shift, it can be eliminated at any time for better management. The visualization of pending items by the nursing team is performed in the "eMAR" function through a list of patients in the department.

During the shift handover, some patient information may be exchanged between the team and must be recorded. To facilitate this process using the "Shift-change" item in the "EPC" function, the user can add a new record selecting the incident/pending type and the standard text, according to previous configuration.

#### **2.1.5.7 Material requests**

This feature supports the process of requesting materials that the nursing team needs to execute the patient care activities, like alcohol, gloves, gauze compresses, or to inform and request a replacement of damaged or expired medicines or materials.

In the "CPOE" function, select the "materials" group, search for the material in the autocomplete field and inform its amount and frequency. This option is used when the requested material is patient-specific, and this material is included in the patient's hospital bill.

Another possibility to request materials for patients or departments is using the "Materials and Medicines Requisition" function. The user needs to select the "Stock operation" field and inform if it is for a particular patient or department consumption or due to other reasons, such as losses, incidental breakages, damaged materials, out of date.

In blood bank processes, the user is allowed to consult materials and medications associated with blood collection, transfusion and therapeutic phlebotomy. The system will also allow the user to refer to the materials reduced from the stock associated with the donation.

#### **2.1.6 Specialized clinical records charting and view**

A subgroup of features related to patient history as documented by healthcare professionals. This section includes specialized records related to patient care supported by the system for specific clinical domains.

##### **2.1.6.1 Oncology records**

This feature supports physicians to record specific information related to cancer disease and treatment, for example, oncology anamnesis, diagnosis of tumor, staging of the tumor, and cancer treatment. Using the "EPC" function, the user selects a patient and chooses the information in the filter to see the patient. Then, select the item "Oncology Anamnesis" in the patient tree to input the information regarding the patient's physical assessment. In "Oncology Anamnesis", the user can insert the following patient information: chief complaint, history of current and past illness, family history of cancer, physical examination, and medical conduct. It is possible to use a structured preconfigured anamnesis.

In the same function, in the "Diagnosis of the Tumor" item, the user can record the diagnosis specific for tumors using the ICD-O (ICD-10, ICD-11, topography, and morphology). Additional information can also be

recorded here, for example, histological diagnosis, TNM (T-primary tumor, N-nodes, M-metastasis) - clinical and pathological, tumor stage, immunohistochemical exam, and tumor progression. It is possible to view the admission and the follow-up form recorded in the “Hospital Cancer Registry” function.

For staging the tumor, the physician can select still the item “Locoregional”, in the same function. It is a process to define the location and the extent of cancer in the patient’s body. The staging information can be documented using the TNM system to define the clinical and pathological TNM, the prognostic factor, and the tumor’s stage. In the “Locoregional” the user can record information about the performance status of the patient, physical examination, histopathology, and proposed therapy. The workflow rules are preconfigured in the “Hospital Cancer Registry” function. It is essential information to define the patient’s treatment and prognosis.

After defining the stage of the tumor, the user can specify the treatment protocol in the “Cancer Treatment” item of the “EPC” function. The protocol is preconfigured in the function “Protocol Record”. If the hospital has a third-party system, such as ISPM™ (Philips IntelliSpace Precision Medicine), the user can select the best clinical pathway related to patient cancer treatment.

As next steps, in the “Cancer Treatment” item, the user can add specific patient data to the selected protocol, such as weight, height, creatinine, AUC, treatment purpose, and locoregional result. The same function can be used to edit the information, if necessary, for example, medication or dose, route of administration, day or cycle of application, notes, interval and/or administration site. The user can add and/or edit solutions, procedures and recommendations. It is possible to add and submit a cycle, add and submit a medical order record, submit days or cycles for scheduling and check the inconsistencies.

Also, in the “Cancer Treatment” item of the “EPC” function, if the patient has a medication order in “CPOE” function or is taking a medication at home, when the user selects the protocol, it is possible to see the drug interaction between those medications if the system uses the Micromedex™ database interface.

#### **2.1.6.2 Ophthalmology records**

This feature supports various professionals who provide ophthalmologic services and care for patients and facilitates the documentation and visualization of the information collected during the medical encounter and exam information.

Used for supporting a physician’s office, it is also possible to use other functions in conjunction, such as, “Consultation Schedule”, “Exam Schedule”, “Perioperative Electronic Patient Chart”, and “Surgical Schedule Management”. It provides for the registration of a variety of information in the medical record and monitoring of that same information in subsequent encounters.

The main functions used for configuration are the “Core table settings” and “System Administration”. Using the “Core table settings” function to configure the “Types of ophthalmology processes” and the “Types of ophthalmic forms”, linking the desired reports. Using the “System administration” function, the user can select the main ophthalmology items for each profile, defining the order of presentation of the items and selecting items for the view tab.

During the ophthalmology process, the user can perform actions including generate ophthalmology based on scheduling via “Consultation Schedule”; generate ophthalmology based on scheduling in “Exam Schedule”, generate ophthalmology based on scheduling in “Surgery Management”, records accessible in medical record format; complete records regarding assessment and definition of treatment; record exams performed during encounters as well as information related to anamnesis, diagnosis, orders, medical certificates, prescriptions, and custom search of information by using the vision resource.

In the ophthalmology process, HCPs register exams, attach documents, release and finalize the ophthalmological consultation, and generate reports for the ophthalmology record.

#### **2.1.6.3 Maternity & newborn records**

This feature supports the HCP in documenting and managing the pregnancy process until the baby's birth.

Using the "EPC" or "EOC" function, go to the "Obstetrics/Birth" item in the tree navigation panel to find the following tabs and corresponding registration screens "Nurse triage", "Medical triage", "Pregnancy", "Prenatal care", "Pre labor", "Labor", "Partograph", "Childbirth" and "Post Natal Obstetrics".

During this process it is possible to record the main information, such as, the beginning of pregnancy, the first assessment with physical exam, pregnancy complications, serological tests (HIV, hepatitis, syphilis, rubella, toxoplasmosis), information related to the progression of labor and delivery, partograph and the childbirth

#### **2.1.6.4 Check-up records**

This feature allows recording and viewing clinical information related to the check-up service flow, from scheduling to patient discharge.

The check-up process allows for organized record keeping and traceability of clinical notes and findings, laboratory test results and reports, and diagnostic guidelines. It allows printing clinical data history and recording additional comments. The "Check-up records" is the main function applied to add a list of patient guidelines and procedures, as well as confirm the check-up date to the patient. The clinician is also able to send the data by email. The requester can identify the status of the agenda and confirm the patient and/or the professional according to the service through the scheduling system.

The HCP can also view this clinical data in other functions such as "EPC", "PEPC", "Medical Chart" and "Chemotherapy Schedule".

#### **2.1.6.5 Nutrition records**

This feature supports HCPs configuring the core table of nutrition elements (such as carbohydrates, lipids, proteins, water, minerals, vitamins, calories), linking them to the institution's products, and informing the number of elements provided for each one. It also supports HCPs in recording physical exams, anthropometric measurements, and nutritional requirements.

Regarding configuring the core table of nutrition elements, for example, every 20 mL of the final product "Glucose 5% with 500 mL" provides 1 g of the glucose element. It is also possible to configure the regular amount and thresholds if a medication has nutrition elements in its composition and the amount of that element. This configuration is essential for Parenteral Nutrition and Intravenous Rehydration Therapy ordering in the "CPOE" function.

The user can configure the core tables of infant milk and formula ordering routines and configure the formula's solubility. In "Nutrition Records" is configured the infant milk and formulas ordering in the "CPOE" function. The user needs to configure the milk and formulas, solubility, dilution (powder), and water quantity.

To record the Nutritional Assessment, the clinical specialist needs to open the "EPC" function, select the patient and the Nutritional Assessment item. The Objective Nutrition Assessment is suitable for adult patients, and the Pediatric Nutritional Assessment is for babies, children, or teenagers.

In the Objective Nutritional Assessment, it is possible to record the anthropometry (weight, height, circumferences, and skinfolds). After that, the user can view the classification of the nutritional status according to the 50<sup>th</sup> percentile. Finally, the user defines the nutritional requirements (calories and proteins) and concludes the nutritional diagnosis.



For recording the Pediatric Nutritional Assessment, after filling in the anthropometry data (weight, height, circumferences, and skinfolds), the user can check the anthropometric and growth curves, such as height/age, weight/age, weight/height, and BMI/age, based on reference percentiles and z-score.

Description of the formulas used in the process described above (not necessarily in the presentation sequence):

- Body Mass Index ( $\text{kg/m}^2$ ):  $\text{BMI} = \frac{\text{weight (Kg)}}{\text{height (m)}^2}$   
Regarding BMI, different result classifications and descriptions are possible (World Health Association 2000, Pan American Health Organization 2002, Brazilian SISVAN 2004, Brazilian MoH 2004). The user needs to define the default options in the Core Tables Settings function (Patient management -> Electronic patient chart -> Default BMI rule).
- Ideal weight = BMI (50<sup>th</sup> percentile) x Height (cm)<sup>2</sup>  
The 50<sup>th</sup> percentile is based on the BMI-for-age table according to WHO.
- Estimated Weight:
  - Chumlea (1988):
    - Women =  $[1.27 \times \text{calf circumference (cm)}] + [0.87 \times \text{knee height (cm)}] + [0.98 \times \text{arm circumference (cm)}] + [0.4 \times \text{subscapular skinfold (cm)}] - 62.35$
    - Men =  $[0.98 \times \text{calf circumference (cm)}] + [1.16 \times \text{knee height (cm)}] + [1.73 \times \text{arm circumference (cm)}] + [0.37 \times \text{subscapular skinfold (mm)}] - 81.69$
  - Rabito (2006) =  $[0.5759 \times \text{arm circumference (cm)}] + [0.5263 \times \text{abdominal circumference (cm)}] + [1.2452 \times \text{calf circumference (cm)}] - [4.8689 \times (\text{gender})^*] - 32.9241$  \*Gender= women (2) men (1)
- Ideal height (cm): The ideal height is presented according to the height-for-age table according to WHO
- Estimated height – Chumlea (1985):
  - Women =  $84.88 + [1.83 \times \text{Knee height (cm)}] - [0.24 \times \text{Age (years)}]$
  - Men =  $60.65 + [2.04 \times \text{Knee height (cm)}]$
- Weight loss (%) =  $(\text{usual weight} - \text{current weight}) \times 100 / \text{usual weight}$
- Weight loss (Kg) =  $(\text{usual weight} - \text{current weight})$
- Adjusted weight (Kg) =  $(\text{current weight} - \text{ideal weight}) \times 0.25 + \text{ideal weight}$
- Weight adequacy (%) =  $(\text{current weight} \times 100) / \text{usual weight}$
- Amputees adjusted weight (Kg) =  $(\text{usual weight} \times 100) / (100 - \text{amputation \%})$
- Corrected weight (Kg) =  $\text{weight before amputation} \times (100 - \text{amputated \%}) / 100$
- Ascites corrected weight (Kg) =  $(\text{current weight} - \text{weight to be discounted})$
- Adjusted weight (Kg) = weight regarding amputation, ascites, edema, and information on paraplegia or quadriplegia
- Waist-hip ratio:  $\text{WHR} = \text{Waist (cm)} / \text{Hip (cm)}$
- Bone estimation =  $\text{Height (cm)} / \text{Wrist circumference (cm)}$
- Arm circumference (%) =  $(\text{obtained arm circumference} \times 100) / \text{arm circumference percentile 50}$
- Triceps skinfold thickness (%) =  $(\text{obtained triceps skinfold} \times 100) / \text{triceps skinfold percentile 50}$
- Arm muscle circumference (%) =  $\text{arm circumference (cm)} - (3.14 \times \text{triceps skinfold thickness (mm)} / 10)$   
Percentile 50 is used according to reference define by the user in “Core Tables Settings” function.
- Classification of nutritional status: The classification of nutritional status is according to the 50<sup>th</sup> percentile based on the Blackburn reference (1979), embracing arm circumference (cm), triceps skinfold thickness (mm), arm muscle circumference (cm), and arm muscle area (cm<sup>2</sup>)e
- 50<sup>th</sup> percentile: Regarding the 50<sup>th</sup> percentile, different results are possible according to Philips (1984), Frisancho (1981), Frisancho (1990), Frisancho (2008), and Brazilian SABE (2001). The user

needs to define the default options in the “Core Tables Settings” function (Main Application -> Physician – Electronic Patient Chart -> 50<sup>th</sup> percentile rank rule). It embraces the arm circumference (cm), triceps skinfold thickness (mm), arm muscle circumference (cm), and arm muscle area (cm<sup>2</sup>)

- Arm muscle area (cm<sup>2</sup>) =  $[\text{arm circumference (cm)} - (3.14 \times \text{triceps skinfold (cm)})]^2 / (4 \times 3.14)$
- Corrected arm muscle area (cm<sup>2</sup>):
  - Men =  $[(\text{arm circumference (cm)} - (3.14 \times \text{triceps skinfold (mm)} / 10)^2 - 10) / (4 \times 3.14)$
  - Women =  $[(\text{arm circumference (cm)} - (3.14 \times \text{triceps skinfold (mm)} / 10)^2 - 6.5) / (4 \times 3.14)$
- Fat (%) – Faulkner (1968) =  $(\text{triceps skinfold} + \text{suprailiac skinfold} + \text{subscapular skinfold} + \text{abdominal skinfold}) \times 0.153 + 5.783$
- Basal Metabolic Rate (Kcal/day):
  - Harris-Benedict (1919):
    - BMR Men =  $66.473 + [13.751 \times \text{Weight (Kg)}] + (5.003 \times \text{Height (cm)}) - (6.755 \times \text{Age})$
    - BMR Women =  $655.095 + [9.563 \times \text{Weight (Kg)}] + [(1.849 \times \text{Height (cm)}) - (4.675 \times \text{age})]$
  - Total Energy Expenditure (Kcal/day): TEE = BMR x activity factor x stress factor
  - Estimated Energy Expenditure – Ireton-Jones (1997):
    - With mechanical ventilation:  $\text{EEE} = 1784 + [5 \times \text{weight (Kg)}] - (11 \times \text{age}) + (244 \times \text{gender}) + (239 \times \text{trauma}) + (840 \times \text{burn})$
    - With spontaneous breathing:  $\text{EEE} = 629 + [25 \times \text{weight (Kg)}] - (11 \times \text{age}) - (609 \times \text{obesity})$ . *Multiply the formula result by 4.168 to get the energy value in kJ/day*
  - Mifflin – St Jeor (2005):
    - Men =  $(10 \times \text{weight}) + [6.25 \times \text{height (cm)}] - (5 \times \text{age}) + 5$
    - Women:  $(10 \times \text{weight}) + [6.25 \times \text{height (cm)}] - (5 \times \text{age}) - 161$
- Rule of thumb:
  - 11 to 24 Kcal/Kg = weight reduction
  - 25 to 29 Kcal/Kg = weight maintenance
  - 30 to 35 Kcal/Kg = weight gain
  - 40 Kcal/Kg = polytrauma
  - 30 to 35 Kcal/Kg = sepsis
- Dietary reference intakes for pediatric (2006):
  - Infants and Young Children
    - 0-3 months:  $\text{DRI} = (89 \times \text{weight (Kg)} - 100) + 175$
    - 4-6 months:  $\text{DRI} = (89 \times \text{weight (Kg)} - 100) + 56$
    - 7-12 months:  $\text{DRI} = (89 \times \text{weight (Kg)} - 100) + 22$
    - 13-35 months:  $\text{DRI} = (89 \times \text{weight (Kg)} - 100) + 20$
  - Children and Adolescents 3-18 years
    - (Boys) 3-8 years =  $88.5 - (61.9 \times \text{age (years)}) + \text{Physical Activity Coefficient} \times [(26.7 \times \text{weight (Kg)}) + (903 \times \text{height (m)})] + 20$
    - (Boys) 9-18 years =  $88.5 - (61.9 \times \text{age (years)}) + \text{Physical Activity Coefficient} \times [(26.7 \times \text{weight (Kg)}) + (903 \times \text{height (m)})] + 25$
    - (Girls) 3-8 years =  $135.3 - (30.8 \times \text{age (years)}) + \text{Physical Activity Coefficient} \times [(10.0 \times \text{weight (Kg)}) + (934 \times \text{height (m)})] + 20$
    - (Girls) 9-18 years =  $135.3 - (30.8 \times \text{age (years)}) + \text{Physical Activity Coefficient} \times [(10.0 \times \text{weight (Kg)}) + (934 \times \text{height (m)})] + 25$
  - Adults 19 years and older
    - Men =  $662 - (9.53 \times \text{age (years)}) + \text{Physical Activity Coefficient} \times [(15.91 \times \text{weight (Kg)}) + (539.6 \times \text{height (m)})]$

- Women =  $354 - (6.91 \times \text{age (years)}) + \text{Physical Activity Coefficient} \times [(9.36 \times \text{weight (Kg)}) + (726 \times \text{height (m)})]$
  - Institute of Medicine (2002) for pediatric:
    - Boys:
      - 0 – 3 years:  $\text{IoM} = (0.249 \times \text{current weight}) - 0.127$
      - 3– 10 years:  $\text{IoM} = (0.095 \times \text{current weight}) + 2.110$
      - 10 – 18 years:  $\text{IoM} = (0.074 \times \text{current weight}) + 2.754$
    - Girls:
      - 0 – 3 years =  $(0.244 \times \text{current weight}) - 0.130$
      - 3– 10 years =  $(0.085 \times \text{current weight}) + 2.033$
      - 10 – 18 years =  $(0.056 \times \text{current weight}) + 2.898$
  - Protein requirement (g/day) = protein (g) x weight (Kg)
  - Calorie requirements per day (Kcal/day) = calorie (Kcal/Kg/day) x weight (Kg)
  - Percentile classification for pediatric: the result ranges is based on the WHO according to the tables height/age, weight/age, weight/height, and BMI/age
  - Z-score classification for pediatric: the result ranges is based on the WHO according to the tables height/age, weight/age, weight/height, and BMI/age

#### **2.1.6.6 Physical body evaluation records**

This feature supports HCPs in recording anthropometric and physical structure information.

The physical assessment is an instrument that helps the user to plan and order physical exercise. In the “EPC” function, the user needs to open the “Physical Assessment” item to record the patient physical body evaluation. Then, the user enters anthropometric information such as weight, height, knee height, circumferences, and skinfolds. Additionally, the user enters data related to the tests of flexibility, manual gripping strength, static balance, and lower limb strength.

After recording the physical body evaluation, the user can define the exercise scheme the patient needs to follow.

#### **2.1.6.7 Spasticity management**

This feature supports the assessment and documentation processes of patients with spastic conditions undergoing muscular and nervous blocks. The process has two main parts, the assessment of the spasticity level and the treatment recording (botulinum toxin application).

The Modified Ashworth scale is used to assess the spasticity level, selecting the body areas, left and right. After selecting the options, the user submits the assessment. Refer to the “Scales, Indexes and Scores” section of this IFU for more details on the Modified Ashworth scale.

The user can record the botulinum toxin applications using the institution’s structured form, previously configured in the “Core Tables Settings” function. The information includes the human body areas, muscle, botulinum toxin, reason for changing the dose, and rules for spasticity and scale evaluations.

After selecting the patient in the “EPC” function, the user can access the “Muscular and nervous block” item to define and record the treatment. When adding a new application toxin record in the “Applications” tab, the “Botulinum toxin” screen opens to support the process. The user can select the human body areas, define the botulinum toxin application spots with their respective doses, and finally confirm the application. In the “Nerve Block” tab, the user can record the nerve block applications by selecting the product and defining the doses of each nerve selected. Finally, in the “History” tab, the user can view information about previous applications, such as movement, muscle, days, and doses applied.

#### **2.1.6.8 Odontology records**

This feature supports the HCP to record, view and manage the patient dental-specific information.

After configuring dental images in the “System Administration” function, the user can access the item “Odontology” in the “EPC” function to record and view the dental assessment and more information such as dental procedures, clinical notes, and treatment plans.

#### **2.1.6.9 Orders and care plans management**

This feature supports the nursing team to review the patient’s therapeutic plan, mainly regarding scheduling and additional material necessary to administer drugs and perform procedures.

In the “Therapeutic Plan Management” function, the user can review the medical orders (ordered items, scheduling times, materials) before submitting them to the pharmacy. The user can also review nutrition, infusions and medicines, exams, procedures, gas therapy, dialysis, blood products, recommendations and materials.

Input from the care team prior to starting pharmacy processes allows for the identification and correction of incomplete or conflicting information so that dispensing takes place at the times scheduled by the nursing team, aiming to improve the process.

#### **2.1.6.10 Nutrition intake management**

This feature supports HCPs with the nutritional data analysis from the patient’s treatment plan.

In the “Nutrition Intake Manager” function, the user has access to the total amount of volume, macro and micronutrients provided for the patient according to the proposed therapeutic plan. The user can set goals and monitor whether a given therapeutic plan reaches the minimum and maximum expectations stipulated for the patient.

The possible macronutrients to analyze are fats, carbohydrates and proteins. Micronutrients are sodium, potassium, chloride, calcium, magnesium, and phosphorus. As well as analyzing the calories and volumes provided by each item requested in the therapeutic plan.

The user can follow the evolution of the patient’s weight through a graph and make edits in the “CPOE” function, keeping the edited records in draft mode, through the “Nutrition Intake Manager” function, to nutritionally analyze the therapeutic plan before releasing it.

The user can directly access the “Nutrition Intake Manager” function and choose a patient with a current treatment plan to analyze or access through an external call to the “CPOE” function.

#### **2.1.6.11 Body graph**

This feature allows the user to make charts, using the human body graph or schematic to record and display clinical conditions or related information, describing and visualizing clinical conditions related to human body locations, such as devices and wounds.

Using the “Body Site Management” function, the user can configure separate image files for use with patients of different age ranges. The image for a male or female body representation is automatically assigned according to the patient’s biological sex, which is registered and maintained in the “Master Patient Index” function. If necessary, the user can manually edit and save which body representation should be displayed for a specific patient directly from the “Body Site Management” function. The user can then link devices, wounds, and dressings to a specific body site located in the body graph. For each site it is possible to access the history of the interventions, in chronological order.

After proper settings, the user can use the human body (“Body Site Management” function) to associate devices, wounds, and dressings, by external call to functions such as “EPC” and “Flowsheet”.

#### **2.1.6.12 Primary care records**

This feature supports HCP to record and manage patient records in outpatient facilities, mainly private consulting offices and primary care settings. They include several specific processes and records, including structured documentation such as SOAP (Subjective, Objective, Assessment, and Plan) and ICPC (International Classification of Primary Care) codes. This feature contributes to maintaining the patient's unique journey, as it is possible to access information from hospital, outpatient, private practices and basic health units.

In the “System Administration” function, the institution needs to configure the HCP profile according to the care type (hospital care, private consulting offices, and primary care). To ensure confidentiality and privacy of the clinical data, the institution needs to define the access privileges. Different care items can be defined for each clinical profile, respecting the predefined care type process, such as selecting the ICPC and the SOAP items for the primary care process profile.

The HCP needs to open the “EOC” function to access and perform the primary care records, selecting the patient, and following the available items, record the main information from the outpatient consultation.

The user handles diagnosis, problem list, complaint, and reason using ICPC codes, clinical notes, treatment, and referrals related to primary care recording activities. Nurses and physicians actively interact and collaborate in the process. Using the “Encounters” and “Scheduling” items, the user can identify the list of patients waiting for care. Supported by updated statuses, the user can select the patient, start the triage and clinical evaluation, or discharge the patient or record their evasion. Using the “Triage” item, the nurse records the main complaint or reason using ICPC codes, the vital signs, and women’s health information to welcome the patient. Following the process, the user views the risk classification with the priority sequence, assigns an appointment, or refers the patient to a health program. Finally, referral requests are transferred to the “Regulation Management” function, where the responsible user can manage them.

#### **2.1.7 Workflow enablers**

A subgroup of features for orchestrating and managing workflows related to clinical practice.

##### **2.1.7.1 Clinical pathways configuration and implementation**

This feature supports the HCP with supplemental information during the clinical decision-making process.

The main system functions associated with this feature are “Clinical Decision Support – Mentor” for configuration and “Mentor” and “EPC” functions for execution. In practice, the combination of the three functions is needed: “Mentor”, “EPC”, and “CPOE”.

According to configured rules and patient clinical records that form the input to the “EPC” function such as vital signs, diagnosis, scales, events, and lab results, the professional may receive notifications and recommendations via the “Mentor” function. Examples of the suggested actions include assigning a new clinical protocol or pathway or a medical prescription to a patient. If the recommendation is, for example, to include a medication order set, the HCP do so in the “CPOE” function, via the option to accept or reject.

Institutions can configure and use this workflow tool in different scenarios, for example, related to sepsis early detection and management, deep venous thrombosis prevention, stroke, acute myocardial infarction, and ventilator-associated pneumonia.

### 2.1.7.2 Alerts, warnings, and notifications management related to clinical processes

This feature supports the configuration and triggering of notifications, alerts, and warnings related to clinical processes. They may be displayed on the patient bar and different system's screens or sent via e-mail, SMS, and internal communication.

**NOTE** In the context of this feature, the word “alert” is not intended to support any clinical decision. The alerts and warnings aim to improve HCP collaboration and communication, enhancing care delivery and fulfilling the operational and administrative needs.



#### **WARNING**

The alerts depend on different conditions and proper previous configuration. Alerts regarding allergies depend on the right configuration of the drug database and the right input of the drug allergy in the patient health history. Alerts related to out-of-range values depend on proper configuration of the limits to be displayed in functions, such as CPOE, EPC, PEPC, and eMAR. Alerts can be related to patient specific conditions or be addressed to HCP.

There are many system tools options to configure different alerts, events, warnings, and notifications, described below.

The “Alerts and Events Management” function is one system resource used to configure alerts and warnings. The user can define the main events and rules, trigger modes, event description, messages via text input prompting (macros), start and end time, presenting mode (on-screen, internal communication, and e-mail), and the specific recipients (user, e-mail, department, group, and profile). The function is also used to manage and view the alerts and events history, such as the ones related to medicine and supplies.

On the “EPC” or “EOC” functions, after selecting a patient, the user can record alerts (in the “Alerts” item of the patient’s tree), defining if the event is for the patient or one specific encounter, selecting the type of alert with messages that the institution configures in the “Core Tables Settings” function. After submitting the record, the alert is shown to the users when accessing the patient’s record. The alert can be deactivated using the “Set end of alert” option.

The “Professional Notifications” functionality aims to improve communication among the professionals involved in the patient care process. It is accessed via the “Check alerts/consult user alerts” right-click options on the “EPC” function. Adding a new alert in the “Registration” tab, the user can select the type of notification, the recipient, the department, and the warning message. The alert is displayed to the recipient through the “Professional Notifications” functionality when accessing the specific patient via the EPC function, where the user can view and acknowledge them.

Using the “Core Tables Settings” function, the institution can configure alerts regarding the request for additional information. In the “Information request” option, rules can be defined to patients with or without encounter number, surgery, encounter type, specific person, department, and establishment. In addition, the “time of presentation” needs to be selected, defining the workflow moments or when the user adds or submits a clinical record, such as a clinical note, medical certificate, and event. Finally, to complete the configuration, a system query needs to be developed, the appropriate message content, and the user alternatives (notifications only, justification, or immediate action). The alert and message are displayed during the clinical workflows via the “EPC” or “PEPC” functions, and the professional may accept it and follow the possible instructions.

The HCP can also view alerts related to clinical and documentation tasks of the patient encounter on the left side of the patient bar (bell icon) above the patient’s name. By clicking on “see more” of each type of

pendency, the user can flag them as read and view more details and possible actions executed in different system functions. The configuration of the alerts is performed in different system functions, such as the “Core Tables Settings” and “Task List”.

In the “Core Tables Settings” function, the user can configure the multiple approvals rule, selecting the system function, the item, and the accountable professional. To trigger the process, the users need to record and submit specific clinical documentation in the “Electronic Pre-Anesthetic Assessment”, “PEPC”, or “EPC” functions. Then, using the legends, the user can view the status of approval of each document, and at the same time, an alert icon is shown in the patient bar. Regarding document approval, by clicking on “see more”, the user can view the screen with details about the pending approval items, such as the status, date, user, document type, and the approvers, and quickly approve it or not.

