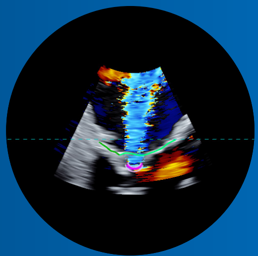
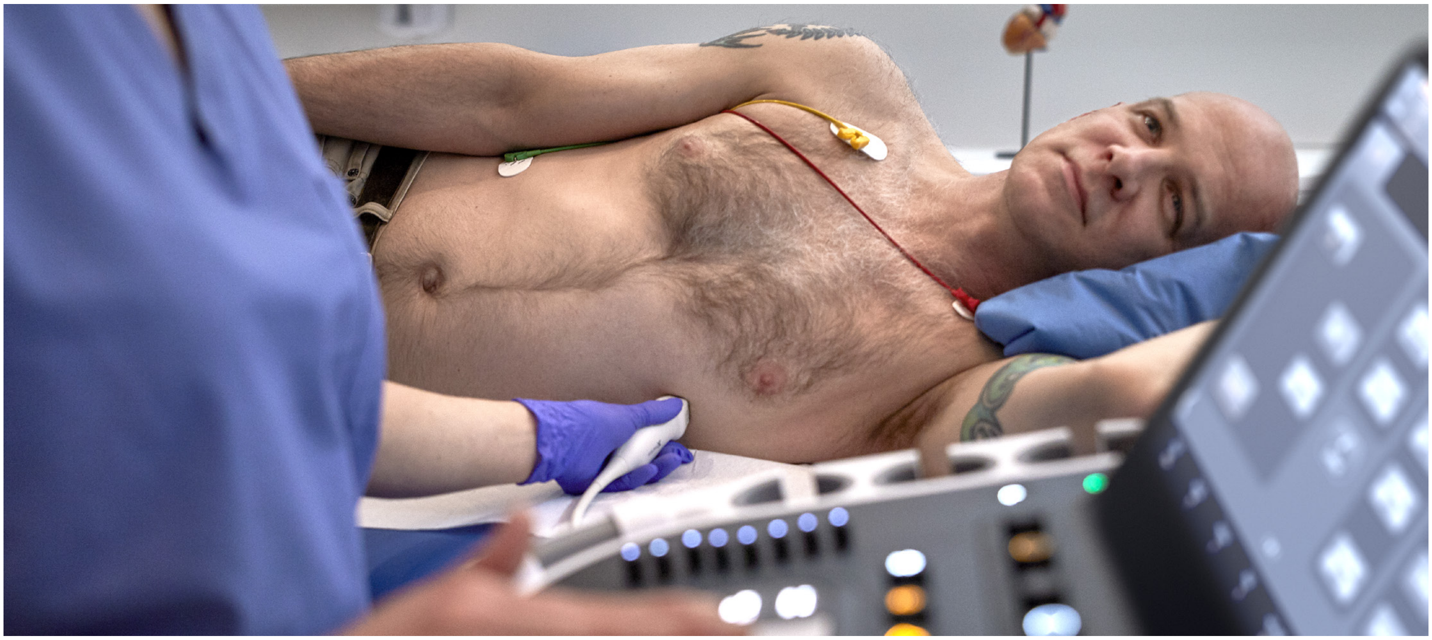
Philips AI-enabled ultrasound

Smarter scans, fewer clicks, more control

Works behind the scenes to make ultrasound more intuitive and reproducible, scan to scan, user to user





Challenge

Keeping up with cardiac ultrasound demand. Time-consuming manual and repetitive tasks associated with getting measurements. Inconsistent results due to inter- and intra-user variability. All of these factors can make it difficult for clinicians to get ultrasound imaging answers quicky and accurately.

Solution

Philips is integrating AI technology into ultrasound in ways that address what's challenging clinicians today to help them to work smarter and faster. Our AI-powered features are built into the end-to-end workflow — from image acquisition and selection, to measurement and quantification, to analysis for clinical decision support — while the ultimate decision-making stays with the clinician.

