PHILIPS

Position paper

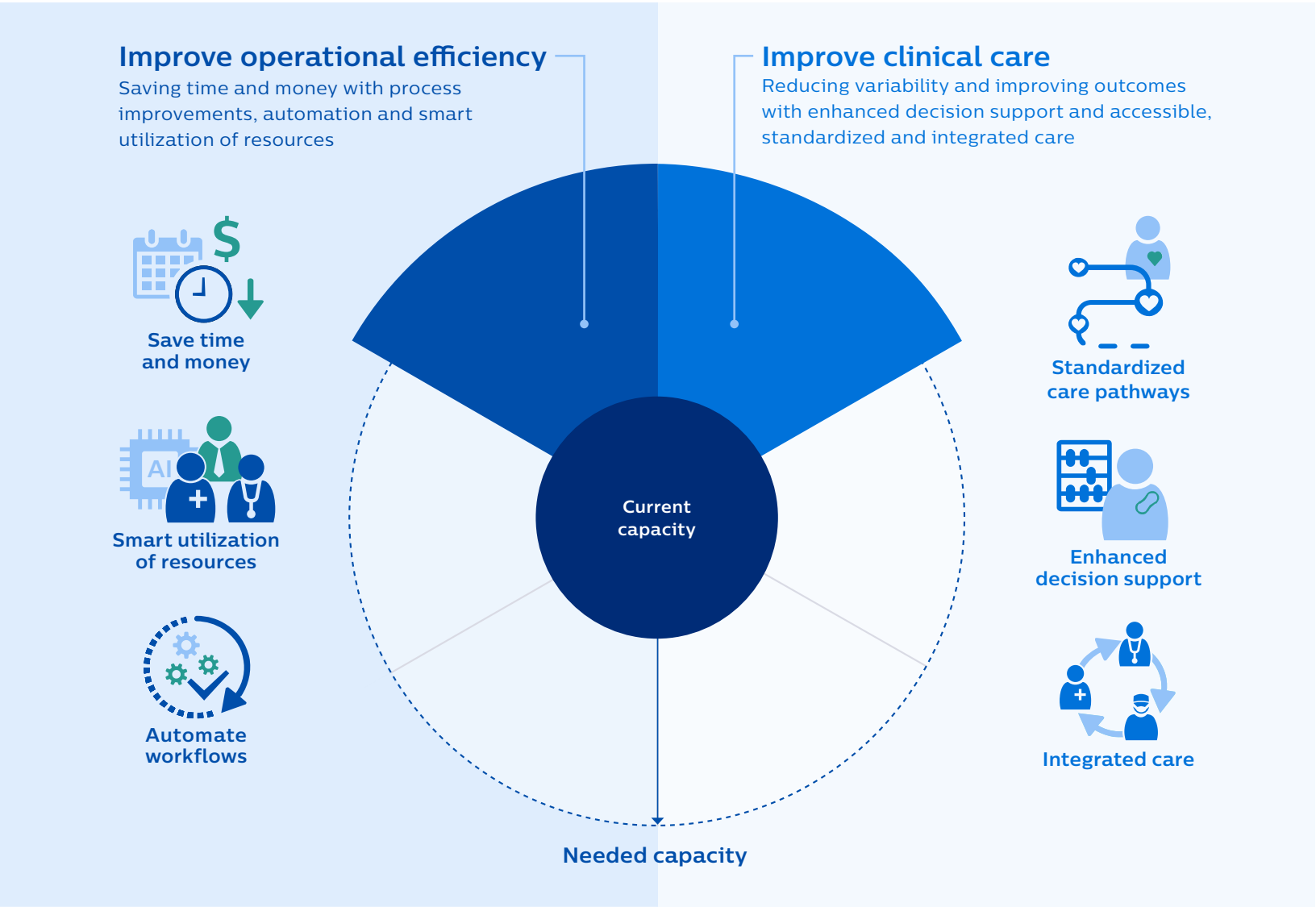
Turning bottlenecks into breakthroughs

How a human-centered approach is driving workflow efficiencies

Our nation's healthcare system is forever changed due to a global pandemic that has accentuated vulnerabilities and accelerated shifts in how and where care is delivered, forcing health systems to reevaluate critical service lines. To expand today's capacity and capabilities to match tomorrow's needs, health systems are embracing innovative approaches to support their workflows.

Strategies for improving workflows

To close the capacity and capabilities gap, health systems will need to:

