Support Your Nurses with Automation and Artificial Intelligence

Vikas Ghayal, FACHE
Chief Strategy Officer at Artisight, Inc.

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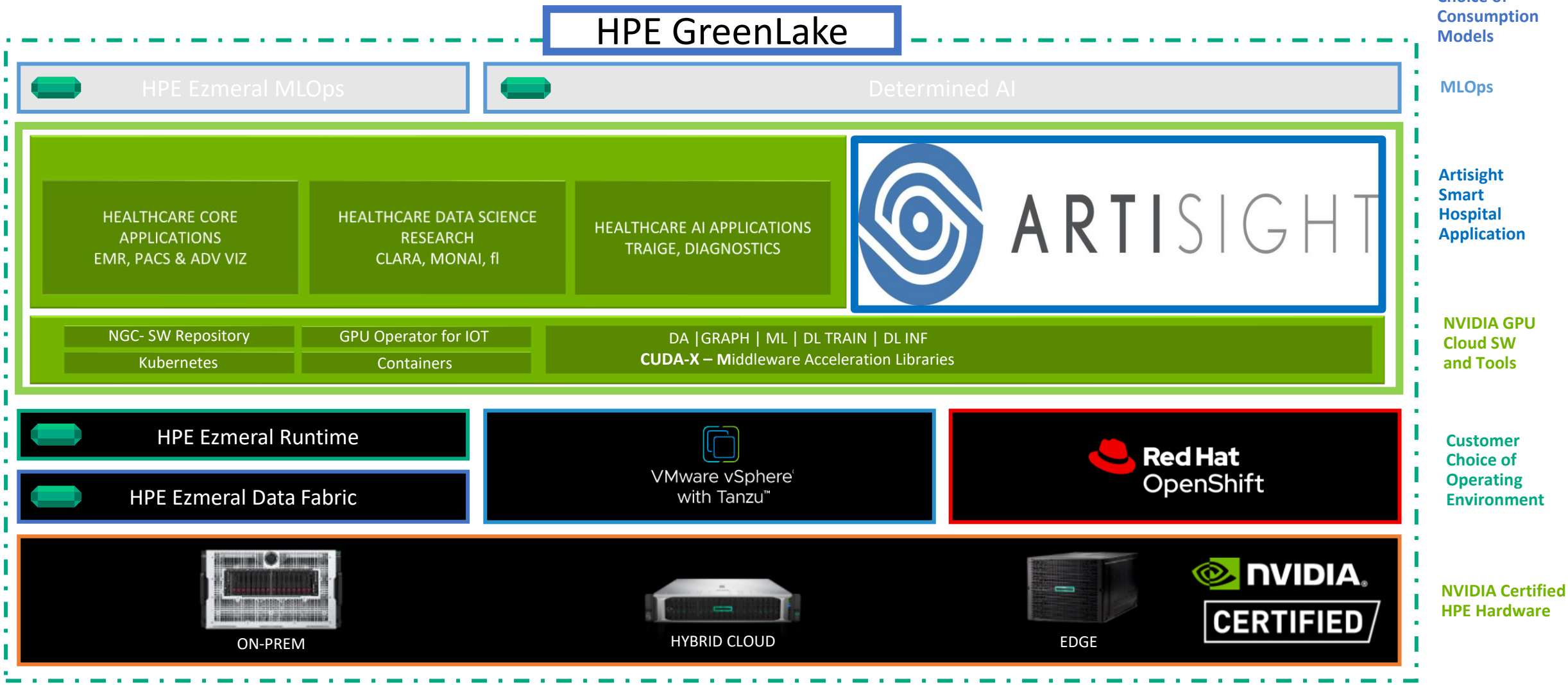
AGENDA

- ❑ HPE Partnership
- ❑ About Artisight
- ❑ Healthcare Labor Crisis
- ❑ Why is the Future Clinical Automation
- ❑ AI Training Strategy
- ❑ Mimicking Human Senses
- ❑ Examples Solutions of Automation in the Clinical Space