Impact

Shifting the repetitive, time-consuming tasks associated with image capture, measurement and analysis to AI can drive productivity and take the subjectivity out of the process. It can also save clinicians repetitive clicks and keystrokes, and free them up to focus more on patient care. Philips AI technology:

1. Shortens exam time and interpretation[1, 2, 3, 4, 5]
2. Improves accuracy and reproducibility[1, 5, 7, 8]
3. Reduces variability between users[1, 5, 7, 8]

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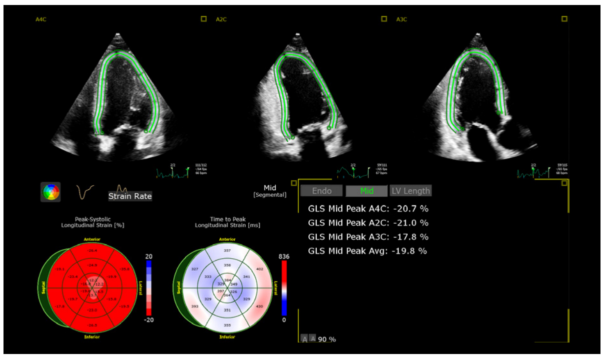
AI is a way to say smart automation. It's smart because its allowed to do things much faster, more accurate, more reproducible and in a way that takes the subjectivity out of the analysis process that today is very subjective and user-dependent."

– Hila Goldman-Aslan
Philips Ultrasound AI Strategy Leader
Founder, DiA Imaging Analysis

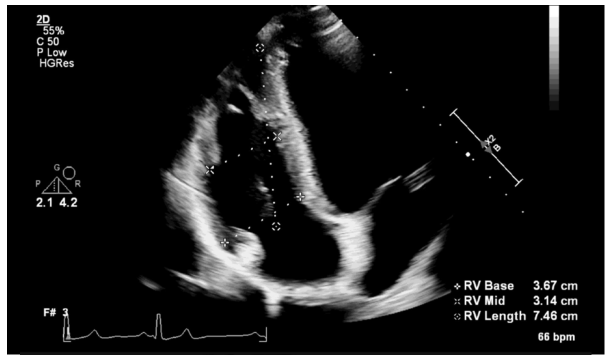
Our latest AI features

As of an internal patent review in October 2023, Philips has been granted over 200 ultrasound-related AI patents.

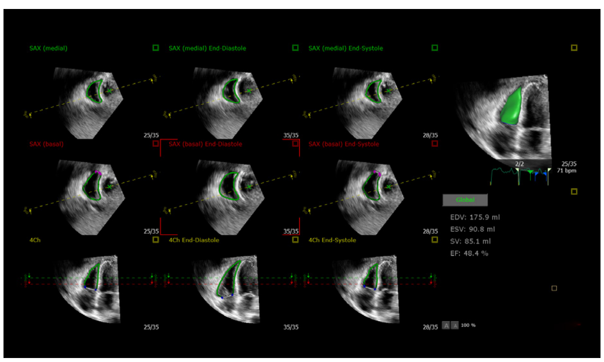
We have industry-leading solutions in the market today, both on and off the cart, that use AI to reduce variability and increase productivity, and we're continually innovating.



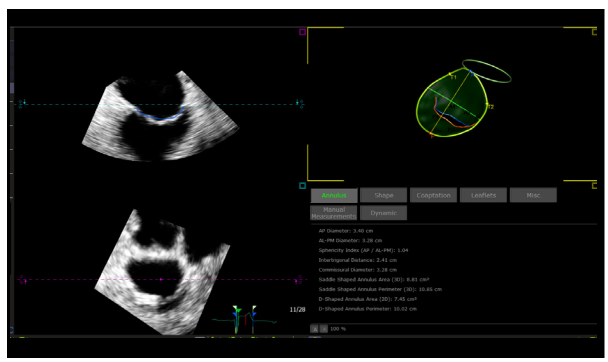
AutoStrain*: fast, reproducible 2D strain quantification for the LV, LA and RV