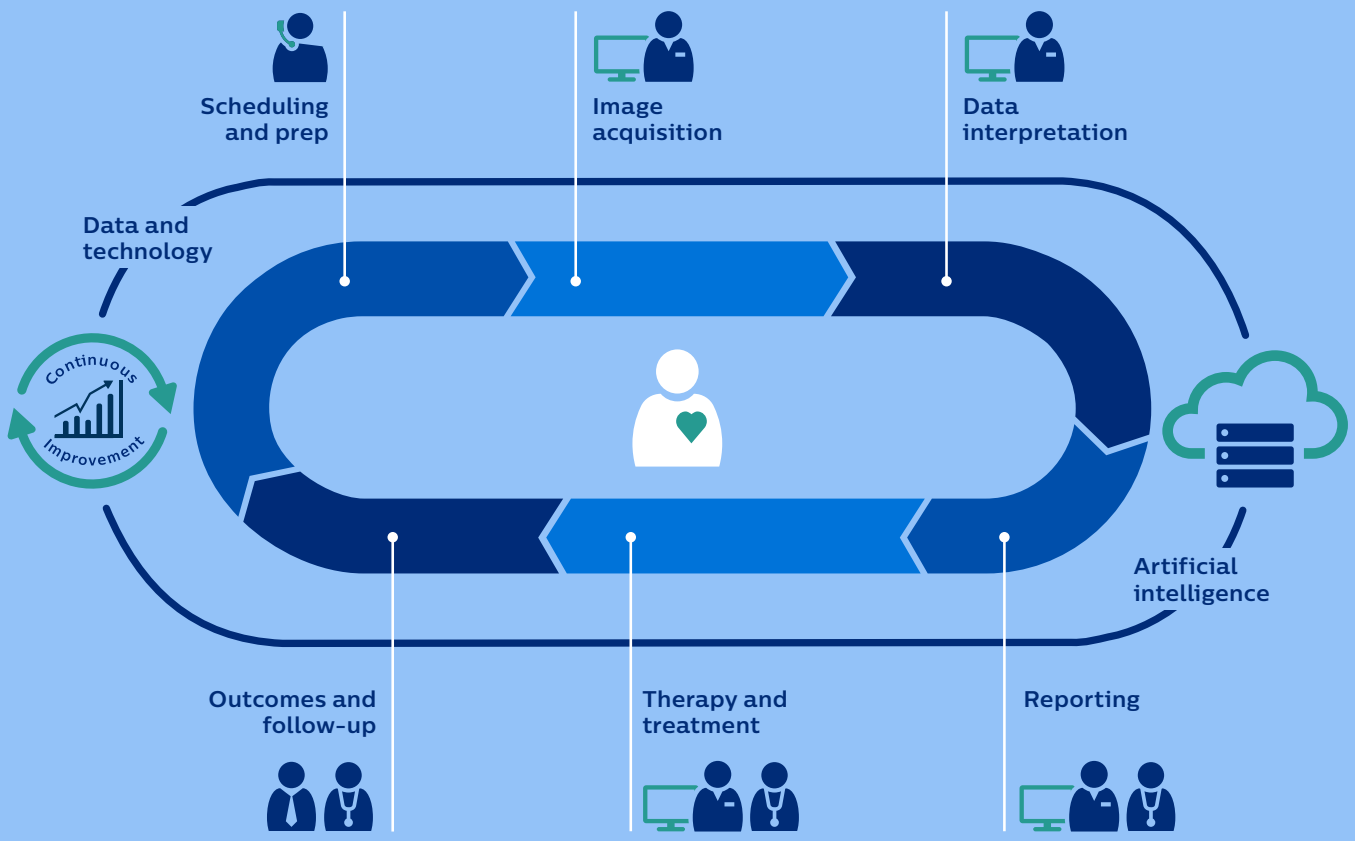


As you aim to improve efficiencies and outcomes to deliver on the quadruple aim, Philips is with you to provide a connected care ecosystem of integrated workflow solutions for radiology, cardiology and oncology. Our human-centered design approach combines automation, artificial intelligence (AI) and smarter processes to enable clinical teams to focus on patient care – efficiently and effectively.

Improve operational efficiency

Improving operational efficiency requires a holistic view of workflows, a multidisciplinary team to identify workflow challenges and the ability to improve the entire patient journey – not just one step along the way.

A systems view – from scheduling to diagnosis to treatment and follow-up



Analytics and experts turn insights into outcomes

The old adage of "you can't manage what you can't measure" is particularly relevant in the complex world of healthcare, where workarounds and a certain level of inefficiency feels par for the course. We often hear that this is just how it is and how it's always been. But it doesn't have to be. When we've implemented performance analytics for customers, they have often been surprised by the state of their operations compared with benchmarks of what could be – even in the face of ever-changing protocols. The data-driven insights not only help customers understand the health of their current operations but the insights also provide a strong rationale for making the commitment to transform.

Transforming operations can happen in ways large and small and in timeframes immediate and long-term. Working in healthcare for as long as we have, we know that while there are many best practices, the

A focus on value to improve care and health outcomes

circumstances for each customer vary and healthcare transformation is not one-size-fits-all. Our consulting team helps pinpoint areas for improvement and creates results that matter to your specific organizational goals. We start by listening to and learning from you, working together to identify the root cause of the challenges you are facing. Our aim is always to recommend clinical, operational and technical solutions tailored to your needs now and over time to help you transform healthcare.

Optimize performance and patient satisfaction, too

Health systems are, by their very nature, complex. Inefficiencies are bound to happen, but in some cases, these inefficiencies can actually lead to patient walkouts and patients seeking care elsewhere.

For example, the emergency department (ED) at St. Mary Medical Center in California was challenged with persistently long patient wait times and a high rate of patients leaving without being seen. The organization turned to Philips to help them overcome process inefficiencies and enhance patient flow in their ED. Philips consultants joined their day-to-day team to analyze, observe and identify core opportunities for operational improvements. Through this consulting engagement, St. Mary Medical Center achieved an 85.3% reduction in patients leaving without being seen, a 66.2% reduction in arrival-to-provider time and a 34% reduction in ED length of stay.[1,*]

Collaborating to improve ED patient flow[1,*]

Philips partnership with St. Mary Medical Center resulted in an:

85% reduction in patients leaving without being seen

66% reduction in arrival-to-provider time

34% reduction in ED length of stay

*Results are specific to the institution where they were obtained and may not reflect the results achievable at other institutions.

Spotlight: WellSpan York Hospital

Collaborating to improve patient throughput

Optimizing workflow efficiency to streamline the patient experience

As south-central Pennsylvania's leader in advanced specialty care, WellSpan York Hospital serves a population of more than 520,000. With 600 beds and more than 4,400 employees, this nationally recognized teaching institution and home to a Level 1 trauma center has been serving the community for over 100 years. On a mission to improve health through exceptional care for all, hospital leaders were keenly aware that barriers to optimal throughput and patient experience during the hospital stay were hindering efficiency.[2]

Finding opportunities for effective and sustainable improvements

WellSpan York Hospital engaged Philips Healthcare Transformation Services team to conduct an in-depth assessment of existing processes and provide recommendations for effective and sustainable performance improvement opportunities. The goal was to manage untapped capacity, define strategies for implementation and assure buy-in from involved stakeholders. After a thorough assessment, our consultants identified five areas for improvement: patient access, patient placement, patient care facilitation, patient support and patient discharge. Through increased transparency, communication and collaboration, multidisciplinary teams gained a better understanding of bed capacity issues and how to address them.[2]

Philips will continue working collaboratively with the WellSpan York Hospital team to maintain the positive patient throughput improvements they have achieved.[2]

For more details, please view the full customer story.

Improving the patient experience while reducing costs[2,*]

74%
decreased time in maximum surge status

$1.7m
cost savings over three months supported by a reduction on geometric mean length of stay

35%
improvement in time from bed request to assignment

*Results are specific to the institution where they were obtained and may not reflect the results achievable at other institutions.

