

Building a stronger healthcare system requires **optimizing clinical and operational workflows**

Now more than ever, we need to deliver care that is more efficient, accurate and consistent. We need a radical new approach to clinical and operational workflows. This third guide in a four-part series examines how to build the healthcare system our country needs.



Introduction

An unprecedented predicament: the need to do more with less

It's undeniable. Our nation's healthcare system is rapidly changing, reshaped in ways we once thought impossible or, at the very least, improbable. A global pandemic has accentuated vulnerabilities in our health system and has acted as a catalyst to accelerate long-overdue, radical shifts in how we care for patients. In the end, one outcome of the global crisis may be better care for our nation's active-duty military members and veterans, American Indians, Native Alaskans and the many people served by Medicaid, Medicare and our federal government's other essential healthcare programs.

Optimizing for efficiency is particularly prudent as a pandemic bears down on hospitals, causing workflow bottlenecks. As chronic- and acute-care needs balloon, our nation's health systems must find new ways to streamline care. In imaging alone, there is up to \$12 billion in potential waste¹ likely due to patient no-shows, wrong tests, repeat exams, poor image quality and more. By eliminating the need to travel for an unnecessary repeat scan, we can better serve, for example, an ailing veteran who lives far from a hospital or lacks transportation.

Health systems around our country, including those run by our federal government, are in a challenging position. As these health systems look to deliver upon their essential missions, they may be facing staff shortages^{2,3} with already **stressed teams**. Acute care is

down in some areas but growing in others. Meanwhile, elective procedures are making a slow comeback, and the availability of some healthcare services may still be limited. The cumulative effects of these challenges only add to the preexisting workflow bottlenecks we saw prior to the COVID-19 crisis.

As we move forward, we need to ensure that important service lines, such as radiology, cardiology and oncology, not only recover but also remain resilient so that, for example, the large populations served by the Department of Veterans Affairs (VA), Department of Defense, Indian Health Service or by Medicaid and Medicare are able to receive the timely, first-time-right diagnoses they need, putting them on the path to precise treatment and recovery.

Closing the gap with optimized clinical and operational workflows

To expand today's capacity and capabilities to match tomorrow's needs, health systems will need to embrace radical change. One way is to extend care delivery, as we explored in **part two** of this series. In this guide, we focus on streamlining clinical and operational workflows to close the gap, wherever care happens. When health systems gain a holistic, system-wide view of their workflows, they can see where efficiencies can be gained.

“Efficiency is doing things right. **Effectiveness is doing the right things.**”