At the same place, it is also possible to see alerts related to the interruption of the integration communication with bedside monitors with no vital signs data inbound. To configure this notification, beyond the presence of an active integration with monitors, the institution needs to set up the rules in the “Core Tables Settings” function, followed by an activation of a database stored procedure job in the “System Administration” function.

The alerts related to professional tasks such as the release of a new exam, order, or clinical note also are shown in the same bell icon of the left bar of the patient bar. The institution configures and manages the tasks on the “Task list” function. The rules for viewing the tasks are configured in the “Records” tab, selecting the clinical item, its priority, and the user profile. Using the “Electronic Patient Chart” function, after selecting a patient encounter, the user can view the alert icon in the patient bar. The user can click on the icon to see the number of pending tasks, and by clicking on see more, the user can access the “Task List” function. In the “Task” tab, the user can filter and check the tasks according to the period, status, department, patient, professional, and priority. According to the selected task, the user can access it directly in the patient record, change status and view the status history.

#### **2.1.7.3 Check-lists of clinical processes**

This feature supports HCP to perform checklists related to patient care processes, using specific tools that facilitate the recording and managing of them and their stages. The checklists are defined according to the institution’s quality objectives. The more well-known example is the surgery time-out assessment.

This feature can be linked with different workflows functions such as “PEPC,” “Radiotherapy Management,” and “Home Care Management.”

The “Electronic Control of Assistance Processes” function is used to configure the checklist rules and manage the process. The user can define a checklist process(es), define the professional role, link the assessment(s), process dependencies, and trigger rules such as starting the surgery or its events, radiotherapy, and home care process. The “Structured Assessments Settings” is used to create structured forms, including the institution process’s required fields. Refer to the “Non hard coded configurable templates” feature in this document for additional information regarding structured forms configuration.

In the surgery context, after selecting a patient in the “PEPC” function and recording a process triggering event, such as starting the surgery, the user is asked to complete, for example, the time-out checklist assessment via the “Electronic Control of Assistance Processes” function. Then, in the “Checklist” tab, the user records the checklist’s previously configured information.

To manage the existing checklists, the user needs to open the tab “Panel” of the “Electronic Control of Assistance Processes” function, where the user has filters to search for pending, partial, and completed checklists.

#### **2.1.7.4 Hard coded configurable templates**

This feature allows the creation of structured templates or forms with fields that can be connected with the native tables and structures of the system, allowing the use of the same clinical information in different workflows.

The user can compose structured templates in the “Patient Chart Settings” function, in the “Templates” tab. For each template, elements (archetypes) and native systems tables are available in the system. The elements and systems tables available are clinical concepts created by Philips according to customer requests. This methodology is essential to avoid duplication and guarantee the proper connection with the native system’s data fields.

The user has the option to import pre-configured templates created by Philips. Using the templates, customizations can be made according to the objective of the template. It is located in the “Patient Chart Settings” function in the “Philips Templates” tab.

The user can select the appropriate template during the clinical appointment and record the patient information, mainly using the “EPC” function. After filling in the required information, the user submits the record. The data entered using this feature can also be visualized in other systems’ screens, dedicated to vital signs, scores, clinical notes, diagnoses, and patient summary, for example.

This feature is an alternative to creating forms and preserving data integrity, allowing adequate data research and triggering clinical processes and pathways.

#### **2.1.7.5 Non hard coded configurable templates**

This feature allows the creation of structured forms with fields that do not have a relationship with the tables and native structures of the system.

The user can configure these forms in the “Structured Assessments Settings” function. For example, it is possible to define the form’s name, the system function to apply it, create different fields (e.g., edit, check box, look-up) and preview them.

The HCP can use the forms mainly in the “EPC” function. After selecting the patient, the user can choose the form and fill in the information therein.

The “Structured Assessment” function is used to manage the forms and their information already recorded in the system for research and quality purposes.

#### **2.1.7.6 Patient Journey**

This feature provides relevant information on a timeline perspective from the patient data through a graphical interface that is activated in some system functions, such as “EPS”, “EPC”, “CPOE”, and “EOC”.

The user can configure this feature in the “Patient Chart Settings” function to set the timeline preview template and the clinical pathways protocols. “EPC”, “EPS”, “CPOE” and “EOC” functions are used to follow up on relevant events in the patient’s life.

According to the clinical pathways protocols and other clinical records registered for the patient in the “EPC” function, the user can view the main relevant events in a timeline, the stages and events of the clinical pathways protocol, and information about the phase of the treatment.

Patient Journey is a standard term for the sequence of care events that a patient follows from the point of entry into the system, commonly triggered by illness, until the patient is discharged from the hospital to his or her home, care home, hospice, or due to death.



This representation provides HCPs with information to check the patient treatment phase to identify delays or missed phases.

#### **2.1.7.7 Calculations systems**

This feature allows the user to create formulas to be used in different functions of the system, such as the "EPC" and "Multiparameter Flowsheet" functions.

In the "Calculation Mechanisms" function, the user can create their own formulas to be applied to the system functions. The variables described in the formula are defined in the "Parameters" tab. A parameter can be set as an attribute from a table or an element from a template. The system displays the formula result in the location defined in the "Destination" tab, following the same concept applied in the "Parameters" tab.

In addition, each calculation can have execution rules defined to set if it will be executed. These rules are applied according to the configured parameter value and condition and can be configured with one or more criteria. For example, it may be desirable to execute a specific clinical calculation only when the patient is female, within a certain age range, or both.

The results are presented in the destination data field, which was defined in the "Calculation Mechanisms" function. For example, suppose the user has chosen the "Mean Arterial Blood Pressure" attribute in the "Vital signs and general monitoring" table from "EPC" function as a destination when all required variables are charted. In that case, the result will be presented in the specific data field of the screen. The same concept is applied for templates in the "EPC" function and models from the "Chartable Flowsheet" tab of the "Multiparameter Flowsheet" function. In the "EPC" function, when a result is generated by a calculation from the "Calculation Mechanisms" function, an orange icon with an exclamation mark is displayed. When the user hovers over this icon, the formula used to obtain the result will be presented. Suppose a calculation created by the "Calculation Mechanisms" function has a destination attribute that already has a system's hard-coded calculation. In that case, the customized calculation from the "Calculation Mechanisms" substitutes the hard-coded calculation.

#### **2.1.7.8 Patient panorama, dashboard, and census**

This feature provides the HCP a view of a specific cohort of patients to be used in different scenarios, for example, new patients admitted in one or more clinical units or departments, a list of patients by physician, provide the occupancy status of a unit or department, notifications, and icons regarding statuses of clinical processes, discharge process, waiting list, bed request and availability, and support prioritization among a group of patients.

The "Clinical Panorama" function allows HCPs to view the general patient population or subgroups based on filter criteria. The users may use a standard view with sub-groups of patients, including "new", "worsening", "both" or customize a list of patients for close oversight.

### **Clinical Panorama**

Supports the HCP to view a group of patients as a set of visual components described as "cards" or "tiles", in a list or graphical layout of the unit, which can be organized according to different filters and sorting capabilities. Each tile contains a summary of relevant information regarding the patient, such as patient identification, age, location as well as other visual components such as icons, score result and delta, and the patient's photo. When the HCP double clicks on a tile, it opens an expanded detailed view, which can have more data and relevant information about the selected patient.

Tile content, detailed view content, and icons must be configured in the “Core Table Settings” function. These configurations can consider criteria such as, system locale, user profile, unit and department, user role, and individual user. For tiles, the user can configure by unit which score results will be presented in the patient tile, such as APACHE II, SAPS II, SOFA, Score Flex II, and MEWS. In the list view, the score name, total score, score trend, and delta score are combined into a single column; the score column data can then be filtered by score and also sorted in ascending or descending order by total score or delta score. For detailed view, the user can define what data will be displayed, for example blood type, estimated discharge date, number of days in ICU, submitted diet, clinical protocols, scores, indexes, and scales. For icons, the user can define certain standard icons for situations such as unchecked items, warnings, suspended medicines, protocols, isolation, and precautions.

#### **2.1.7.9 Tasks and worklists**

This feature allows HCPs to view and manage pending tasks related to patient care, according to their professional role. It allows to organize, in a consolidated view, tasks related to one or multiple patients.

Using the “Task List” function, the user can evaluate tasks and can go directly to the execution of the action, such as executing a clinical record submission, reviewing lab or image exams, justifying a need for a procedure, or responding to a medical opinion request in the “EPC” function.

With this feature, users can better evaluate tasks that must be performed during the day or a shift, optimizing time, defining priorities, and tracking the executed tasks.

## **2.2 Operational features**

A group of features related to management of data that is available to healthcare professionals to provide delivery of care to patients.

### **2.2.1 Pharmacy management**

A subgroup of features related to the management of processes necessary for the operation of the pharmacy.

#### **2.2.1.1 Medication and related materials stock management**

This feature supports the management of materials and medicines in stock, preventing surplus or lack of materials and medicines.

Once items are purchased and the invoice is registered into the system, the stock is updated in “Stock Management” function. This function allows to check the stock quantity, define the minimum and maximum quantity each item must have in each stock location, check the items’ transactions, count inventory, generate labels, and maintain traceability of the items.

To transfer items between stock locations, or consumptions and removal of expired medicines, use the “Materials and Medicines Requisition” function. The user can use two requisition options: “automatic”, based on pre-registered rules in the system, and “manual”, where the user adds the items as needed informing the requesting site and the stock location that will provide the items.

Once the requisition is generated, the users responsible for the items in the stock location can view the pending requisitions in the “Requisition Processing” function. The items are then processed manually, or by using the barcode, and the request is submitted. After submission, the request is sent to the fulfilment site and the user responsible can inform that the request has been successfully received.

To transfer materials and medicines between establishments use the “Stock Transfer Control” function, the user from one establishment can request items stored in another establishment, and these requests can be generated automatically based on pre-registered rules in the system, or manually, where the user adds information related to this request, such as the items and the quantity necessary, the establishment that must process the request, and the delivery department.

These requests have a “pending” status at the establishment that processes this request, the items can be added using the barcode for traceability, and at the end, an invoice is generated to transport the items from one establishment to another. Once the items are transferred, the invoice is added to the system and the stock of the requesting site is updated.

#### **2.2.1.2 Medication preparation**

This feature supports the process of systematically preparing medications to administer to the patient. The preparation workflow occurs in several steps: separation, sanitization, preparation, check and dispensation.

Use the “Electronic Medication Administration Record - Dispensing Management - eMAR-DM” function to track the progress of each step in the process. The HCP can view all pending medication items and use filter options to find specific items. The HCP can view items grouped by medication and the total amount of each medication, this way all items requiring the same components can be processed together. Alternatively, the HCP can view each item individually and a breakdown of sub items for items scheduled to be administered at multiple times.

The “Closed Loop Medicine Administration Process - CLMAP” function is accessible via external call only and opens automatically from the “Electronic Medication Administration Record - Dispensing Management - eMAR-DM” function when the process requires confirmation of each component used by the HCP during preparation.

After completing the preparation process, use the “eMAR” function to document the administration of the medication to the patient. Refer to the Management and administration of specific and general orders section of this IFU document for more information.

#### **2.2.1.3 Drug and material dispensing and distribution**

This feature supports the process of dispensing and distributing drugs and materials, to have the necessary supplies where and when they are needed.

For emergency and unconscious patients that are not able to identify themselves, “Execution of Emergency Card” function can be used and all materials and medicines necessary to stabilize the patient can be registered in pre-registered emergency cards. Once the patient registration is completed, these materials and medicines are transferred to the patient’s account.

After the registration, the user orders the material and medicines for the patient using the “CPOE” function, informing for example, the medicine dose, the interval, and the administration route.

The ordered items are displayed and prepared in the “Order Batch Dispensation” function. The user selects the patient that the items are prescribed to and dispense them using the barcode. This function also provides options such as, canceling items, splitting the batch of items in case the necessary amount is not available, and replace medicine with another option that has a pre-register to serve as a replacement for the ordered item.

After the batch dispensation, the items might update the patient’s account and the stock quantity, depending on the hospital process.

To manage the items dispensation time, use the “Dispensation Batch Management” function that goes from the preparation and dispensation to the delivery of the items. The time for each action is configurable by the institution.

Use the “Patient Material Return” function when the user must return the items to the stock, for example, the patient refuses to take the medicine or dies during the treatment, the items must return to the stock

location. In this function, the user can use the barcode reader or add the items manually, consult the pending return requests, and settle the items returning them to the stock.

#### **2.2.1.4 Clinical pharmacy**

This feature supports activities related to the review of the patient's therapeutic plan, including the analysis of oncological items. The goal is to guarantee that the patient receives adequate doses, dilution, etc. and to review information related to the prescribed items, as well as to manage medication reconciliation.

The clinical pharmacists, using the "Therapeutic Plan Management" function, can review the patient's therapeutic plan before the dispensing by the pharmacy or medicine preparation, to identify adjustments, such as drug interactions, therapeutic duplications, dose limits, incorrect route of administration, among other essential checks that this professional can review.

Regarding medication reconciliation, the same function allows the pharmacist to verify if the patient's continuous medications (medication the patient was already using before the hospitalization) were included in the therapeutic plan.

#### **2.2.1.5 Drug settings**

This feature supports the user to configure a data set of medications used in the institution.



##### **WARNING**

The healthcare organization is responsible for the proper information configuration and maintenance of the medicine and material catalog, since it will influence the clinical workflows bringing information such as default dose, alerts when the dose is out of limits, and dilution and reconstitution.



##### **WARNING**

Some medicines and drugs may have the similar spellings related to their commercial name or the active ingredient / formula. This may pose a mix up when ordering the medicine for a selected patient. Hence, configure the medicine and material catalogs in such a way to prevent or reduce the possibility of errors while selecting a medicine or drug. One recommended way of attaining this is uppercase lettering to help distinguish sound-alike or look-alike medicine names. For similar reasons, materials, procedures and exams may also require the same attention during the configuration process.

In the "Medicine" function, the user can link a kit (set) of materials to dispense with the medication, link a reconstitution, dilution, and re-dilution of the medication, and adapt them to the patient's profile or conditions, if needed. In addition, the user can define medications' dose limits, drug interactions, and routes of administration suitable for the medication.

**NOTE** This feature is specific for medications. The feature General Material Settings support the configuration of other materials, such as hospital supplies, office supplies, cleaning materials, enteral diets, infant formula, etc.

The "Medicine" function also allows the user to configure several aspects related to the medications, such as linking the drug to the active ingredient, the generic drug description, and the conversions of the units of measurement (for example, one tablet is equivalent to 500 mg).

#### **2.2.1.6 Analysis of non-standard drugs**

This feature supports the HCP, usually a pharmacist, to analyze medical orders that contain drugs that are not standardized for use in the institution.

In the “Material Record” function, the user can flag a drug as non-standard in the institution and configure a list of drugs available to replace it.

In the “CPOE” function, if the physician orders a non-standard drug, depending on a set of parameters and rules defined by the institution, the list of substitutes is displayed to allow the choice of another drug of the same therapeutic class. It is also possible to configure the system to not allow ordering non-standard drugs, or allow it, but require additional information, such as justification, daily doses, and how many days of treatment will be necessary.

By using the “Non-Standard Medicines Release” function, the user analyzes the order and releases it fully, partially, or cancels it, after the acknowledgement of the ordering physician. The system can also be configured to generate a purchase order anytime a non-standard drug is released by the user.

#### **2.2.1.7 Surgery supplies**

This feature supports the organization of surgical supplies needed for surgeries.

Use the “Stock Management” function to create and manage material kits. Use the “Surgical Schedule Management” or “Surgery Management” functions to select and reserve the material kits for surgery. Use the “Surgery Management” function to dispense the material kits for use in surgery, routing them from stock to the final destination.

The management of surgical supplies helps the HCPs to prepare to conduct surgeries. The preparation process involves linking all the necessary supplies to the surgery event and can be linked to other processes such as the surgical schedule and billing.

#### **2.2.1.8 Outpatient pharmacy**

This feature supports the HCP in managing the dispensing of medication for the patients to continue their treatment at home. Respecting the processes of the Family Health Program Units or long-term medicines treatments as in the cases of Oncology.

Using the “Outpatient Pharmacy” function, access the “Records” tab to enter information about the medications that can be dispensed, reasons for cancellations, rule by type of insurance and existing programs in health institutions. It is also possible to register the protocols, with their respective medications and restrictions, in the “Protocols” tab. The user can view and register prescriptions by date, type of prescription and prescription validity.

In the “Outpatient Pharmacy” function, the user selects a patient according to the filter options such as day patients, program type, pending delivery, or delivered. The patients are included in the pharmacy’s list of patients with pending items after outpatient prescriptions are submitted in the “EPC” function. If an outpatient prescription was not already generated by another process, the user can also manually register a prescription.

The user can control the patient's return schedule for upcoming deliveries and the dispensing of medicines delivered to the patient. The outpatient prescription can be split into more than one delivery. For example, if the physician orders medication for 30 days, the pharmacy can split it into two deliveries of 15 days or three deliveries of 10 days. The order details need to be double-checked in each delivery, such as medication, administration route, interval, number of days, start, and end date.

If the pharmacy does not have the prescribed medication in storage, replacing it with an equivalent one is possible, using the same function. In addition, it is possible to record if the patient is affiliated with medication programs, such as medication at home or nutrition at home. In this case, the hospital may regularly provide the delivery of the medication or nutrition at the patient's home.

It is possible to cancel the encounter in cases of interruption of treatment due to a change in the therapeutic approach or death of the patient and in cases of treatment abandonment by the patient.

#### **2.2.1.9 Transcription process**

This feature supports the process of converting paper-based clinical documents into digital format (orders and clinical notes). The original document is attached and linked to the patient for further consultations.

The user accesses the "Transcription Management" function on the "Patient attachment" tab, selects the patient, attaches the document, and submits the transcription using a right-click option.

The patient is listed in the "Transcription" tab, where the user starts the transcription using the "Start/Undo transcription analysis" and "Generate order" right-click options. Then, the user is directed to the "CPOE" function to carry out the transcription into the system.

The function can also be used to transcribe sector requests, such as materials for the nursing team and this type of transcription does not generate a prescription.

The "Transcription Management" function manages this end-to-end transcription process, executed by multiple users.

#### **2.2.2 Surgical and special materials management**

A subgroup of features related to the process of managing surgical materials including processing, sterilization and surgical kit assembly.

##### **2.2.2.1 Orthoses, prostheses and special materials management**

This feature supports the management of processes linked to orthoses, prostheses, and special materials, that may be purchased or from consignment stock. It includes the procedure schedule, details about sterilization type and validity date, the billing, and the necessity of resupply.

Use the "Surgical Schedule Management" and "Surgery Management" functions to record and manage the orthoses, prostheses and special materials, which can be previously linked to procedures.

Managing of orthoses, prostheses and special materials during surgical procedures is important so the prescribed material is available at the right time for the patient.

##### **2.2.2.2 Material processing & sterilization execution and management**

This feature supports the management and tracking of material processing and sterilization for the type of sterilization, its expiration date, place of use, and details of patients it will be used on. The entirety of the process needs to be tracked for infection control purposes.

Use the "CSSD Management" function to register the resources, cycles and steps for the sterilization of materials, carry out the control of sterilized and contaminated materials, as well as receipts and shipments for external sterilizations, and also consult the sterilized materials that are linked to the surgical procedures.

##### **2.2.2.3 Surgical kits and packs configuration and preparation**

This feature allows the HCP to manage the surgical kits and packs with materials and medications.

First use the "Stock Management" function to create surgical kits and material packs. Once the kits and packs are defined, they can be used in place of the individual items from which they are composed. Use the

“Internal Exams and Procedures” function to link kits and packs with their corresponding procedures. Linking a kit or pack to a procedure reflects in other workflows in the same way as if each item was linked individually.

In the “Surgical Schedule Management” function, after selecting a procedure, it is possible to view the standard kits and packs linked to the scheduled procedure. Additional kits and packs can be manually added to the scheduled procedure if necessary. After generating the records for the upcoming surgery and surgical supplies order, the kits linked to the procedure via the scheduling event can be managed by the HCP responsible for the process of dispensing the surgical supplies.

In the “Surgery Management” function, select the “Surgery data” tab then the “Pharmacy” subtab to manage the expected materials and medicines needed for the procedure.

In the “Perioperative Electronic Patient Chart” function, the HCP can manage the kits and the dispensed material through the “Surgery Graphs” functionality, recording the materials and medications used during the surgery.

In the “Patient Anesthetic Form” function the HCP can record and manage the kits with materials and medications used during the procedure.

The kits and packs are configured and used to facilitate the process in several system functions such as “Stock Management”, “Internal Exams and Procedures”, “Surgical Schedule Management”, “Surgery Management”, and “Patient Anesthetic Form”.

### **2.2.3 Blood, blood products and other hematology therapies management**

A subgroup of features related to blood product collection, production, storage, transfusion and related hematology therapies that are provided by a healthcare institution.

#### **2.2.3.1 Blood collection, production, storage and dispensing**

The feature supports the user in managing blood products, including blood donation, blood components production, and blood bags storage.

Access the “Blood Management” function to follow the donation management process . After opening the function, it is necessary to filter the information to see the donor. If the donor is still not enrolled in the system, it is necessary to proceed with it and follow the processing to record physical and clinical triage, and the beginning and end of the collection. During the collection stage, the user records the clinical data, events, process interruption, self-exclusion, and bag data updates.

According to the donor’s conditions, the user defines the type of donation and the type of collection to be performed in the donation. The user links the donation to specific campaigns, records the delivery of gifts, records the bags and the recipient exam results, and displays recipient impediments.

When the collection is finished, the user defines the production stages, records the donor’s exams, performs the verifications and validations related to the serology exams, and records phenotyping.

When handling the donated bags, the user performs specific steps for each blood component according to the validity and specific conditions. When the serology results are available, the donated bags receive an assigned slot in the storage, and the user record the stock entry of blood components via bar code.

#### **2.2.3.2 Apheresis, phlebotomy and other therapies**

This feature supports the HCP in processes related to blood therapy treatments, such as therapeutic apheresis and phlebotomy.

The user opens the “Blood therapy” item in the “Blood Management” function. To view the apheresis information, the order must be created and submitted in the “CPOE” function. In the item “Blood therapy”,

the user can select the item “Therapeutic apheresis” to start apheresis. At this moment the status is changed, and the hemodynamic data is recorded in the same function. It is possible to record the assessment if an assessment template is configured.

To record a therapeutic phlebotomy, the user accesses the item “Therapeutic phlebotomy” in the “Blood Management” function. It is necessary to add a treatment record and document the start and end the blood removal. In this process, the user can also disable the blood removal record.

#### **2.2.3.3 Patient transfusion information**

This functionality supports the management of the transfusion process of blood components prescribed and reserved for the patient.

In the “Transfusion” tab of the “Blood Management” function, the user can check the transfusion requests for the patients. By double-clicking the selected request, the user can check information such as phenotyping, compatibility tests, antibodies’ presence, and transfusion and reaction history. In addition, by selecting the blood component linked to the request, the user can double-check its information (capability to use bar code readers is also available), such as the blood component identification number, production and expiration dates, and bag phenotype. If necessary, the user can also exclude or disregard a blood component from the transfusion request.

During the blood component infusion process, in the “Blood Management” function, the user can select the transfusion request to record the start, pause, end, or cancellation of the infusion and follow the process via different statuses displayed on the screen. It is also possible to perform the same actions in the “eMAR” function. If the clinical user has a mobile device approved by Philips, it is possible to check the blood components programmed for the transfusion encounter number.

Suppose the recipient patient has a scheduled surgery or it is in progress. In that case, the user can link the blood component to the surgery identification number, and the component is automatically displayed in the “PEPC” function.

In case of a transfusion reaction suspicion, using the “Blood Management” function, the clinical user can record the patient’s vital signs, select the reaction type, describe the observations and symptoms, allowing for further investigation and confirmation. In addition, if checking the process via the “eMAR” function, the user can call the “Blood Management” function via the “reaction” right-click option.

#### **2.2.4 Nutrition and milk processes management**

A subgroup of features to manage the nutrition processes including product ordering, production, portioning and dispensing of oral diet, supplement and milk formula.

##### **2.2.4.1 Diets and nutrition management**

This feature supports nutritionists and nutrition teams in the clinical nutrition and production management process.

In the “Nutrition Management” function, the HCP user can view the patient worklist according to the information selected in the filter to have access to clinical nutrition management. After selecting a specific patient, the user needs to choose the item “Patient Assessment” to complete an assessment template and clinical notes, which can also be viewed via “EPC” function. In the “Nutrition Management” tab it is also possible to define the selected diet therapy, submit the service, define the menu, and register extra items (for patients and companions), record diet inconsistencies and guidelines.

The production nutritionists need to configure the core table settings containing the foodstuff records and the recipes before configuring the menu options. The configuration process is done in the “Nutrition



Management” function, in the “Records Foodstuff” and “Records Recipe” items, respectively. After these configurations, the production nutritionist can register the menu in the “Records Menus” item of the “Nutrition Management” function. Then, the nutritionist can generate the planning and the request to buy the foodstuff accordingly.

When the clinical nutritionist selects the patient menu in the “Menus” item of the “Nutrition Management” function, it is possible to view all the preconfigured menu options and select one for the patient diet. In the “Production” item of the same function, the HCP responsible for production can check the defined patient menu and inform on screen the stages of the production process, e.g.: Start production, end production and release production;

To view the list of patients according to the service generated in the “Nutrition Management” function, the nutritionist can access the “Nutrition Service Panel” function. In this function, it is possible to check the information generated in the “Nutrition Management” function and perform other actions, such as, submit the service, define the menu, deliver the service and view the patient’s specific diet or partial/complete fasting diet.

#### **2.2.4.2 Milk formula production and management**

This feature supports the HCP in preparing the artificial milk formulas according to the clinical order.

The nutrition team can view the clinical order information in the item “Milk Production” of the “Nutrition Management” function.

To view the quantity of powder and water necessary to prepare the artificial milk, the nutrition team needs to generate the production order in the item “Milk Production” in “Nutrition Management” function and the user needs to double-check the products using the bar code reader in the same function before starting the artificial milk preparation.

After preparing the milk, the nutrition team can tag the device (for example, baby bottle) with a bar code label in the “Milk Production” tab of the “Nutrition Management” function and deliver it to the nursing team to feed the baby.

#### **2.2.4.3 Human milk bank process and management**

This feature supports HCPs in managing the human milk donation process from donor registration to pasteurization and milk donation.

The “Human Milk Bank Management” function is used for recording the collection, processing, and quality control of the milk produced in the first days after delivery (colostrum), transitional milk, and mature human milk. The milk is delivered to the patient according to the medical order.

The donor is enrolled in the tab “Donor” in the “Human Milk Bank Management” function, with basic information such as obstetric history, birth, exams, current medication, and milk collection. After submitting the obstetric history, the clinical user can register the collection’s start and end in the same function.

If pasteurization is necessary, the management of the milk pasteurization process is made in the item Pasteurization in the “Human Milk Bank Management” function. First, the HCP can register the milk batch, adding bottles via bar code labels. After that, the user needs to start the record of the pasteurization process in the item “Batch” in the same function.

During the pasteurization cycles, the clinical user needs to control the temperature shown in a graphical view. After the conclusion of the pasteurization process, the milk is available in the stock (in the same function) to be delivered for babies, inside and outside the healthcare facility.

### **2.2.5 Nosocomial infection surveillance**

A subgroup of features related to the tracking and management of infectious disease in a clinical setting, also known as Hospital-Associated Infections (HAIs).

#### **2.2.5.1 Nosocomial infection surveillance process**

This feature supports the hospital infection surveillance control by managing data related to invasive or non-invasive procedures, antimicrobial resistance, and incidence of outbreaks.

In the hospital infection surveillance control process, HCPs (physician, nurse, and nursing technician) access the “Infection and Prevention Control Management” function. Through the main filter, the user selects the control conditions related to patients, such as: incident form, surgery, devices, and events, it allows patient management regarding notifiable diseases and post-discharge control.