Engage patients to reduce miscommunication and missteps

A significant cause of operational inefficiencies is patient no-shows or patients who are poorly prepared. In radiology, patients who are not properly prepared often require repeat exams. It is estimated that 6.5% of patients do not show up,[3] and one study showed that repeat scans can cost approximately $115,000 per scanner per year.[4] If patients can engage in their care before they arrive, they will show up educated and adequately prepared – creating a smoother and more efficient process for everyone.

Patient satisfaction doesn't solely rely on shorter wait times. Philips patient engagement solution enables easy communication between care providers and patients. This solution acts as a digital liaison to prepare patients for their appointments, help them show up on-time and follow their care plans. By automating patient outreach and management, health systems are better positioned to focus on caring for patients.[5]

At the onset of the COVID-19 crisis, Boston Medical Center rapidly adopted Philips patient engagement platform to successfully communicate with more than 400,000 patients, providing tips on how to mitigate the spread of COVID-19, instructions for mail-order prescription refills and reminders for telehealth visits. These communications helped patients prepare and show up on time for their virtual appointments.[6]

In imaging services, studies have shown that automated reminders can lead to a 67% reduction in poor patient preparation[7] and a 42% reduction in patient no-shows.[8] Particularly as health systems reschedule a backlog of elective procedures, timely education and instructions remain essential and cost-effective.

However, preparing patients for imaging appointments is only part of the story. Helping them go through with the scan is another matter. For many patients, the stress and anxiety of undergoing a radiology exam can create a fight-or-flight response, causing patient motion that results in poor image quality. Philips Ambient Experience uses room design guidelines, dynamic lighting, projection and sound to give patients greater control and positive distractions during their journey, leading to better image quality. This has resulted in a 70% reduction in rescans and an 80% reduction in sedation, contributing to improved clinical efficiency, better use of staff resources and lower costs.[9] A recent customer survey revealed 91% of users are likely or extremely likely to recommend Ambient Experience to other hospitals.[10]

Make the best use of resources: staff and equipment

To be most effective, staff and equipment need to be utilized at just the right amount. Too much work and you risk burnout. Too little work and you risk financial health. Finding the right balance means knowing where, how and when resources are needed most. With insight into workloads, you can reallocate resources and ease the burden on care teams. By understanding where equipment is underutilized – or even unused – you can optimize scheduling and make more informed financial decisions.

A US government health agency wanted to streamline scan time to improve workload. Philips helped one of their clinics upgrade their MR by implementing compressed sensing technology, a technique used to reconstruct a full image from severely undersampled data (in k-space) while maintaining virtually equivalent image quality.[11] The clinic, once backlogged and managing 200 scans per month, has increased volume by 50 scans. The drastic improvement in workflow has given valuable time back to the staff so they can focus on other important tasks, such as disinfection protocols.[12,*]

It's not just staff who benefit from reallocation; it can help better meet the demands of patients, too. Patients may be able to get appointments or test results faster. For patients and their families, a quick diagnosis may help ease feelings of anxiety.

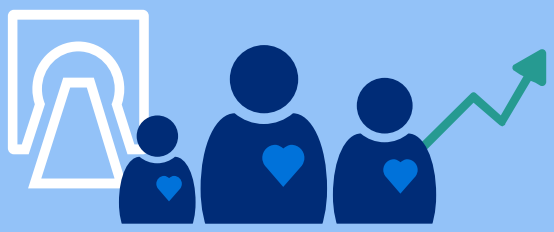
When it was time to replace its old MRI system, Miami Cardiac & Vascular Institute wanted state-of-the-art technology with high-quality images that was easy to install, easy to use and, most importantly, easy on the patient. After evaluating several MRI systems, the

Streamlining scan time to improve the staff experience

In one backlogged clinic, compressed sensing technology helped increase scan volume by

50 scans

giving valuable time back to the staff.[12,*]



*Results based on Philips internal data.

institute chose the world's first MR system to realize helium-free operations. The "7-liter liquid helium MRI system" with a Blue Seal magnet so helium cannot escape,* allows for simple siting, workflow efficiency, many patient comfort features and superb image quality. The result? Faster exam times, completion of scans by nearly all patients and positive patient feedback about the MRI experience. By taking a human-centered design approach, Miami Cardiac & Vascular Institute was able to improve the exam experience, help radiologists acquire better scans and boost diagnostic confidence.[13]

Rebalance the load to scale operations

Sometimes health systems need smart ways to shift resources around to better serve their patients and scale their enterprise. A Philips team recently examined caseloads for a network of pathology labs across a large geographical area where productivity varied widely – some labs were overloaded while others were hardly busy, and some did not have the right level of expertise. However, with digital workload balancing and automatic sorting, the analysis revealed that this network could increase cases per day by up to 40%.[14] By doing so, the network could improve capacity and quality. The ability to dynamically assign the right case to the right pathologist with the right expertise, coupled with the digital collaboration tools that allow these experts to confer with each other, can help pathologists within and outside the network to improve their speed and diagnostic accuracy.

Automate workflows to allow for greater focus on patients

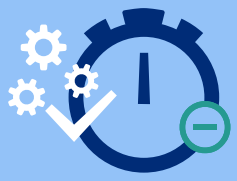
More and more, too much of care providers' time is spent on administrative tasks or in dealing with disparate systems and technology. But technology should and can reduce their workload so they can maintain more focus on their patients.

Something as basic as reducing the number of keystrokes a clinician makes can greatly impact patient care. Philips developed smart workflows for ultrasound exams that decrease keystrokes by as many as 300 per exam, reducing exam time by 30% to 50%.[15] By reducing and simplifying patient preparation steps, even operators new to a scanner can proceed with confidence, and teams are better able to spend time attending to patients.