—Peter Drucker, management consultant

Two strategies for **improving workflows**

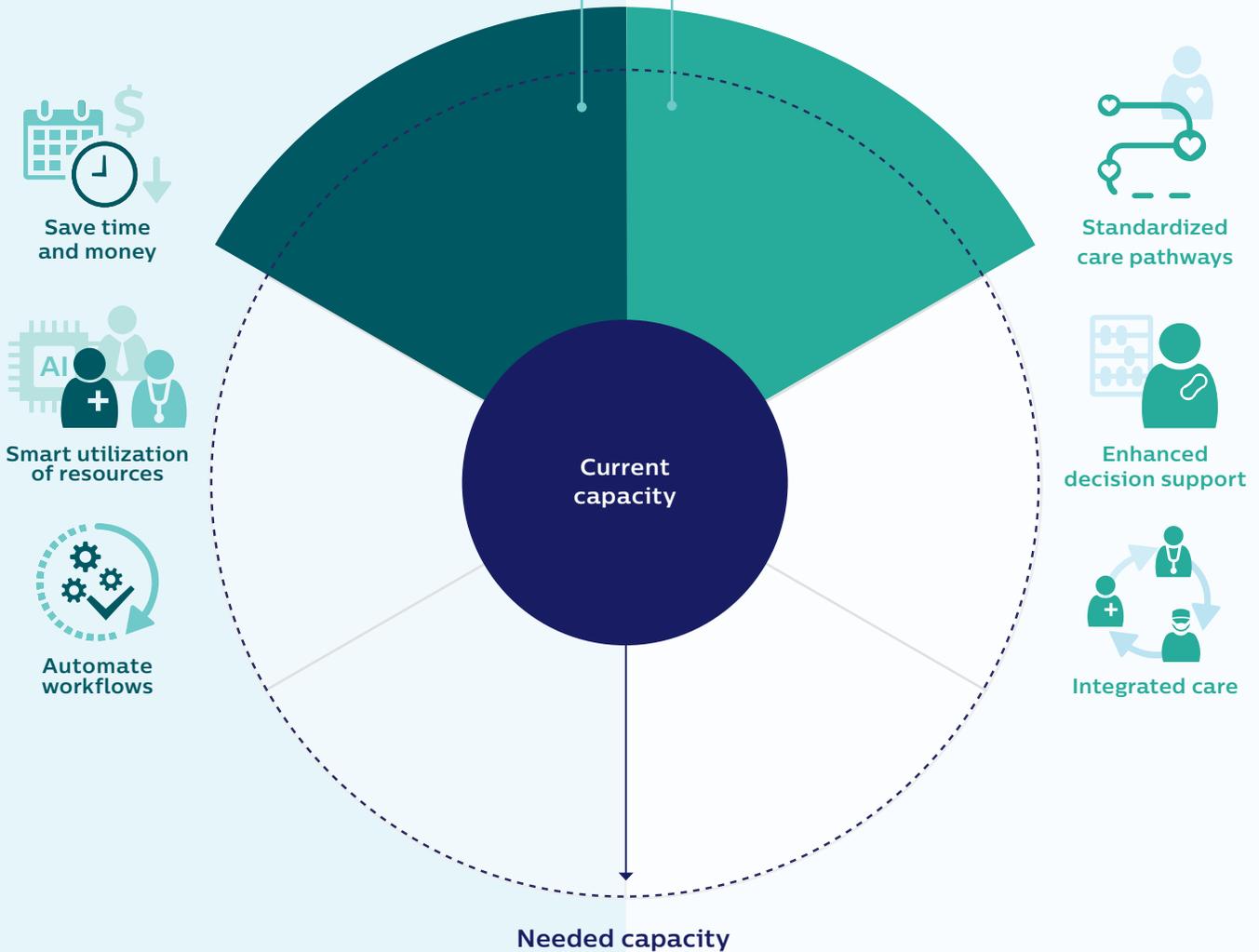
To close the capacity and capabilities gap, health systems will need to:

Improve **operational efficiency**

Saving time and money with process improvements, automation and smart utilization of resources

Improve **clinical care**

Reducing variability and improving outcomes with enhanced decision support and accessible, standardized and integrated care