Once the patients are filtered, the user can view information related to the patient’s infections, such as date of infection, date of origin of infection, and main site. The user can include other patients in this control, defining the control condition involving the patient, for example: Antimicrobial.

The control of Antimicrobials allows users to monitor how many, and which main antimicrobial drugs are being used in the institution, by patient, purpose of use, date of prescription and with or without definition of the infectologist.

Users can document data collected on hand hygiene including department, professional, procedure and opportunities identified regarding the hand washing technique. From this data the user can generate strategic indicators for the institution.

#### **2.2.5.2 Patient infection surveillance record process**

This feature supports users in recording and consolidating the patient’s clinical information related to infection cases. The surveillance management team uses identification and recording of infection cases (or even potential cases) to define and adopt guidelines for infection prevention and its control measures and adequate antibiotic ordering and control.

Use the “Incident Form Register” and the “HAIs Incident Form” functions to record information related to infection cases. After starting a new case, the user can see the patient’s microbiological cultures, surgeries and record other clinical information such as the patient’s devices and the definition of the primary and secondary site. In addition, the user can see the antimicrobial drugs and their conditions regarding the cultures, such as resistance, sensitivity, or sensitivity with the dose increase.

Based on the consolidated clinical information, the user can assign devices to infections and their respective sites, feeding the healthcare-associated infection indicators in the “HAIs Management” function and managing the data in the “Infection and Prevention Control Management” function.

#### **2.2.5.3 Antimicrobial orders surveillance process**

This feature supports the antimicrobial stewardship member to analyze the medical orders that contain antimicrobials. Antimicrobial stewardship is the systematic effort to educate and persuade prescribers of antimicrobials to follow evidence-based prescribing to stem antibiotic overuse and thus antimicrobial resistance.

In the “HAIs Medicine Control” function, the user can find all antimicrobials ordered in the institution, all patients who have an antimicrobial order or search for patients with antimicrobials by department or by ordering clinician.

The user can view patient’s data such as weight, age, bed, department, and clinical notes. Also, data on the antimicrobial ordered for the patient, such as the number of days, dose, unit of measurement, and interval,

including other antimicrobials, previously used or still in use. With these data, the user can analyze the medical order, totally or partially approve it, reject it or suggest a change to the ordering physician.

#### **2.2.5.4 Nosocomial infection graphs and indicators**

This feature supports users to manage indicators of healthcare related infections, in a global and detailed view.

In “HAIs Management” function, the user can filter the indicators related to the surgical site through variables, such as, surgical infection risk index, type of surgery, level of contamination, and ASA (American Society of Anesthesiology)” criteria. In the item “Invasiveness”, the user views the indicators of infections related to healthcare by sector, period, and site of infection: Bloodstream Infection, Urinary Tract Infection and Respiratory Tract Infection, showing strategic clinical indicators for the institution.

#### **2.2.6 Emergency department**

A subgroup of features to manage the emergency department and emergency patients.

##### **2.2.6.1 Emergency management**

This feature supports the management of the emergency department including patient registration, patient list management, triage process, medical consultation process, and maintain the patient under observation aiming at adequate control and prioritization.

The main function associated with this feature is the “EPC”. In the “EPC” function, in the “Emergency” item the user can view and filter a list of patients in the emergency department. According to the applied process, the user can select actions via the right-click option to perform patient care.

To control and manage the process, the user can follow the patient list through the status interacting and defining priorities, as well as following the actions performed on the patients.

After selecting a patient from the list, the user can call the patient for a consultation via call panel, define the physician responsible for the patient, define or change the level of urgency and priority, start and finalize the medical consultation, generate reports, record outcomes and start the discharge process.

##### **2.2.6.2 Patient triage**

This feature allows the HCP to carry out the triage process using pre-configured tools to perform a patient risk assessment.

Use the “Nursing Records” function to configure the triage protocol, which defines the Type, Item, Diagnosis, and the Model to organize the assessment structure. The type of risk classification is configured in the “Core Table Settings”, defining the desired description and the priority. This configuration is necessary to link the risk classification with the triage protocol diagnostics.

The “EPC” function is used to perform the triage processes from the list of patients pending in triage, and to start the processes the “Classificatory triage” function is used.

After selecting a patient, the user can start triage using the “Triage protocol” tab, opening the protocol, selecting patient’s signs and symptoms, confirming diagnoses, and risk classification finalizing the assessment.

To manage the status of the patient’s list, the HCP can view each patient’s risk classification through color coding and descriptions.

##### **2.2.6.3 Emergency protocols configuration**

This feature provides standard protocols configuration for use during the emergency patient care process, which may contain orders set for certain diseases, conditions, and procedures, to facilitate the process.

To configure the protocol, the user can access the “Protocol Record” function, by adding a new protocol template and informing the use in the emergency, add the desired items like clinical note, diagnosis, prescription, medical certificates, discharge instructions, medications and procedures.

To apply the protocol, the user can access the “EPC” function, select a patient from the list of emergency patients, with the right-click option selecting the configured protocol name and confirm the generation to the patient.

### **2.2.7 Specialized clinical services**

A subgroup of features related to specialized clinical services offered by the institution.

#### **2.2.7.1 Health check-up management**

This feature supports an overall evaluation of a patient’s health condition with a battery of examinations, lab tests, and procedures. This overall evaluation can be customized by patient taking into consideration variables such as sex, age, habits, and personal history related to family, environmental and professional characteristics.

The institution shall configure information for standard checkups, items, orders, and the check-up process in the “Core Tables Settings” function under the item “Check-up”.

After a patient is admitted and an encounter number has been created, all the medical orders associated with the checkup are linked to that encounter. Use the “Check-up” function to manage the calendar of scheduled checkups, select the steps in the check-up process for individual patients, update the flow of steps in a patient’s checkup process as they are completed, and view. After the associated exams, tests, and procedures are documented in the system they will be available via the “EPC” function in the “check-up” item.

#### **2.2.7.2 Organ transplant (donors and recipients) process and management**

This feature supports the search for potential donors and to manage the uptake processes, implant, and postoperative care of transplant patients.

After identifying patients as potential living donors and/or cadaver donors, the user registers in the “Transplant Management” function all information regarding laboratory and non-laboratory tests, compatibility tests such as: Human Leukocyte Antigens (HLA), Antibody Reactive Panel and Crossmatch.

In cadaveric donor patients, the user can record information related to organ removal such as: perfusion solutions, date and time of hot and cold ischemia and other surgical characteristics evidenced in the surgical report.

Once the recipient is selected, the user registers the recipient’s treatment (Pre-transplant, Transplant and Post-transplant), and configures protocols for laboratory and non-laboratory tests, types of tests and compatibility.

For consulting patients (recipients and donors), the user can record the actions of calling for any consultations, pre-transplant and post-transplant.

#### **2.2.7.3 Home care management**

This feature allows the management of patients requiring home care after hospital discharge and the follow-up of their health care when indicated by an HCP. It assists in the logistical process (professional responsible, team hours, equipment, script), family socioeconomic status, sanitary conditions of the place, and degree of knowledge of caregivers about the patient’s condition.

In the “Home Care Management” function, the registration of the entities responsible for the patient are carried out, as well as the origin of this patient, the professionals responsible for the service, services, and records of visits performed. After registration in the function, it shows the patient’s condition in their medical record and the information is available for data mining.

#### **2.2.7.4 Rehabilitation and health fitness process and management**

This feature supports the clinical user to record and follow the patient’s rehabilitation from disabilities and diseases or even for primary or secondary prevention purposes.

In the “Management of Patients in Rehabilitation” function, the clinical user manages the disabled patients (physical, hearing, motor) or the proper treatment. In the beginning, the clinical user enrolls the patient, defines the treatment (physiotherapy, group conversation, occupational therapy), defines orthosis and prosthesis, the accountable professional, the schedules, and can also put the patient on the waiting list. In the same function, in future visits, the clinical user can follow the progress of the patient rehabilitation measures. It is possible to record structured assessments according to the previous configuration. Finally, the clinical user can define the patient’s discharge.

For patients that need cardiopulmonary and metabolic rehabilitation or prevention, the “Health Fitness Program” function is available. In this function, the HCPs enter structured assessments, such as functional kinetic assessment, physical composition (cardiopulmonary assessment and quality of life), view laboratory and non-laboratory exams, schedule, and conclude with a medical opinion. After recording the functional kinetic assessment, it is possible to record the physiological assessment, body composition (weight, height, and skinfolds), and view the graphs. In addition, the user can record the six-minute walk test and prescribe the appropriate exercise program. A level of risk (low, moderate, and high risk) can be assigned for every patient, allowing HCPs to filter the day’s patients according to risk level.

#### **2.2.7.5 Radiotherapy process**

This feature helps HCPs in managing the radiation therapy process during a radiation session.

After requesting radiotherapy in the “EPC” function, in the “Patients in treatment” item of the “Radiotherapy Management” function the information will be available to the user. The physician must open the “Radiotherapy Management” function to view the protocol and the radiotherapy order. After selecting the protocol, the physician accesses the order and edits the information on the treatment phases, such as the start date, total dose, dose per application, days of application, equipment, treatment volume (GTV, PTV and CTV), and percentage of isodose.

The physician can also request treatment directly in the “Radiotherapy Management” function, in the “Patients in treatment” item, by clicking on “Add”. In this case, the physician can record patient information, diagnosis, topography and treatment.

In the same “Radiotherapy Management” function, the physicist adds information in the physician’s previously defined radiotherapy protocol. The information includes treatment start date, total dose and dose per fraction (cGy), amount of check film, days of application, applicator, insertion number, total dose for insertions (cGy), interval, and the volume of the treatment. The process of determining the volume of the treatment has several steps. Two volumes need to be defined before the planning begins. These volumes are GTV (Gross Tumor Volume) and CTV (Clinical Target Volume). Then, two more volumes are defined during the planning process: PTV (Planning Target Volume) and Organ at Risk.

To release the treatment protocol, there must be a double check process between the prescribing physician and the physicist, validating the information. After clinical consensus, the treatment is released for the radiotherapy treatment scheduling stage to start the treatment.

In the "Radiotherapy Management" function, information on treatment protocols (equipment, total dose, volume, accessories, fields, phases, among others) and records (type of treatment, linked equipment, health insurance, establishments) is entered, which is used in the radiotherapy process.

The user can register and view the accessories linked to the treatment, which must be used at the time of the treatment, as well as the organs at risk of radiation exposure. In addition to being able to record patient history and treatment interurrences.

Some radiology equipment is also designed for data entry and can store detailed treatment information including scheduling and planning information. It is possible to integrate information from radiology equipment directly into the "Radiotherapy Management" function so that the treatment information is entered only once and is synchronized. The exchange of information is always one-way, from the radiology device to the information system only.

#### **2.2.7.6 Dialysis process**

This feature aims to support HCPs in the reception and care of dialysis patients.

Before starting the reception and care, the user accesses the function "Kidney Failure Management" to register the patient, define the scale, shifts and treatment units, the access technique, the dialyzer, and dialysis point, and whether the patient uses any medication.

In this same function, the user accesses the tab "Records" to register the patient, dialyzer, machines and reproprocessors. In the tab "Records", after the patient's previous registration, the user selects the patient, using double-click, and registers information such as, dialysis access, serology, dialysis scale and shift, type of treatment, teams, exams protocol, vaccines, among other information. Still in the same function, on the tab "Reuse Management", the user registers the dialyzer for the patient, initiates and finalizes reprocessing, prepares or discards the dialyzer.

In the tab "Occupancy", the user monitors the scheduling of the session and also transfers the patient to another dialysis point through the "Transfer selected time slot" right-click option.

#### **2.2.8 Management, execution and reporting of exams and procedures**

A subgroup of features related to management of the processes that involve exams and procedures and controls inherent to each type.

##### **2.2.8.1 Laboratory exams (management, execution and reporting)**

This feature provides detailed information about the workflows of laboratory exams, including prescription, sample collection, execution, submission, reporting, and traceability.



#### **WARNING**

**Some medicines and drugs may have the similar spellings related to their commercial name or the active ingredient / formula. This may pose a mix up when ordering the medicine for a selected patient. Hence, configure the medicine and material catalogs in such a way to prevent or reduce the possibility of errors while selecting a medicine or drug. One recommended way of attaining this is uppercase lettering to help distinguish sound-alike or look-alike medicine names. For similar reasons, materials, procedures and exams may also require the same attention during the configuration process.**

Hospitals and clinics use the function "Laboratory Tests" to configure the laboratory exams, defining relevant information such as specimens, methods, equipment, reference values, and report structure.

Based on the exams configured in the previous function, the clinician can request them in the “CPOE” function and verify the schedule of sample collections in the “eMAR” function.

The function “Laboratory Management/LIS” manages laboratory tests internally performed or exam results received via an interface. It supports the entire specimen process and tracking in the laboratory department, including sample identification and distribution, accountable professionals of each analytical step, tests applied for each sample, result submission, and printing reports.

The patient submitted results are also available in the “Lab tests” item on the “EPC” function for clinical use.

#### **2.2.8.2 Image exams (management, execution and reporting)**

This feature supports the management of the entire flow of imaging exams, from viewing the order request to releasing the report.

The workflow of imaging exams consists of the following steps: View exam order requests, record and monitor the transition of exam from one status to another in the workflow process, follow up and release the patient reports through a worklist.

The primary function of the system associated with the setup of the reports is “Medical Report Infrastructure”. The user can configure different report templates using macros and standardized sentences. Rules for access control to these templates can be defined for specific users and specific exams.

Clinical and administrative professionals can access the “Exam Management” and “Patient Registration” functions to manage and view the imaging exam orders. Access the “Exam Management” function to register and manage each step of the workflow process, choose the exam in the worklist, and confirm the finalization of each step as the exam passes through the workflow.

Radiologists use the function “Medical Report Processing” to manage reports by using functionalities such as managing a user-specific worklist, requesting/providing the medical opinion of another professional in a report, consulting previously recorded guidelines based on protocols for the execution of the image exam and managing the status of the processes via the worklist.

Use the “Medical Report Processing” function to choose previously executed exams from the worklist. The process of creating and releasing the report uses the predefined configurations from the function “Medical Report Infrastructure” to standardize and automate certain elements in the report.

#### **2.2.8.3 Anatomical pathology (management, execution and reporting)**

This feature allows the user to document the activities performed during the pathology exam.

The exam related activities may include analysis of cells, tissues, and organs; manufacturing of slides; and preparation of cytological, histological, immunohistochemistry, and immunofluorescence tests to support pre- and post-surgical processes, as well as diagnoses. In addition, it is possible to carry out complementary tests to ensure the exact analysis. After the analysis, the exam results and diagnosis are included in the electronic health record.

The anatomical pathology management includes sample receipt, defining and executing the technique to be applied for analysis, complementary exams request, and issuing reports, being fundamental actions to ensure traceability in the sample sent as well as safe and effective results.

Samples can be received via a prescription created in the “CPOE” or “Patient Registration” functions. After the samples arrive in the technical area, it is possible to carry out the macroscopy and the separation of the samples into sub-samples for analysis, according to the process of each type of sample.

After the macroscopy is released, the pathologist initiates the report using the “Histopathology Report” function, loads administrative information for the report, and finally the responsible medical area types the macroscopy results used when composing the final report. The pathologist will then be able to type the final report including the microscopy results, conclusion, and guidance in the report. After finalizing the report, the medical professional can approve and release the report by making the report available on the portal and in the patient's chart.

#### **2.2.8.4 Interventional cardiology (management, execution and reporting)**

This feature supports the management of hemodynamic procedures, allowing the HCP to record structured clinical reports.

In the “Digital Interventional Suite – DIS” function, the user can view the scheduled hemodynamic procedures, the execution status, pending procedures and procedures with medical reports ready.

By double-clicking on the procedure, it opens in detailed mode, allowing the user to edit and add information regarding devices, techniques used, accesses, and the professionals involved.

Checking the “Scale” tab, the results of scales, registered and released in the “EPC” function, are displayed. Users can record planning procedures for future interventions.

Users record the specific fields according to the type of procedure: Congenital and acquired, intravascular ultrasound (IVUS) and optical coherence tomography (OCT), fractional flow reserve (FFR), angioplasty and coronary angiography, allowing you to edit this information, configure the type of assessment of the hemodynamic calculations, release the result and generate the corresponding medical reports.

It is possible to configure and select standardized medical reports for each type of procedure, copy information from other medical reports and preview them during registration, and finalize the medical report, and if necessary, it is possible to print.

#### **2.2.9 Population Health Management**

A subgroup of features related to the identification, prevention and intervention of prevalent diseases and conditions in large patient populations, also known as Health and Disease Management (HDM).

##### **2.2.9.1 Programs, campaigns and participants configuration**

This feature supports the user in the configuration of the programs, campaigns, and participants for prevention and intervention of prevalent chronic diseases.

In the “HDM-Programs” function, the user registers the programs for promotion of health available for care groups according to the rules established by the health plan operator. The rules are divided in standard National Health Agency of Brazil “Agência Nacional de Saúde” (ANS) information (field of work, topics, details, strategies, and system possibilities) and general for the programs (team, campaign, pathologies, exams, and encounter modules).

To register campaigns related to the programs for promotion of health, the user opens the “HDM- Campaign Control” function. It is necessary to record the campaign and add the entry methods, teams, actions to be executed in this campaign, encounter groups, and participants.

In the “HDM-Participant Control” function, it allows the user to register participants in programs, campaigns, or care groups, define the doctor or companion, generate a care cycle or place a patient on a waiting list if necessary. The “Participants” tab allows the user to cancel participant activities in programs, campaigns, care groups, future appointments and to deactivate participants in the prevention and intervention of prevalent chronic disease. With this information, the user can follow the progress of the participants.



#### **2.2.9.2 People capitulation, professionals and activities attribution**

This feature supports the user to identify and include candidates for programs related to the prevention and intervention of prevalent chronic diseases, team management and roles.

In the “HDM- Invitation” function, the user searches for people to invite them to participate in programs or campaigns of health promotion. There are two options to invite people: spontaneous demand or business search (according to the health plan). After inviting, the user needs to call the person, start the appointment, set triage, and define the participation (accepted or rejected). When a potential participant declines, their name is available to be selected at another time. When a potential participant accepts, the user needs to document information such as assigned person, program, and pathology or risk factor.

Use the “HDM – Team Control and Roles” function to configure the team members and roles of those who will work in the program or campaign of health promotion by registering details such as, form of service (individual, in group, in person or at home) and schedule (frequency, weekday, start and end time, interval, duration). The schedule from the previous step is available in the “HDM – Schedule” function.

#### **2.2.9.3 Programs and participants management and indicators**

This feature supports the user in configuring, viewing, and following the encounter plan (individually or in a group) and configuring the participants in programs or campaigns.

In the “HDM - Participants Control” function, the user defines the attendance plan, such as enrolling the participants in programs, campaigns, or encounter groups, defining the physician or caregiver, and putting the patient on the waiting list, if necessary. With this information, the user can follow the progress of the participants.

After defining the encounter plan, the user views the planning in the “HDM - Encounter Plan Monitoring” function. In this function, the user can define the schedule, cancel the encounter plan, define the activities, assessments and exams, and view referrals.

#### **2.2.9.4 Population health tracking**

This feature provides HCPs with information to manage the citizens who are assisted in primary care, being distributed by homes, micro-regions, and regions.

The main function used is “Population Management”, which helps the professional visualize information regarding a specific population. The user can identify the number of needs and problems that exist in the group, as well as the health needs of each region.

Through this function, the user can manage the resources of the healthcare organization and identify what has to be modified or improved.

In this function, it is possible to manage consultations performed, types of health services vaccines, exams and orders pending, disease and problems and type of household, water supply, and electricity.

#### **2.2.9.5 Population care demand management**

This feature allows the institution to manage the population care demand considering the available resources and structures. This includes the configuration and execution of several activities related to population care demand management, such as referrals, waiting lists, and care coordination.

The primary system functions associated with this feature for configuration and management purposes are the “Consultation Schedule”, “Integrated Schedule”, “Regulation Management”, “Waiting List” and “Population Management” functions.

In the “Regulation Management” function, the institution can manage the supply and demand of certain services, considering workflows, care protocols, bed centers, medical consultations, and exams. Considering the degree of each patient’s need, the institution can analyze, organize, prioritize, and distribute the services offered. The HCP can also use the “Regulation Management” function to track the progression of service requests based on stage and priority, view referrals to medical specialists for auditing purposes, and configurations of rules for requesting admission vacancies.

In the “Waiting List” function the user can manage the waiting list and configure the rules about priority of regulation analysis, prioritization levels, registration of reasons for changes on waiting list, waiting list priority, professionals for priority scheduling, contacts, and joint effort. According to the institution processes, the professional can also manage the waiting list in the “Consultation Scheduling” and “Integrated Scheduling” functions adding people, recording history, and managing the status related to the priority.

#### **2.2.10 Scheduling system**

A subgroup of features related to scheduling of the clinical services offered by the institution.

##### **2.2.10.1 Services scheduling process**

This feature supports scheduling appointments for specialized health care services.

The scheduling process includes creation, visualization and management of specialized service appointments. Use the “Service Schedule” function, to schedule the appointments, which can use information already documented during patient registration. The user can configure the list and structure of services based on the needs of the healthcare institution. The user can also define time slots for each day of the week and limit the number of appointments per agreement and HCP.

This feature is linked to the functions “Patient Registration”, “EPC”, and “Patient Account”.

##### **2.2.10.2 Medical consultation scheduling process**

This feature helps HCP in the execution and management of patient consultations (appointments). It allows the user to schedule and manage appointments, supports recurring appointment events and follow-up for insurance authorizations.

By accessing the “Consultation Schedule” function, the user can register new schedules and create permissions for consultations, shifts in schedules, and blocks. It allows the registration of information relevant to medical consultation scheduling, such as health insurance, card, contacts, and patient confirmation data. Also, it provides tools that facilitate scheduling, such as walk-in appointments, confirmations, and cancellations with the possibility of recording the justification for the action taken. It also makes it possible to provide the patient with technical guidelines and health insurance authorization needs when booking by phone or email.

This feature is linked to the functions “Patient Registration”, “EPC” and “Patient Account”.

##### **2.2.10.3 Image exams scheduling process**

This feature allows the user to schedule imaging exams such as magnetic resonance, X-ray, and computed tomography, and the management of the main system schedules such as exams, services, surgeries, procedures, and appointments schedule.

The “Exam Schedule” function is used to facilitate the scheduling process. The user can create a scheduling structure by a group of exams or sectors. The feature allows the creation of mandatory professional information, consent, and procedures for each structure. It also allows the user to create differentiated and temporary scheduling time slots and provides resources for the usage of a call panel for patients who will be seen and who will undergo exams.

This feature is linked to other functions such as “Patient Registration”, “EPC”, and “Patient Account”.

#### **2.2.10.4 Surgery scheduling process**

This feature supports the surgery scheduling processes, which include managing authorizations, verifying equipment and operating room availability, defining the surgical team, the need for blood typing, and reservation of blood components.

Use the “Surgical Schedule Management” function to perform the activities in the surgery scheduling process. Use the “Calendar” tab to view the availability of a schedule by year, month or day. Use the “Surgical Panel” tab to track when the patient is in the surgical center and displays relevant information available to the team.

Settings and configurations for the surgery scheduling process are also located in the “Surgical Schedule Management” function in the “Schedule settings” tab. Under “Records”, configure schedule generation, reservation rules, blocking rules, release rules and permission to schedule. Under “General Rules”, in the “Third party authorization” subtab, define rules for authorization of third parties, the authorized physician, profile, and observations. Under “General Rules”, in the “Reason for cancellation” subtab, maintain a list of reasons for cancellation to use when scheduling. Under “General Rules”, in the “Scheduling quantity rule” subtab, define maximum number of surgery slots based on criteria including establishment, profile, department, schedule, insurance, physician, nature of the surgery and shift. Under “General Rules”, in the “Schedule consistency rule” subtab, create rules to validate when adding a new appointment to a surgery schedule.

This feature allows the HCP to configure, view and manage the scheduling of materials from the materials and sterilization center, kit orders, special materials schedule, and to record the disposable materials that are being ordered from the pharmacy. The system informs the HCP if OPSM (Orthotics, Prosthetics and Special Materials) is authorized and if it is necessary for the surgery. Finally, the HCP can generate a surgery order and enable printing of an order with the items that must be separated for the surgery, patient specific assessments, and other relevant information to the scheduling management needed for surgery.

#### **2.2.10.5 Chemotherapy scheduling process**

This feature supports the users in the chemotherapy scheduling process.

Open the “Chemotherapy Schedule” or “Integrated Schedule” functions to carry out the treatment scheduling actions. After requesting the chemotherapy treatment, generating the cycle, and releasing for scheduling, which is done by the physician in the “EPC” function, the scheduling process can be continued in the “Chemotherapy Schedule” function. The “Chemotherapy Schedule” function displays the patients and their scheduling protocols, as well as scheduling data. The function facilitates the management of beds or armchairs in the chemotherapy service, enabling the scheduling of cycles and days of application, carried out in accordance with the releases of the protocols used.

The user accesses the “Chemotherapy Schedule” function and, in the “Pending issues” item, can schedule appointments, generate treatment authorization, update the duration/infusion time of the treatment, generate a consultation, update the expected date or actual date, define the service sector, and make transfers or cancel appointments. In the “Scheduling data” item of the same function, the user can view information about the patient’s scheduling, transfer or cancel the scheduling, register intercurrents, among other necessary actions for the treatment scheduling process.

Through the item “Occupancy map”, still in the “Chemotherapy Schedule” function, it is possible to have an overview of the department occupancy by patient profile (gender, child, adolescent, adult, and elderly). The

user accesses the “Chemotherapy Schedule” function and can view the establishment's treatment rooms, validating the availability of times and identifying the scheduled patients.

In the “Integrated Schedule” function, it is also possible to schedule chemotherapy. When generating the treatment cycle in the “EPC” function, they are displayed in the “Chemotherapy pending” item in the “Integrated Schedule” function. The user can schedule the treatment cycles/days, according to the patient's protocol, application time and availability of the application rooms. It is also possible to define the expected and/or actual date, change an appointment already made or suspend it. Still in the “Integrated Schedule” function, it is possible to view the patients' appointments in the item “Chemotherapy scheduling data”, identifying protocol, cycle/day of treatment, location defined for application, infusion time, authorization stage, reason for rescheduling, prescription, among other information.

Regarding scheduling, it should be noted that the system allows configurations to block date, periods or rooms in the agenda and validates if there are appointments for the same patient at the same time.

#### **2.2.10.6 Radiotherapy scheduling process**

This feature supports the users in the radiotherapy planning and scheduling process.

Use the “Radiotherapy Management” function to plan a radiotherapy treatment. In the daily “Agenda” item of the “Radiotherapy Management” function, it is possible to view appointments by establishment, equipment, and date. The screen also displays information such as patient name, status, type of treatment, time, duration, protocol, doctor, treatment phase, health insurance, date and user of the treatment or simulation, observations, among others. In the “Patients in treatment” item of the “Radiotherapy Management” function, it is possible to view exam schedules and/or consultations that are carried out in the “Consultation Schedule” and “Exam Schedule” functions, respectively.

Use the “Radiotherapy Management” function to schedule a radiotherapy treatment. According to the treatment protocol defined by the physician and validated by the physicist in the “EPC” function, the user can schedule the simulation session and the beginning of the treatment. Regarding the simulation, the physicist records the data for each radiotherapy phase, validates the information, and records it with a check film. After the simulation, the user schedules the radiotherapy sessions and assigns the proper equipment according to the type of treatment (protocol), and time/duration of treatment. It is possible to integrate information from radiology equipment directly into the “Radiotherapy Management” function so that the treatment information only needs to be entered once and is synchronized.

A self-check-in process is available using biometric or barcode identification when the patient arrives for a radiotherapy session. The radiotherapy process can start after positioning the patient in the equipment. The user records the data related to the radiation applied in the phase fields, automatically changing the patient schedule status to “executed”.

#### **2.2.10.7 Multiple scheduling process**

This feature allows the HCP to create, view, and manage the scheduling of different kinds of appointments, such as consultations, exams, chemotherapy, services and health check-up.