HPE Artisight Partnership

Enterprise support for Enterprise Workflows

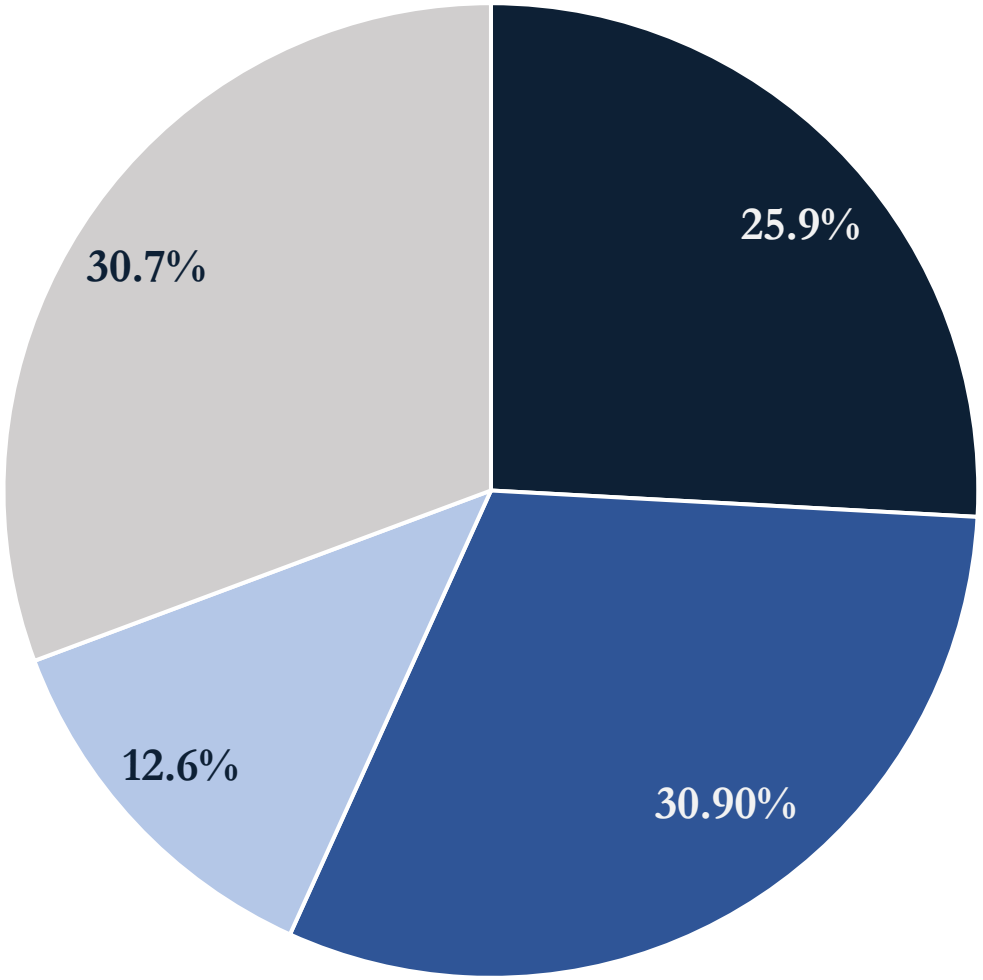


ARTISIGHT

- Artisight Healthcare IT company focused on leveraging passive sensors to automate the clinical environment
- Deploy sensors in the clinical setting, utilize AI and computer vision to generate data points
- Date points passively send messages to clinicians and patients/families, and update the EHR
- We are an end-to-end enterprise AIaaS for hospitals
- Our vision of a smart hospital

HEALTHCARE LABOR FOCUS

Hospital Labor Force Breakdown



- Clinicians (Physicians, PA, NP, Etc.)
- Registered Nurses
- Healthcare Support Occupations (PT, OT, Nurse Assistants, Etc.)
- All Other Occupations