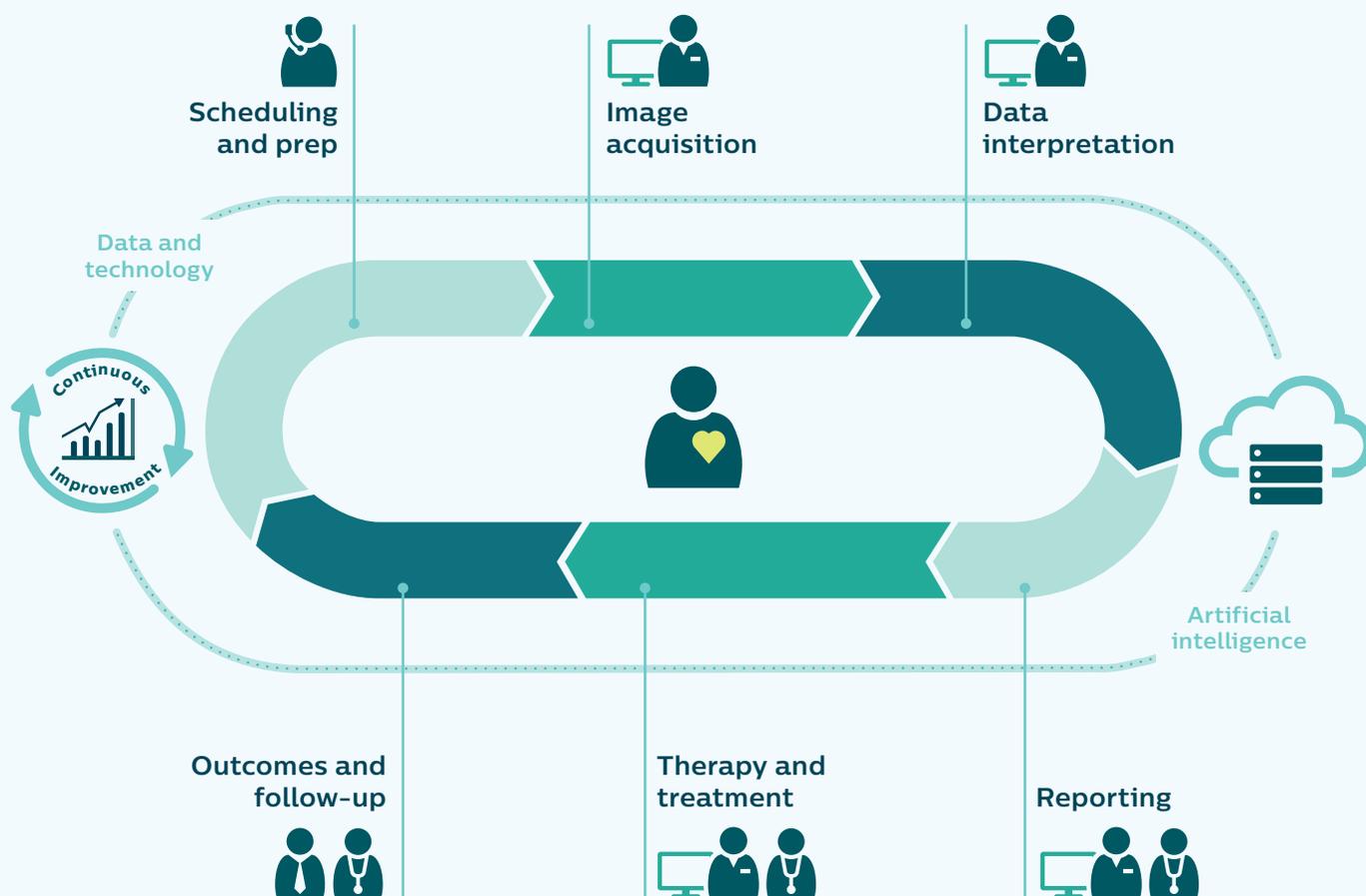


As you aim to improve efficiencies and outcomes to deliver on the quadruple aim, Philips is with you to provide a **connected care ecosystem of integrated workflow solutions** for radiology, oncology and cardiology. With automation, artificial intelligence (AI) and smarter processes, there is more we can do to enable clinical teams to focus on patient care – efficiently and effectively.

Improve operational efficiency

Improving operational efficiency is a worthwhile goal, but when clinical teams must handle increasing complexity with fewer resources, it is easier said than done. It takes a multidisciplinary team to look at the full system, to map and measure each step in a patient’s journey and to identify **workflow challenges** and opportunities for improvement. Accomplishing this requires a holistic view of workflows – from scheduling to diagnosing to treating and beyond. Looking at every step and the sum of the parts can help drive value-based care, and patients, care providers and the nation’s healthcare system at-large are all the better for it.

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





A focus on value to improve care and health outcomes

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’s 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 to benchmarks of what could be – even in the face of ever-changing protocols. The data-driven insights not only help them understand the health of their current operations, they also provide a strong rationale for making the commitment to transform. When Banner Health in Arizona implemented and leveraged performance analytics, they were able to reduce length-of-stay costs, improve the patient and staff experience and improve the efficiency of MR facilities by 10% to 20%.⁴

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 circumstances for each customer vary and healthcare transformation is not one-size-fits-all. **Our teams** help pinpoint areas for improvement and create 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.

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 veteran and service member care, this can result in financial penalties to VA hospitals as well as a poor experience for veterans themselves.

In the private healthcare setting, for example, 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 emergency department. Philips consultants joined their day-to-day team to analyze, observe and identify core opportunities for operational improvements. Through this collaborative initiative, 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 more than a one-third reduction in length of stay.⁵

Patient satisfaction doesn’t solely rely on shorter wait times. Feeling comfortable in a setting that typically induces anxiety goes a long way to ensure patients have a positive experience. Philips **MR clinical application** is designed with patient comfort in mind. It allows for quicker imaging and exams so patients don’t have to hold their breath as long, a true benefit for patients who may have claustrophobia, pulmonary issues, trouble holding their breath or PTSD.⁶



Innovative, intuitive technologies enable care providers to focus more on their patients

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,⁷ and one study showed that repeat scans can cost approximately \$115,000 per scanner per year.⁸ 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.