The “Integrated Schedule” function is mainly used at the call center, but can also be used by other departments to integrate the medical consultation schedules, exams, and services allowing the simultaneous scheduling of medical consultations and exams in a single function. This facilitates an integrated view of the time slot scheduled for the patient. It is also possible to restrict the scheduling of appointments to only the days and times that a physician is available to attend patients.

The schedules can be configured regardless of the schedule type, or in an integrated way, by grouping various types of schedules. For example, if a patient requires both a medical consultation and an exam, it is possible

to schedule the appointments all at once, using only one function. After scheduling both appointments, they are available in their respective agendas, the exam and encounter agendas.

The system displays all the items selected to schedule and the time slots available on a single screen. Use the filter options to see specific dates and select the best date and time slot for the patient's encounter and/or exam. If previously configured, the system displays an alert in case of scheduling conflicts.

#### **2.2.11 Patient arrival priority system**

A subgroup of features to organize and manage the patient intake process using electronic queue management.

##### **2.2.11.1 Electronic priority system configuration**

This feature allows setting priorities in the issuing of tickets and helps to direct patients to encounters through a call panel, avoiding queues. The issue of tickets for patient care prioritizes patients with conditions or people with special needs, controls the call, and standardizes the care. It is necessary to configure the workstations (computer, monitor, queues) according to the priority of patient care and direct them to the correct attendant.

Using the "Waiting Number Management" function, the institution can electronic priority system configuration helps to control and queue the patient encounter.

##### **2.2.11.2 Electronic process of patient arrival**

This feature supports the management of encounter queues by calling the next waiting number on electronic display panels and directing the patient to the correct attendant.

Encounter booth is the first process in the patient's arrival at the healthcare organization. The waiting list ticket precedes the patient encounter and is essential to organize the electronic calls.

The "Waiting number management" function allows the institution to sort the patient's arrival and creates a standardized way to attend to patients considering their needs (exams, medical appointments, and clinical procedures).

The system allows configuring several rules to manage patient queues. The user can set either a workflow in which the attendant generates the waiting number or a self-service approach, where the patient generates their encounter.

The function allows specifying and merging queues, changing a patient from one line to another, disabling and transferring a waiting number, and setting an encounter priority (for pregnant women, elderly, and disabled people). It also allows setting a numbering range, resetting the numbering progression, and linking tickets to a service schedule, in which the user can call a specific queue.

#### **2.2.12 Operation and legal supporting tools**

A subgroup of features related to operation and legal supporting tools.

##### **2.2.12.1 Master person index**

This feature supports the recording and management of the personal, demographic, and socioeconomic information related to every stakeholder involved in healthcare, such as patients, physicians, and all healthcare professionals, employees, visitors, and companions.

Using the "Core Tables Settings" function, the institution can configure related information such as nationality, religion, and occupation, define if it is mandatory and if it can be edited, and user access privileges.

The “Master Person Index” (MPI) function allows the user to record and manage complete personal information, including family ties, contacts, addresses, national identification number, and health insurance information. In the “Record” tab, the user can enter information such as past medical history, allergies, language, and habits. In addition, it is possible to check the logs of changes and authorship of the person’s records.



**WARNING**

**To avoid data-related issues, it is highly recommended to maintain an accurate MPI database, without ambiguities or duplications, particularly related to names with similar spellings. In case of duplication of a person's records, there is a capability in the “MPI” function to merge them into one.**

Apart from the capability to support a complete and potentially unequivocal identification of a patient in a non-urgent condition, the system allows the institution to handle situations in which it is important to have a quick enrollment of a person with basic information to characterize someone and expedite care delivery in an emergency department.

**NOTE** The information recorded in the “MPI” function is used in several other parts of the system, such as “Patient Registration”, “Simplified Register of People”, “Physician Record”, “Emergency Services” and “System Administration”.

**NOTE** To support the recording and management of legal entities, refer to the Legal Entity Index feature for further information.

#### **2.2.12.2 Patient registration**

This feature supports the documentation of patient information for admission into the healthcare organization. Besides that, this feature supports the user to register people (patients, companions, visitors, physicians, professionals, and service providers), and ensure the data is up to date.

The admission process is done in the “Patient Registration” function. The user can register important information such as the source of referral, method of arrival, the physician responsible, type of insurance, the person responsible for the patient, and define the patient accommodation. From a new encounter, it is possible to register other information, for example, diagnosis, health history, professionals, and retrieved exams.

Before starting the patient registration, the user needs to open the “Master Person Index” or “Simplified register of people” functions to fill out fields such as personal information (name, date of birth, gender, documents, contact person, address), socioeconomic profile, consents, privacy, authorized access, and visits. The user can manage and update patient information and register data not only about the patient but also companions, visitors, physicians, professionals, and service providers.

#### **2.2.12.3 Patient tracking**

This feature supports the recording and checking of patient movement among the departments, units, sectors, and facilities of a healthcare organization.

In the “Core Tables Settings” function, the user can configure information such as types of transfer, department places, reasons, and types for bed reservation and discharge, prioritization of bed services, patient’s origin, age classifications, and patient’s companion. In addition, it is possible to set user access privileges and information qualifications, such as editable or mandatory.

The “Movement of Patients” function allows the user to change and track the patient’s movement along the journey in the institution from admission to discharge. All the movements among the units are updated and presented in an organized and chronological view. In addition, it is possible to check the logs of the changes and the authorship.

The information of patient tracking is also used by other services, such as hospital occupation and infection stewardship.

#### **2.2.12.4 Patient related specific operational processes**

The feature supports the user in the operational processes related to patient care.

The main functions used to perform the processes are the “EPC”, “Electronic Outpatient Chart (EOC)”, “Ophthalmology”, and “Patient Belongings”.

In the “Patient belongings” function, the user has a departmental view with several patients together, aiming to record and manage their belongings, exams, and other materials received or delivered during the admission episode.

In the “EPC”, “EOC”, and “Ophthalmology” functions, the user can record and manage the patient’s request and justifications (including attachments), the materials, exams and belongings receiving and delivery, questionnaires, probability of discharge, document the follow-up contact with patient after discharge and managing the printing of patient information.

#### **2.2.12.5 RNC - Registro Nacional do Câncer (National Cancer Registry)**

This feature supports the user to view and manage information involving the national cancer registry. The user can access the “National Cancer Registry” function to perform the necessary actions.

The “Hospital Cancer Registry” function is intended mainly for registering the TNM Classification (Classification of Malignant Tumors) and the types of tumors with their classifications. The function allows the user to register the types of topographies and morphologies; allows registering the rules of TNM (T- primary tumor; N- nodes; M- metastasis), stage and prognostic factors according to the disease; ; allows the user to register and monitor information on diagnoses and their prognoses, as well as the treatments performed.

In the “Records” item, the user can register and consult the following information: anatomical category, topographic category, TNM (type of disease, classification, location, prognostic factor, stage), topography, and morphology.

In the “Administration form” of the function, the user can access and register the main data of the patient that were informed in the “EPC” function. These data are used to assess the quality of patient survival. The information inserted/registered in the clinical histories of the patients in the “EPC” function is used in the “Admission form”.

The “Follow-up form” is presented from the admission form, making it possible to consult and register by date, events that occurred since the last information, quality of survival, among other information.

With the information registered in the “National Cancer Registry” function, the user can register in the “ECP” function, in the items “Diagnosis of the Tumor” and “Locoregional”, all the information that involves the diagnosis of the tumor, its classification, and prognostic factors.

#### **2.2.12.6 SINAN - Sistema de Informação de Agravos de Notificação (Compulsory Disease Notification System)**

This feature supports the creation and management of the Compulsory Disease Notification Reports from the Ministry of Health of Brazil.

In the function “SINAN”, there are three tabs, “Register” tab, “Patient consultation” tab and “Injury/Disease” tab, where the user can configure and register the notifications.

The “Register” tab supports the HCP in recording information related to the compulsory notifications and investigation, linked to the patient, according to the condition to be notified. Allows you to register from suspicion to conclusion of the investigation, in addition to generating the report, and also being able to send it by email to the Ministry of Health and Health Secretariats, according to the requested standard.

The “Patient Consultation” tab allows the HCP to view a list of patients according to the filter used, where it is possible to filter by: Date, Period, Patient, only hospitalized, only list of injuries, Diagnosis, Establishment and Status of notification.

The “Injury/Disease” tab allows the configuration of injuries, allowing to make the relationship between injury, disease, frequency of notification, type of notification form, which are native to the system and which health institution should be notified.

#### **2.2.12.7 ANS - Agência Nacional de Saúde Suplementar (National Agency for Supplementary Health)**

The feature supports the creation and management of official documentation required by the Brazilian National Agency for Supplementary Health (ANS). The ANS requires submission of declarations and statements from health insurance organizations and health care service providers based on historical data and processes, for regulatory and oversight purposes.

Use the “TISS – Beneficiary Hospitalization/Discharge Notice”, “Insurance Protocol”, “Insurance Authorization”, “HPMS - TISS Eligibility Requests”, “HPMS – Authorizations”, “HPMS - Form Attachment Authorization”, “HPMS - Authorization Request”, “HPMS - Medical Production Control”, “HPMS - Encounter Protocol Management”, “HPMS - Medical Guide”, “HPMS - ANS Monitoring - Data delivery to ANS” or “HPMS - Supplementary Health Fee” functions to generate files and comply to standards related to TISS (Troca de Informações na Saúde Suplementar).

Use the “HPMS - SIB ANS - Beneficiary Information System” function to generate files related to SIB (Sistema de Informações de Beneficiários).

Use the “HPMS - SIP - Product Information System” function to generate files related to SIP (Sistema de Informações de Produtos).

Use the “HPMS - Health Plan Record” function to generate files related to RPS (Registro de Planos de Saúde).

Use the “HPMS - CPA - Collective Plan Adjustment” function to generate files related to RPC (Reajuste de Planos Coletivos).

Use the “HPMS - DIOPS - Periodic Information Document” function to generate files related to DIOPS (Documento de informações periódicas das Operadoras de Planos de Saúde).

Use the “HPMS - Technical Provision” function to generate files related to PEONA (Provisão para Eventos/Sinistros Ocorridos e Não Avisados), and PPSC (Provisão para Perdas Sobre Créditos).



The regulated entities provide the required documentation using standardized electronic file formats defined by the ANS. This allows for more consistency and automation in the oversight process, therefore promoting compliance and correct operation by the regulated entities.

#### **2.2.12.8 ANVISA - Agência Nacional de Vigilância Sanitária (National Health Surveillance Agency)**

The feature supports the creation and management of official documentation required by the National Health Surveillance Agency (ANVISA).

To supervise sanitary surveillance operations and processes, ANVISA has ordinances and regulations for processes that must be followed by health care service providers and can be consulted and made available by the computerized system.

The main function used to manage the process of Nosocomial Infection Surveillance (NIS) medication is “HAIs Incident Form”. Refer to the “Patient infection surveillance record process” section of this IFU for more information.

#### **2.2.12.9 SUS - Sistema Único de Saúde (Brazilian health system processes)**

The feature supports the user in the operational process related to inpatient and outpatient encounters covered by SUS insurance.

The main functions used to perform the processes are the “SUS Update Management”, “SUS Authorization Management”, “Unified SUS Management”, “SUS AIH”, “SUS BPA”, “SUS APAC”.

In the “SUS Update Management” function, the user can import the SUS table data like procedure codes, procedure values and verification rules to be used in the SUS encounter processes.

In the “Unified SUS Management” function, the user has all the SUS table data imported in the function “SUS Update Management”.

In the “SUS Authorization Management” function, the user can manage the medical reports to request SUS authorization for the encounters.

In the “SUS AIH” function, the user can view the SUS inpatient encounters, linking the AIH (Authorization for Hospital Admission) authorization code with the patient account. The user can validate the encounter data with the SUS insurance rules to close the patient account and insert it in a protocol. The user can send the protocols to SUS insurance with the monthly charges. The user can manage the rules regarding of SUS inpatient processes.

In the “SUS APAC” function, the user can view the SUS high-cost outpatient encounters, linking the APAC authorization code with the patient account. The user can validate the encounter data with the SUS insurance rules to close the patient account and insert it in a protocol. The user can send the protocols to SUS insurance with the competence charges. The user can manage the rules regarding SUS high-cost outpatient-encounter processes.

In the “SUS BPA” function, the user can view the SUS outpatient encounters, linking the BPA authorization code with the patient account when it is necessary. The user can validate the encounter data with the SUS insurance rules to close the patient account and insert it in a protocol. The user can send the protocols to SUS insurance with the competence charges. The user can manage the rules regarding of SUS outpatient encounters processes.

#### **2.2.12.10 PTU - Protocolo de Transações entre Unimed (health cooperatives transaction protocol)**

The exchange between health plan operators in Brazil is still precocious in terms of standardization and exchange of information. It is not regulated by the ANS.

Some operators have developed integration mechanisms, creating their own transaction standards to meet processes such as: Authorization, Billing, Data Loading (Beneficiaries, Contracts, Plans, Products, Price Lists, among others). This is the case of the Unimed portfolio customers, who created the PTU standard. This is a set of formal rules for the electronic exchange (Batch and on-line) of data between Unimeds, Unimed System companies, and external entities.

The proposals for improvement of the OTP Manual are discussed in the CATI (Technical Support Committee for Information Technology) and published by Unimed of Brazil. The detailed information about the existing PTUs are in the PTU manuals made available by Unimed of Brazil. These manuals are made available to suppliers so that they can be adapted to the operators' management systems.

Source : MIN (National Exchange Manual - Unimed)

Files that compose the PTU include:

- A100 - Beneficiary's Record Movement - Interchange
- A200 - Return of Beneficiary Record
- A300 - Beneficiary's Record Movement - Products
- A400 - Beneficiary's Record Movement
- A410 - Network Classification
- A450 - Data Complement - Medical Guide
- A500 - Invoices in Exchange
- A510 - Interchange Write-off of Invoices in the Non-Payment System
- A515 - Return of Interchange Invoice Write-Offs in the Non-Payment System
- A550 - Disputes of the Contesting Chamber
- A560 - Charge for Debit Memo
- A580 - General Invoice
- A600 - Documents for the Clearing House
- A700 - Services Rendered in Prepayment
- A800 - Interchange Invoicing for Prepayment
- A900 - National Table of Materials and Medicines
- A950 - Table of Unimed Procedures
- A1100 - List of Transactions Answered by WSD
- A1200 - Packages
- A1300 - National Register of Beneficiaries
- A1350 - Updating of the Beneficiary's Personal Data

Refer to the “Health Plan Features” section of this IFU for more details.

#### **2.2.12.11 CIHA - Controle de Informação Hospitalar e Ambulatorial (Hospital and ambulatory information communication)**

This feature allows the management of patient admissions, and data export to the SUS system

Use the “Hospital and Outpatient Information Control” function to manage and generate the batch data. The batch traceability is done preferably with identification of the batch by period. It is possible to record the storage location, type of admission and filters to create a specific batch to share with the government, for example, a report detailing all relevant hospital events once a year.

Recording and managing all admissions and procedures is a necessary process not just for patients or insurance, but for everyone who enters. It also allows for quality control of service provided to patients.

#### **2.2.12.12SNT - Sistema Nacional de Transplantes (National transplant system)**

The feature aims to support the user to follow the patient register made in National Transplant System, according to the General Registry of the Transplant Center (RGCT).

Use the “Transplant Management” function to view and update donor, recipient and other transplant related information.

The user receives the RGCT number of the recipient patient from the state transplant center, then, selects the recipient patient; registers the RGCT number and digit received from the transplant center, the registration date, and the status.

When the status is updated by the transplant center, the user changes the status in the system, monitoring the recipient’s viability on the transplant waiting list.

#### **2.2.12.13CBO - Cadastro Brasileiro de Ocupações (Brazilian classification of jobs and occupations)**

This feature supports the use of a classification system for professional occupations to organize and standardize the way this data is collected and analyzed. The national standard for Brazilian market is the Brazilian Classification of Occupations (CBO), which is based on the International Standard Classification of Occupations (ISCO).

Use the “Physician Record” function to link an HCP with a standard occupation. Select a physician record and use the subtabs to access the path “Relationships” > “Specialty” > “TISS CBO” and complete the information. Use the “Employees Record” function to link an HCP or other employee with a standard occupation. Select an employee record and use the “CBO SUS” subtab to complete the information. Use the “Master Person Index” function to link any person with a standard occupation. Select a person record and use the subtabs to access the path “SUS” > “CBO” and complete the information.

The Brazilian Classification of Occupations - CBO, aims to identify occupations in the labor market, for classification purposes with administrative and household records. By linking the professional to the CBO, it allows this information to be kept up to date in accordance with government systems, maintaining the standard defined by current legislation.

#### **2.2.13 Other specific operational processes**

A subgroup of features to manage other non-clinical processes that are important for the daily operation of a healthcare institution.

##### **2.2.13.1 Lost and found process**

This feature allows the recording and management of lost and found items at the institution.

Use the function “Lost and Found Control” to view, add, edit and delete records of lost and found items. Item records can be link to the person who lost it or the person who found it. It is possible to record the storage location and type of settlement, define the lost and found status, and the classification of the item as personal property.

Recording and managing of all lost and found items is a necessary process not only for patients but for everyone who enters the healthcare institution.

##### **2.2.14 Occupation, beds and units management**

A subgroup of features related to capacity management including the configuration of units, sectors and beds, occupation and hygiene.

#### **2.2.14.1 Beds, rooms and units configuration**

This feature supports users in configuring beds, rooms, and units of healthcare organizations, defining their capacity to host patients.

Using the function “Organizational Structure”, the user can create departments and units defining the configuration, such as unit classification and location in the hospital.

For each unit, the user can configure the number of rooms and beds. Each bed has multiple parameters, for example, the number of beds inside a room, gender assignment, and the configuration of which beds can be accessed from an external interface, in the case of telehealth.

Medical department is a concept of associating units, not in a hierarchy structure. By associating a unit with a medical department, a logical structure is created in the system to be used in other functions, such as “Clinical Panorama”. For example, by filtering in the “Clinical Panorama” function, it is possible to select a specific medical department, which displays the associated units. This association is important for loaned beds and billing perspectives.

#### **2.2.14.2 Occupation management**

This feature supports the healthcare organization’s capacity management, which is critical to its operational and financial performance.

Using the “Core Tables Settings” function, the institution can configure related information such as age classification, sanitization reasons, bed isolation, visitors flow, and displaying beds methods. In addition, it is possible to set user access privileges and information qualifications, such as mandatory.

The “Hospital Occupancy” function allows the user to have an integrated view of the occupancy maps and units (census) and manage them with relevant information such as the probability of discharge, bed isolation and reservation, current bed status, sanitization control, hospitalizations, and surgeries.

The information recorded in the “Hospital Occupancy” is used in several other parts of the system, such as “Visitor Control”, “Movement of Patients”, “Patient Registration”, and “Organizational Structure” functions.

#### **2.2.14.3 Hygiene cleaning process**

This feature supports the user in the sanitation process of the institution.

The sanitation process takes several steps to complete. Cleaning services staff must be informed of the need and type of cleaning required for each bed. Once the space is released, the cleaning services team must inform the status of the services.

In the “Bed Services Management” function, the user can consult the history of bed services, start, cancel, change, or prioritize the service.

The “Hospital Occupancy” function displays the work phases and a summarized overview. It also manages the institution’s beds, generates information for the hospital census, and provides the user with information to perform the analysis of hospital occupancy for patients in isolation.

#### **2.2.15 Personnel, visitors and legal entity management**

A subgroup of features related to information of the personnel and healthcare professionals that work in the institution.

##### **2.2.15.1 Physician index**

This feature allows the user to create and manage a database of professional information for physicians linked to the institution.

The “Physician Record” function presents a set of professional information from the institution’s physicians, a mandatory requirement for all management and the quality of care provided.

The physician formalizes the professional registration for various accesses in the entity. In the “Physician Record” function, it is possible to establish records such as area of activity, employment relationship, professional advice, specialty, professional code, insurance, attach documents, personnel management, visitors, and legal entity.

When the physician information is linked to the user information, the system allows the physician to register the order in the “CPOE” function, access the patient’s record in the “EPC” function, and access their schedules.

#### **2.2.15.2 Employee index**

This feature supports the enrollment, viewing, and management of hospital employees, job title, and department changes.

Use the “Employee Record” function to add new employee records or edit existing records. First, add information related to the person such as, the name, ID number, nationality, gender and blood type. Next, add professional data, which includes the hiring and/or termination date, profession/occupation, employee department. Finally, add attachments and documentation, bank account information, and education.

Use the right-click options to create a user and password so that the new employee can access the system. Also, change the employee password, department, or job title when the employee is promoted, for example.

Use the “Person/Legal Entity Consultation” function for read-only access to employee information, such as the name, phone number, address, level of education and occupation.

#### **2.2.15.3 Legal entity index**

This feature supports the enrollment, view, and management of the legal entities the hospital has a relationship with, such as suppliers, insurance companies, laboratories, service providers, and clinics.

To enroll a legal entity, open the “Legal Entity” function and record the required information, such as the entity’s name, the reference number or code (for example, the EIN in the USA and RFC in Australia), address, phone number, e-mail, payment method, and terms. In addition, it is possible to attach specific documentation or certificates.

This function also allows the user to modify legal entity records, adjust duplicated records, check change logs, and evaluate the legal entity quality performance. When physicians have their legal entity, it is possible to link the physician’s legal entity to the physician record in the “Physician Record” function, which facilitates separating the medical services from the hospital bill.

After the proper enrollment of the legal entity, the users can generate new contracts, purchase orders, and invoices. In addition, it is possible to link a legal entity to an incoming medicine batch, thereby maintaining traceability between products and suppliers.

#### **2.2.15.4 People, roles and services performance management**

This feature allows verifying if the assigned goals are consistently being met effectively and efficiently.

Use the function “Assessment of Professionals” to view and manage the assessments and the results used to determine conformity to performance criteria.

Performance management can focus on employees, processes, roles, or services (external and internal). Structured evaluations performance management helps monitor and follow up if the specified goals are being accomplished.

#### **2.2.15.5 Duty and on call management and view**

This feature is an administrative tool to record and manage the professionals' shifts and schedules, making this information available to selected personnel.

Use the "On-duty and On-call Schedule" function to view and manage work shifts and schedules.

Duty and on call management allows the definition of professionals, specific shifts and schedules, individually or in groups and sharing of this information.

#### **2.2.15.6 Visitors and personnel access control**

This feature supports the HCP to register the people circulating in the institution and restrict access levels as needed.

By opening the "Visitor Control" function, the user selects a patient according to filter options, such as encounter or department. Next, the user can add the visitor information (entry and exit date, person's name, type of relationship with the patient, date of birth, and personal data) and capture an image of the visitor. The user can also register blocked and authorized visitors and companions, or only companions, and print the label to identify the visitor.

In the same function, the user can view the entries by department and check the outflows.

To view the professional assessment approval result (canceled, not assessed, approved, or disapproved), it is necessary to open the "Professional Access Management" function. First, the user can add the professional, define the process type and generate stages. In each stage, the user can set the result (if the professional was approved, disapproved, or not assessed) and link the courses, training, and documents.

In the same function, the user can follow the professional assessment and define if she/he is able to work in the institution or on the new team.

#### **2.2.16 Processes, documents and quality management systems**

A subgroup of features to register, manage, and monitor documents, aiming to improve results within operational and clinical processes.

##### **2.2.16.1 Paper health records management**

This feature aims to organize and manage paper-based data and is used for both the administrative staff and the clinical team. The main functions associated with it are "Health Information Management", "Medical record control", "Medical record Internal control", and "Medical Record Issue".

The "Health Information Management" function supports the management of medical record movements, the requests submitted, and pending medical records. This function allows the user to add new volumes in a medical record; group, inactivate, and destroy records; define the type of physical record; register lends and copies; transfer the medical record storage to different locations.

In Addition, the user can view the information of the volume of records, status, sequence, current department of the medical record, location within the department, add comments in the notes section, and create alerts for the patients.

In the "Medical Record Control" and "Medical Record Internal Control" functions, the user can register the medical record operations, like requests, loans and reviews. As well as check the lent medical records pending return.

The function "Medical Record Issue" allows the user to select and print the content of the patient medical record. For reasons of data security, only users assigned by the institution can record and print the report with some or all of the patient's data. The main data set involves the requesting professional, start and end

dates, as well as definition of the full or partial issuance of the medical record. The institution can control the sequence of requested items selected and generated for each patient.

The paper medical record is necessary even when the institution uses an electronic medical record. It can be used for legal and clinical reasons, enabling communication between the care team, and continuity of care.

#### **2.2.16.2 Attachment document process**

This feature enables the user to attach documents, photos, exams, and other kinds of paper-based information to the electronic health record and other operational activities.

Use the “Patient Registration” function to view, add, edit and delete patient information including the attachment of electronic documents.

Attached documents are then available to other users, based on their privileges, in the electronic health record and other operational functionalities.

#### **2.2.16.3 Glossary tools**

This feature aims provide the user possibilities to set and identify terms and concepts that the institution allows to use in the clinical record.

The user can configure the glossary with the main acronyms, terms, and abbreviations in the function “Patient Chart Settings”, informing the abbreviation name, abbreviated meaning, classification, and the meaning expression specified.

In the “Electronic Patient Chart” function, after selecting a patient and entering a new clinical note, the user can access and check the glossary clicking on the “select glossary word” option.

The user can search in the “Glossary Consultation” function by using the filter to find acronyms, terms, and abbreviations available.

#### **2.2.16.4 Meeting and minutes records**

This feature supports the process of documenting subjects and actions discussed during a meeting.

Use the “Meetings and Minutes” function to keep track of decisions and arguments that were previously presented during meetings, registering the meeting participants, schedule, content, attachments, and pending items.

The feature allows recording the meeting subject, the participants, the issues discussed, the results of this discussion and who is responsible for any planned actions. These documents can have access control and can be integrated to other functionalities like “Service Order”.

#### **2.2.16.5 Document flow control**

This feature supports the recording and management of internal documents and their storage.

The “Document Protocol” function allows registering a document or document protocol with its items, history, and attachments, as well as recording the recipients who should receive the document and receipt status.

#### **2.2.16.6 Incident and suggestion report**

This feature supports the collection, storage and analysis of feedback from stakeholders who use and interact with the healthcare institution.

The “Incident Report” function allows the documentation of information mentioned by a patient, companion, or employee to register a doubt, suggestion, question, or comment. After analyzing the information, it is sent to the sector and a reference person for decision-making.

The incident report enables decision-making that influences assertive behaviors to improve working protocol, searching for solutions to the reported incidents. Rules can manage who is going to be responsible for the analysis and follow-up of the incident.

#### **2.2.16.7 Quality management system and training management systems**

This feature supports the record and control of an organization's activities related to its Quality Management System to meet customer and regulatory requirements, and training objectives.

Using the "Quality Management" and "Training Management" functions the user can document processes, procedures, and responsibilities for achieving quality policies and objectives.

Quality Management System documentation encompasses different types of documents. Usually, it includes documents such as quality policy, quality manual, procedures, work instructions and quality plans. The function allows control over the employees who can access these documents and record information on who has read these documents. In the same way, the training function allows controlling of the different types of training and the employees to whom these trainings are allocated to.

#### **2.2.16.8 Clinical quality management**

This feature supports searching clinical information used to conduct follow-up activities aiming to measure the quality of service offered to patients.

The main functions associated with this feature are the "Healthcare Quality Management – HQM" to search and view the data and the "EPC" and "EOC" function to document the clinical records.

Using filters, the user obtains clinical information, allowing for an analysis and understanding of the care processes from the professional workflow. For example, searching for inpatients with prophylaxis for venous thromboembolism. This analysis targets to match the quality goals of the institution using auto-refresh to guarantee the most up-to-date information.

#### **2.2.17 Purchase and warehouse management**

A subgroup of features related to the asset and service acquisition needs of the institution.

##### **2.2.17.1 General material settings**

This feature supports the user in configuring a data set of items that need inventory control or purchasing by the institution, such as hospital supplies, office supplies, cleaning materials, medication, enteral diets, and infant formula.