Saving time by streamlining and automating workflows

Through an innovative as-a-service partnership with Philips, Jackson Memorial Hospital standardized their monitoring solution and established a sustainable model for ongoing improvement.[16,**]

Some initial results include:



~13,331

Potential staff hours saved through workflow improvements and automation of manual tasks

3.9s

The average time spent on the patient transport process, reduced from 5 minutes

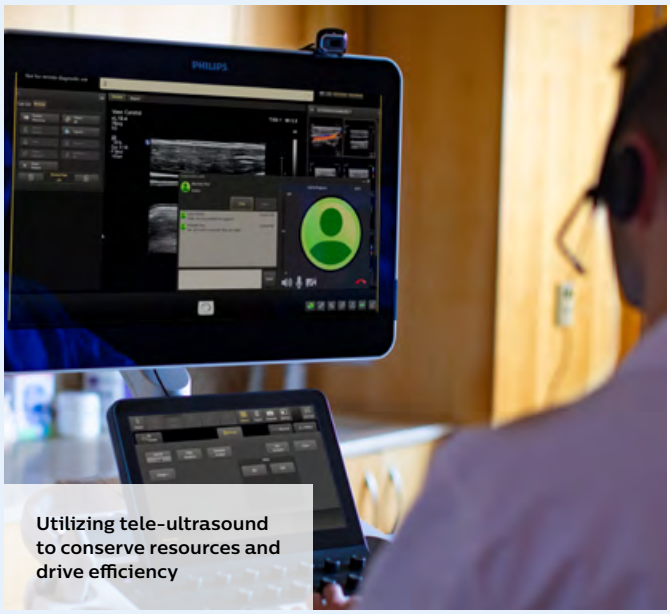
When you consider today's new demands for personal protective equipment (PPE) changes and disinfection protocols between patients, efficient setup times become increasingly important to teams who are already stressed by their workloads.[17] Philips patient-centered productivity solution for magnetic resonance imaging simplifies setup time to less than a minute.[18,***] Additionally, this solution helps simplify procedural steps, guides and coaches, and automates where possible so care teams can be highly productive and patient centered whether they're in the exam room or control room.[18]

"Digital pathology opens new, innovative ways to help laboratories and hospital systems improve workflows and provide better patient care."

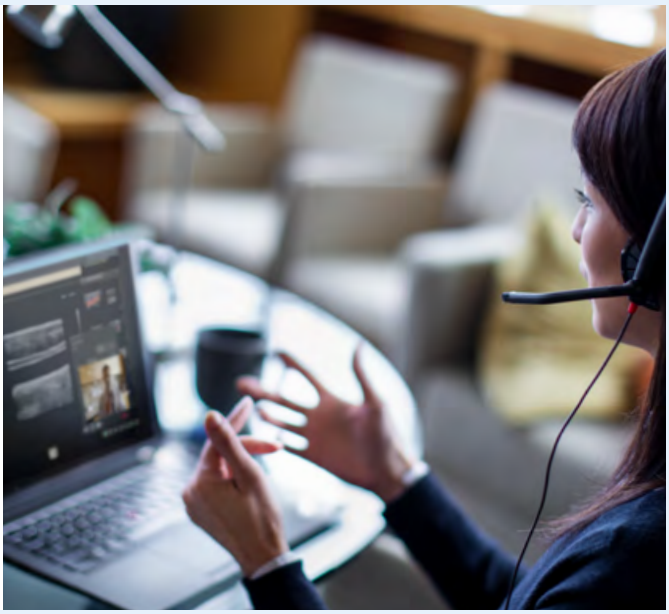
—Marlon Thompson, General Manager, Philips Digital & Computational Pathology[19]

*Even in the rare case of the magnet becoming unsealed, the negligible amount of helium escaping would not materially affect the oxygen level in the room.
**Results from baseline and post time and motion studies conducted by Philips and customer internal teams in the high-acuity units (ED, TICU, CCU).
***For routine exams, based on in-house testing.

Spotlight: Children's Hospital Colorado



Utilizing tele-ultrasound to conserve resources and drive efficiency



Collaborating remotely for greater efficiency and safety

For the staff at Children's Hospital Colorado, Philips tele-ultrasound solution brings professionals, places and patients together to make a difference. Like many health systems during the pandemic, Children's Hospital Colorado was committed to protecting their clinical staff but was challenged by a lack of PPE to fully do so. Collaboration Live, an innovative feature of Philips tele-ultrasound solutions, enables clinical teams to communicate via text, voice and video and delivers a real-time connection with monitor sharing and remote system control. The result – physicians and clinicians no longer need to be physically present during the exam to provide guidance. Now a cardiologist in one location can view scans and provide feedback in real time to a sonographer in another location (e.g. the cath lab or a clinic an hour away.) Images are captured correctly the first time, reducing the need for repeat scans and improving the time to diagnosis. In the operating room, a specialist can collaborate virtually with a surgeon, assisting during the operation by taking control of an image and manipulating it in a 3D fashion as though in person.[20]

Saving time and conserving resources

Remote collaboration also frees up valuable time for clinicians who would otherwise be traversing the hospital or traveling to other sites, enabling them to address other pressing needs, all while conducting an imaging session. Being in multiple places at once has proven invaluable during the pandemic and will continue to shape how care is delivered moving forward. By leveraging Philips tele-ultrasound solution, Children's Hospital Colorado has conserved resources and protected their staff while driving workflow efficiency, expanding outreach and streamlining the patient experience.[20,*]

For more details, please view the full customer story.

"I can take control of the image and manipulate and turn the image in a 3D fashion for the surgeon, as if I [were] in the surgical room."

—Pei-Ni Jone, MD, Professor of Pediatrics, Pediatric Cardiology, University of Colorado
Director of 3D Echocardiography and pediatric cardiologist, Children's Hospital Colorado[20]

*Results are specific to the institution where they were obtained and may not reflect the results achievable at other institutions.

Plan for better outcomes with standardized care pathways.

Improve clinical care

Innovative solutions, many of which have been rapidly accelerated during this pandemic, can radically improve clinical care.

AI-enabled clinical decision support tools, clinical informatics and mobile point-of-care solutions help care providers respond and decide next steps quickly. This can improve outcomes and also control costs.