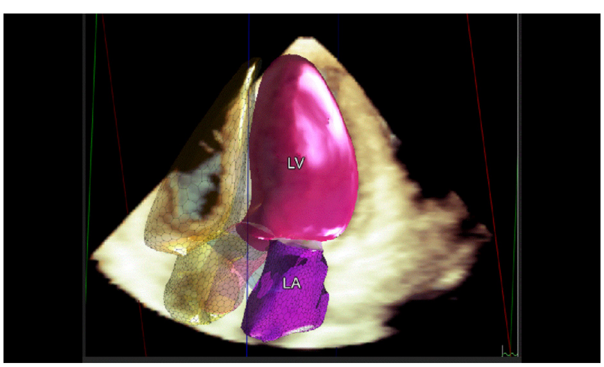
AutoMeasure: fully automated and reproduceable routine 2D and Doppler cardiac measurements



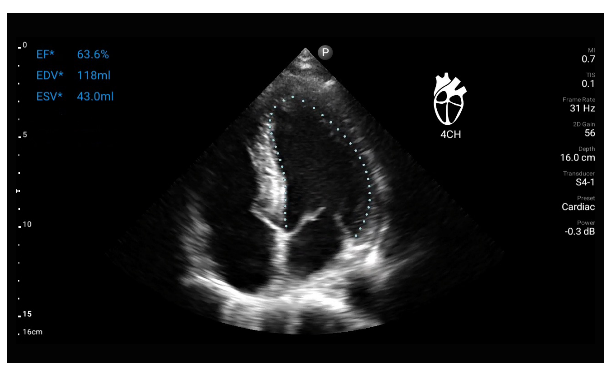
3D Auto RV: full 3D quantification for LV, LA and RV volumes and functional assessment



3D Auto MV: semi-automated measurements of mitral valve annulus and leaflet morphology



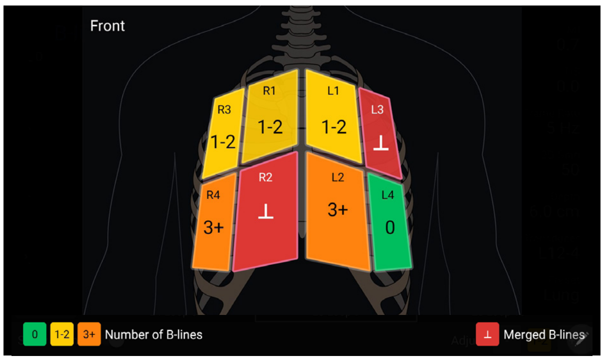
Dynamic Heart Model*: tracks every frame over the cardiac cycle using 3D speckle technology to provide a holistic view of the left heart function



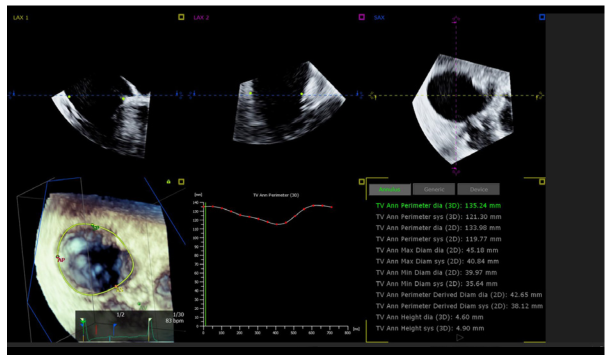
Auto EF:** uses an apical 4CH view to automatically detect the LV endocardial border and calculate the ejection fraction

Our latest AI features

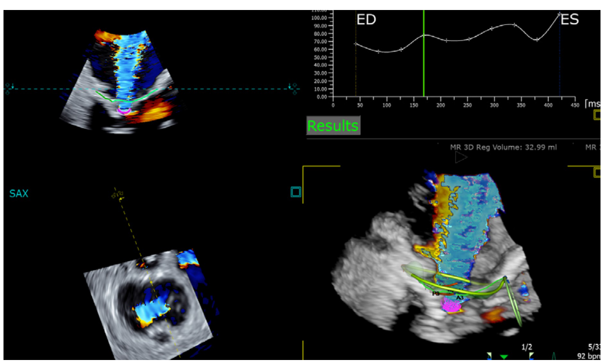
We're continually innovating, and a number of updated versions and new features are coming out.