#### **WARNING**

The healthcare organization is responsible for the proper information configuration and maintenance of the medicine and material catalog, since it will influence the clinical workflows bringing information such as default dose, alerts when the dose is out of limits, and dilution and reconstitution.



#### **WARNING**

Some medicines and drugs may have the similar spellings related to their commercial name or the active ingredient / formula. This may pose a mix up when ordering the medicine for a selected patient. Hence, configure the medicine and material catalogs in such a way to prevent or reduce the possibility of errors while selecting a medicine or drug. One recommended way of attaining this is uppercase lettering to help distinguish sound-alike or look-alike medicine names. For similar reasons, materials, procedures and exams may also require the same attention during the configuration process.



In the “Material Record” function, the user can check the quantity of the item in stock and its price, link a kit (set) of materials to dispense with the medication, link a reconstitution, dilution, and re-dilution of the medication, and adapt them to patient’s profile or conditions, if needed. In addition, the user can define medication dose limits, drug interactions, and routes of administration suitable for the medication.

The user can still define a minimum stock limit to support the proper purchasing process, aiming to resupply the stock efficiently.

This feature allows the user to configure several aspects related to the medications, such as linking the drug to the active ingredient, the generic drug and the stock material, for inventory controlling (when having the same drug from different brands), informing if the item is or not standardized in the institution, and the conversions of the units of measurement (for example, one tablet is equivalent to 500 mg).

**NOTE For medication configuration, the institution can use either this feature or an specific for medications, called Drug Settings.**

#### **2.2.17.2 Purchase process**

This feature supports the user in the process of purchasing assets and services, being able to obtain more precision in the expected purchase quantities and a better price.

In the “Purchase Request” function, the user can register the need to purchase a product/service, quantity and the purchase cost center. With the purchase request, you can link a quotation document for price analysis using the “Purchase Quotation” function. It is also possible, from the “Purchase Request” function, to generate a purchase order and link a contract with a supplier previously registered in the “Contract Control” function.

The quotation workflow allows the user to inform the product/service that will undergo the quotation process and the suppliers that will be involved in the price analysis. The user can import the data registered in the quotation to the “Purchasing Portal” function, where suppliers can access it in a web environment and inform the price of the product/service, this information can be retrieved within the “Purchase Quotation” function later. When completing the quote, the user can generate a purchase order based on the information collected in the quote.

The “Purchase Order” function allows the user to register a document prior to the invoice, that is, it is possible to inform the delivery dates, all tax on the product, method of payment, discount, type of shipping, in which type of currency payment must occur, among other information. After the purchase order has been registered, the user can link the order to an invoice.

#### **2.2.17.3 General materials stock management**

This feature supports the user in material stock management, allowing the visualization of stock balances and values.

In the “Stock Management” function the user has access to balance information by stock location and material. The function allows to register which stock locations the item can be moved to, allows to carry out inventories, carry out the unitization process, consult stock movements, and allows monthly closing. The user can still define a minimum stock limit to support the proper purchasing process to resupply the stock efficiently.

#### **2.2.17.4 Incoming invoice management**

This feature inputs and manages the invoices related to purchases or services provided by suppliers on the system. Invoice is a document intended to support a transfer of ownership of an asset or a commercial

activity provided by a legal entity to an individual or legal person. The invoice is also intended for tax records. Incoming invoice is the document received regarding specifically to the legal entity's entry operations, such as acquisition, purchase, or transfer.

With this feature, it is possible to record the invoice using rules to define the type, actions, and validations related on the process. Adding an invoice, taxes will be generated following previous records and parameters, accounting rules will be applied to prepare the invoice for the accounting process, inventory records also can be registered to update the stock balance and amount, and at the end of the payment document, it can be generated and delivered to the financial features.

To perform this feature, the main function is "Invoice", supported by the main records on functions like "Accounting Parameters", "Tax Records", "Procedures" and "Material Record", "Purchase Order", and "Contract Control".

In the "Invoice" function, the system allows adding invoices manually or by purchase process like purchase order and supplier contracts. Adding an invoice, the user can select the invoice items, updating the accounting and inventory data, generate the taxes manually or according to the tax rules, and apply apportionments to share the amount between cost centers.

#### **2.2.18 Operational maintenance**

A subgroup of features related to the service orders maintenance system and equipment management.

##### **2.2.18.1 Service orders management**

This feature allows the institution to configure, record, and manage the service orders (SO's) for operational maintenance.

The main system functions associated with this feature are "Core Tables Settings", "Maintenance Records", "Service Order Management" and "Service Order" functions.

Each institution needs to configure the main records using the "Core Table Settings" function. According to the processes defined, some records are needed such as the "Categories of service order", "Classification of Service Orders", "Complexity of the SO", "Equipment status", "Process stage", "Service orders protocol", and "Types of SO History".

In the "Maintenance Records" function, the user can record the location of the equipment that needs maintenance. In the "Core Table Settings" function in "Hospital Maintenance" > "Records" > "Workgroup", configure the professionals responsible for carrying out maintenance. In the "Core Table Settings" function in "Hospital Maintenance" > "Records" > "Planning group", link the workgroup records defined in the previous step with the planning group records, to complete the configuration.

In the "Equipment control" function the user can configure the equipment types, rules to generate the preventive service order, and the equipment with additional data such as description, year of manufacture, series, value acquisition, width, height, weight.

In the "Service Order Management" function, the institution can manage the processes monitoring the service orders generation, execution, allocation, and closing the service orders. For each service order, the user can perform actions such as adding a message to the message history, changing process status, attaching files, recording activities performed, sending e-mail, assigning persons responsible for the service order and controlling pending issues and actions performed.

##### **2.2.18.2 Equipment management**

This feature supports the user to register the institution's equipment and vehicles, aiming to have an accurate inventory, ability to manage the maintenance, and share them among different system functions.

In the “Equipment Control” function, the user can register several sorts of available equipment in the institution, linking each of them to cost center, year of manufacture, manufacturer, brand, model, batch, serial number, voltage, power, color, life span in years and months, technical assistance information, and information about any transfers between locations. In the case of infusion pumps, it is possible to register the pump channels if there are more than one.

In addition, the “Equipment Control” function supports the user to manage the equipment maintenance, allowing to define preventive maintenance schedule, corrective maintenance, life span, and the need for replacement in some instances. Rules can be created to automate this process and notify the professional staff. Finally, it is also possible to register automotive vehicles, linking the license plate number, chassis, year of manufacture, and other relevant information.

#### **2.2.18.3 Environmental temperature management**

This feature supports the user in managing the temperature and humidity of an environment, room, or equipment, allowing the correct use and conservation of products, drugs, foods, materials, and equipment.

It is necessary to create an internal database integrated with other system’s functions to set rooms, the environment, equipment, materials, and products that require temperature and humidity control.

In the “Core Table Settings” function, by selecting “Items for Temperature Control”, the user can configure rules for notifications related to temperature and humidity thresholds, generate automatic service orders, and the measurement schedule.

The “Department Temperature Control” function allows the user to register the current, minimum, maximum temperature, and humidity. The user can also register an event related to the environment or equipment, and the actions taken, justifying them. The function also offers a graphic view for record trend analysis.

#### **2.2.18.4 Biomedical waste process and management**

This feature supports the process of collecting and routing biomedical waste produced in the facility for proper disposal.

The hospital waste management process must document the kind of waste produced, the date, the quantity, origin, and destination, use the “Hospital Waste and Garbage Control” function to add, view, edit and delete these records. This function also allows to generate indicators based on the information managed in the process.

In some cases, the process of handling and disposing of biomedical waste is regulated and must comply with specific laws.

#### **2.2.18.5 Linen and laundry management**

This feature supports the management and tracking of information regarding the institution's linen and laundry processes, obtaining a view of the clothing inventory, parts in movement and distribution, their traceability and service life, and control of the laundry process.

Use the “Laundry” function to register the type of linen and some product characteristics, such as size, weight, and validity data. With the registration of the type of linen, the user can register a unique code for each piece of that product, thus ensuring a traceability per item in the inventory, this combination of information is called a clothing batch. In the linen room registers, the user can also register clothes by kit or uniform, kit being a collective of pieces combined for a single purpose e.g., bed linen kit (pillowcase, bed sheet and bed linen) and the uniform is a composition of clothes used in each hospital role, e.g., surgical area uniform.

The function allows the user to record the entire movement history of hospital clothes, including the exits and entrances of clothes that were sent to the external laundry, and carrying out inventory processes to check the amount of linen available in stock. The return and dispensing of garments in the sector can also be controlled through the movements tab, enabling the user to document the entire history of movements, informing the reason for the operation and which location is being destined for the clothes.

To check the hospital linen stock, the user can use the system to periodically generate an inventory, in the "Laundry" function there is the option for the user to register an inventory process, making it possible to select the clothes that will be inspected and include the updated quantity of the product, after the completion of the process with the release of the inventory, the quantity is updated at the product's stock location.

#### **2.2.19 Business intelligence and strategy**

A subgroup of features that encompass the healthcare institution's strategic planning measurement and control tools through key performance indicators (KPI) and balanced scorecard (BSC).

##### **2.2.19.1 Key performance indicators configuration**

This feature supports managing the record of indicator rules for generating standardized information that supports performance measurement and monitoring.

Use the "Dashboards" function to register automation rules for records, transactions and analysis information that are to be used in the management processes and strategic performance of the legal entity.

Use configuration records such as "Indicator record", "Categories of the indicator" and "Dashboards" to configure indicator generation format, indicator category types and visualization dashboards.

##### **2.2.19.2 Key performance indicators dashboard**

This feature provides support for configuring dashboards, tools for viewing indicators, and rules for creating alerts.

Use the "Dashboards" function to view indicators and to create dashboards with information based on indicators. Use the "Indicators Update" tab to manually update information on monthly and daily indicators. Use the "Alerts" tab to create alerts that can be sent via internal communication or by email, configuring how alerts will be triggered can be done via SQL command, which allows configuring alerts to trigger based on any change that occurs with the data stored by the system.

##### **2.2.19.3 Balanced scorecard and strategic planning**

This feature supports the visualization and management of the company's strategic planning, BSC strategic objectives, and indicators.

Strategic planning is a management process related to the formulation of objectives and their execution, considering the entity's expected evolution. Balanced Scorecard (BSC) is a specific measurement and performance management methodology that considers business strategy, business, service, and quality management.

Use the "BSC - Balanced scorecard" function to consult the progress of BSC initiatives, extract information from the accounting data to calculate BSC indicators, manually input BSC indicator values, maintain the record of analyses of BSC indicators, consolidate the result values, and register rules.

Use the consultation tabs such as "Indicator view", "Theme analysis" and "Consultations" to consult the progress of BSC initiatives, and extract information from the accounting data to calculate BSC indicators. Use the right-click options to manually input BSC indicator values, maintain the record of analyses of BSC indicators, consolidate the result values, and record rules.

### **2.2.20 Health care stakeholders engagement**

A subgroup of features to create and maintain communication channels with stakeholders to foster transparency and autonomy.

#### **2.2.20.1 Engagement systems**

This feature supports patients, their caregivers and healthcare professionals to participate and have access to information related to the patient's health and their diagnoses and treatments. Engagement systems are the applications and tools that are used to foster this approach.

The Web Suite is a collection of Progressive Web Applications (PWA) whose function is to provide a secure portal for specific users to access a limited subset of health-related data from outside the restricted local network. The Web Suite includes My Companion (for patients and caregivers), Mobile Clinician Workspace (for HCPs), Pending Approvals (for HCPs), Results (for external HCPs), Web Suite Online Proposal Request (for bid requesters and bidders) and Web Suite Beneficiary (for beneficiaries). Refer to "Appendix – Web Suite Index" for a listing of features in this document that also apply to web portals.

Use the "Web Suite Management" function to view the list of portals and configure setting related to security & privacy, access control, localization and branding.

When a user edits sensitive data via a portal, there is an intermediate verification step, in which the healthcare institution must accept the change before it becomes official.

### **2.3 Controlling (F&A) features**

A group of features related to billing, financial and controlling aspects of care delivery.

#### **2.3.1 Patient account and billing processes**

A subgroup of features related to generation of the patient's medical bill.

##### **2.3.1.1 Internal exams and procedures configuration**

This feature supports the configuration of service, exam, and procedure catalogs from different sources, creating internal names, codes, and rules facilitating the use by HCPs while directly addressing the clinical, operational, administrative, and billing needs.

The "Core Tables Settings" function supports the users to configure the internal exams and procedures, aiming to streamline the processes and link the medical procedures and materials with reimbursement code tables of health insurance companies and according to the plan categories.

The "Internal Exams and Procedures" function manages and standardizes exams and procedures, creating internal codes, avoiding duplicities, and links them with different procedure tables. Regular use cases include glucose control schemes, image exam sets, and combined surgical procedures.

The information defined in the "Internal Exams and Procedures" feature participates in several other functions, for example, "CPOE", "Schedules", "Exams", "Reports", and "Patient Account".

##### **2.3.1.2 Billing specific rules configuration**

This feature supports the user when recording and configuring billing specific rules related to service delivery to attend specific demands and predefined agreements.

The adequate registry of billing rules generates the information basis that supports the billing process, considering the particularities and agreements with different customers, individuals or legal entities. The establishment of specific billing rules aims to automate the records, transactions and movements performed during the institution service delivery routines.

To register the agreements offered by the hospital, the user can access the “Insurance, Prices and Rules Record” function. The user enters the agreement data on the main tab of the function and saves the record. Then, the user can register the categories and plans released by the agreement. The function provides configurations so that the user can link the price tables practiced by the agreement and the specific pre-defined billing rules.

Specific information can be configured by the health insurance company, such as authorization rules for the items required by the patient, discount rules for the patient’s account and specific documentation of the health insurance plan.

To register rules for automatic entry of items to be billed to the patient’s account, the user can access the “Automatic Entry Rules” function. In this function, the user can create rules through events in the system, which automatically post expenses to the patient’s account. To use this feature, the user enters data for generating the rule on the main tab of the function according to the event selected in the filter.

To set up specific billing rules for the institution, the user can access the “Billing Parameters” function. This function provides several settings to automate and define the billing method applied to the hospital.

#### **2.3.1.3 Health insurance authorization recording process**

This feature supports the user in the registration, configuration and control of items within the health insurance plan during the authorization process. Health insurance plan authorization is the formal process of accepting (or not) the procedure, medicine, or special material coverage required for a patient’s diagnosis or treatment.

Use the “Insurance, Prices and Rules record” function to configure the items that require agreement authorization. Double click the agreement record, select the “Rules for Authorization generation” and “Rule Procedure/Material Plan” tabs and inform the system event that generates the authorization request and the items that require authorization according to previous agreement with the health insurance organization.

In the “Authorization Management” function, the user can access a unified view of the authorizations generated in the institution and their respective stages of progress.

In the “Insurance Authorization” function, the user can perform control, adjustments and maintenance of the authorizations generated in the institution. Options such as sending authorization to the agreement, authorizing, disapproving, or canceling the authorization are available to the user in this function.

In the “Authorization of Special Materials” function the user can perform the control, adjustment, and maintenance of authorizations generated for special materials (orthoses, prostheses, and special materials) in the institution.

The person responsible for managing the health insurance plan takes into consideration the existing negotiation, its internal controls and rules (coverage policies). The provider needs to manage these authorization documents constantly, to ensure the correct operation of care and billing.

The adequate control of service records and authorizations related to health insurance plan services is fundamental for the correct communication between the service provider and the health insurance plan manager. A large part of the services provided to an insured party (beneficiary) depends on this formal authorization. Previous authorization avoids financial losses and unnecessary conflicts, due to services rendered that are not covered by the insurance plan. The exchange of this information between the interested parties can be in an electronic format.

#### **2.3.1.4 Quotation creation process**

This feature supports the user in creation and follow-up of price quotations for healthcare services.

The quotation provides a price estimate used during the negotiation process between a client and the service provider entity. This negotiation involves procedures, materials, daily rates and fees.

To register the patient's quote, the user can access the "Patient's Budget" function. Data related to patient identification and other necessary data can be entered in the main tab of the function. Information such as payment method, payment due dates, additional documentation and history can be registered. Inform the procedures, services, materials and medicines needed by the client.

When the user finishes registering the quote, it can be emailed to the customer. Upon receiving the return, the user can approve or cancel the budget.

#### **2.3.1.5 Billing generation**

This feature allows the user to generate billing and manage services provided to a private or insured patient (beneficiary).

Billing is a process of formal recognition of the execution of a service or the sale of a product. The issuance of a legal document characterizes the generation of financial revenue and the attribution of the respective taxes. The generation of revenues is the basis for the management of the entity's revenues. It shows the result of the activities / procedures performed in patient care, integrating care and non-care modules. The process also includes the control and electronic sending of protocols (files) and auditing of patient accounts.

To perform the control and posting of the items used by the patient during hospital care, the user can access the "Patient Account" function and enter the patient's ID. On the main tab of the function, an account for posting the patient's expenses in the hospital either manually or through pre-defined rules can be created. By double-clicking on the patient's account, the user accesses to the screen for posting and charging procedures, fees, taxes, daily fees, materials, and medications. These items can also be posted to the "Patient Account" function through other processes in the system.

In this function, the user can perform several administrative processes, such as discounting the value of the items or the total value of the patient's expenses and perform the launching of procedure packages previously configured in the system.

After finishing the posting of the patient's expenses, the user can recalculate the account to update the values of the posted items, close the account, include it in a protocol for later billing, and generate a title and invoice for the patient.

In the "Patient Account Audit" function, the user can check the items posted to the patient's account, to make sure that everything used for the patient was charged to the account according to the rules and agreements pre-defined with the health insurance company.

In the "Health Insurance Protocol" function, the user can control the sending of a group of bills to the health insurance provider, and the billing of these bills.

In the system, the user has several management reports to monitor and control the billing of patient accounts.

#### **2.3.1.6 Outgoing invoice issuing process**

This feature is used to centralize the outgoing invoices, generated on the before flows, in order to send an electronic file to a government office, interfacing the system with the government system.

First the invoices must be generated on the before flows and recorded in the "Invoice" function. Then the main function is "E-Invoice Follow-Up", where the user can locate these invoices using the filters on the main tab and proceed with the actions to start the interfacing process. In this function, it is possible to transmit

the electronic invoices, register rules and configurations, follow the transmission process, and view some inconsistencies on a log tab to fix and retransmit the file if necessary.

To use this feature, it is important to have the rules and records previously configured, like interfaces, layouts, end points and way of the interfacing process (such Webservices or Tasy Interface Engine).

#### **2.3.1.7 Management of reimbursement from insurance companies**

This feature allows the user to register, control, and manage the payments made by the insurance companies for the services performed.

At the end of the audit process of a patient's bill, the health insurance plan usually pays the amount claimed by the operator according to the patient's bill. These payments are related to groups of documents, including the specific items (materials, drugs, services) involved. Payments are usually made by deposit into a bank account.

Proper control of the money received from bills sent to insurance, knowing exactly which bills have been paid and which have been denied (the status and reasons), is a critical process for administrative management. These payments can be sent, either via physical report or via electronic file format and represent the amount of money credited to the provider's bank account.

In the "Insurance Return" function, the user can perform the process of receiving the amounts from the insurance plan and identifying items and tabs paid by the insurance. The items, guides, and amounts that the health insurance plan did not pay are also identified, and it is possible to define whether they will be accepted or resubmitted. In this function the user can write off the notes receivable and start the process of the disallowances not accepted.

In the "Denial Appeal Management" function, the user can control the items disallowed by the health insurance plan, perform the analysis of such items, and accept the disallowance, settling the account receivable or resubmitting it to the health insurance plan.

#### **2.3.2 Financial process**

A subgroup of features related to management of processes necessary for financial operation.

##### **2.3.2.1 Account payables and receivables configuration**

This feature allows the configurations and parametrizations of financial processes.

Use the "Financial Records" function to create configurations and parameterizations for financial processes and register rules to automate monetary transactions related to payable and receivable accounts processes. The main functions associated with this feature are "Accounts Payable", "Maintenance of Accounts Receivable", "Banking Management", "Cash Flow", "Treasury", "Card Administration", "E-Payment" and "E-Collection".

The registration of these configurations and rules prepares the system to process the financial data.

##### **2.3.2.2 Account receivable processes and procedures**

This feature supports the maintenance of accounts receivable documents and performs manual operations of changing the monetary value of the documents and registering write-offs.

The main functions associated with this feature are "Maintenance of Accounts Receivable", "Banking Management", "Cash Flow", "Financial Records", "Card Administration", and "E-Collection".

Use the "Accounts Receivable Maintenance" function to maintain records of accounts receivable, consult the entries related to accounts received, and register write-offs of accounts receivable.



Use the "Query of Accounts Receivable" function to consult the accounts receivable and select the record to be viewed.

#### **2.3.2.3 Account payables management**

This feature provides support to perform maintenance of accounts payable documents and perform manual operations of changing the monetary value of the documents and registering write-offs.

Use the "Accounts Payable" function to maintain accounts payable records, consult entries related to paid accounts, and register write-offs of accounts payable.

The main functions associated with this feature are "Accounts Payable", "Banking Management", "Cash Flow", "Financial Records", and "E-Payment".

#### **2.3.2.4 Treasury management**

This feature supports registration and maintenance of payments and receipts occurring directly in the legal entity's treasury.

Use the "Treasury" function to view and maintain checkout registers, and the resulting records from the payment transactions such as payment details and receipts. Receipts can be in cash, check, or card, and transfers can be made between the cashiers.

#### **2.3.2.5 Third parties onlending management**

This feature allows the user to register, calculate, and manage the onlending of third-party payments. Onlending to third parties is the process in which the health services organization, after receiving the revenue from a service provided to its client, transfers part of that amount to a third party (individual or legal entity) that supported in providing the service.

The process of third parties transfers, allows to register , calculate, manage and consult of information that assists in the payment to physicians and other providers. It is based on rules and conditions established in a previous agreement with third parties.

To register the physicians and third parties for the health plans serviced by the institution, the user can access the "Payment Transfer Rules and Criteria" function and enter the necessary data in the main tab of the function. In the same function, the user can define rules for the payment form of the onlending amounts. These rules can be created by the user on the "Payment transfer rule" tab, by double-clicking the rule and going to the "Criteria for payment transfer of Procedures" subtab.

In the "Production by Medical Shift" function the user can determine when the physician should receive the payment for the shift and when they should receive the payment for the procedures performed, allowing the institution to determine the result for each situation. The user can register it in the main tab of the function by adding a new record.

In the "Payment Transfer to Third Parties" function, the user can generate the transfers through the services rendered, control and monitor the pending transfer values, and generate the payment of physicians, third parties, and the generated taxes. In the main tab of the function, the user registers the onlending, and has several options available, such as generating onlending, generation of due dates, and generation of taxes.

#### **2.3.2.6 Banking accounts management**

This feature provides functionalities for maintaining bank accounts and adding, updating, and viewing financial transactions.

Use the "Banking Management" function to register financial transactions related to the bank operations. Use the right-click options to execute operations such as closing the financial month by a bank, processing

the banking reconciliation, reversing transactions, and changing financial transaction information. The movements of financial transactions can be added manually and by automated processes such as write-offs of accounts receivable and accounts payable. The automated entries are configured in the “Financial Transaction Record” function by the type of financial transaction.

#### **2.3.2.7 Financial transactions record**

This feature provides the main queries to the historical financial information of individuals and legal entities.

Use the “Financial Sheet” function to view financial information such as payments, receipts, liquidation balances, and outstanding amounts in summarized and detailed formats.

#### **2.3.2.8 Account reconciliation**

This feature supports the creation of financial compensation capable of grouping amounts receivable and payable from the same individual or legal entity, aiming to work financially only with the balance of this reconciliation.

Use the “Accounts Reconciliation” function to create batch generation rules to reconcile values by choosing individuals or legal entities, periods, or other specific financial characteristics. Create a batch according to the desired specifications, grouping the amounts receivable and payable, and ending the process, generating the financial document to be received or paid according to the presented balance.

#### **2.3.2.9 Cash flow management**

This feature provides settings and the main options for analyzing and managing institutional cash flow.

Use the “Cash Flow” function to register financial accounts, visualize the financial movement of the entity in a given period, and generate visual information about different types of cash flow, such as quoted, to pay off, paid-off, overdue, paid-off/to pay off, estimated, and passed/quoted.

Use the "Financial account" tab of the "Cash Flow" function to configure rules for getting accounts for financial movements and parameterize how the system shall compose and present the amounts.

#### **2.3.2.10 Legal financial requirements**

This functionality supports the record and availability of some regulated financial and tax statements required by tax authorities.

These records are made in the “Tax Control” function, which allows performing Declaration of Withheld Income Tax (DIRF), Declaration of Medical and Healthcare Services (DMED), Tax Accounting Collection (ECF) and Digital Tax Bookkeeping (EFD) processes, some examples in Brazil.

Generally, these declarations are presented through files generated by the system with data and historical movements of the entity.

### **2.3.3 Controlling process**

A subgroup of features related to management of processes necessary to accounting and controlling operation.

#### **2.3.3.1 Legal tax calculation settings, generation and follow-up**

This feature supports rules and records to carry out processes related to taxes incident on customer operations, as well as the generation and follow-up of these taxes.

Tax settings are carried out in the “Core Table Settings” function and allow the indication of different characteristics of each tax, such as the aliquot, type of tax, incidence, operation and payment condition.

Use the “Tax Follow-Up” function to calculate and manage certain taxes. The generation of taxes can also originate from other system functions, such as “Invoice” and “Accounts Payable”.

#### **2.3.3.2 Accounting processes configuration**

This feature supports rules and records to carry out the process according to customer accounting workflows. These rules and records can be registered in different ways, according to the needs of the accounting department.

Use the “Company/Establishment/Accounts/Cost Center” function to register companies (identification of the legal entity that owns the business), establishments and business units, the general ledger accounts and the structure of cost centers.

Use the “Accounting Parameters” function to register the revenue accounting rules, budget and costs rules, stock movement accounting rules, types of accounting batches, standard accounting history, accounting apportionments and accounting classification format.

Use the “Financial Transaction Record” function to register the different transaction types and create accounting rules based on these transactions.

Use the “Asset Control” function to register the assets and fixed assets to be controlled and accounted for by the institution.

The registration of these entries and rules prepares the system to generate, group, and organize accounting data for analysis and representation, thus reducing manual entries.

#### **2.3.3.3 Automated and manual accounting transaction records**

This feature allows manual or automatic registration and management of accounting transactions.

The accounting purpose is to analyze and register the quantitative and qualitative changes occurring in the entity equity (assets, rights, and obligations group).

Accounting provides useful information for administrative management decision-making.

Any occurrence that results in an equity change must be registered according to regulations and maintained for legal consultations.

The registration, analysis, and management of the accounting facts is the basis for the health institution controlling process.

Use the “Accounting Batch Generation” function to generate the accounting movements grouped by accounting batch types by using the registered rules, in case when using offline accounting process. Using this function is not necessary for online accounting. Online accounting is not available to Health Plan organizations.

Use the right-click options to create and generate accounting batches and to integrate them into the “Accounting” function.

Use the “Accounting” function to consolidate data for financial statements, view trial balance and financial statements, and check accounting closing records. Use the right-click options to close accounting periods, update the trial balance and generate accounting statements and balance sheets.

#### **2.3.3.4 Balance sheet, ledger and accounting reports**

This feature supports the processing and viewing of the balance sheet, ledger, and accounting reports, which are different representations of the financial position and accounting transactions on a given date.

The generation of financial statements is a process that organizes and consolidates the accounting movements and the entity's equity position, making the information available in electronic or printed format.

To use this feature, the user must first configure the accounting rules and parameters in the functions “Accounting Parameters”, “Billing Parameters”, “Financial Transaction Record”, “Master Person Index”, “Legal Entity”, “Treasury”, “Banking Management” and for HP organizations HPMS – Accounting Criteria to provide information to the accounting process.

After configuring the rules, the user needs to follow the process of the accounting batch generation in the “Accounting Batch Generation” function and consolidate the information through the “Accounting” function.

Once the information is consolidated in the “Accounting” function, the system enables options to generate the trial balance, accounting statements, balance transfers between accounting accounts, and generate reports.