Standardize care pathways for better patient outcomes

By standardizing clinical pathways, you can reduce variations in practice and support decisions with evidence-based medicine, operational efficiency and quality care.[21]

One issue that has long plagued the field of radiology is that exam quality can vary widely depending on staff expertise. Training and experience of technologists is diverse, and this can lead to highly variable images and exam quality.[22] The pandemic has highlighted the need for standardized protocols, such as tissue-specific presets. Philips has helped answer this need with tissue-specific presets across modalities that can streamline workflows and reduce variability.[23]

In the field of oncology, clinicians struggle to keep up with evolving treatments to help them select the right care pathways, and they must quickly adapt pathways to ensure safe patient care. Philips has worked alongside the expert clinicians at Dana-Farber Cancer Institute on a platform that helps deliver more personalized care plans for patients while taking into account the multitude of treatments available. This helps patients and their families feel confident in their care even in the most uncertain of times.[24]

Cardiologists who now find themselves working from home face a burgeoning patient load due to COVID-19. It is essential that they have a comprehensive suite of diagnostic tools available to them at home so they can provide seamless care while avoiding unnecessary trips to the hospital. These cardiologists can then reinforce understaffed hospitals in their broader area. Philips web-based and remote-enabled cardiology solutions can help by automating the diagnostic workflow all the way from AI-generated measurements to diagnostic studies and reports* to electronic health records (EHRs) and billing environments. These solutions can improve workflow quality and consistency for optimal patient care and provider experience.[25]

For elective procedures returning to hospital and clinic schedules, cardiac care pathways help identify the most appropriate care setting and least invasive treatment,

“The Dana-Farber Pathways platform enables busy oncologists to function as efficiently as possible by providing them at-their-fingertips access to predetermined treatment recommendations based on review of the most recent data by their peers.”

—Joseph O. Jacobson, MD, MSc, Chief Quality Officer, Dana-Farber Cancer Institute[26]

*By matching the measurements to diagnostic findings based on the American Society of Echocardiography standard (when configured by the customer).

so patients are in the hospital or clinic only as long as they need to be – and they allow for continuity of care afterward. Data and automation enable agile, efficient and personalized care pathways across care settings for even the most complex cases, including heart failure.[27]

Enhanced clinical decision support for stretched care teams

Care providers need support. They need insight-driven, timely and evidence-based data to enable quick decision-making at all points of care. AI-enabled technology and wearable biosensors are a few ways to make care 'smarter.'

Philips AI–enabled cardiology ultrasound system assesses COVID-19–related complications. Because timing is critical in monitoring these patients, this ultrasound provides advanced automation for right ventricle volumes and ejection fraction measurements in as little as 15 seconds, speeding exam times.[28] The system can also help reduce staff exposure to contagion. The same smart workflows that reduce keystrokes and decrease exam time by 30% to 50% also minimize time spent in proximity to patients.[15,*]

AI-enabled early warning patient monitoring systems are customizable, combining software, clinical decision support algorithms and mobile connectivity to help healthcare systems identify patient needs sooner and respond faster. And it has been shown that use of an early warning system resulted in a 35% reduction in serious events for cardiac patients.[29]

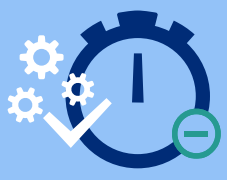
Move care closer to the patient

Whether it is a hospital room, clinic or home, the latest global crisis has reaffirmed that care must be delivered wherever the needs are. For example, the unique clinical manifestations of COVID-19 increase the need to assess both lung and cardiac status of patients quickly and confidently at their bedside – a risky endeavor in the current climate. However, point-of-care ultrasound can answer the need for portability and speed, without sacrificing quality. Indeed, ultrasound is being widely used in COVID-19 diagnosis protocols. A lung ultrasound has been shown to accurately detect lung pathologies, including pneumonia, as well as signs of acute respiratory distress syndrome.[30]

Wearable technology to keep a close eye

To help manage and confirm patients suspected of having COVID-19 and other acute conditions, Philips wireless wearable biosensor helps identify even the most subtle sign of patient deterioration.[31] In this way, at-risk patients can be monitored 24/7 while still protecting other patients and staff.

Portable handheld ultrasound devices also provide care on the go in emergency situations and in remote locations. An app-based solution paired with a transducer turns any compatible smartphone into a mission-critical diagnostic tool. This portable care can also save lives by providing access to care for those living in remote areas. With live communications connected to experts, emergency responders can make quicker critical decisions and gain procedural guidance.



30% to 50%

In cardiac imaging, smart protocols have been shown to decrease exam time by 30% to 50%, minimizing the time spent in proximity to patients.[15,*]

*Results are specific to the institution where they were obtained and may not reflect the results achievable at other institutions.

Spotlight: echocardiography lab transformation

Transforming clinical and operational workflows through the use of automated strain tools

Evolving rapidly to meet the need of patients with COVID-19 cardiac complications

With the COVID-19 pandemic, clinical teams have needed to perform and transform at the very same time – doing so amidst a high-stakes yet highly uncertain environment. While it is known that the acute phase of COVID-19 is often associated with pulmonary system effects, reports now show that the heart muscle, too, may sustain damage that appears similar to cardiotoxic effects seen during cancer therapy.[32]

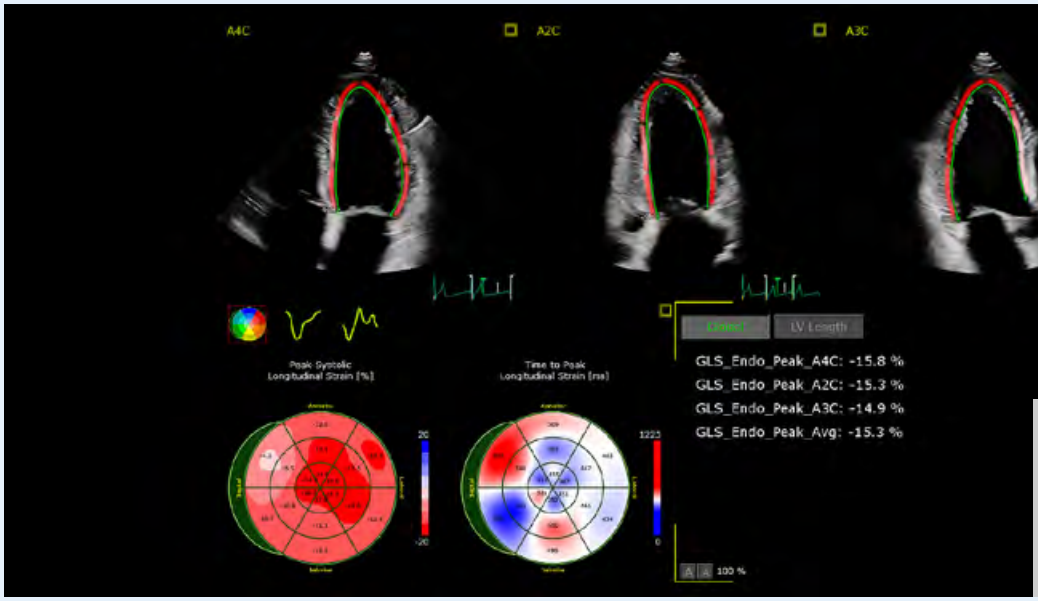
Roberto Lang, MD, director of noninvasive cardiology at the University of Chicago, is a pioneer in three-dimensional transthoracic and transesophageal echocardiography (echo), a noninvasive technique used worldwide to diagnose heart disease. He has seen the impact of COVID-19 on the heart firsthand and shares how his echo lab has incorporated automated strain tools to rapidly adapt and provide care for these challenging patients.[32]