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https://www.bls.gov/oes/current/naics4_622100.htm#00

NAICS: 622100

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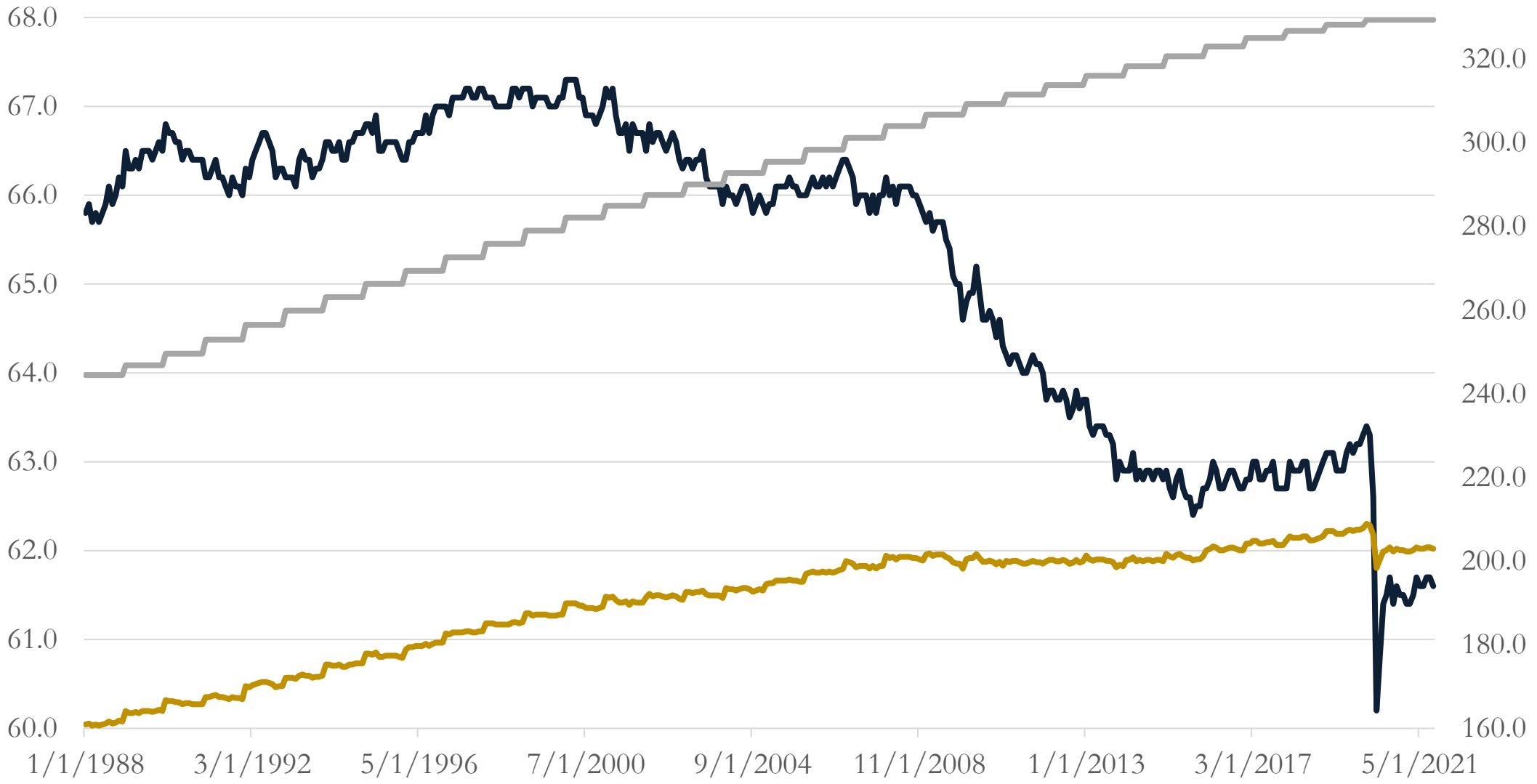
Labor Force Participation