This information reflects all financial and accounting transactions for the selected period in order to comply with local regulations and provide strategic data for management teams

#### **2.3.3.5 Contracts management**

This feature supports the maintenance of contracts between the healthcare institution and its suppliers or customers, in order to document the negotiation, legally ensuring the fulfillment of the agreement between the parties.

Use the “Contract Control” function to link the contracting party, establish the type of contract, include a date of termination, establish the form of contract renewal, standardize the form of payment and stipulate the contract value. The user can link materials that will be part of the registered contract, being able to predefine information including the material value, quantity and delivery days. In the contract, it is possible to document updates to clauses agreed upon after the initial contract has been closed by including a contract amendment in the written agreement.

With the registration of the finalized contract, it is possible to consult and control the balance of the contract, viewing the documents linked to the contract, linking documents of the purchase process to the contract, either for new or existing processes.

#### **2.3.3.6 Biddings management**

This feature aims to support the health institution in contracting services or purchasing products when there is use of monetary resources of public origin.

The process starts in the “Purchase Request” function where the user creates a request, includes the necessary products/services and indicates the type of request as a bid.

When the need for a bid is identified, the user goes to the “Bidding Register” function. In the function the user can register the purpose of the bid, the mode in which the bid is raised, the products/services involved in the bidding and the value limits for each product/service. When the bid is registered, the user is able to document the legal opinion and the means by which the notice is published for registration purposes.

In the process of opening the notice, the “Bidding Register” function allows the user to register all the suppliers that participate in the process together with the initial price proposals. By raising all the suppliers involved in the bidding, the user can proceed with the bidding round process, which results in a winning supplier for lowest value offer of the product/service.

At the end of the bidding process, the user is able to generate a purchase request by pointing out the price record purchased in the bidding and subsequently enabling the creation of the purchase order, making the purchase official.

#### **2.3.3.7 Assets management**

This feature supports tracking assets, fixed assets and processes to manage the monthly depreciation of those assets.

An asset is any equity with economic value for the entity's operating activity and can be converted into cash (providing gain for the entity). Investment is the application of capital to increase production capacity (facilities, machines, and infrastructure).

Use the "Asset Control" function to track and manage assets and process and query the depreciation of their monetary value on a monthly basis.

#### **2.3.3.8 Cost control management**

This feature provides support for maintaining monthly cost records, getting cost data from accounting, processing cost distribution between control centers, and calculating the production capacity of each control center.

Costs are all expenses that directly determine the purchase price, production of products, or delivery of services. Use the "Cost Records" function to register the control centers, expense nature group, nature of expenses, and cost rules.

Use the "Cost Calculation" function to register cost values per control center and maintain the price rules and standard cost of materials and services. Use the right-click options to get values from other functions, such as "Accounting" and "Accounting Budget", distribute cost values between control centers, calculate results by control centers and calculate costs by patient accounts.

#### **2.3.3.9 Annual operation planning**

This feature supports future planning of income and expenses, creation of different income and expense scenarios, monthly monitoring of the budget, and comparisons between budgeted and achieved values.

Use the function "Accounting Budget" to register the annual financial budget and visualize the comparison between budgeted and achieved values. Use the right-click options to update achieved values based on accounting data and to record the justifications for the executed amounts.

### **2.4 Health Plan Features**

A group of features related to the management of a health insurance organization.

#### **2.4.1 Health plans management**

A subgroup of features to manage the health insurance plans offered by the organization.

##### **2.4.1.1 Health plans settings and configuration**

This feature allows the user to record the health insurance plans offered by the organization, along with the settings for each of their contractual characteristics and regulations. Health insurance organizations sell health insurance plans with the objective of providing their beneficiaries access to healthcare in settings determined by contracts and respecting national regulations.

Use the "HPMS - Insurance Management" function to manage the list of health insurance plans to be sold, including their respective coverage, coverage start dates, discounts, copayment and the contractual characteristics or national regulation.

#### **2.4.1.2 Health plan interchange settings and configuration**

This feature allows the user to setup the data fields necessary for a specific communication protocol. This configuration process allows the transmission of health insurance plan information and their contractual characteristics between partnering networks. An interchange health insurance plan is a plan marketed by the health insurance organization that provides the beneficiary access to state-wide and nation-wide healthcare through partnering health insurance networks.

In the “HPMS - Exchange Contracts” function, the register of interchange health insurance plans stores information about the agreements between the partnering health insurance organizations for how to distribute health care coverage according to the contract.

#### **2.4.1.3 Additional health plans and services settings and configuration**

This feature allows the user to record the services and additional coverage, as well as the configuration of the contractual characteristics and regulation. Additional services and additional coverage are supplementary health insurance plans or services offered by a health insurance organization to their beneficiaries, either together with the main health insurance plan or as a standalone product or service.

Use the “OPS – Operator Management” function to include additional services and coverage to be sold. The user can customize the coverage, coverage start dates, discounts, copayment and characteristics defined through national regulation.

#### **2.4.1.4 Health plans price management**

This feature allows the user to record and manage the price tables of the individual items used in the organization’s health insurance plans. A price table defines the amount to be charged for each item in a marketed health insurance plan, the total price will vary according to the set of services acquired by the beneficiary. These prices may be negotiated or may be defined by a regulatory body.

Use the “HPMS - Price Rules and Criteria” function to register price tables with information such as, price, age group, number of beneficiaries, copayment, interchange tables.

### **2.4.2 Sales and sellers management**

A subgroup of features to manage a team of salespeople or distributors driven by sales goals, and the remuneration through commissions for these professionals.

#### **2.4.2.1 Health plan organization sales management**

This feature allows the user to record and manage the sales operation through a workflow, organizing and supporting the sales team of the health insurance organization.

Sales operation is the activity of marketing the health insurance plans offered by the organization. Use the “HPMS - Sales Commission Control” function to organize the sales operation and operational workflow. Use the “HPMS - Salespeople and Commission Management” function to register sales channel, rules, sale channel summary, teams, team target and commission payment transfer.

Use the “HPMS - Sales Commission Control” function to register to create batch files of the monthly commission files, such as, monthly revenue grouped by individual installment payments, monthly revenue grouped by account, submission of pending payments, sales targets achieved by each team. This function also allows actions such as, generate, undo and close batch commission payments.

#### **2.4.2.2 Health plan organization sellers management**

This feature allows sellers to record and manage their sales and sales commissions. Sellers are professionals or sales channels who are hired and may or may not be compensated through commissions in order to market the health insurance plans offered by the organization.

Use the “HPMS - Commercial Management” function to manage external requests from people interested in hiring a health insurance plan (prospect/lead), view and manage sales monitoring, sales channel, salesperson, target, sales graph, and product sale.

The user can also execute actions such as lead requests, prospection, the creation of rules of effective days, sellers scale, payment transfer rule, seller scheduling, classification rule, sales municipalities of operation, and identification of duplicated leads.

This function also has query features such as commercial stage, adhesion proposal disapproved, adhesion proposal pending, hired party, lead request disapproved, lead request pending, and pending prospection disapproved.

#### **2.4.3 Contracts and beneficiary portfolios management**

A subgroup of features to manage active contracts, the beneficiaries linked to those contracts and the billing activities necessary to fulfill the payments stipulated in the contracts.

##### **2.4.3.1 Health plan organization contracts maintenance**

This feature allows the user to record and manage beneficiary contracts.

Use the “HPMS - Contract Management” function to register and manage contracts between health insurance organizations and beneficiaries. It is possible to configure the contract data such as payer, sub stipulating, beneficiaries and rules related to coverage, limitations, waiting period, copayment, discount, monthly payment, bonuses, rules for new beneficiaries.

Use this feature to perform the flow of registration, analysis, and approval of contracts (physical person or legal entity).

##### **2.4.3.2 Health plan organization interchange contracts maintenance**

This feature allows the user to record and manage interchange contracts.

An interchange health insurance plan contract is a term signed between partnering organizations, where the billing and payment arrangements are documented and made official. Use the “HPMS - Exchange Contracts” function to register and manage contracts between partnering insurance organizations, to perform the registration of an interchange contract and its particularities, such as, beneficiaries, products, payer, scheduled termination, readjustment, history, attachment, web access.

Also use this function to perform maintenance of beneficiary records by adding, updating and deleting.

##### **2.4.3.3 Health plan organization beneficiary portfolios management**

This feature allows the user to record and manage the customer portfolio of the health insurance plan organization.

A portfolio is a list of effective and active customers or potential customers with regards to a market. In the “HPMS - Management of Collective Contract for Relationship” function, use the “Relationship group” tab to manage groups of similar legal entities having similar contracts. It is possible to add, edit, view and delete companies in the relationship group, define the resources responsible for handling the customers in each group, customers contacts, history items and document attachments.

It is also possible to perform actions such as, assign a customer care team to specific relationship groups, contract groups or a group identified as a risk, e.g., late payments.

##### **2.4.3.4 Health plan organization health plan price adjustments**

This feature allows the user to adjust the prices of health insurance items, either individually or as a batch operation.

Price adjustments are adjustments of the billing prices applied to the contracts, aiming to optimize the result by supporting the increase of costs, or with the objective of retaining the client portfolio. Use the “HPMS - Billing” function to create billing batches, update general ledger accounts, update values from the batch, validate batch, track progress by status (awaiting, awaiting processing and completed).

This function also allows the user to recalculate invoices after the price adjustments are in effect, view the status of invoices (pending, submitted, do not bill, settle as loss, canceled, reverted, not pending, pending with issues), identify pending accounts and define conversion rules used during the exchange of billing information between different health insurance companies where no standard exists.

#### **2.4.3.5 Health plan organization portfolio receivables management**

This feature allows the user to manage outstanding accounts receivable using billing processes and perform actions on late payment notifications.

The management of accounts receivable is the control of outstanding balances, aiming to reduce delinquent payments to the organization. In the case of health insurance plans, standard criteria are considered related to the suspension and termination of the contract, to comply with local market regulations for example.

Use the “HPMS - Monthly Payment” function to add, edit, view and delete monthly payment batches; separate income tax for each payment batch, issue invoices, apply adjustment fees, define rule for billing groups and view a billing summary with totals per customer.

This feature can also display totals based on different filters, such as monthly fee item, financial account, manual entries, product, segmentation, and type of contracting/regulation.

#### **2.4.4 Accredited network management**

A subgroup of features to manage extended health insurance networks. Extended networks are formed through contracts with medical service providers who are either recognized by the health insurance organization or by separate health insurance organizations that have a partnership agreement.

##### **2.4.4.1 Health plan organization accredited network management**

This feature allows the user to define and maintain the accredited service providers considered part of the accredited network. Providers are professionals or entities accredited by the health insurance organization, who provide healthcare services to the beneficiaries of a health insurance plan.

The accreditation process for providers includes an evaluation of equipment and infrastructure, the maximum capacity for attending patients, specialized expertise, and the need of the organization to complement the service chart with the table of prices for different services offered if new services are included into the contract.

Use the “HPMS - Provider Relationship Management” function to perform the complete flow of the accreditation request. Follow the complete flow of the technical visit, through the statuses (awaiting schedule, awaiting confirmation of schedule, pending release, scheduled visit, visit closed, canceled, visit canceled, visit in progress, under review by the operator, awaiting evaluation. The user can follow the complete flow of negotiations with providers (accreditation, contractual changes, price tables, attachments, histories).

Through this function it is also possible to schedule and generate tasks/dependencies for providers, such as updating documentation, updating indicators, and updating action plans. Registration can also be performed in the function, such as accreditation type, reason for refusal, “National Record of Healthcare Establishments' Code” (CNES), integration, and reasons for cancellation. The user is able to use the available filters such as



name, company name, type of applicant, type of person. The function also has resources to make support materials available, like pamphlets or documents, to assist in the orientation of providers.

#### **2.4.4.2 Health plan organization partner organizations management**

This feature allows the user to record and manage the health insurance organization partners.

Use the “HPMS - Provider” function to update the complete provider's registration, with all its characteristics such as field of work, product, provider specialty, professionals, provider taxes, receipt criteria, provider's price, service sectors, and provider equipment. It is possible to manage requests from providers that are accessing the web portal for the first time in the “Web access” tab, where the user responsible can allow or deny access and troubleshoot any access problems on the provider side.

Partners/providers or similar health plan organizations are healthcare organizations that contract other organizations for exchanging or sharing health insurance service network. The registration of the partner organizations must allow the identification of its beneficiaries and their health plans, as well as characteristics such as areas of action, pricing and billing, and payment rules.

#### **2.4.4.3 Health plan organization packages and bundles management**

This feature allows the user to manage standard sets (packages) of hospital materials, procedures, and services, for invoicing and payment.

Use the “HPMS - Package Management” function for operator package management, where the user can perform the workflow from composition registration to package valuation. It allows configuring which items make up the package, such as, procedures, materials, attachments, and composition of the package. It also allows the user to set rules with price rule, co-pay rule, package conversion rules, and group of packs. This function also allows generating imported packages, follow-up logs, validating rules that alert the user if any part of the package has inconsistencies, such as start and end of validity of a given pack. In this function you can also import and export the PTU A1200 file, as well as perform the entire workflow of the Unimed of Brazil package system.

Packages are groups of procedures and materials for billing and payment according to electronic data transmission negotiations or protocols. Packages contain procedures, materials, medical fees, and operating costs, grouped together to facilitate the final billing process. Similarly, when packet billing is received, usually through specific codes that the institution uses, the system must interpret it and open it according to its composition. Conversion of codes should also be provided for cases where package handling refers to processes related to interchange contracts.

#### **2.4.4.4 Health plan organization services price management**

This feature allows the user to record price tables applied to the services provided by the accredited network for payment.

The price tables define the values to be applied to the services provided by the accredited network (certified providers) which are formed through negotiations.

The price table registration tool must differentiate the tables through the characteristics of service, beneficiary, health plan and medical specialty, according to standard payment rules defined by regulatory agencies or other tables regulated by the providers. Within the process of paying the health plan organization it is possible to separate the payments according to procedures, materials, medical fees, and cost.

Use the “HPMS - Package Management” function to configure the institution's price lists. Several pricing tables (such as CBHPM Prices, TUSS, Brasíndice, Simpro, PTU A1200, PTU A950) can be configured in the

function. It is possible to register and configure prices from the service tables, material tables, material/medicine tables, and medical procedure tables.

#### **2.4.5 Beneficiary supporting process**

Health plan beneficiaries can trigger the health plan organizations to perform various services, such as contractual demands, requisitions, and authorizations, and to support this demand the health plan organizations have a structure of care and analysis.

##### **2.4.5.1 Health plan organization service requests and authorization**

This feature allows the user to record and perform analysis on authorization requests for services.

Authorizations or requests for service / execution are requests generated by the beneficiary via the credentialed provider and sent to the organization for analysis and release of the service, avoiding unnecessary costs.

The process of generating the authorization or requisition is generated by the accredited provider that is serving the beneficiary and is physically by taking the form to the operator or electronically forwarded to the organization via the system. This service request is registered and analyzed based on the characteristics of the accredited party and follows the characteristics of the health insurance plan contracted by the beneficiary, releasing or denying the service. This process may be linked to judicial determinations.

Use the “HPMS - Authorization Request” function for to perform actions such as disapprove, include duplicate requisitions, cancel requisitions, submit requisitions for audit, display copayment estimate, and change request reasons. The user can also access other functions such as “HPMS - Beneficiary’s report” and “HPMS - Management of Authorization Analysis” making an external call.

It is possible to track an authorization end-to-end, in its complete flow, through the authorization status (approved, awaiting contractor's authorization, awaiting exchange sending, authorized by contract holder audit, exchange audit, canceled, partially approved, disapproved, open).

##### **2.4.5.2 Health plan organization interchange service requests and authorization**

This feature allows the user to record and perform analysis on interchange authorization requests and services.

Interchange authorization are requests generated by the beneficiaries of another health plan organization via an accredited provider.

The process of generating the interchange authorization originates from the accredited provider that is serving the beneficiary and is physically or electronically forwarded to the organization. This request for service/execution of the service is analyzed based on the characteristics of the interchange contract and a contact may occur with the partner organization to transfer the release process. This process of transferring analysis can be performed electronically.

Use the “HPMS - Exchange Authorizations” function to perform the interchange workflow, such as request order, authorization request response, authorization complement request, insistence request, cancelation, audit reply, unexpected error, confirmation, requirement of the service order, service order response, service order approval, service order authorization, status request response, lapse of time, and provider consultation. This function also has a feature to query requests that were performed on the national interchange, use the “Request A1100” tab to perform queries.

#### **2.4.5.3 Health plan organization customer services**

This feature allows the user to record and perform the requests received from customers and accredited network.

Client requests can be made in person or by phone and both must be registered and monitored, ensuring the solution. The demands can vary from authorizations requests to doubts of process and coverage. The services, depending on the type of request, may be linked to regulations according to current legislation.

Use the “HPMS - Authorizations” function to manage the authorization flow.

The function has a feature to consult authorizations requested from the Web Portal, use the available filters such as: status, stage, process, request source, provider, beneficiary, material, type of care, ID number, and some date filters.

It is also possible to perform analysis and audit procedures, based on the stages of authorization, such as authorized with denial, authorized without denial, awaiting contractor's authorization, awaiting exchange authorization, canceled, denied, exchange audit, partially authorized under audit, user (awaiting action), validated with denial, and validated without denial.

From the “HPMS - Authorizations” function the user can perform the following actions: validate forms, duplicate forms, generate copayment estimates, generate beneficiary's new authorizations, audit owner of the encounter, check debits, and make external calls to the function “HPMS - Beneficiary’s Report”.

#### **2.4.6 Health plan organization billing invoices processes**

A subgroup of features to handle billing and processing of payments related to health insurance plans sold by the health insurance organization.

##### **2.4.6.1 Health plan organization predefined billing invoices**

This feature allows the user to perform the billing process of pre-established values.

Billing of pre-established amounts refers to a financial process from values tabulated by contract, for use of the insurance.

The billing process occurs monthly or in accordance with the needs, with the previously registered table values and the financial occurrences of the period, and can be generated by hiring groups, contracting types, retroactive or future. Due to pricing characteristics, the generation must present the data opened by the beneficiary, but the collection is sent to the financial collection process in accordance with the contract's payer. This process may be linked to judicial determinations.

Use the “HPMS - General Use Statement (A580)” function to create rules like attachment rule, information for generating the accounts payable, and rule of action validation. The function also allows the user to import and export a batch file (A580).

##### **2.4.6.2 Health plan organization beneficiary participation billing invoices**

This feature allows the user to perform the billing process of the beneficiary participation shares (co-participation).

Billing of co-participation amounts refers to the financial process from values based on the percentage applied on events occurred (procedures performed by the beneficiary).

The billing process collecting the beneficiary participation (co-participation) normally occurs together with the pre-established billing process based on the events (services) performed by the beneficiary in a period. This process may be linked to judicial determinations.

Use the “HPMS - Billing” function to follow up on the operator's billing flow, some actions are also available such as: accounts release, billing, billing batch, generate file, generate taxes, generate invoice/account receivable, generate XML information, undo information from XML, generate TXT foundation information, and undo TXT foundation information.

Query is available using filters such as: date type (accrual period, batch generation, file generation), billing batch, operator, contract, payer, beneficiary, billing rule, account receivable, account, company code, return canceled invoices).

#### **2.4.6.3 Health plan organization non predefined billing invoices**

This feature allows the user to perform the billing process of post-established values.

Post-established billing is the process of collecting the amounts generated based on the beneficiary of the plan, that is, based on the events occurred (procedures performed by the user).

The billing process of the post-established values occurs with contractual characteristics, but is usually monthly, after undergoing a process of analysis and release for billing.

Use the “HPMS - Billing” function for generate billing files, containing the monthly fees, insurance expenses, and any additional services. The function also allows the configuration of rules of conversions of procedures, materials, specific form fields, participants, file batch PTU rules, file batch TXT rules, pending accounts, update general ledger accounts, update values from the batch, and validation of batches.

#### **2.4.6.4 Health plan organization interchange billing invoices**

This feature allows the user to perform the billing process of interchange values.

Interchange billing is the charge made by the organization that rendered the service to the beneficiaries from other health insurance plan organization as a partner. Values may be post-established or pre-established.

The generation of interchange billing occurs according to contractual characteristics, applied using the appropriate rates and after undergoing a process of analysis and release for billing.

Use the “HPMS - Pre-Payment Exchange Billing” function for generating the interchange movements, creation of rules, based on payables. You can also define payment rules considering financial accounting transactions, financial transactions for settlement, generation of files, generation of notes, and revert batch generation.

#### **2.4.6.5 Health plan organization interchange billing challenging process and rebilling invoices**

This feature allows the user to record and perform analysis from interchange denials (dispute) and post re-billing or payment.

Deny is the act of positioning against a given definition, that is, not agreeing with the billing made, with the purpose of discussing denied or charged values, which may result in rebilling. The dispute occurs when the destination carrier does not agree with the charge made. It may be a billing dispute, when the destination organization does not agree with the billed amounts, or a payment dispute, when the partner organization does not agree with the amounts charged.

The process allows for the recording of the denials (disputes) or charged values and the respective discussions and analyzes, closing and partial closure of the discussion until finalization. Billing dispute is a specific activity and follows transaction protocol from partners organizations using this practice. The billing dispute can start a rebilling process.

Use the “HPMS - Adjustments for Re-invoicing” function to make adjustments/corrections for invoicing.

The function has features for adjusting accounts and invoices. Batches with the adjustments can be created.

#### **2.4.7 Beneficiary health expenditures management**

The costs of providing health care to the beneficiaries are sent to the Health Plan Organization by the providers or by the beneficiaries themselves, for analysis and subsequent payment. These analyzes are audited to identify inconsistencies based on usage guidelines or business rules, which are deducted from payments and presented to providers for appeal.

##### **2.4.7.1 Health plan organization beneficiary health expenses acknowledgment**

This feature allows the user to record and perform the beneficiaries' costs from accredited network billings received through a physical form or electronically through the system.

Costs of the beneficiaries, refer to the services performed by the accredited network in a period, presented with the purpose of charging the health insurance plan organization. Also known as medical production or medical bills.

Every time a beneficiary is served by the accredited network, it generates an event or cost to the provider that is later sent to the health insurance plan organization with the purpose of billing. When receiving this information, it must be registered and controlled through a tool that allows for subsequent analysis and billing. The sending to the health insurance plan organization can be through physical forms, through the health plan organization portal or directly online through webservice and must obey time-out rules and competencies.

Use the "HPMS - Medical Accounts Management" function to perform actions such as: modifying the type of account, recalculate protocol, change data of the protocols, generate payment transfer of fees, update general ledger accounts, update general ledger accounts of the protocol, update cooperative acts, update additional accounting records, generate resubmission accounts, validate medical accounts, close accounts, view notes related to the protocol, view account summary, make an external call to the function "HPMS - Medical Production Analysis Management", edit notes, and check/uncheck for direct delivery of the notes.

Use the "HPMS - Medical Accounts Management" function to make adjustments/corrections for invoicing. The function has features for making queries, identification of deletion logs, allows importing batches of accounts, allows importing attachments, check pending protocols, and it is possible to create internal communication rules that can notify the user.

##### **2.4.7.2 Health plan organization interchange health expenses acknowledgment**

This feature allows the user to record and perform the beneficiary's costs from interchange billings.

Interchange costs are billings of health insurance care provided to beneficiaries for the period, performed by other health insurance plan organizations or partners. It is a specific activity and follows a protocol of transactions of the organizations that use this practice.

When a beneficiary is looked after by another health insurance plan organization, it generates an event or cost that is subsequently sent to the beneficiary's home health plan organization for the purpose of charging. When receiving this information, it must be registered and controlled through a tool that allows for subsequent analysis and billing. It is a specific activity and follows the transaction protocol of the health plan organization that uses this practice.

Use the "HPMS - Exchange Accounts" function to perform actions such as: delete inconsistent invoices, import XML file, import attachments, cancel bill that were charged incorrectly, check for structural inconsistencies in the XML file, and add a comment regarding the bill about a potential change if necessary.

#### **2.4.7.3 Health plan organization denial and challenging rules configuration**

This feature allows the user to record the denial categories and occurrence rules to be applied to the medical bills and authorizations processes.

The register of the denial categories and occurrences is used to anticipate and assist authorization or payment analysis. Denials are consistencies applied to the requested or performed events. Occurrences deal with business consistencies, related or not to the denials categories, applied to the events.

In order to perform some validation for authorizations or analyzes for payment, the system user records rules with denial categories and occurrences, combined or individual rules, that present to the analyst registers considering contractual, nursing and medical characteristics, directed to specific stages of the analysis processes.

Use the “HPMS - Denials and Incidents” function to create denial rules such as procedure x ICD, procedure x OPM, professional's specialty requirement, authorization integration (denials that will not be generated), incident classification, account validations, and authorization validation. This function allows creating occurrences to be forwarded to the audit flow.

#### **2.4.7.4 Health plan organization beneficiary health expenses checking and auditing**

This feature allows the user to perform an analysis of accredited network billing for payment or denial of payment.

Medical production analysis consists of evaluating the medical care performed according to contractual, nursing or medical characteristics to verify the permission and consistency of the care provided by the accredited network.

To perform the checking and auditing processes on the beneficiary health expenses (accredited network bills), it is necessary to evaluate the beneficiary's contract, its coverage, its needs, and health insurance care characteristics, as well as nursing and medical, directing the steps to specific audit groups by area of action, identifying inconsistencies in the accounts/bills, and applying the denial practices of within the required standards of the contract, for release or denial of payments.

Use the “HPMS - Medical Production Analysis Management” function to execute actions such as perform the audit flow according to the organization's structure, view analysis, forward the audit to another group, insert occurrence or other auditor groups.

The function has features to perform queries from some filters such as current auditing group, provider's group, analysis batch, encounter type, type of encounter form, protocol, status of analysis, and submitted physical encounter form. Based on the status of the accounts, the user is able to complete the workflow of checking accounts.

#### **2.4.7.5 Health plan organization denial appeal**

This feature allows the user to perform an analysis of accredited network denial appeal for payment or maintenance of denial.

Denial appeal is the action that the accredited network takes with the purpose of challenging payment denials or minor payments executed by the health insurance plan organization after the collection of the services performed.

The denial appeal process must be recorded and analyzed with subsequent release for payment or keeping the refusal. This process can be manual or online through webservice and can comply with deadlines defined in contract with the organization.

Use the “HPMS - Production - Denial Appeal” function to perform actions such as importing the disallowance resource files, define flow generation rules, perform the complete flow analysis, forward to the responsible for audit, release for payment, and features such as cancel the denial appeal, submit for payment, recalculate values according to price query, new denial appeals, change competence date, and change presentation date are also available.

#### **2.4.7.6 Health plan organization beneficiary reimbursement**

This feature allows the user to record, analyze, and do maintenance of beneficiary’s reimbursements.

Refund to beneficiaries refers to the process of reimbursement of amounts paid by beneficiaries of the plan due to lack of accredited network or difficulties of service by the health insurance plan organization.

The request for reimbursement of amounts to beneficiaries must be registered and analyzed according to contractual and accredited network characteristics, respecting deadlines of the process. This request may occur when a beneficiary is in an area with no accredited network for the specialty needed, resulting in a particular reimbursement.

Use the “HPMS - Control of Reimbursement Processes” function to execute actions such as create a reimbursement process and analyze reimbursement requests.

In the function it is possible to import files called “ABI”, that the “ANS” makes available to the operators to follow with the reimbursement flow to SUS. The user can consult requests for reimbursement requested by beneficiaries, view reimbursement values (Dashboard) and their respective status as account value, deferred value, pending value, value to reimburse, and amount paid.

#### **2.4.8 Accredited network reimbursement**

The payment of the providers follows a schedule of payment of the health plan organization and business rules, as well as a monitoring of withholding of taxes on these payments.

##### **2.4.8.1 Health plan organization accredited network payment process**

This feature allows the user to record, analyze and keep maintenance of accredited network billings.

Payment of medical production is the process of generating amounts payable based on appointments made and presented by the accredited network in addition to financial amounts that apply to the cases after the analysis processes are performed.

After the check and audit processes have finished which are in accord to business characteristics and payment methods, it initializes the start of the group of amounts to be paid for the accredited network. Applicable to this generation are specific financial values that can be paid or discounted according to the nature of each instance.

