



Contributing Value

An emergency medical service took a long-term view when standardizing its defibrillator/monitors

Who/where

Emergency Medical Services,
Freiburg, Germany

Dr. Frank Koberne, Medical Head of
the Emergency Doctor Service

Challenge

Standardize on a defibrillator/
monitor for paramedics and
emergency doctors

Solution

HeartStart MRx

The emergency medical service in the Freiburg region, in south-west Germany, does not limit itself to the usual way of working: the emergency doctors work in shifts, for example, rather than being on standby. This has benefits for the overall cost of treating emergency patients. When replacing its defibrillator/monitors in 2005, it also took a broader view, and standardized on a single solution for the 26 vehicles. By thinking about both quantity and quality, the goal was to maximize both functionality and value.

Unlike some European countries, which only have paramedical teams, Germany's emergency medical services have a second tier. For around 40% of calls an emergency doctor responds in parallel. In most regions, these are hospital doctors who are on standby. The town of Freiburg is one of the few locations with a dedicated emergency doctor station. In rotation, the hospital releases doctors from their responsibilities to work the same shifts as the paramedics.

In part, this is a response to the workload. With a population of over 250,000, the emergency doctors in Freiburg attend more than 6,000 calls a year. On Fridays in particular, they can often respond to call after call, without returning to the station. But Dr. Frank Koberne, Medical Head of the Emergency Doctor Service in the Freiburg region, points out that a dedicated service is also part of making the emergency work attractive, because it is significant work, and not a distraction. Emergency work done on



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Doctor Service

standby is often the duty of the most junior member of a team. The extra stress of being on call means many give up this emergency work as soon as they can. This stops them building up expertise. The time the emergency doctors work in the station in Freiburg proves the value of their approach: the average is 12 years service, and the longest serving member has been there 26 years.

PHILIPS

Emergency expertise to relieve hospital resources

This way of working is not only attractive to the doctors. Dr. Koberne sees it as a way of saving money for the health service. There is pressure in Germany to take costs out of the emergency services by using only paramedics. Dr. Koberne argues that expanding the dedicated emergency doctor service, can reduce hospital admissions and patients can receive better treatment – creating overall savings.

Inexperienced emergency doctors will often err on the safe side, and admit patients that might not need hospitalization.

Dr. Koberne quotes the case of an elderly person collapsing in the street.

An experienced emergency doctor confidently recognizes dehydration, and sends the patient home after treatment. A less experienced colleague may decide to admit the patient, just in case there is a cardiac problem.

On average in the state of Baden-Württemberg emergency doctors leave 6% of patients at home. For Freiburg this figure is 20%.

Similarly while the survival rate for cardiac arrest in the state is around 20%, the expertise of the emergency medical staff, the two-tiered defibrillation and the quality of equipment raises this rate to 50% for the Freiburg region. Results like these have prompted Freiburg to become a competence center for emergency doctor services in south-west Germany.

In fact, the expertise of the doctors in Freiburg is such that they can even decide autonomously to start up catheter laboratory interventions while the patient is still in transport. An internal study has backed up the quality of these decisions, and Dr. Koberne has presented this approach internationally,



Freiburg was the first site in Germany to buy the MRx, and one of the first in Europe to use it outside the hospital

with Prof. Dr. Christoph Bode, Head of Cardiology and Angiology at the University Clinic, Freiburg.

The right choice of equipment

When it comes to equipment, Dr. Koberne is again keen to take a longer term view. Though the various stations and ambulance services had been equipped with defibrillator/monitors at different times, by 2004 many were soon due for replacement. This seemed like an ideal time to standardize on a single model. Though it meant a major investment, the idea was to save money in the longer term by buying in bulk. By buying 26 units of a product that was fairly new on the market – Freiburg was the first site in Germany to buy the MRx, and one of the first in Europe to use it outside the hospital – Dr. Koberne was also investing in the possibility to further develop the product to suit real needs.

The process for deciding on a solution for the whole area involved the emergency doctors and members of each of the paramedic services – the Order of Malta and two regional groups of the German Red Cross. They evaluated all the defibrillator/monitors on the market with an extensive evaluation form. This covered the availability and quality of features, the ease of use, and the buying and running costs. They finally decided the Philips HeartStart MRx offered the best combination of accessible, useful functionality and value for money.

"The MRx is very intuitive to use. You can put it down in front of a responder and they will know what to do with it"

The accessibility of the features is particularly important. Every member of staff has to train on the equipment, but what most impresses

Dr. Koberne is that on the MRx, the features you need “are not buried elbow-deep in menus. It is very intuitive to use. You can put it down in front of a responder, and they will know what to do with it.” This was a major factor in the decision.

“I am very impressed by how seriously Laerdal and Philips take our feedback.”

“The MRx is a great device, I am definitely a fan,” says Dr. Koberne, despite some early problems because they were among the first to use it for emergency response. “This was often very productive for us, in the end,” he adds. Issues included mounts that did not always hold the MRx under the vibration in the ambulance, or poor protection of the screen from knocks, for example when the paramedic was carrying the MRx over a shoulder. “I am very impressed by how seriously Laerdal and Philips take our feedback,” he says of how they corrected these problems. “We can see how our innovations contribute to the overall product.” His favorite example is the ECG cable, which after a year of heavy use became prone to breaking when the paramedic rewound it to fit back in the carrying case. Today the cables are much more flexible and robust.

