PHILIPS

Auto Cine

Workflow efficiency for fast, consistent first-time-right frame selection

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This white paper describes efficiency study results of Auto Cine, including reduction in time to select the best frame for review, improved first-time-right frame selection, reduction in number of frames scrolled and user impressions of workflow and image quality gains vs manual workflow. Auto Cine allows for faster best-frame selection (up to 54.4% less time) and substantially higher first-time-right selection during standardized abdominal and vascular workflows, while also reducing user interactions (button pushes and frame scrolling).



Overview

Selecting the best frame is a routine but critical step in ultrasound exams: clinicians depend on clear, clinically acceptable images for confident review. Current ultrasound workflow requires manual trackball scrolling after selecting the "freeze" function to search for the right frame, often repeatedly across an exam. Over dozens of image captures, this manual post-freeze searching can slow workflow and introduce variability in how quickly and effectively the best frame is identified.

The Philips Auto Cine function in the latest release of Philips ultrasound systems has demonstrated significant reduction in time to select the best frame and improved first-time-right frame selection in abdominal and vascular scanning. While this study covers only abdominal and vascular scanning, Auto Cine is available across Philips ultrasound applications, including general imaging and women's healthcare.

Study objective

This study quantified workflow efficiency improvements (reduced time to select frame, rate of first-time-right frame selection, and number and quality of user interactions) when selecting the best frame during abbreviated abdominal and vascular ultrasound protocols using Auto Cine compared with manual workflow **(Table 1)**.

Study design

This prospective, single-site activity used device log data from paired scanning on both study devices (previous and current releases of Philips general imaging ultrasound) and collected subjective user feedback. A total of 18 examinations per application set (nine abdominal and nine vascular), based on three models scanned by three sonographers per application, with each model scanned on both devices. Objective device log data were collected during abbreviated but clinically relevant abdominal and vascular scanning protocols performed on systems with and without Auto Cine. Statistical approach: paired comparisons (Auto Cine compared to manual), percent change calculated as 100×(Auto Cine compared to manual)/manual; paired t-tests with 95% confidence intervals reported for key endpoints.

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Workflow endpoints

Objective measurement

Number of button pushes required to select the best frame

Image selection time (from press of "freeze" function to acquisition of clinically acceptable image

Rate of first-time-right image selection (how often the frame selected on "freeze" is a high-quality, clinically acceptable image)

Number of frames scrolled after "freeze"

Subjective measurement

User perception of intuitive/user-friendly workflow, first-time-right images and image quality improvement, measured using the Likert-scale rating tool

Table 1
Objective and subjective measures of workflow endpoints.

Results

Auto Cine (2D and color/pulsed wave Doppler modes) is intended to reduce post-freeze searching and help users reach a best frame faster, with results showing up to a 54.4% reduction in time to select the best frame (abdominal scanning) and improved first-time-right selection when freezing during scanning.

Auto Cine has been found to significantly reduce button pushes required to select the best frame and also reduces number of frames scrolled in abdominal and vascular studies. All users in the study reported more intuitive, user-friendly workflow, as well as increased incidence of first-time-right abdominal and vascular images, and enhanced image quality using the latest release of Philips ultrasound with Auto Cine **(Tables 2, 3 and Figures 1-5)**. These results support quantitatively meaningful gains in workflow efficiency with Auto Cine.[1]

Workflow and user perceptions[1]

	Improvement in first-time-right frame selection	Reduction in time to select best frame	Reduction in button pushes to select best frame	Reduction in frames scrolled	Users perceiving Auto Cine workflow to be more intuitive/ user-friendly, offer more first-time-right images and exhibit image quality improvement
Abdominal	+68.9%	As much as -54.4%	-32.7%	-83.3%	100%
Vascular	+37.8%	As much as -45.7%	-24.8%	-86.5%	100%

Table 2
Auto Cine improvement in first-time-right frame selection; reduction in time and button pushes to select the best frame; reduction in frames scrolled; user perceptions of improvements in workflow and image quality. All paired t-tests p<0.0001.

Rate of first-time-right image selection[1]

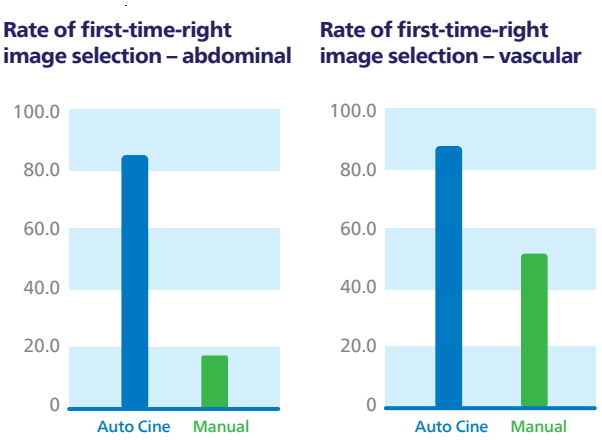


Figure 1
Increase in first-time-right image selection Auto Cine vs manual for abdominal and vascular scans.