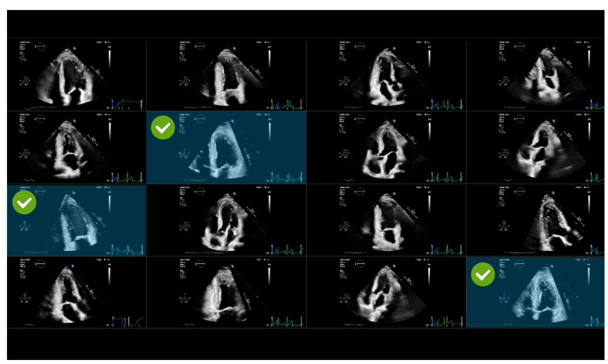
Auto B-line:** assists in detecting interstitial lung fluid and guides therapy of lung disease



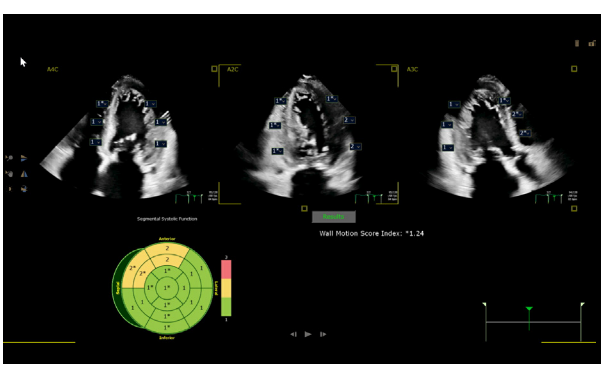
3D Auto Tricuspid Valve Quantification*:** automated, reliable 3D tricuspid valve annulus measurements to help confirm device selection



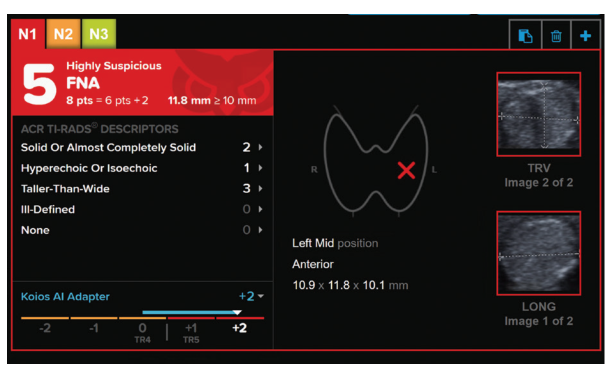
3D Auto Color Flow Quantification*:** offers fast, easy, reproducible MR volume to help assess MR severity



Smart View Select: automatically selects the three best images for strain quantification (this is a graphical depiction of SVS)



Auto Segmental Wall Motion Scoring: automated evaluation of wall motion for objective assessment for a holistic view of the left heart function



Philips Ultrasound imaging plus Koios AI-based clinical decision support software: provides a BI-RADS (breast), TI-RADS or ATA (thyroid) score on the selected nodule as well as a confidence level indicator

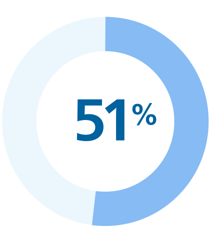
Impact:
Fast, accurate and intuitive[1-7]

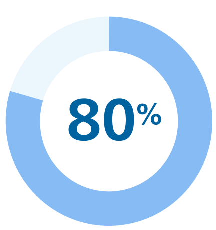
51% The Auto Measure feature can reduce quantification time by 51%.[1]