Defibrillation and extensive monitoring

The full region is made up of the town of Freiburg and the area 60 km around it. This has 500,000 inhabitants, 10,000 emergency medical calls a year, and is covered by 6 emergency doctor vans, and 20 ambulances.

Each of these vehicles is equipped with an MRx. This ensures whoever gets to the



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patient first is ready to defibrillate. (In fact, Freiburg was first in this part of Germany to set up a two-tier defibrillation programme to minimize the time to first shock, by training lay responders in the other emergency services how to use Automatic External Defibrillators (AEDs)). Normal practice is for the paramedics to use the defibrillator in half-automatic mode (as an AED). The emergency doctor can then choose to switch to manual operation. Many choose to continue in half-automatic mode because they find the MRx keeps a good rhythm.

“When you see all 12 leads in parallel, you can see changes immediately.”

They use the MRx for monitoring in just about every call the emergency medical services get. They are all configured with 5- and 12-lead ECG, pulse oximetry (SpO₂), capnometry, and non-invasive blood pressure (NBP). Motion artifacts mean the NBP is not accurate during transport, but is a useful addition at the emergency site, which has

increased the overall use of monitoring. Capnometry is standard for every reanimation and every ventilated patient. They use SpO₂ in almost every case.

The emergency doctors are experienced in interpreting ECGs to make treatment decisions, and have received extra coaching from the cardiologists. They therefore saw no need for the option to transfer the traces to the hospital for teleconsulting. However, this meant the 12-lead ECG needed to be good. The MRx excels here by providing all 12 leads simultaneously on the screen. “This is great for patients after a heart attack, when there are ECG changes during transport,” explains Dr. Koberne. “When you see all 12 leads in parallel, you can see changes immediately. If you only have one or two leads at a time, you might not notice anything.” The MRx also has software to analyze the 12-lead ECG. The analysis is often overcautious, and points out any and every possible problem. While the paramedics now largely ignore the report, Dr. Koberne finds it useful as a cross-check for his interpretation of the traces.



The HeartStart MRx is standard equipment for all ambulances and emergency doctor vehicles in the Freiburg region.

Ensuring quality, immediately and in the long-term

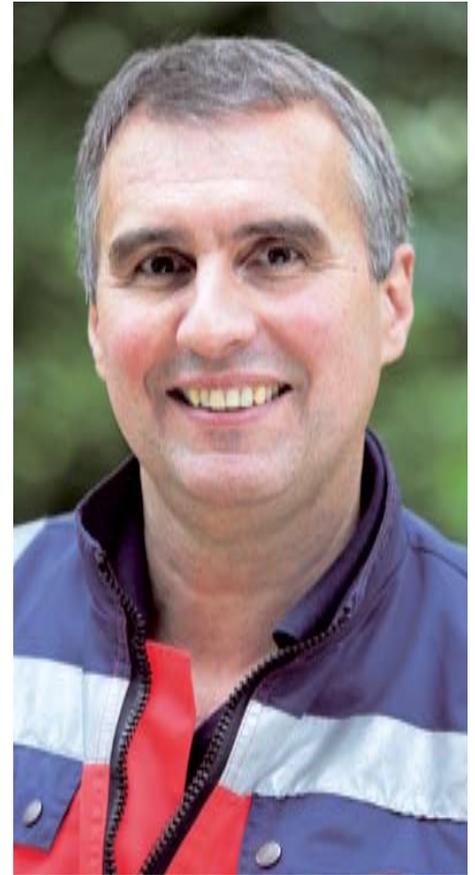
Freiburg also pioneered electronic recording of deployment details in south-west Germany. Filling in the electronic form, when the doctors get back to the station, is a precondition for their payment.

This ensures comprehensive data for quality improvement. A current project is looking at using a tablet PC to record the details about the deployment as it happens. This would also include a selection of the information recorded by the MRx to make a complete record. The cardiologists already use this data for cardiac patients. It lets them see how the ECG looked before, and how it developed after defibrillation. This can help them decide whether a patient is a good candidate for an implanted defibrillator.

But ensuring the quality provided by the emergency doctors does not stop with

retrospective analyses. The plan is to upgrade the defibrillators with Q-CPR, a feature that monitors the quality of CPR a responder is delivering, to give immediate feedback on the frequency and pressure of compression, and the quality of artificial respiration. The immediate reaction of the paramedics and doctors was to dismiss this. But after experiencing it "there is now great enthusiasm for using it," says Dr. Koberne. In this case the data will not be part of the electronic record – it is purely to ensure the quality of CPR at the site of the emergency.

"The MRx was a great choice, the response teams accepted it quickly, and the satisfaction remains very high," says Dr. Koberne, crediting this to the accessible functionality. This is also proving to be the greatest value: he adds, "We had positive expectations for the device, and these have been fulfilled. It doesn't come better than that."



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Philips Medical Systems is part of Royal Philips Electronics

www.medical.philips.com
medical@philips.com
fax: +31 40 27 64 887

Printed in The Netherlands
4522 962 25411/861 * JUL 2007

Philips Medical Systems
Global Information Center
P.O. Box 1286
5602 BG Eindhoven
The Netherlands