Image selection time[1]

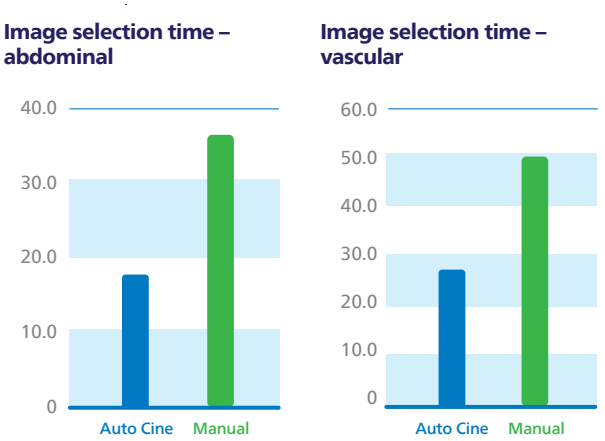


Figure 2
Reduction in image selection time Auto Cine vs manual for abdominal and vascular scans.

Number of button pushes required[1]

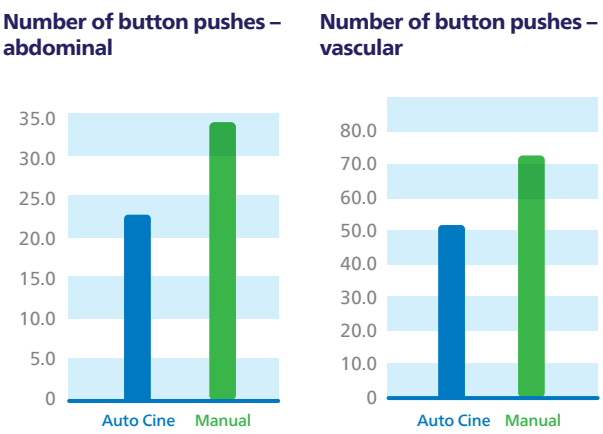


Figure 3
Reduction in button pushes required for Auto Cine vs manual for abdominal and vascular scans.

Number of frames scrolled post-freeze[1]

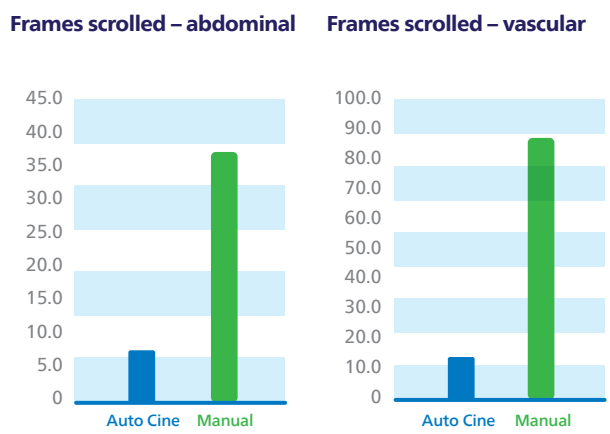


Figure 4
Reduction in the number of frames scrolled post-freeze for abdominal and vascular scans, indicating improved efficiency of Auto Cine vs manual workflow.

Additional context for first-time-right image selection[1]

	Manual	Auto Cine
Abdominal	15.6% (1.5 times out of 10)	84.4% (8.5 times out of 10)
Vascular	50.0% (5 times out of 10)	87.8% (8.8 times out of 10)

Table 3
Comparison of first-time-right image selection for manual workflow vs Auto Cine.

Post-study feedback from sonographers[1]

"Huge improvement for sick patients that have trouble breathing."

"More enjoyable to scan with the new updates."

"Very intuitive and easy to use."/"I would use Auto Cine all the time."

"Definitely would save me time and effort throughout my exams."

"By the time you have to think about picking your image it's done. Makes me think I only take good images."

"Very useful during ICU/transplant exams where I have a small amount of time to optimize so this would be very useful."

How Auto Cine aids efficiency in 2D and color/pulsed wave (PW) Doppler

2D Auto Cine

The system applies two primary criteria to automatically select a frame at "freeze" function: (1) it prioritizes frames that are consistent with where the user was scanning immediately before pressing freeze (so the selected frame is context-relevant), and (2) it selects the algorithmically sharpest frame from that relevant set. This helps reduce the need for manual scrolling, which can be time-consuming and variable across users when performed repeatedly throughout an exam.