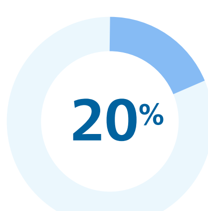
82% Total time saved for acquisition and analysis combined: 3DE image acquisition required less time than the multiple 2DE views required for volume measurements. Analysis of the 3DE images was significantly faster than that of the 2DE images. Total time saved for acquisition and analysis combined was 82% in the fully automated mode and 63% even when manual editing was performed.[5]

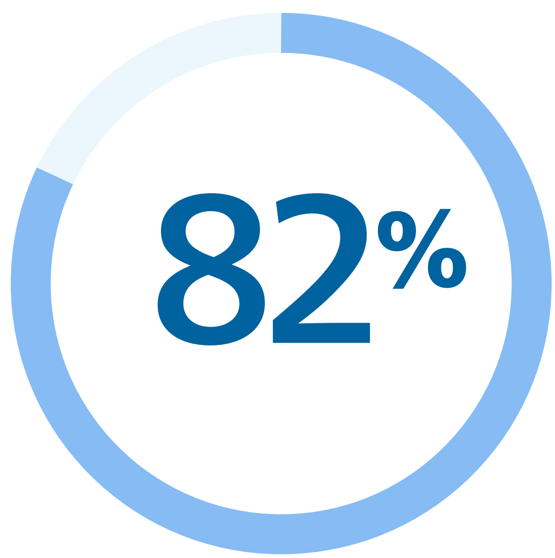
80% Agreement that the AutoStrain LV application was fast and easy to use, after performing 10 echo exams with the Compact 5500 system.[9]

20% Reduction in 2D diagnostic echo exam time by incorporating Philips automated solutions into everyday echo.[4]



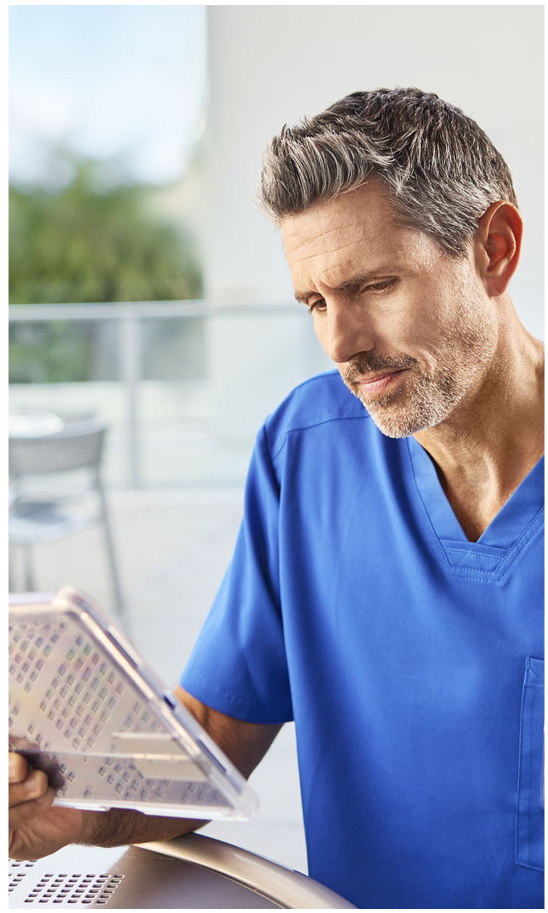






Total time saved for acquisition and analysis combined

Responsible AI – for meaningful measurements clinicians can trust



Developing machine learning and deep learning for cardiac ultrasound AI requires vast amounts of data, and data quality is paramount in order to give clinicians results they can count on.