Complications in imaging COVID-19 patients

Echo is essential to noninvasively assess COVID-19 patients for biventricular function. But the left decubitus position, ideal for cardiac scanning, is challenging for patients prone to bouts of coughing, making the scan technically difficult to acquire.[33] In addition, minimizing the sonographer's exposure to the patient with COVID-19 is imperative.[34] This points to a need for simplified but reproducible imaging that can help to enhance echo labs so they can easily incorporate into workflows to improve efficiency, accuracy and safety.

Maximizing workflows to minimize risk

With COVID-19 observed to affect the left side of the heart, Dr. Lang's echo lab has been performing strain on



AutoStrain enables a robust, reproducible one-button GLS measurement, making it an efficient tool for routine clinical use.[35]

COVID-19 patients, using Philips AutoStrain LV, which has been found to correlate closely with biplane echo left ventricular ejection fraction (LVEF).[33] AutoStrain, powered by Auto View Recognition, Auto Contour Placement and speckle tracking, enables a robust, reproducible one-button global longitudinal strain (GLS) measurement, making it an efficient tool for routine clinical use.[35] Sonographers acquire the images and then return to the echo lab to quickly calculate strain using automated tools, reducing potential infection exposure for the clinical team.[33]

Assessing function to predict outcomes

Complications affecting the right side of the heart create unique challenges where pulmonary and respiratory dysfunction go hand in hand. RV dysfunction, typically indicative of poor clinical outcomes in patients with COVID-19, requires timely and effective treatment to save lives and improve prognosis.[36] A recent study noted that mortality of COVID-19 patients has been directly correlated to the degree of abnormality in RV free-wall strain.[37]

The use of strain imaging to assess RV function offers the advantage of imaging that is simplified and reproducible using AutoStrain RV for right ventricular quantification.

RV free wall strain can be measured reproducibly from RV-focused views using AutoStrain.[33] Dr. Lang suggests that RV strain should be assessed in every patient because tricuspid annular plane systolic excursion (TAPSE) and the Doppler tissue imaging (DTI)-derived tricuspid lateral annular systolic velocity (S′) measurements can be misleading and do not correlate well with MRI measurements in certain conditions.[33]

Making accurate exams faster and easier to conduct

Philips provides an AI-enabled cardiovascular ultrasound system that integrates numerous significant automated quantification features, including 3D Auto MV, 3D Auto RV, and the AutoStrain suite of tools for robust and reproducible measurements.[38] In fact, clinicians can reduce the number of touches of the system by 21% per exam, equivalent to more than 400 exams each year, while the platform provides advanced automation for right ventricle volumes and ejection fraction measurements in as little as 15 seconds, speeding exam times. When exams are faster and easier to conduct, clinicians are able to confidently evaluate the heart's function, leading to accurate treatment decisions that ultimately benefit patients.[28,*]

For more details, please watch the full interview with Dr. Lang.

"Automated strain tools have simplified assessment of right ventricular function, which is important to [patient] care."

—Dr. Roberto Lang, head of the noninvasive cardiac imaging lab, University of Chicago[33]

*Results are specific to the institution where they were obtained and may not reflect the results achievable at other institutions.

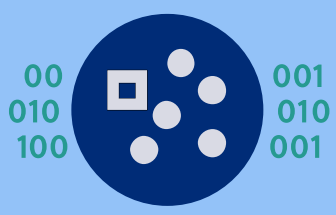
In image-guided therapy, an enhanced touch screen module allows clinicians to seamlessly control compatible applications at table side in the sterile field, helping them work quickly and decisively.[39]

Integrate diagnostics for a holistic view

A first-time-right diagnosis and high-quality patient care depend on clinical service lines having access to a seamless integration of information sources, such as those from imaging, genomics, pathology and longitudinal data. While some of these data sources are in the early stages of adoption, this holistic view will transform how we deliver precise treatment plans for patients and improve the ability to arrive at more predictable outcomes.

In oncology, Philips genome informatics and clinical reporting solutions bring together information across clinical domains, such as radiology, pathology, EHR systems and genomics, and incorporate key patient and medical data into one centralized location to provide a clear view and facilitate data-driven clinical decision support.

Currently, the information-gathering process to prepare for tumor boards is time-consuming and inefficient. Philips can help transform the tumor board process by streamlining preparation, enhancing review and analysis and empowering the care team to reach clinical treatment decisions that are driven by rich dashboards, diagnostic images, reports and structured patient data. It has been shown that aligning precision diagnostic data with the latest therapies and clinical trials can shorten preparation time for oncologists by 53%.[40,*] Equally important during times such as a pandemic is that these tumor boards can be attended virtually.



Transforming the tumor board process

53% reduction in oncologist preparation time

Aligning precision diagnostic data with the latest therapies and clinical trials can shorten preparation time for oncologists by 53%.[40,*]

*Results are specific to the institution where they were obtained and may not reflect the results achievable at other institutions.