Color/PW Auto Cine

The system uses multiple criteria derived from color information to identify a high-quality frame with strong color signal and maximum color fill, used as a proxy for peak systole, so that the user is presented with a representative frame automatically at "freeze". This approach is intended to work broadly across vascular targets by analyzing the color data directly to support consistent, high-quality image selection without manual post-freeze searching.

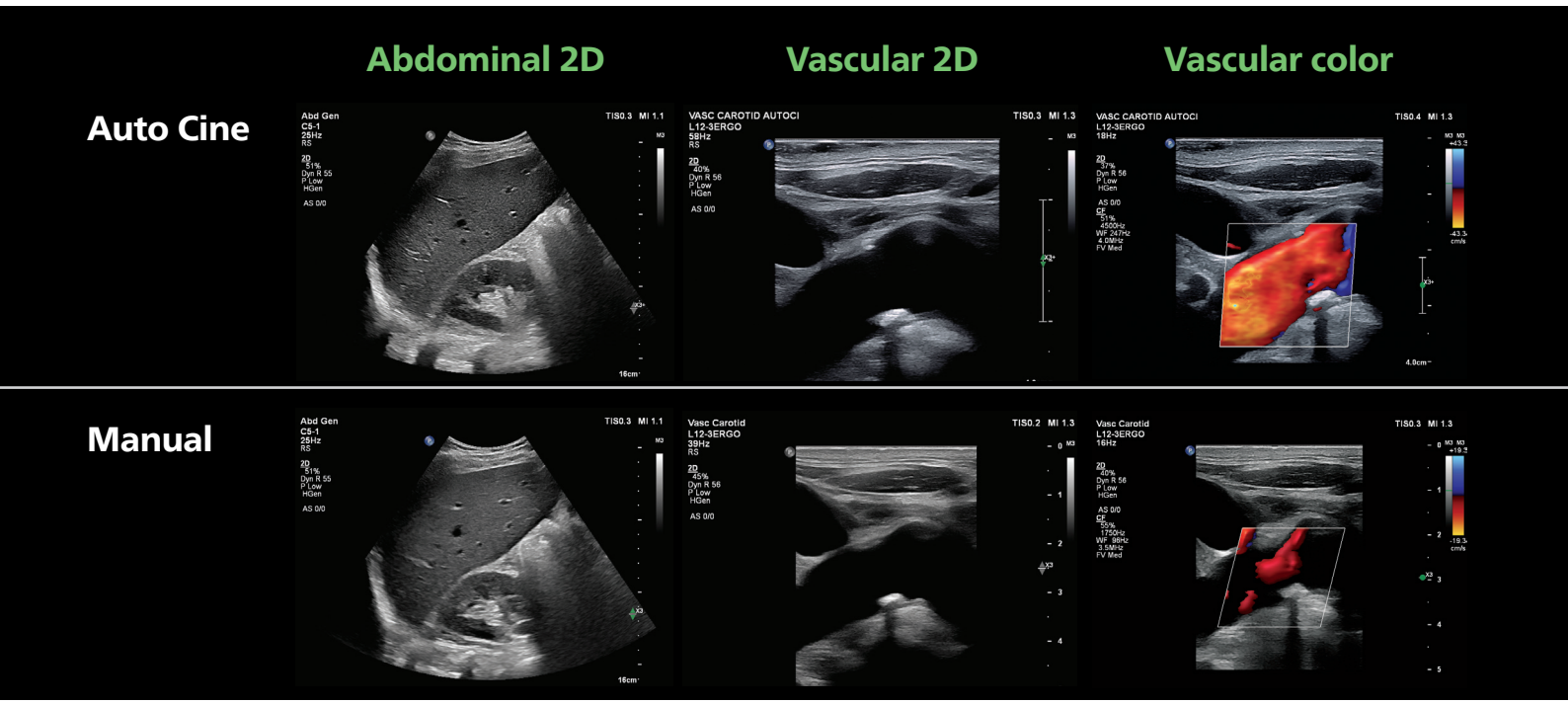


Figure 5
Clinical image comparison of frames selected with Auto Cine vs manual workflow.

Conclusion

Manually choosing a high-quality image for review can disrupt workflow, requires fine manipulation, is time-consuming and can yield inconsistent results in an ultrasound exam. Auto Cine supports a more efficient scanning experience by allowing for faster best-frame selection (up to 54.4% less time in abdominal scanning and up to 45.7% in vascular scanning) and higher first-time-right image selection during standardized workflows for abdominal and vascular scans.

Reference

1. Internal documentation: Validation report D002362562.

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