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https://fred.stlouisfed.org/series/CIVPART

Labor Force Productivity And Cost

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https://fred.stlouisfed.org/series/CIVPART

NAICS: 622100

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Why The Need For Automation

E-Newsletters | Conferences | Virtual Conferences | Webinars | Whitepapers | Podcasts | Print Issue

Infection Control | Patient Safety & Outcomes | Public Health | Nursing

1 in 5 nurses burned out: 5 findings from Medscape's nurse career satisfaction report

Erica Carbajal - yesterday Print | Email

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Medscape's 2021 report on nurse career satisfaction, published Dec. 29, probed the COVID-19 pandemic's effect on career satisfaction, as well as nurse burnout and workplace violence against nurses.

The report is based on a poll of 10,788 nurses conducted over the summer of 2021. Responses came from a range of nursing positions, including LPNs, RNs and APRNs, a group that included nurse practitioners, nurse midwives, clinical nurse specialists, and certified registered nurse anesthetists.

Five findings:

1. At least 25 percent of respondents in each position category said the pandemic decreased their satisfaction with being a nurse, with nurse midwives (41 percent) and RNs (40 percent) most likely to report this.

2. In each nursing position category, at least 20 percent of respondents reported currently being very burned out or burned out, the two highest levels of the response options. RNs and LPNs reported the highest levels of burnout at 35 percent and 34 percent, respectively.

3. Overall, 31 percent of respondents said they had experienced emotional abuse in the last year. When asked about the source of emotional abuse, managers/administrators were the most commonly cited. Of those who reported experiencing emotional abuse, about 62 percent of clinical nurse specialists said they experienced it from a manager/administrator, followed by 55 percent of LPNs.

4. Among RNs and LPNs, helping people/making a difference was the most commonly selected response when asked about the most rewarding aspect of their jobs.

https://www.beckershospitalreview.com/nursing/1-in-5-nurses-burned-out

Impact To Care With Labor Shortage

The less-discussed consequence of healthcare's labor shortage

By Mackenzie Bean and Gabrielle Masson

The healthcare industry's staffing shortage crisis has had clear consequences for care delivery and efficiency, forcing some health systems to pause nonemergency surgeries or temporarily close facilities. Less understood is how these shortages are affecting care quality and patient safety.

A mix of high COVID-19 patient volume and staff departures amid the pandemic has put hospitals at the heart of a national staffing shortage, but there is little national data available to quantify the shortages' effects on patient care.

The first hint came in September from a CDC report that found healthcare-associated infections increased significantly in 2020 after years of steady decline. Researchers attributed the increase to challenges related to the pandemic, including staffing shortages and high patient volumes, which limited hospitals' ability to follow standard infection control practices.

"That's probably one of the first real pieces of data — from a large scale dataset — that we've seen that gives us some sense of direction of where we've been headed with the impact of patient outcomes as a result of the pandemic," Patricia McGaffigan, RN, vice president of safety programs for the Institute for Healthcare Improvement, told *Becker's*. "I think we're still trying to absorb much of what's really happening with the impact on patients and families."

An opaque view into national safety trends

Because of lags in data reporting and analysis, the healthcare industry lacks clear insights into the pandemic's effect on national safety trends.

National data on safety and quality — such as surveys of patient safety culture from the Agency for Healthcare Research and Quality — can often lag by several quarters to a year, according to Ms. McGaffigan.

"There [have been] some declines in some of those scores more recently, but it does take a little while to be able to capture those changes and be able to put those changes in perspective," she said. "One number higher or lower doesn't necessarily indicate a trend, but it is worth really evaluating really closely."

For example, 569 sentinel events were reported to the Joint Commission in the first six months of 2021, compared with 437 for the first six months of 2020. However, meaningful conclusions about the events' frequency and long-term trends cannot be drawn from the dataset, as fewer than 2 percent of all sentinel events are reported to the Joint Commission, the organization estimates.