- Philips algorithms are trained on hundreds of thousands of culturally diverse clinical cases and on images taken with vendor-neutral, cross-platform machines.
- Our data is highly controlled and annotated by experts.
- Our AI-enabled technology follows FDA guidelines as well as our own framework for quality control.[10]
- Philips is committed to ethical use of AI. Our CEO, Roy Jakobs, co-chairs U.S. National Academy of Medicine's Steering Committee on AI Code of Conduct, to develop a framework to ensure equitable, ethical, safe and responsible use of AI health and healthcare.[11]

"

AI offers unprecedented new opportunities and developing an AI Code of Conduct will help to ensure equitable, ethical, safe and responsible use of AI in health and healthcare. This is about designing a framework to deliver on the full promise of AI, with people at the center, so we can help more care providers help more patients."

—**Roy Jakobs,** Philips CEO

Committed to innovative AI

Our commitment to ultrasound AI includes two major acquisitions. We are merging the groundbreaking cardiovascular ultrasound AI capabilities of TomTec (an industry-leading automation solution) and DiA (a company specifically focused on cardiac ultrasound AI) with Philips solutions. Our combined technologies aim to push limits of ultrasound AI diagnostic capabilities while prioritizing high-quality, responsible AI every step of the way.

Expanding access to OB care with Lumify

Philips is developing, with support from **the Bill & Melinda Gates Foundation**, AI-driven algorithms built into the Philips Lumify handheld ultrasound, to improve the quality and accessibility of obstetric care for women living in remote and underserved communities.

With this disruptive technology, Philips is emerging a new way of performing ultrasound scans in which midwives and non-expert users will be guided by AI driven algorithms, identifying critical parameters in prenatal ultrasound exams. The AI assistant will measure and interpret images from the ultrasound itself, and then provide important information about the health of the mother and baby.

Thanks to this AI enabled version of Lumify ultrasound, more healthcare providers will be able to perform ultrasounds after only a short training program and without having to make image interpretations, hugely expanding the pool of health workers.

This prototype application does not yet have global regulatory approval.

FOOTNOTES:

[1] The Auto Measure feature can reduce the quantification time by 51%. VM9 claims document 270472 A.

[2] AutoStrain – automated global longitudinal strain (GLS) measurement, Verena Roediger, PhD. PM, TOMTEC/Philips White Paper. Printed in The Netherlands. 4522 991 45791 * FEB 2019.

[3] After performing 10 echo exams with the Compact 5500 system there was 80% agreement that the AutoStrain LV application was fast and easy to use. 275264C_Protego Claims List for Marketing Communications and 277399 Protego User Preference

[4] Reduce your 2D diagnostic echo exam time by 20% by incorporating Philips automated solutions into your everyday echo. 270472_VMQ9.0 Claims Evidence Report

[5] HeartModel study (4522 991 17141 * MAY 2016) by Dr. Roberto Lang: Automated transthoracic three-dimensional echocardiographic quantification of the left heart chambers

[6] AutoStrain, AutoMeasure, EchoNavigator, 3D Auto MV, 3D Auto RV, HeartModel as compared to equivalent manual methodology.

[7] "Validation and Reference Values for Three-Dimensional Echocardiographic Right Ventricular Volumetry in Children: A Multicenter Study." J Am Soc Echocardiogr 31(9): 1050-1063.

[8] Henry MP, et al., Three-Dimensional Transthoracic Static and Dynamic Normative Values of the Mitral Valve Apparatus: Results from the Multicenter World Alliance Societies of Echocardiography Study. J Am Soc Echocardiogr. 2022 Jul;35(7):738-751.e1. doi: 10.1016/j.echo.2022.02.010. Epub 2022 Mar 1. PMID: 35245668; PMCID: PMC10257802.

[9] 277399 Protego User Preference

[10] Philips AI Principles | Philips

[11] Philips CEO Roy Jakobs co-chairs US National Academy of Medicine's Steering Committee on AI Code of Conduct.

* Dynamic HeartModel and AutoStrain are advanced automation solutions, not currently certified as artificial intelligence.

** Auto EF and Auto B-line on Lumify: Not available in all countries. Contact your sales representative for more details.

*** 510(k) pending, not available for sale in US.

4522 991 85621 * July 2024

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