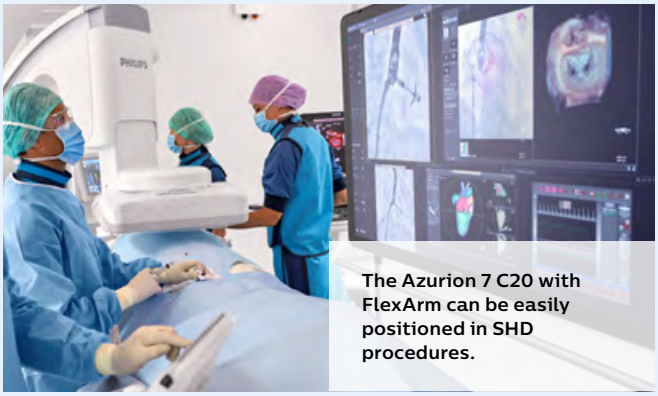
Spotlight: Hackensack University Medical Center

Enabling innovative patient-centered care for SHD

Hackensack University Medical Center (HUMC) is a leading academic hospital in New Jersey with a Heart and Vascular Hospital dedicated to delivering the region's broadest array of services as cost-effectively as possible. When HUMC was dealing with limited space and a growing volume of valve repair and replacement procedures, it was clear a hybrid operating room was needed with a hybrid image-guided therapy solution that could fit in a small footprint, accommodate both transcatheter and open procedures, and help improve productivity.[41]

HUMC partnered with Philips to integrate the Philips Azurion 7 C20 with FlexArm system because it was designed with productivity in mind. In a clinical study at a leading hospital in the Netherlands, Azurion was shown to positively impact workflow efficiency during everyday use, delivering reductions in patient preparation time (12%), procedure time (17%) and postprocedure lab time (28%), and allowing one extra procedure to be performed each day.[42,*] Procedure cards offer presets to standardize setup for cases while hospital checklists and/or protocols can be uploaded and displayed on the system's FlexVision monitor. This feature has helped HUMC achieve real benefits. "We've been able to use the technology to load some important precase planning details up on the screen, so the entire team is completely engaged from anesthesia, echocardiographer, scrub team, structural heart, the monitor team," said Hilary Nierenberg, Director of Network Operations, Cardiovascular Transformation Services.[41]

The unique geometry of the Azurion 7 C20 with FlexArm allows the C-arm a 270-degree range of movement around the patient table, enabling positioning for optimal patient access and optimal ultrasound and anesthesiology workflows. "When you're talking about today's hybrid OR, you have to think that you are going to have multidisciplinary teams: surgeons, anesthesiologists, imaging cardiologists," explained Carlos Ruiz, MD, who led the clinical team designing the room and who retired recently as HUMC's Structural Heart and Congenital Heart Disease Chair.[41]



The Azurion 7 C20 with FlexArm can be easily positioned in SHD procedures.

Other features, such as HeartNavigator, provide planning and live guidance based on previously acquired CT or MR images, while EchoNavigator integrates with Philips EPIQ CVxi interventional ultrasound solution to automatically fuse live 3D transesophageal echo and live X-ray in real time to allow HUMC interventionalists to intuitively and quickly guide devices in 3D space. "The EPIQ allows us to now not only use fusion imaging in the way we were using it before, but now using the anatomical intelligence – that is a game changer. It is having fusion real time in 4D. For interventions, it is very, very, very useful," added Dr. Ruiz.[41]

For HUMC, Philips Azurion 7 C20 with FlexArm hybrid interventional lab is helping them deliver on their commitment to innovative, patient-centered care with a partner committed to helping them realize their goals.[41,*]

For more details, view our full customer story.

"In all the cath labs that I've ever worked, everybody [moved] around that cath lab. This is the first room [where] the equipment [adapts] to where you are. You can position [it] wherever you need it and that [is] the big difference."

—Dr. Carlos Ruiz, former Structural Heart and Congenital Heart Disease Chair, HUMC[41]

SHD=structural heart disease
*Results are specific to the institution where they were obtained and may not reflect the results achievable at other institutions.

Summary

This pandemic is proof that we need to build a stronger healthcare system – a system sustainable enough to withstand a global crisis, efficient enough to manage burgeoning chronic and acute care populations and effective enough to deliver quality clinical care for patients everywhere.

This pandemic has also shown that in every breakdown, there are breakthroughs. There are opportunities for innovation that can streamline workflows for greater efficiency, ease workloads for overburdened care providers and provide better quality care for patients. This guide showcases how Philips innovative human-centered design approach can help optimize clinical and operational workflows to enable clinical teams to efficiently and effectively deliver care, no matter where.

Subscribe for updates

An opportunity lies before us. Now is the time to support efficiencies by streamlining workflows, easing workloads and providing better quality care, wherever it is needed.

References

1. https://www.usa.philips.com/healthcare/consulting/articles/customer-story/patient-flow-improvement

2. https://www.philips.com/c-dam/b2bhc/master/hts/optimizing-workflow-efficiency-wellspan-york/optimizing-workflow-efficiency-at-wellspan-york-hospital.pdf?_ga=2.269168241.1665487587.1616424289-1263110072.1598635823&_gl=1*1ib0vtv*_ga*MTI2MzExMDA3Mi4xNTk4NjM1ODIz*_ga_2NMXNNS6LE*MTYxNjQyNDI4OS4yMjcuMS4xNjE2NDI2NDAyLjU0

3. Harvey HB, Liu C, Ai J, et al. Predicting no-shows in radiology using regression modeling of data available in the electronic medical record. *J Am Coll Radiol.* 2017;14(10):1303-1309.

4. Andre JB, Bresnahan BW, Mossa-Basha M, et al. Toward quantifying the prevalence, severity, and cost associated with patient motion during clinical MR examinations. *J Am Coll Radiol.* 2015;12(7):689-695.

5. https://www.usa.philips.com/healthcare/resources/landing/medumo?_ga=2.213509396.1481163638.1592234322-1307636507.1587569150

6. https://www.medumo.com/post/medumo-and-bmc-partner-to-engage-with-patients-amidst-the-covid-19-outbreak

7. Nayor J, Feng A, Qazi T, et al. Improved patient preparedness for colonoscopy using automated time-release reminders. *Gastrointest Endosc.* 2018;87(6S):AB507-AB508. Gastrointestinal Endoscopy abstract Tu1044.