"We may never have as much data as we want," said Leah Binder, president and CEO of the Leapfrog Group. She said a main area of concern is CMS withholding certain data amid the pandemic. Previously, the agency has suppressed data for individual hospitals during local crises, but never on such a wide scale, according to Ms. Binder.

CMS collects and publishes quality data for more than 4,000 hospitals nationwide. The data is refreshed quarterly, with the next update scheduled to have been released in October. The update was set to include additional data for the fourth quarter of 2020.

"It is important to note that CMS provided a blanket extraordinary circumstances exception for Q1 and Q2 2020 data due to the COVID-19 pandemic where data was not required nor reported," a CMS spokesperson told *Becker's*. "In addition, some current hospital data will not be publicly available until about July 2022, while other data will not be available until January 2023 due to data exceptions, different measure reporting periods and the way in which CMS posts data."

Hospitals that closely monitor their own datasets in more near-term windows may have a better grasp of patient safety trends at a local level. However, their ability to monitor, analyze and interpret that data largely depends on the resources available, Ms. McGaffigan said. The pandemic may have sidelined some of that work for hospitals, as clinical or safety leaders had to shift their priorities and day-to-day activities.

"There are many other things besides COVID-19 that can harm patients," Ms. Binder told *Becker's*. "Health systems know this well, but given the pandemic, have taken their attention off these issues. Infection control and quality issues are not attended to at the level of seriousness we need them to be."

What health systems should keep an eye on

While the industry is still waiting for definitive answers on how staffing shortages have affected patient safety, Ms. Binder and Ms. McGaffigan highlighted a few areas of concern they are watching closely.

The first is the effect limited visitation policies have had on families — and more than just the emotional toll. Family members and caregivers are critical players missing in healthcare safety, according to Ms. Binder.

When hospitals don't allow visitors, loved ones aren't able to contribute to care, such as ensuring proper medication administration or communication. Many nurses have said they previously relied a lot on family support and vigilance. The lack of extra monitoring may contribute to the increasing stress healthcare providers are facing and open the door for more medical errors.

Which leads Ms. Binder to her second concern: A culture that doesn't always respect and prioritize nurses. The pandemic has underscored how vital nurses are, as they are present at every step of the care journey, she said.

To promote optimal care, hospitals "need a vibrant, engaged and safe nurse workforce," Ms. Binder said. "We don't have that. We don't have a culture that respects nurses."

Diagnostic accuracy is another important area to watch, Ms. McGaffigan said. Diagnostic errors — such as missed or delayed diagnoses, or diagnoses that are not effectively communicated to the patient — were already one of the most sizable care quality challenges hospitals were facing prior to the pandemic.

"It's a little bit hard to play out what that crystal ball is going to show, but it is in particular an area that I think would be very, very important to watch," she said.

Another area to monitor closely is delayed care and its potential consequences for patient outcomes, according to Ms. McGaffigan. Many Americans haven't kept up with preventive care or have had delays in accessing care. Such delays could not only worsen patients' health conditions, but also disengage them and prevent them from seeking care when it is available.

Reinvigorating safety work: Where to start

Ms. McGaffigan suggests healthcare organizations looking to reinvigorate their safety work go back to the basics. Leaders should ensure they have a clear understanding of what their organization's baseline safety metrics are and how their safety reports have been trending over the past year and a half.

"Look at the foundational aspects of what makes care safe and high quality," she said. "Those are very much linked to a lot of the systems, behaviors and practices that need to be prioritized by leaders and effectively translated within and across organizations and care teams."

She recommended healthcare organizations take a total systems approach to their safety work by focusing on four interconnected pillars:

- Culture, leadership and governance
- Patient and family engagement
- Learning systems
- Workforce safety

For example, evidence shows workforce safety is an integral part of patient safety, but it's not an area that's systematically measured or evaluated, according to Ms. McGaffigan. Leaders should be aware of this connection and consider whether their patient safety reporting systems address workforce safety concerns or instead add extra work and stress for their staff.