At Philips, we believe that streamlined workflows must involve the patient. Our **patient engagement platform** uses automated text messages, email and voicemail to deliver targeted and timely educational and

instructional messages to patients.⁹ This helps the patient as well as the health system. 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 with tips on how to mitigate the spread of COVID-19, mail-order prescription refill instructions and telehealth visit reminders that helped patients prepare and show up on time for their virtual appointments.¹⁰

In imaging services, studies have shown that automated reminders can lead to a 67% reduction in poor patient preparation¹¹ and a 42% reduction in patient no-shows.¹² Particularly as health systems reschedule a backlog of elective procedures, timely education and instructions remain essential and cost-effective.



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6.5%

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

—Marlon Thompson, GM Philips Digital & Computational Pathology¹³

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.

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 a patient who serves in the military and is injured on the front lines, a quick diagnosis can mean the difference between life and death.

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 and 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 increase 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, helped 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.

When you consider today's new demands for PPE changes and disinfection protocols between patients, efficient setup times become increasingly important to teams who are already stressed by their workloads.¹⁶ Philips **patient-centered productivity solution** for magnetic resonance imaging simplifies setup time to less than a minute.^{17,*} 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.

**For routine exams, based on in-house testing.*

Saving time by **streamlining and automating workflows**

Through an ongoing, innovative partnership with Philips, a health system standardized their monitoring solution.^{18,**}



Estimated that 13,331 staff hours will be saved from workflow improvement and automation of manual tasks annually



3.9 seconds

Reduced from 5 minutes to 3.9 seconds the average time spent on the transport process

***Results from baseline and post time and motion studies conducted by Philips and customer internal teams in the high-acuity units (ED, TICU, CCU).*

Improve clinical care

While improving efficiency is crucial to healthcare transformation, it should not come at the expense of quality care. In fact, the quality and consistency of care must improve as well. When the quality of care varies, it has a cascading effect of higher costs and unpredictable outcomes.

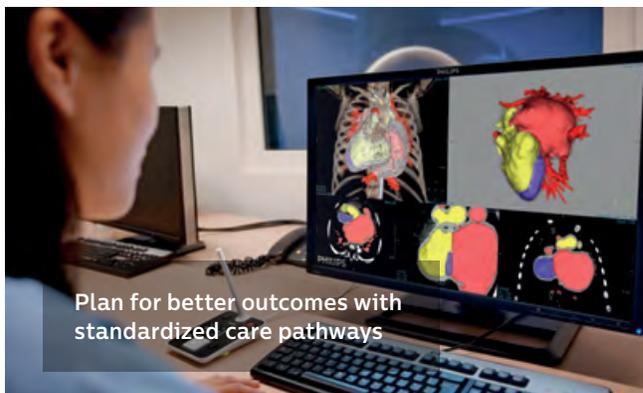
Innovative solutions, many of which have been rapidly accelerated during this pandemic, can radically improve clinical care. AI-enabled clinical decision support tools, clinical informatics and mobile point-of-care solutions help care providers respond and decide next steps quickly. This can improve 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.¹⁹

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. Now, with the need for standardized protocols even more urgent with the onset of COVID-19, tissue-specific presets and protocols are needed that support standardization. Philips has helped answer this need with tissue-specific presets across modalities that can streamline workflows and reduce variability.

The pandemic is being felt strongly in the oncology field. 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.

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 EHR and billing environments. These solutions can improve workflow quality and consistency for optimal patient care and provider experience.

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



Improving care quality through alarm management has improved clinical practice and workflow.

Working with Philips, **Tourcoing General Hospital**** achieved a 39% decrease in 6 months in non-actionable alarms from baseline of 237 alarms per bed per day.²⁰

**At Centre Hospitalier de Tourcoing, France.



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. At-risk patients can be monitored 24/7 while still protecting other patients and staff and while saving use of PPE.

“With the help of this new biosensor, we can **continuously and remotely monitor patients**, which is especially important on the COVID-19 wards.”

—Florian van der Hunnik, Chief Nursing Information Officer and team leader of the COVID-19 ward at OLVG Hospital in Amsterdam

For elective procedures returning to hospital and clinic schedules, **cardiac care pathways** help identify the most appropriate care setting and least invasive treatment, so patients are in the hospital or clinic only as long as they need to be, and 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.