8. Richter JM, Ha JB, Marx M, et al. A digital preprocedure instruction program for outpatient colonoscopy. *Telemed J E Health.* 2020;26(4):468-478.

9. https://www.philips.com/a-w/about/news/archive/standard/news/articles/2020/20201201-philips-ambient-experience-better-imaging-precise-diagnoses-and-better-patient-care.html

10. https://www.philips.com/a-w/about/news/archive/standard/news/press/2021/20210303-survey-cites-enhanced-patient-experience-and-anxiety-reduction-as-top-benefits-of-philips-ambient-experience.html

11. https://www.usa.philips.com/healthcare/resources/landing/the-next-mr-wave/compressed-sense

12. Philips data on file, 2021.

13. https://www.philips.com/c-dam/b2bhc/master/education/publications/fieldstrength/boost-in-mri-quality-speed-patient-comfort-ambition-mcvi/us-boost-in-mri-quality-speed-and-patient-comfort-ambition-miamicvi.pdf?_ga=2.31597246.1665487587.1616424289-1263110072.1598635823&_gl=1*172tzdc*_ga*MTI2MzExMDA3Mi4xNTk4NjM1ODIz*_ga_2NMXNNS6LE*MTYxNjQyNDI4OS4yMjcuMS4xNjE2NDI3MjEwLjYw

14. Philips. *Partnering to Scale Histo-Pathology Services* [slide deck]; August 23, 2019.

15. https://www.usa.philips.com/a-w/about/news/archive/standard/news/press/2013/20130830-Philips-launches-new-EPIQ-premium-ultrasound-system.html

16. https://www.usa.philips.com/a-w/about/news/archive/standard/news/press/2020/20200311-jackson-memorial-hospital-gives-philips-enterprise-monitoring-as-a-service-model-high-marks-for-satisfaction-and-efficiency.html

17. https://www.philips.com/c-dam/b2bhc/master/Specialties/radiology/radiology-staff-in-focus/radiology-staff-in-focus.pdf

18. https://www.usa.philips.com/healthcare/resources/landing/the-next-mr-wave/ingenia-elition

19. https://www.usa.philips.com/healthcare/sites/pathology/about/philips-in-pathology

20. Philips Healthcare YouTube page. Collaboration Live for tele-ultrasound. Accessed March 18, 2021. https://www.youtube.com/watch?v=KWT_FTGo-IY

21. Hipp R, Abel E, Weber RJ. A primer on clinical pathways. *Hosp Pharm.* 2016;51(5):416-421.

22. Brady AP. Error and discrepancy in radiology: inevitable or avoidable? Review. *Insights Imaging.* 2017;8:171-182.

23. https://www.philips.com/a-w/about/news/archive/blogs/innovation-matters/2020/20200608-seven-ways-covid-19-is-accelerating-digital-transformation-in-healthcare.html

24. https://www.philips.com/a-w/about/news/archive/standard/news/articles/2020/20200814-dana-farber- cancer-institute-philips-and-aws-providing-access-to-best-practices-in-cancer-patient-care.html

25. https://www.usa.philips.com/healthcare/product/HC830230/xper-information-management-xper-im-with-xper-flex-cardio

26. https://www.usa.philips.com/a-w/about/news/archive/standard/news/articles/20190911-philips-intellispace-precision-medicine-oncology-pathways-powered-by-dana-farber-is-now-live

27. https://www.usa.philips.com/healthcare/medical-specialties/cardiology

28. https://www.philips.com/a-w/about/news/archive/standard/news/press/2019/20190620-philips-extends-advanced-automation-capabilities-on-its-epiq-cvx-cardiology-ultrasound-platform-making-accurate-exams-faster-and-easier-to-conduct.html

29. Subbe CP, Duller B, Bellomo R. Effect of an automated notification system for deteriorating ward patients on clinical outcomes. *Crit Care.* 2017;21(1):52.

30. Lichtenstein DA, Malbrain MLNG. Lung ultrasound in the critically ill (LUCI): a translational discipline. *Anaesthesiol Intensive Ther.* 2017;49(5):430-436.

References

31. https://www.usa.philips.com/a-w/about/news/archive/standard/news/press/2020/20200526-philips-launches-next-generation-wearable-biosensor-for-early-patient-deterioration-detection-including-clinical-surveillance-for-covid-19.html

32. https://gateway.on24.com/wcc/eh/2412272/lp/2590060/cardiac-implications-of-covid-19/?partnerref=ESC

33. Lang RM. *Expert Perspectives*. Koninklijke Philips N.V.; 2020.

34. Kaminski A, Payne A, Roemer S, et al. Answering to the call of critically ill patients: limiting sonographer exposure to COVID-19 with focused protocols. Letter to editor. *J Am Soc Echocardiogr.* 2020;33(7):902-903.

35. https://www.philips.com/c-dam/b2bhc/master/landing-pages/cvx/epiq-cvx-autostrain-white-paper-vmq-5-0-fnl.pdf

36. Lan Y, Liu W, Zhou Y. Right ventricular damage in COVID-19: association between myocardial injury and COVID-19. *Front Cardiovasc Med.* 2021;8:1-13.

37. Li Y, Li H, Zhu S, et al. Prognostic value of right ventricular longitudinal strain in patients with COVID-19. *Cardiovasc Imaging.* 2020;13(11):2287-2299.

38. https://www.usa.philips.com/healthcare/resources/landing/epiq/cardiology

39. https://www.usa.philips.com/healthcare/product/HCNCVD081/touch-screen-module-pro

40. Krupinski EA, Comas M, Gallego LG; GISMAR Group. A new software platform to improve multidisciplinary tumor board workflows and user satisfaction: a pilot study. *J Pathol Inform.* 2018;9:26.

41. Philips Healthcare YouTube page. Hackensack University Medical Center and Philips Azurion with FlexArm. Accessed April 5, 2021. https://www.youtube.com/watch?v=eEOCVDX_QIE

42. https://www.philips.com/a-w/about/news/archive/case-studies/20180824-reducing-procedure-time-in-image-guided-therapy-with-philips-azurion.html