Use the “HPMS - Provider Payment” function to perform actions such as create batches from month closing, define criteria for debit and credit terms, creating specific payment batches, and check pending accounts. It is also possible to make queries such as inconsistencies by period, values for appropriation, and by payment batches.

##### **2.4.8.2 Health plan organization accredited network tax retention rate follow-up**

This feature allows the user to analyze the withheld taxes for returns or discounts.

Withheld taxes are the taxes discounted on medical production payments, in order to update the previous data.

After the generation of the medical production payment process, it is necessary to re-evaluate the taxes withheld in the period, compared with the withholdings in other sources of the specific provider to then make a refund if there is a greater withholding or discount if there is less retention to it.

Use the “HPMS - Monthly Payment” function to perform actions such as creating rules for different periods of times (e.g., daily, weekly, bimonthly, etc.), administrative fees, payment by providers, production events, discount priority events, and tax calculation base values. This function also allows other actions such as generating monthly payments, generating monthly payments opened in previous months, and updating general ledger accounts.

#### **2.4.9 Communication with beneficiaries, customers and accredited network**

The communication with the beneficiaries, customers and accredited network can occur through portal access and release, messaging and data file exchange.

##### **2.4.9.1 Health plan organization portal access**

This feature allows the beneficiaries, providers, and contract holders access to specific data related to their roles through a portal.

Health insurance plan portal deals with an online tool, accessible through browsers, providing a set of information and actions to facilitate processes according to the logged role.

The health insurance plan portal provides a set of information and actions, differentiated by type of access, such as beneficiaries, accredited network, contract holders and each type of access will have specific activities made available. The portal complies with the regulations for communication and the provision of information in accordance with current regulations.

Use the “HPMS - Web Portal” function to organize the accesses to the portal.

The function also allows checking the available parameters, create different types of access for beneficiaries, concurrent auditors, cooperative members, external access to the medical forms, and providers.

##### **2.4.9.2 Health plan organization warnings and alerts configuration**

This feature allows the user to configure warnings and alerts to beneficiaries or providers.

Warnings and alerts are information directed to the target public with the purpose of passing information quickly and specifically.

The configuration of warnings and alerts facilitates the sending of information to health insurance plan beneficiaries or to the accredited network through different means, warning users about certain completed processes or to alert about possible situations of interest.

Use the “HPMS - Alerts and Events Management” function to handle the entire communication flow of the operator with its beneficiaries, providers. Use the function to configure different communication events such as beneficiary product changes, sending the protocol to the beneficiary, authorizations that were approved, and payment release of reimbursements. Also, it is possible to check if the message was sent successfully or if it failed by accessing the available logs.

##### **2.4.10 Additional health plan operational processes**

Some additional processes of the health insurance plan organizations allow to generate analyses and controls of result or capital quota. Also, there are specific configurations that allow workflow and process definitions impacting the generation of information in several areas.



#### **2.4.10.1 Health plan organization specific files generation process**

This feature facilitates the generation of files in specific layouts to meet data transfer according to business rules.

The user can configure layouts for generating files with specific information to send to beneficiaries or contractors. The files contain information of beneficiaries, financial data, actuarial data or billing needs. The function allows the generation of monthly fee statement files, to be sent to certain companies, each with its own layout. It also has settings that allow the customer to define which information should be in the files for each company.

Use the “HPMS - BMFF - Business Monthly Fee Files” function to set up batches, define a contract or payer. It is also possible to create conversion rules (from-to), file layouts, generate batches, send files by e-mail, and consult sent/received batches. The drop-down menu options available to the user are remittance, consultation, registration, return, rules of batch generation, conversion rule, return invoices rule, and return file rule file layout.

#### **2.4.10.2 Health plan organization general configuration and rules**

This feature allows the user to record and configure general rules for the health insurance plan organization.

General settings and rules provide a variety of options for performing and applying processes or determining workflows. The centralization of rules and configurations of the health insurance plan organization allows to determine context and process workflows of several areas of attendance to beneficiaries, billing and payment, as well as operational and legal characteristics of the organization.

Use the function “HPMS - Insurance Management” for the configuration of items such as contracts and beneficiaries, monthly fees, medical bills, accredited network, Call Center, clearing house, exchange, type of material, PTU version, payment of providers, technical provisions, analysis of medical account authorizations analysis, analysis of contestation dispute, account XML import, accounting, parameters of prior billing services, billing, Web portal, requisition, authorization, operator encounter, Web physician form, attachment form batch, XML form import, readjustment, denial appeal, hospitalization communication/Discharge XML, Web Service (PTU A510), result analysis, requisition execution, Online proposal request, and credit card integration parameters.

#### **2.4.10.3 Cooperative quote management**

This feature allows the user to manage the quote and partial quote billing.

Quote or Share refers to the portion or fraction of the financial or corporate interest that each individual has, and which comes to be paid as the capital of the cooperative.

Quote or Share capital control record must be kept by the organization for purposes of analysis and monitoring of capital payments and for managing the integration of new members. This monitoring provides data to the system making it possible for the user to calculate the current capital and the returns, the needs for new payments, interest and fines, installment payments, and redemption in case of any members leaving the cooperative.

Use the “HPMS - Bookkeeping of quotes from the cooperative members” function to manage the member quotas, to perform the following actions to allow posting of all quota movement types in the quote share function, including allowing the user to generate invoices payable for returns. Define readjustment rules for creation of configuration of dates of cooperative members on anniversaries of joining the cooperative for readjustment of dues, allow the exclusion of quotas that don't need to be readjusted in the month, edit existing readjustment errors, generate movement of quotas from production payment events, and allow the generation transfers of quotas.

#### **2.4.10.4 Health plans and contracts performance analysis**

This feature allows the user to generate and view their customer portfolio results.

The result is the difference between revenues and expenses or costs for a given period carried out by the customer portfolio which the system user can calculate from various perspectives. In health insurance organizations, the term result is also known as loss ratio.

The result can be calculated by the system user under variables such as contract, per beneficiary, per health insurance plan against a specified period. This result or loss ratio is used by the health care organizations to evaluate readjustments, grant discounts, health promotions, renegotiation, and contractual rescission.

Use the “HPMS - Analysis of Results” function to get an operational overview (dashboard) of the operator's financial health. Use this function to manage various operational indicators, such as total income, total expenses, result, monthly fee, accounts, revenue reducer account, commission, billing, refund loss ratio, exchange rate, denial appeal, administrative expense percentage, copayment, and reimbursements to SUS.

### **2.5 Business features**

A group of features to define, configure and manage system-wide behavior to be in accordance with business requirements dictated by guidelines, best practices, policies, regulations and laws. Requirements to consider may include, but are not limited to, organizational architecture, cyber security, data governance, quality assurance, risk management, high availability and business continuity.

#### **2.5.1 Patient data privacy and security**

A subgroup of features related to securing confidential data related to patients and users.

For more detailed information refer to the Cyber Security Guide available on the Customer Portal.

##### **2.5.1.1 Data protection policy and cryptography**

Data protection and cryptography governance is a policy focused on the assurance that specific data can be accessed only by the person who is supposed to access it.

Applying cryptography to the data at rest and in transit avoids unauthorized access. In addition, restricting data access to authorized personnel mitigates the risk of misuse of personal data. It is possible to cryptograph the data inside the database using specific tooling.

This feature supports attending the General Data Protection Regulation.

In the “Access Control” function, the user can create rules based on user groups, teams, and patient profiles, then define the type of access rule, start and end date, and type of access permission. In the “Log Management” function, the user can create rules to store logs automatically.

By default, the “Log Management” function stores the following records: access to encounters, access to medical records, access to the system, attempts to access the system, closing of functions, closing of functions due to time limit, deletion of patient data, system access with two-factor authentication (2FA), system exit, and system exit due to timeout. Additional logs can be created, such as: changes to data fields, access to functions, access to specific function items, e-mail sent, filters, integrations, report generation, report printing, and Short Message Service (SMS) sent.

##### **2.5.1.2 Authentication methods**

This feature supports the process of verifying the identity of users accessing the system, ensuring proper access control. The system provides various authentication methods; each healthcare institution must determine which authentication methods are appropriate based on their policies and security requirements.

Passwords can be authenticated by the system itself or an external authentication server using Lightweight Directory Access Protocol (LDAP). Other methods include barcode tag cards, biometric fingerprint scan and 2FA. The system can be configured to automatically log off a user after a predetermined period of inactivity, therefore requiring the user to re-authenticate during login.

Use the “System Administration” function to configure the system to use different combinations of authentication methods, such as alternative login + password, automatic login (Kerberos), barcode only, biometrics + password, Active Directory (AD) login or Only AD login, only biometrics, user + password, radio-frequency Identification (RFID) only, user + password/barcode, user + password + biometrics, user/alternative login/barcode + password. The system then requires the user to provide the combination of authentication methods at the login screen, before gaining access to the system.

Authentication may be required by the system at other moments and such requirements are also configured in the “System Administration” function. For example, the system may request re-authentication when an exam needs additional approval by a specialist in the function “Medical Report Processing” or when the cleaning services team registers that the cleaning process is started and/or finished in the function “Hospital Occupancy”.

#### **2.5.1.3 Password management**

This feature allows the system administrator to define the rules that will be validated when the password is entered during user login.

Use the “System Administration” function parameters to define the criteria for valid passwords. Refer to the Cyber Security Guide and System Administration Guide available on the customer portal for more information.

Strong passwords increase security by preventing unauthorized access and brute-force attacks. Other recommended policies are blocking a user after a certain number of wrong attempts in a row, forcing a new password to be created every 30 days, and ensuring that a password has a minimum length and extended set of characters, for example, lowercase, uppercase, numbers, and special characters.

#### **2.5.1.4 Digital signature**

This feature supports the digital signatures of files and system records when elevated levels of data veracity are required.

Digital signature is available in several functions including “Batch Signature Management”, “System Administration”, “Computerized Provider Order Entry - CPOE”, “Ophthalmology”, “Electronic Pre-Anesthetic Assessment” and “EPC” functions.

Digital signature is used to guarantee the authenticity, origin and integrity of digital artifacts. A digital signature gives the recipient reasons to believe that an artifact was created by someone (authenticity), that this someone cannot deny having created the document (non-repudiation), and that the document was not changed after it was signed (integrity).

The process encompasses sending data to a certification authority. The return of the digital signature is stored with the original data in the system. By digitally signing data, the system guarantees that data generated and stored in the system by the users are valid.

#### **2.5.1.5 Audit logs and traceability**

This feature supports the use of audit logs regarding who, when and from where the system is accessed or has its information modified or deleted.

System administrators can:

- View logs of every user who accesses the system and when.
- View logs of changes made by users.
- Enable, disable, or view logs of system events and access to specific locations.
- Enable, disable, or view logs of reports and the records of generated reports.
- Manage log storage time or manually clear the logs.
- View logs of users who access patient records in the “EPC” function.
- Export logs.
- Store change logs of physician records.
- Store and view change logs of service orders for scheduled preventive planning.
- View crash logs that occurred during the version update.
- View logs of reports exported and imported when using the “Report Manager” function.
- View change logs of the records of database tables.
- View duplicate log entries.
- View logs of registered profiles, registered users, and report generation.

Regarding patient information, this feature supports the user to add, edit, delete, and maintain the logs in situations such as the patient’s care access authorizations, the checklist and history for the patients waiting for a vacant bed, patient information access authorizations, view logs of SMS messages sent after the patient discharge, consult the change logs of the information from a person’s record, consult the history of calls to the patient. Submit and deactivate the access authorization to a patient appointment in the electronic medical record, and the same for the authorization of access to a patient’s electronic medical record.

Audit logs are available in several functions including “Log Management”, “System Administration”, “Surgeon’s Schedule”, “MPI”, “Employees Record”, “Equipment Control”, “Surgical Schedule Management”, “Bed Management”, “EPC” functions.

#### **2.5.1.6 Data privacy**

This feature supports control over the exposure and availability of information of physical persons by implementing privacy by design techniques and strategies.

Use the “Access Control” function to define privacy rules for specific locales. Defining privacy rules to specific locales allows organization and management of privacy-related requirements that vary by country. In the “Access Control” function in the “Settings” tab, go to the “Privacy” subtab to view, add, edit or delete a privacy rule and define a specific locale option.

The system offers customizable definitions of sensitive/private information to meet the needs of different markets, pseudonymization of sensitive/private information, privacy mode for support via remote connection, and fine-grained access controls that can be customized to enforce the principle of least privilege for access to specific system content for specific users.

#### **2.5.1.7 Data security**

This feature supports the creation, configuration, and maintenance of a secure system by implementing various guidelines and mechanisms.

The native system functionalities should be combined with other external mechanisms to form a multilayered security strategy to address aspects including physical security, operational security, procedural security, risk management, security policies, backup policies, high availability and contingency planning.

Use the “System Administration” function to configure system access controls such as password encryption, password login, password masking, authorized user list, password recovery, password reset, two-factor

authentication, password complexity rules, password expiration rules, automatic logoff, account Lockout Policy, allow/prevent multiple sessions.

The native system functionalities should be combined with other external mechanisms to form a multilayered security strategy to address aspects including physical security, operational security, procedural security, risk management, security policies, backup policies, high availability, and contingency planning.

Refer to the “Password management” and “Authentication methods” sections for more details.

## **2.5.2 Operational system toolkit**

A subgroup of features related to running the system internally at the customer site.

### **2.5.2.1 System administration and configuration**

This feature supports the system administrator to configure and maintain the system.

System administrators can fine-tune the system to achieve a highly customized experience via the configuration of parameters and settings. The “System Administration” and “Core Tables Settings” functions are the main tools for configuring the system.

Use the “System Administration” function to add, view, edit and delete medical record items; manage users, profiles, departments, workgroups and corresponding access controls; control which users can view or access any data field; manage function parameters; view invalid database objects and revalidate; view and delete patient files stored in hospital repositories; link functions, database tables and reports to the user profiles. For more detailed information refer to the System Administration Guide available on the Customer Portal.



#### **WARNING**

**This product is a highly configurable system that incorporates large amounts of data from different areas of healthcare. There must be multidisciplinary involvement when configuring the system to ensure compliance with all laws, regulations, standards, guidelines, and best practices.**

**Implementation must have a pre-production environment (test environment) with test cases that accurately reflect the practice of the healthcare institution to ensure safe and effective operation in the final production environment.**

**Philips provides no warranty and accepts no responsibility or liability for the accuracy of the information, configuration and settings defined by the user. If they are not done properly, it may result in the inability to use the system.**



#### **WARNING**

**User access controls must be configured to grant the minimum necessary level of access for users to perform their duties. Granting users access to more information than necessary may lead to unauthorized access to sensitive data and a breach of data privacy and security policies.**

The “Core Tables Settings” are stored in separate tables, each for a specific context. These core tables are the system tables that contain data used throughout the system and do not belong to one specific function or functionality. The “Core Tables Settings” function, found in the “Utilities” tab of the main screen, contains the main records and rules that affect system behavior on a system-wide level. Changing one of these settings impacts all parts of the system that have a dependency on the core table in question.

The table below describes the main differences between “Core Tables Settings” and “Function Parameters”.

Core Tables Settings	Function Parameters
Not mapped to a specific function	Restricted to a specific function
Each type of setting requires a unique data model and is stored in a separate table	Parameters require only a key-value pair and are stored in a single table
Access can be controlled by profile	Access control follows the same rules set for access to system functions
Settings apply for the entire system (some exceptions allow more fine-grained control)	Parameters can be applied by: Establishment, Profile or User

Only the system administrator and specific key users have access to “Core Tables Settings”, and even those key users see only a subset of settings related to their area of expertise. The system administrator can configure access control for “Core Tables Settings” via the function “System Administration” in “Profiles” > “Record” > “Table”. From there the system administrator can configure which core tables can be accessed by profile.

#### 2.5.2.2 User preferences configuration

This feature allows the definition and management of end-user preferences.

System administrators can use the “System Administration” function to define preferences for users. Alternatively, non-admin users can access their own personal settings by selecting “My Settings”. The “My Settings” option is found in the “User Menu” icon, located on the top-right corner, in the Menu Bar. Using this resource, it is possible to configure standard texts, calendar, signatures, languages, system opening preferences and default values. Refer to the System Administration and Quick Reference Guides respectively, available in the Customer Portal.

Users can export or import the parameters that are currently being used in a function by opening the utility “Function Information”. First, open the function for which the parameters will be exported or imported, then click on the “Main Menu” icon, in the top-left corner of the “Menu Bar” and select the “Utility” tab. Finally, select the “Function Information” utility function to view information about the function, and export or import function parameters.

#### 2.5.2.3 Reporting management

This feature allows users to create, manage and generate reports as digital or printed documents.

In the “Report Manager” function, the user can create and manage standard or customized reports by defining rules for the data source, organization of the data, layout, export, and printing. On the “Dynamic Report” tab, the user can create a report by adding items to report sections and using the drag-and-drop functionality for data layout throughout the report. Reports can be linked to specific functions or configured for specific users.

The “Automatic Printing” feature is in the “Core Table Settings” function. This feature allows defining which documents can be printed automatically, when to print them, which printer to use, and where they must be stored in the file directory configured by the user in the “System Administration” function.

#### 2.5.2.4 Excel data importing and exporting processes

This feature supports the user to import and export data into Excel spreadsheet files. In addition, the system allows the user to import a table by configuration using the XLS extension file.

The export to the Excel file can be done in all the functions where the information can be presented in the grid view, then the user can use the shortcut in the keyboard “Control + E” (Ctrl + “E”), the system will then generate the information to the Excel file.

In functions such as “SUS APAC”, “SUS BPA”, there is a special functionality to export data when the information needs to be imported to another system, following the standard file as, the dBase database file (.dbf file), or this feature can be used in the function “Insurance Protocol” to export the patient accounts to an XML file that is sent to the insurance company.

The import can be done through the function “Loads”. This feature allows importing information, such as Addresses Catalogue, Materials and Medicine list, Price Table, Postal Code, and Service Table, that can be done from different sources like Excel file, the dBase database file (.dbf file), or text file.

#### **2.5.2.5 Internal and external communication system**

This feature allows the system to communicate an alert or a specific message to the user, allows communication between users, and also enables the user to send a message to an external contact.

The automatic generation of a message can be configured. The tab menu “Alerts” of the “Quality Management” function allows defining the conditions for the generation of the message using the SQL command and how this message can be sent, whether by internal communication, SMS, or email. In the menu tab “Events and Rules” of the function “Alerts and Events Management”, the user can define the characteristics of the message that can be sent by internal communication, SMS, email, or can be presented on the screen. In the “Core Tables Settings” function > “Main Application” > “Core Tables Settings” > “Rule for sending alerts and events”, the system administrator can define the action that generates the message by choosing the option in the field “Action that launches”.

The user can read the internal communication using the “Internal Communication” function. It is also possible to use the same function to write a message for a user, profile, department, user group, group of profiles, or a combination of these options. In the purchase process, through the functions “Purchase Quotation” or “Purchase Order”, the user can send an email to the supplier describing the items being quoted or authorizing the supplier to send the items to the entity.

#### **2.5.3 Interoperability**

A subgroup of features related to the exchange of information with other systems via standard communication methods.

##### **2.5.3.1 Interoperability tools**

This feature provides interoperability capability to interface with third-party devices or software in a healthcare organization for an overall integrated information management flow, including access via a web portal using a mobile platform.

It handles the extraction and access of data, its mapping, and its transformation to other formats, based on standards that can be recognized by other systems. This integration can be configured to work with the current protocols used by third-party devices or software like XML, JSON, HL7, etc.

The interoperability process allows sending and receiving clinical information to and from other Electronic Health Record (EHR) systems, such as retrieval and search of clinical bed locations, clinical room locations, clinical unit encounters, locations, organizations, patient data and related people.

Other actions include:

- Access electronic documents available in online repositories or intranet by hyperlink.
- Add, edit, delete, and view rules for automatic printing of reports.

- Add and maintain interface points with external systems, interfaces that allow the import and export of data.
- View the logs of all transmissions sent and received via interface.
- Add and maintain rules for filtering the interface points and records for the conversion of defined data between different systems for interface.

Communication is handled in an asynchronous fashion using a message bus. The interface has built-in retry logic to prevent loss of data when a message is not successfully processed on the first attempt.

For communication with other applications, the recommended standard is API, which is a set of functions that allows applications to access data and interact with external software components, operating systems, or microservices; APIs deliver a user response to the system and send the system response back to the user; In case of a failed request, the API returns a standard HTTP error message.

When the system receives and sends messages via interface, the standard used is Health Level 7 (HL7). Some examples of HL7 as a standard for exchanging health information in the healthcare industry are Laboratory Information System (LIS) to Electronic Health Record (EHR), Health Informatics System to Radiological Information System (RIS) and medical equipment. This communication is based in events as this is throw in specific situations to communicate to external system that the event happens and it can response/act according to the event. One example of the interface happens during a patient's appointment registration, where the user can check the eligibility in the insurance portal or third-party company. This process ensures that the patient's health plan can be accepted by the clinic.

The configuration of the interfaces can be done in the "Management for Integration" function.

**NOTE The requests for enabling interoperability features can be done through Service Orders. Refer to the feature "Service orders management" of this document.**

#### **2.5.4 Standards & regulations**

A subgroup of features to support the use of the system globally.

##### **2.5.4.1 Ontologies**

This feature supports the process of ontologies encoding, by consulting and receiving terminology concepts from external services. It is possible to relate ontology encoding to system data fields.

An ontology is a set of concepts and categories in a subject area or domain that shows its properties, and the interrelationships between those properties. These standard concepts are essential in medicine, particularly for data exchange (interoperability) and research purposes. The "Ontologies" function is designed to host different ontology sources, such as SNOMED-CT, ICD-10, ICD-11, LOINC, and others.

In the "Ontologies" function, tab "Configuration" > "Consultation", it is possible to register the weblink to the external service that will be used to consult the specific terminology.

In the tab "Configuration" > "Terminology", it is possible to register the type of terminology and to create fields for additional terminology information, status and classification, which can be related to existent system fields.

The tab "Patient" is an external call from the EPC function, it is possible to register a terminology and the additional terminology information (previously configured in the "configuration" tab), and the "start date" and "expiration date" of this terminology, related to the patient encounter. It is also possible to consult all the terminologies registered for that patient.



In the tab “Tasy & SNOMED”, there is read-only access to reference mappings between SNOMED and the standard data fields and data values in the system. The standard clinical data is centralized in the “EPC”, “eMAR” and “CPOE” functions. Also, there is access to define mappings between SNOMED and the custom data values created by the healthcare institution. The data specific to each healthcare institution are defined in the “Core Tables Setting” utility function. These core tables include Allergens, Anesthesia warnings, Categories of surgery models in the Perioperative Electronic Patient Chart, Internal exams and procedures, International Classification of Diseases (ICD), Lab test material, Laboratory examination, Material registration, Medicine datasheet, Oral diets composition, Pain condition, Part of the body, Prescription interval, Recommendations, Register of problems, Types of fasting, and Unit of Measurement.

After the mapping between the system and SNOMED is defined, patient data exported via HL7 messages will contain the associated SNOMED information making it possible to integrate with other systems that use the HL7 protocol and SNOMED standards. Finally, define which data to export in the “HL7 Interfaces” utility function."

#### **2.5.4.2 Regulatory requirements**

This feature supports the implementation of regulatory requirements such as mandatory labeling content to support deployment in a market/country where the product shall comply with the set of requirements defined by local Regulatory Agencies.

Refer to the Quick Reference Guide available on the Customer Portal for more information about labeling, which can be accessed via the About Box.

Local Regulatory Agencies in each country are responsible for determining the concept and scope of a medical device product and the set of requirements such a product must comply with to be marketed in the country.

#### **2.5.4.3 Localization and internationalization**

This feature supports the use of the system in different geographic locations where business and user requirements vary.

Use the “System Administration” function to configure aspects such as language, currency, unit of measurement, time zone, postal address, date, and time format, to match the geographical location of its users.

Localization refers to the configuration of specific information to accommodate the norms of specific countries and markets, while internationalization refers to the product being capable of supporting different localizations and therefore prepared to be used internationally once localized.

**NOTE** Features for use in specific markets only can be disabled for other markets where they are not applicable. Refer to the “System administration and configuration” section of this IFU for more information.

### **2.5.5 Artificial intelligence**

A subgroup of features related to Artificial Intelligence (AI) algorithms and functionalities.

#### **2.5.5.1 Artificial intelligence use cases**

This feature incorporates artificial intelligence (AI) capabilities provided by third-party AI models connected via APIs.

#### **WARNING**



AI features are not intended to replace clinical judgment or provide new suggestions of diagnosis, clinical management, or treatment, being intended to facilitate user navigation through the system with voice commands, provide speech to text data entry option, and consolidate, structure and extract data already presented in the patient record.



**WARNING**

The user must always review information processed via AI to ensure appropriateness before submitting it.

**NOTE** Consult your Philips Representative to check the availability of the AI features.

### **Dictation of clinical notes**

Use AI to convert speech to text for data entry as an alternative to traditional typing.

If the functionality is available to the institution, the user can click on the microphone icon in the lower right corner of the text box where they want to enter the information and start dictating the content.

During dictation, the transcript of the content is presented. The user can, at any time, pause dictation by clicking on the microphone icon in the lower right corner of the screen and insert and restart dictation by clicking on it again.

After the user completes the dictation, the text is formatted using artificial intelligence. The content is then displayed to the user and available for eventual editing, saving and releasing. In addition to dictation, the user can use voice commands to facilitate the creation of the clinical note, inserting structured information such as standard text previously configured by the user or the institution. For this, the voice command "Ok, insert standard text 'normal physical examination'" can be used, for example.

Observation: The configuration of standard texts are of the institution's responsibility.

**NOTE** This functionality is only available for use in Brazilian Portuguese language and in the Brazilian market.

For a better experience, it is recommended to use a unidirectional microphone, such as a headset, and to avoid places with noise or where other people are talking. If it is not possible, the user can type the clinical notes.

### **Ambient Documentation**

If the functionality is available to the institution, the user can use the voice command "Record the consultation" to access the ambient listening and the assistant transcribes the dialogue between the patient and the clinician. The draft document (e.g. a pre-filled clinical note) is presented to the user (according to a pre-configured prompt) to review, edit and confirm manually.

The process then continues with the Data Extraction feature.

**NOTE** This functionality is only available for use in Brazilian Portuguese language and in the Brazilian market.

**For a better experience, it is recommended to use a microphone that captures ambient sound and to ensure that the ambient includes only the professional and the participants, remaining free of external noises or voices**

### **Voice commands & system navigation**

Convert speech into voice commands to enable navigation through the system, reducing or even eliminating the need for mouse clicks.

If the functionality is available to the institution, the user can click on a dedicated icon in the upper right corner and interact with a modal screen requesting the tasks they want to perform.

When requesting the tasks, the user receives visual feedback and interacts with the screen and resolves possible ambiguities such as distinguishing between homonymous patients.

The system then automatically "navigates" through the system, taking the user to the requested destination or displays the requested information.

Some examples of commands are: "Create a new clinical note for patient So-and-so" or "show last vital signs of this patient".

The expected result after pronouncing the voice command is that the system executes the commanded action. In case the command is not available or not understood, an exception message will appear in the modal and the user will have to click on the microphone icon inside the modal to initiate a new voice command.

**NOTE This functionality is only available for use in Brazilian Portuguese language and in the Brazilian market.**

**For a better experience, it is recommended to use a unidirectional microphone, such as a headset, and to avoid places with noise or where other people are talking. If it is not possible, the user can type the commands.**

### **Flexible Order**

If the functionality is available to the institution, the user can use the voice command "Create flexible order" to access the Flexible Order function. The user can dictate or type items to order, such as medications and infusions, nutrition, exams and procedures, recommendations, gas therapy, blood products, materials, and nutrition. The AI analyzes the content and returns a list of structured items for the user to review and record in the CPOE function.

**NOTE This functionality is only available for use in Brazilian Portuguese language and in the Brazilian market.**

**For a better experience, it is recommended to use a unidirectional microphone, such as a headset, and to avoid places with noise or where other people are talking. If this is not possible, the user can type the commands.**

## Flexible Record

If the functionality is available to the institution, the user can use the voice command "Create a flexible record" to access the AI virtual assistant and dictate or type the diagnosis, medications in use, vital signs, and social history in the Health History.