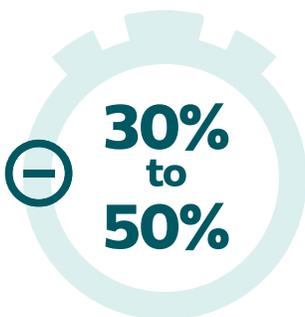
Enhanced clinical decision support for stretched care teams

With the complexity in healthcare and the rapid pace of change, now both amplified by the pandemic, 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 lung and cardiac 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.²¹ 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 close 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.²²



Smart protocols have been shown to decrease exam time by 30% to 50%, minimizing the time spent in close proximity to patients.¹⁵



Stand by the patient's side

In image-guided therapy, Philips set out to keep care focused on the patient by eliminating unnecessary steps to and from the control room. To do this, they examined how people actually work in the lab, uncovering ways to keep care tableside, closer to the patient. The result of these efforts is a **next-generation platform** that has been shown to help organizations reduce procedure time by 17%.²³

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, as lung ultrasound has been shown to accurately detect lung pathologies, including bacterial and viral pneumonia as well signs of acute respiratory distress syndrome.²⁴

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. With live communications connected to experts, emergency responders can make quicker critical decisions and gain procedural guidance. This portable care can save lives by providing access to care for our nation's veterans living in remote areas and for active-duty military members.

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 by aligning precision diagnostic data with the latest therapies and clinical trials, this solution can shorten preparation time for oncologists by 53%.²⁵ Equally important during times such as a pandemic is that these tumor boards can be attended virtually.

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 a stronger, healthier America.

This pandemic has also proved 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 the nation’s active-duty military members and veterans, American Indians and Native Alaskans as well as all those served by our federal government’s vital healthcare programs.

To help build stronger healthcare systems, we’re publishing a series of guides that offer strategies, tactics and resources. This is the third of four guides – see the others [here](#). **Subscribe for updates and to be notified when the next guide becomes available.**

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Results from case studies mentioned in this paper are not predictive of results in other cases. Results in other cases may vary.



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

References

1. Reaction Data. *Unnecessary Imaging: Up to \$12 Billion Wasted Each Year*; 2014.
2. AMN Healthcare. 21st century sourcing: solving the healthcare supply-demand crunch. Accessed June 22, 2020. <https://www.amnhealthcare.com/latest-healthcare-news/healthcare-supply-demand>
3. <https://www.usa.philips.com/healthcare/education-resources/publications/copd-insider/articles/nursing-shortage>
4. Philips. *EOI Value Calculator – Companion Guide* [slide deck]; May 2020.
5. <https://www.usa.philips.com/healthcare/consulting/articles/customer-story/patient-flow-improvement>
6. <https://www.usa.philips.com/c-dam/b2bhc/master/landing-pages/compressed-sense-redesign/brochure-compressed-spreads.pdf>
7. 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.
8. 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):689-695.
9. https://www.usa.philips.com/healthcare/resources/landing/medumo?_ga=2.213509396.1481163638.1592234322-1307636507.1587569150
10. <https://www.medumo.com/post/medumo-and-bmc-partner-to-engage-with-patients-amidst-the-covid-19-outbreak>
11. Naylor J, Feng A, Qazi T, et al. Tu1044 Improved patient preparedness for colonoscopy using automated time-release reminders. *Gastrointest Endosc*. 2018;87(6):AB507-AB508.
12. 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.
13. <https://www.usa.philips.com/healthcare/sites/pathology/about/philips-in-pathology>
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.philips.com/c-dam/b2bhc/master/Specialties/radiology/radiology-staff-in-focus/radiology-staff-in-focus.pdf>
17. <https://www.usa.philips.com/healthcare/resources/landing/the-next-mr-wave/ingenia-elition>
18. Data on file.
19. Hipp R, Abel E, Weber RJ. A primer on clinical pathways. *Hosp Pharm*. 2016;51(5):416-421.
20. <https://www.philips.com/a-w/about/news/archive/case-studies/20200204-reducing-alarm-fatigue-in-the-icu.html>
21. <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>
22. Subbe CP, Duller B, Bellomo R. Effect of an automated notification system for deteriorating ward patients on clinical outcomes. *Crit Care*. 2017;14(1):52.
23. <https://www.philips.com/a-w/about/news/archive/case-studies/20180824-reducing-procedure-time-in-image-guided-therapy-with-philips-azurion.html>
24. Lichtenstein DA, Malbrain M. Lung ultrasound in the critically ill (LUCI): a translational discipline. *Anaesthesiol Intensive Ther*. 2017;49(5):430-436.
25. Krupinski EA, Comas M, Gallego L. A new software platform to improve multidisciplinary tumor board workflows and user satisfaction: a pilot study. *J Pathol Inform*. 2018;9:26.