The AI analyzes the content and returns a list of structured items for the user to review and record in the corresponding item within the Electronic Patient Chart function.

**NOTE** This functionality is only available for use in Brazilian Portuguese language and in the Brazilian market.

**For a better experience, it is recommended to use a unidirectional microphone, such as a headset, and to avoid places with noise or where other people are talking. If this is not possible, the user can type the commands**

## Data extraction

Use AI to analyze the patient's clinical notes text and return a list of possible structured information to be recorded into the system.

If the functionality is available for the institution, the user requests AI support for structuring the data from clinical notes documented in the Electronic Patient Chart function, besides flexible record, flexible order and ambient documentation.

After processing the text data from the clinical note, suggestions of matching system records based on the text are displayed to be evaluated by the user. The system then guides the user for any necessary adjustments, corrections, and complementation of information to enable structured recording in the corresponding system items.

Available items include diagnoses, allergies, medications in use, social history, and CPOE items (medications and infusions, nutrition, exams and procedures, and recommendations, gas therapy, blood products, materials and special routines).

The user-selected ICD-10 code and diagnosis description appear under the diagnosis item of the Electronic Patient Chart function, as well as allergies, medications in use, and social history in the Health History of the Electronic Patient Chart function. The medications and infusions, nutrition, exams and procedures, recommendations, gas therapy, blood products, materials and special routines will appear in the Selection Screen of CPOE function, for the user to confirm, edit and submit the items.

**NOTE** This functionality is not available for all countries. Please contact your Philips representative for further information.

## 2.5.6 Extensibility

### 2.5.6.1 Running installed CM-Extensions

Care Management Extensions (CM Extensions) are plugins developed using Philips Care Management Development Kit (CMDK) tool to extend HTML5-based applications such as Tasy EMR.

CM-Extensions are used to handle customization and/or localization scenarios related to user interface and business rules. Each extended function displays labeling information per CM-Extension.

**NOTE** Any customization and localization made through CMDK must be performed by qualified Philips personnel or certified partners. Contact your Philips representative for further information.

### 3 Appendix – Web Suite Index

The Web Suite, described in the section "Engagement systems" of this IFU document, is an extension of the system via Progressive Web Applications (PWA) for access by mobile devices. Untethering system users from their desktop devices aims to provide flexibility and convenience, therefore allowing better quality and higher frequency interaction.

**NOTE** The address to access a specific web application from a specific healthcare institution is defined and maintained by the system administrator of that institution. Contact your healthcare institution or system administrator for the exact web address.

Many of the functionalities available in the web applications mirror the functionality of the system and follow the same workflows as the features in the standalone product. This appendix maps the functionalities available in the web applications to the corresponding sections of this document where more details about the feature are available.

#### 3.1 Mobile Clinician Workspace (Clinician Portal)

A web application specifically for HCPs to access and manage information related to their patients, aiming to improve outcomes.

**NOTE** Login credentials for users are the same as those used to access the standalone system.

Section in this IFU document	Functionality available via web application
Glycemic control	Add, edit and suspend clinical orders related to glycemic control. Glycemic control orders can be either conventional or intensive.
Vital signs and clinical parameters	Add, edit and delete vital signs; manage respiratory monitoring data; and view calculated vital signs that are based on input vital signs.
Scales, indexes and scores	Add, update, submit, undo submission and delete clinical scoring data. Scores include DINI, PEWS, MEWS, NRS, TISS-28, NAS and MFS.
Bedside checking process	View, edit, suspend, delay and revert order administration record or patient refusal; register a double check for high-alert medicine; register the collection, receipt and delivery of specimen or exam;  View, start, interrupt, restart, adjust velocity, suspend, delay and reverse of order solution record; view and perform oral diet and Milks and infant formulas orders.
Chemotherapy administration	Information about oncology treatment records.
Clinical notes	Add, edit, delete, view, submit and undo submission of patient clinical note.
Diagnosis and problem lists	Add, edit, delete, view, submit and undo submission of patient diagnosis.

Section in this IFU document	Functionality available via web application
Meaningful summaries	Search for patient and corresponding clinical information.
Intakes & outputs	Add, edit, delete, view, submit and undo submission of intake and output records, view fluid balance.
Tubes, lines and devices management	View, add and edit the device record, device replacement or device removal.
Alerts, warnings, and notifications management related to clinical processes	Various types of alerts, warnings and notifications.
Detailed view of prescribed orders	Search patient orders.
Surgery scheduling process	Search surgical appointment.
Multiple scheduling process	Search multiple schedule and block time slots in schedule.
Master person index	Locate patient and view general patient data.
Image exams (management, execution and reporting)	Access PACS images also available via web portal.
Laboratory results charting and view	Access exam results.
Non-lab results (images and others)	Access exam results.
Health history	Add, edit, delete, view, submit and undo submission of medicine in use, allergies and adverse reactions, social history and past history
Wound, dressing and healing process	Add, edit, delete, view, submit and undo submission of wounds, dressing and image attachments.
General plan and medications administration	View, add, edit, suspend, delay and revert order administration record of enteral nutrition, Medicines associated to glycemic controls, Medicines associated to procedures
Clinical pharmacy	View, register the administration, suspend and delay order administration record of oral supplements
Nursing assessment, diagnosis and intervention system	View, register the perform, suspend, reversal and reschedule of nursing interventions.
Bladder irrigation	View, register the start and finalization, delay, reversal and reschedule of bladder irrigation

### 3.2 Pending Approvals Portal

A web application for users involved in the purchasing process.

**NOTE** Login credentials for users are the same as those used to access the standalone system.

Section in this IFU document	Functionality available via web application
Purchase process	search, approve, disapprove, request opinion and forward purchasing records that are pending approval.

### 3.3 Bidding Portal (Web Suite Online Proposal Request)

A web application for users involved in the public bidding process.

Section in this IFU document	Functionality available via web application
Biddings management	Add, edit, delete, and view requests for bid. View bid proposals.

### 3.4 Health Plan Operator Portal

A web application for HCPs to request health insurance authorization of medical services offered to health insurance beneficiaries. Health Insurance Plan Operators can also interact with stakeholders via the web application.

**NOTE** Login credentials for users are the same as those used to access the standalone system.

Section in this IFU document	Functionality available via web application
Health plan organization accredited network management	View documents related to the accreditation process.
Health plan organization portal access	Add, edit, delete, and view access controls.
Health plan organization service requests and authorization	View authorization requests.
Health plan organization warnings and alerts configuration	View messages.
Health plans settings and configuration	View health plans configuration information.

### 3.5 Beneficiary Portal (Web Suite Beneficiary)

A web application for beneficiaries to view information about their health insurance plan.

**NOTE** When first accessing the web application, external users must register and confirm the registration process before login.

- **User/Beneficiary**
  - View health insurance plan coverage details.
  - View health insurance authorization.
  - View monthly payment.

### 3.6 Policyholder Portal

A web portal for companies which offer health plans for their employees to manage the contracts in their health plan portfolio.

### 3.7 Provider Portal

A web portal for providers and the health plan organization's accredited network (doctors, clinics and hospitals). Providers use the portal to interact with the health plan organization via requests for authorization and submission of claims.

### 3.8 Medical Guide Portal

A web portal for general use to lookup HCPs that are part of the health care operator's accredited network.

### 3.9 Adhesion Proposal Portal

A web portal for companies that are seeking a contract with a health plan operator but have not yet signed a contract.

### 3.10 Online proposal request portal

A web portal for general users to request a price estimate and buy a health plan.

### 3.11 Concurrent Audit Portal

A web portal for doctors who audit the health plan operator to perform external audits in hospitals.

### 3.12 Provider Accreditation Portal

A web portal for HCPs that are not in the accredited network and want to start the accreditation process.

### 3.13 Results Portal

A web portal for clinicians' access from anywhere, using any device with an internet connection, including desktop computers, laptops, tablets, and smartphones. This level of flexibility enhances communication and collaboration between healthcare providers, reducing the need for in-person meetings and phone calls.

The results portal is specifically designed for external clinicians who are not part of the healthcare institution and do not have access to the standalone system, allowing them to keep informed about their patients' exam results.

**NOTE When first accessing the web application, external users must register and confirm the registration process before login.**

Section in this IFU document	Functionality available via web application
Laboratory exams (management, execution and reporting)	Access exam results.
Non-lab results (images and others)	Access exam results.

### 3.14 My Companion (Patient Portal)

To improve relations between patients, their healthcare providers, and healthcare institutions, a web portal has been developed for patients and/or caregivers. This patient portal facilitates interaction and empowers patients to actively participate in the health care process. The patient portal, also known as "My Companion", provides a subset of system functionalities, which are traditionally performed by members of the healthcare institution, but can now be performed directly by patients. The clinical information managed in this web portal is also available to the HCP in the Clinician Portal.

**NOTE When first accessing the web application, external users must register and confirm the registration process before login.**

The following functionalities are available:



- **User/Patient**
  - Register new user.
    - Confirm new user.
  - Add, edit, delete, view general information.
    - Registration data.
    - Dependents.
  - View notifications.
- **Appointments**
  - Schedule appointment(s): consultation, referral, exam, specialty service, follow-up, surgery, chemotherapy, and services.
    - Use recommended scheduling for multiple appointments.
    - Health insurance authorization.
  - Complete appointment scheduling questionnaire.
  - View appointment details.
    - Check appointment status: requested, approval, approved, cancelled, in progress, no-show.
  - Reschedule appointment.
  - Add to waiting list.
  - Cancel appointment.
  - Confirm appointment.
  - Tele-consultation.
    - Start tele-consultation.
    - Send and receive files.
    - End tele-consultation.
- **Exam Results**
  - View exam results:
    - Laboratory exam report.
    - Image exam report/image.
    - Pathology exam process status/report.
- **Tasks**
  - Add, edit, delete, view, and execute to-do list items.
    - Institutional content: patient education, questionnaire, consent form.
  - View Emergency Department waiting time.
    - Inform the hospital that patient is on route to the Emergency Department.
- **My Patient Chart**
  - View medical certificate.
  - View received documents.
  - View sent documents.
  - Send document.
  - Add, edit, delete, and view patient's previous and current illnesses, allergies, vaccinations, and medicines in use by the patient.
  - View patient discharge summary.
  - View Encounter Summary.

#### 4 Abbreviations, Acronyms and Definitions

Term	Definition
.dbf	dBase database file
@	At
2FA	Two-factor authentication
a.m.	Ante meridiem (before midday)
A-aO <sub>2</sub>	Alveolar to arterial Oxygen Gradient
ABI	Claim notice for SUS reimbursement from the Portuguese “Aviso de Beneficiário Identificado”
ACC/ AHA	American College of Cardiology and the American Heart Association
ACP	American College of Physicians
ACS	Acute Coronary Syndrome
ACU	Acute Care Unit
AD	Active Directory
ADL	Activities of Daily Living
AF	Atrial Fibrillation
AI	Artificial Intelligence
AKI	Acute Kidney Injury
AIH	Authorization for Hospital Admission from the Portuguese “Autorização de Internação Hospitalar”
AKIN	Acute Kidney Injury Network
AMC	Arm Muscle Circumference
amp	Ampoule
AMTS	Abbreviated Mental Test Score
ANS	National Agency for Supplementary Health from the Portuguese “Agência Nacional de Saúde Suplementar”
ANSG	Subjective Global Nutritional Assessment. from the Portuguese “Avaliação Nutricional Subjetiva Global”
ANVISA	National Health Surveillance Agency from the Portuguese “Agência Nacional de Vigilância Sanitária”
AOP	Arterial Occlusion Pressure
APAC	Authorization for Procedures of High Complexity from the Portuguese “Autorização de Procedimento de Alta Complexidade”
API	Application Programming Interface
aPTT	Activated Partial Thromboplastin Time
ARDS	Acute Respiratory Distress Syndrome
ASA	American Society of Anesthesiology
ASIA	American Spinal Injury Association
AST	Aspartate Aminotransferase
AUC	Area Under the Curve
AUDIT	Alcohol Use Disorder Identification Test
AWS	Alcohol Withdrawal Score
BAROS	Bariatric Analysis and Reporting Outcome System
BFP	Body Fat Percentage
BG	Blood Glucose
BI	Barthel Index
BMI	Body Mass Index
BMR	Basal Metabolic Rate

Term	Definition
BP	Blood Pressure
BPA	Outpatient Production Bulletin from the Portuguese “Boletim de Produção Ambulatorial”
BPH	Benign Prostatic Hyperplasia
BPS	Behavioral Pain Scale
BSA	Body Surface Area
BSFS	Bristol Stool Form Scale
BSL	Blood Sugar Level
BUN	Blood Urea Nitrogen
CABG	Coronary Artery Bypass Graft
CAM-ICU	Confusion Assessment Method for the Intensive Care Unit Scale
CAP	Community Acquired Pneumonia
CAT	COPD Assessment Test
CBO	Brazilian classification of jobs and occupations from the Portuguese “Cadastro Brasileiro de Ocupações”
CBHPM	Hierarchical Brazilian classification of medical procedures from the Portuguese “Classificação Brasileira Hierarquizada de Procedimentos Médicos”
CDS	Clinical Decision Support
Cdyn	Dynamic Compliance
CGC	Conventional Glucose Control
CGI-SCH SI	Clinical Global Impression – Schizophrenia Scale Severity of Illness
cGy	Centigray
CHD	Coronary Heart Disease
CHEOPS	Children’s Hospital of Easter Ontario Pain Scale
CI	Cardiac Index
CIN	Contrast Induced Nephropathy
CL	Cormack-Lehane
CLMAP	Closed Loop Medication Administration Process
cm	Centimeter
cmH <sub>2</sub> O	Centimeter of Water Column
CO	Cardiac Output
COPD	Chronic Obstructive Pulmonary Disease
CPAP	Continuous Positive Airway Pressure
CPIS	Clinical Pulmonary Infection Score
CPOE	Computerized Provider Order Entry
CPOT	Critical Care Pain Observation Tool
CPSS	Cincinnati Prehospital Stroke Scale
CrCl	Creatinine Clearance
CRIB	Clinical Risk Index for Babies
CRIES	Crying Requires oxygen Increased vital signs Expression Sleep
Cst	Static Lung Compliance
CT	Computed Tomography
CTV	Clinical Target Volume
CVA	Cerebrovascular Accident
CVP	Central Venous Pressure
CVVHD	Continuous Veno-venous Hemodialysis
CVVHDF	Continuous Veno-venous Hemodiafiltration
D50	25 grams of glucose in a 50 mL prefilled syringe (50% glucose)
DAP	Diastolic Arterial Pressure
DBP	Diastolic Blood Pressure

Term	Definition
DFAP	Diastolic Femoral Arterial Pressure
DIOPS	Periodic Report of Financial and Economic Information from the Portuguese “Documento de Informações Periódicas das Operadoras de Planos de Saúde”
DIRF	Declaration of Withheld Income Tax from the Portuguese “Declaração do Imposto de Renda Retido na Fonte”
DIS	Digital Interventional Suite
dL	Deciliter
DMED	Declaration of Medical and Healthcare Services from the Portuguese “Declaração de Serviços Médicos e da Saúde”
DMS	Dialysis Malnutrition Score
DPAP	Diastolic Pulmonary Arterial Pressure
DRI	Dietary Reference Intake
DVT	Deep Vein Thrombosis
DWC	Data Warehouse Connect (Separate Philips product)
EAT	Eating Assessment Tool
EBI	Extended Barthel Index
ECF	Tax Accounting Collection from the Portuguese “Escrituração Contábil Fiscal”
ECOG	Eastern Cooperative Oncology Group
ED	Emergency Department
EDD	Expected discharge date
EEE	Estimated Energy Expenditure
EFD	Digital Tax Bookkeeping from the Portuguese “Escrituração Fiscal Digital”
eGFR	Estimated Glomerular Filtration Rate
EHR	Electronic Health Record
EIN	Employer Identification Number
ELPO	Risk Assessment Scale for the Development of Injuries Resulting from Surgical Positioning
eMAR	Electronic Medication Administration Record
EMR	Electronic Medical Record
EOC	Electronic Outpatient Chart
EORTC QLQ-C30	European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core-30
EPAA	Electronic Pre-Anesthetic Assessment
EPAP	Expiratory Positive Airway Pressure
EPC	Electronic Patient Chart
EPS	Electronic Patient Summary
ER	Emergency Room
ESAS	Edmonton Symptom Assessment System
ESAS-Br	Edmonton Symptom Assessment System – Brazilian Version
ESI	Emergency Severity Index
ESPEN	European Society for Clinical Nutrition and Metabolism
ESS	Epworth Sleepiness Scale
EuroSCORE	European System for Cardiac Operative Risk Evaluation
F&A	Financial & Accounting
FEV1	Forced expiratory volume in 1 second
FFR	Fractional Flow Reserve
FHIR	Fast Healthcare Interoperability Resources
FIM	Functional Independence Measure
FiO <sub>2</sub>	Fraction of Inspired Oxygen
FIQ	Fibromyalgia Impact Questionnaire

Term	Definition
FLACC	Face, Legs, Activity, Cry, Consolability scale
FM	Fibromyalgia
FRS	Framingham Risk Score
g	Gram
GA	Gestation Age
GCS	Glasgow Coma Scale
GCS-P	GCS Pupils Score
GF	Glomerular Filtration
GIR	Glucose Infusion Rate
GISS	ISSQN Information and Electronic Bookkeeping Guide from the Portuguese “Guia de Informação e Escrituração Eletrônica de ISSQN”
GMFM	Gross Motor Function Measurement
GRC	Global Risk Classification
GRO	Austrian Federal Statistical Institute from Austrian German “Geburtenregister Österreich”
GTV	Gross Tumor Volume
h	hour
HADS	Hospital Anxiety and Depression Score
HCP	Health Care Professional
HDF	Daily Hemodiafiltration
HDL	High-density Lipoprotein
HDM	Health and Disease Management
HDRS	Hamilton Depression Rating Scale
HF	Heart Failure
HL7	Health Level 7
HLA	Human Leukocyte Antigens
HPAS	Health Professional Assistance Systematization
HPMS	Health Plan Management System
HR	Heart Rate
Hz	Hertz
IABP	Elective Intra-aortic Balloon Pump
IBE	IntelliBridge Enterprise (Separate Philips product)
IBS	Irritable Bowel Syndrome
ICD	International Classification of Disease
ICD-O	International Classification of Diseases for Oncology
ICDSC	Intensive Care Delirium Triage Checklist
ICPC	International Classification of Primary Care
ICU	Intensive Care Unit
IFU	Instruction for Use
IGC	Intensive Glucose Control
IHD	Intermittent Hemodialysis
INR	International Normalized Ratio
IoM	Institute of Medicine
IPAP	Inspiratory Positive Airway Pressure
ISCO	International Standard Classification of Occupations
ISNCSCI	International Standards for Neurological Classification of Spinal Cord Injury
ISSQN	Tax on Services of Any Nature from the Portuguese “Imposto Sobre Serviços de Qualquer Natureza”
IUD	Intrauterine Device
IV	Intravenous

Term	Definition
IVCF-20	Clinical-Functional Vulnerability Index from the Portuguese “Índice de Vulnerabilidade Clínico Funcional”
IVUS	Intravascular Ultrasound
JCS	Japan Coma Scale
Kcal	Kilocalorie
Kcal/Kg/day	Calorie intake per day
KDIGO	Kidney Disease Improving Global Outcomes
Kg	Kilogram
L	Liter
LDAP	Lightweight Directory Access Protocol
LDH	Lactate Dehydrogenase
LDL	Low-density Lipoprotein
LIS	Laboratory Information System
LMCA	Left Main Coronary Artery
LOS	Length of Stay
LVSW	Left Ventricle Systolic Work
LVSWI	Left Ventricle Systolic Work Index
m <sup>2</sup>	Square meter
MAP	Mean Arterial Pressure
mcg	Microgram
MDF	Maddrey’s Discriminant Function
mEq	Milliequivalent
MEWS	Modified Early Warning Score
MFAP	Mean Femoral Arterial Pressure
MFS	Morse Fall Scale
mg	Milligram
MI	Myocardial Infarction
min	Minute
mL	Milliliter
mm	Millimeter
mmHg	Millimeter of Mercury
mmol	Millimole
MNA	Mini Nutritional Assessment
MOPS	Modified Objective Pain Score
MOS	Medical Outcomes Study
MPAP	Mean Pulmonary Arterial Pressure
MPI	Master Person Index
MPL	Multi Patient List
MRN	Medical Record Number
MST	Malnutrition Screening Tool
MUST	Malnutrition Universal Screening Tool
NAS	Nursing Activities Score
NEWS	National Early Warning Score
NFCS	Neonatal Facial Coding System Score
NHL	Non-Hodgkin Lymphoma
NICU	Neonatal Intensive Care Unit
NIH	National Institute of Health
NIHSS	National Institute of Health Stroke Scale







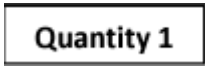



Term	Definition
NIPS	Neonatal Infant Pain Scale
NLP	Natural Language Processing
N-PASS	Neonatal Pain, Agitation and Sedation Scale
NPC:N	Nonprotein calorie to nitrogen gram
NPP	Neuropathic Pain
NPRS	Numeric Pain Rating Scale
NRS	Nutritional Risk Screening
NSRAS	Neonatal Skin Risk Assessment Scale
NSTEMI	Non-ST Segment Elevation Myocardial Infarction
NTISS	Neonatal Therapeutic Intervention Scoring System
O <sub>2</sub> Sat	Oxygen Saturation
OCT	Optical Coherence Tomography
OPS	Objective Pain Score
OPSM	Orthotics, Prosthetics and Special Materials
OR	Operating Room
p.m.	Post meridiem (after midday)
PaCO <sub>2</sub>	Partial Pressure of Carbon Dioxide
PACS	Picture Archiving and Communication System
PACU	Post-Anesthesia Care Unit
PAINAD	Pain Assessment Scale in Advanced Dementia
PaO <sub>2</sub>	Partial Pressure of Oxygen
PAOP	Pulmonary Artery Occluded Pressure
PCA	Patient-controlled Analgesia
PCI	Percutaneous Coronary Intervention
PDA	Personal Digital Assistant
PE	Pulmonary Embolism
PEEP	Positive End-Expiratory Pressure
PEONA	Incurred but not reported (IBNR) from the Portuguese “Provisão para Eventos / Sinistros Ocorridos e Não Avisados”
PEPC	Perioperative Electronic Patient Chart
PEWS	Pediatric Early Warning Score
PG-SGA	Patient Generated Subjective Global Assessment
PHQ	Patient Health Questionnaire
PICiX	Patient Information Center iX (Separate Philips product)
PIM	Pediatric Index of Mortality
PIP	Peak Inspiratory Pressure
PPI	Palliative Prognostic Index
PP-SGA	Patient-Produced Subjective Global Assessment
PRN	Pro Re Nata (Latin for “As needed” / “As the situation arises”)
PPSC	Provision for Credit Losses from the Portuguese “Provisão para Perdas Sobre Créditos”.
PT	Prothrombin Time
PTU	Unimed Transaction Protocol from the Portuguese “Protocolo de Transações Unimed”.
PTV	Planning Target Volume
PVR	Pulmonary Vascular Resistance
PVRI	Pulmonary Vascular Resistance Index
PWA	Progressive Web Application
RASS	Richmond Agitation Sedation Scale
Raw	Resistance Airway
RFC	Registered Financial Corporations

Term	Definition
RFID	Radio-frequency Identification
RIS	Radiological Information System
RPF	Recurring Patient Flag
RPS	Readmission Prediction Score
RR	Respiratory Rate
Rsr	Respiratory Resistance
RSS	Respiratory Severity Score
RVSW	Right Ventricle Systolic Work
RVSWI	Right Ventricle Systolic Work Index
s	Second
SAH	Subarachnoid Hemorrhage
SAP	Systolic Arterial Pressure
SBP	Systolic Blood Pressure
SCI	Spinal Cord Injury
SCUF	Slow Continuous Ultrafiltration
SDB	Stroke Data Bank
SEFIP	SEFIP refers to a Brazilian system related to social security information from the Portuguese “Sistema Empresa de Recolhimento do FGTS e Informações à Previdência Social”
SFAP	Systolic Femoral Arterial Pressure
SI	Systolic Index
SIRS	Systemic Inflammatory Response Syndrome
SIV	Scale Integrated View
SINAN	Compulsory Disease Notification System from the Portuguese “Sistema de Informação de Agravos de Notificação”
SLED	Sustained Low-efficiency Dialysis
SMS	Short Message Service
SNCP	Structured Nursing Care Process
SO	Service Order
SOAP	Subjective, Objective, Assessment, and Plan
SPAP	Systolic Pulmonary Arterial Pressure
SQL	Structured Query Language
STRONG	Screening Tool for Risk of Nutritional Status and Growth
SUS	Unified Health System from the Portuguese “Sistema Único de Saúde”
SV	Systolic Volume
SVR	Systemic Vascular Resistance
SVRI	Systemic Vascular Resistance Index
TCU	Transitional Care Unit
TCV	Total Caloric Value
TEE	Total Energy Expenditure
TIA	Transient Ischemic Attack
TIE	Tasy Interface Engine
TISS	Information Exchange in Supplemental Health Care from the Portuguese “Troca de Informações na Saúde Suplementar”
TNM	Cancer Staging System. Tumor (T), Node (N) and Metastasis (M).
TPE	Therapeutic Plasma Exchange
TPN	Total Parenteral Nutrition
TRS	Transition review score
TUG	Timed Up and Go



Term	Definition
TUSS	Unified Supplementary Health Terminology from the Portuguese “Terminologia Unificada da Saúde Suplementar”
TWSTRS	Toronto Western Spasmodic Torticollis Rating Scale
TXT	Text only (no graphics) version of a document.
UoM	Units of Measure
USA	United States of America
UUN	Urinary Urea Nitrogen
VAP	Ventilator Associated Pneumonia
VAS	Visual Analogue Scale
VNS	Visual Numeric Scale
VTE	Venous Thromboembolism
WAT	Withdrawal Assessment Tool
WBC	White Blood Cells
WHO	World Health Organization
WHR	Waist-hip Ratio
XLS	File extension used for Microsoft Excel spreadsheets.
XML	Extensible Markup Language

## 5 Symbols Glossary

Symbol	Symbol Name	Symbol Description
	Manufacturer	Indicates the name and address of the manufacturer
	Date of Manufacturing	Indicates the date when the device was manufactured.
	Catalogue number	Indicates the manufacturer's catalogue number so that the device can be identified
	CE Marking of Conformity	Product meets the requirements of (EU) 2017/745 for Medical Devices distributed in the European Economic Area (EEA).
	Batch code	Indicates the full Software Release/ Version number.
	Unique device identifier	Indicates a carrier that contains unique device identifier information
	Quantity of packaging	Indicates that there is only one of the software.
	Caution	<p>CAUTIONS are directions, which if not followed, could cause damage to the equipment described in this Instructions for Use and/or any other equipment or goods, and/or cause environmental pollution.</p> <p>Also: This symbol is used on the device label to highlight the fact that there are specific warnings or precautions associated with the device, which are not otherwise found on the label.</p>
	Consult instructions for use	Indicates the need for the user to consult the Instructions for use.
	Warning	<p>WARNINGS are directions which if not followed could cause moderate to serious injury to a user, patient, or other person, or could lead to clinical misdiagnosis, and/or loss or damage of patient-related data.</p> <p>Also: This symbol is used on the device label to highlight the fact that there are specific warnings or precautions associated with the device, which are not otherwise found on the label.</p>

## Accessing the instructions for use from the internet



1. Go to the following website: [www.philips.com/ifu](http://www.philips.com/ifu)
2. Follow the instructions on the website and select your preferred language.  
The PDF file is downloaded from the website and saved to your computer. You can open the file using a PDF reader application. If you do not have a PDF reader application installed, you can download Adobe Reader from the following website: [www.get.adobe.com/reader](http://www.get.adobe.com/reader).

### Obtaining the instructions for use in paper form

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