Safety performance can slip when team members get busy or burdensome work is added to their plates, according to Ms. McGaffigan. She said leaders should be able to identify and prioritize the essential value-added work that must go on at an organization to ensure patients and families will have safe passage through the healthcare system and that care teams are able to operate in the safest and healthiest work environments.

In short, she said leaders should ask themselves, "What is the burdensome work people are being asked to absorb, and what are the essential elements that are associated with safety that you want and need people to be able to stay on top of?"

To improve both staffing shortages and quality of care, health systems must bring nurses higher up in leadership and into C-suite roles, Ms. Binder said. Giving nurses more authority in hospital decisions will make everything safer. Seattle-based Virginia Mason Hospital redesigned its operations around nurse priorities and subsequently saw its quality and safety scores go up, according to Ms. Binder.

"If it's a good place for a nurse to go, it's a good place for a patient to go," Ms. Binder said, noting that the national nursing shortage isn't just a numbers game; it requires a large culture shift.

Hospitals need to double down on quality improvement efforts, Ms. Binder said. "Many have done the opposite, for good reason, because they are so focused on COVID-19. Because of that, quality improvement efforts have been reduced."

Ms. Binder urged hospitals not to cut quality improvement staff, noting this is an extraordinarily dangerous time for patients, and hospitals need all the help they can get monitoring safety. Hospitals shouldn't start to believe the notion that somehow withdrawing focus on quality will save money or effort.

"It's important that the American public knows that we are fighting for healthcare quality and safety — and we have to fight for it, we all do," Ms. Binder said. "We all have to be vigilant."

Conclusion

The true consequences of healthcare's labor shortage on patient safety and care quality will become clear once more national data is available. If the CDC's report on rising HAI rates is any harbinger of what's to come, it's clear that health systems must place renewed focus and energy on safety work — even during a situation as unprecedented as a pandemic.

The irony isn't lost on Ms. Binder: Amid a crisis driven by infectious disease, U.S. hospitals are seeing higher rates of other infections.

"A patient dies once," she concluded. "They can die from COVID-19 or *C. diff*. It isn't enough to prevent one." ■

What researchers found reviewing 250,000 long COVID-19 cases

By Erica Carbajal

More than half of COVID-19 survivors experience at least one symptom six months or more after initially recovering from the illness, a systematic review involving 250,351 COVID-19 survivors found.

The findings were published Oct. 13 in *JAMA Network Open* and are based on a systematic review of 57 studies. Of the 250,351 people included in the studies, 56 percent were men and 79 percent were hospitalized during their initial COVID-19 infection.

The median proportion of people experiencing at least one symptom one month after their initial infection was 54 percent, based on 13 of the studies. At two to five months after infection, 55 percent of people experienced at least one symptom (38 studies) and about 54 percent still had at least one symptom six months or more after their initial recovery (nine studies).

Four studies found 62.2 percent of COVID-19 survivors had abnormalities on chest imaging, the most prevalent pulmonary symptom.

Meanwhile the most common neurologic symptom was difficulty concentrating, experienced by nearly 24 percent of people across four studies. The findings also identified generalized anxiety disorder (29.6 percent) as the most commonly reported mental health symptom in seven studies.

General functional impairments (44 percent across nine studies) were the most common functional mobility symptoms, and fatigue or muscle weakness (37.5 percent across 30 studies) was the most common general and constitutional symptom.

"These findings suggest that [post acute sequelae of COVID-19] is a multisystem disease, with high prevalence in both short-term and long-term periods. These long-term PASC effects occurred on a scale sufficient to overwhelm existing health care capacity, particularly in resource-constrained settings," researchers said. "Moving forward, clinicians may consider having a low threshold for PASC and must work toward a holistic clinical framework to deal with direct and indirect effects of SARS-CoV-2 sequelae." ■

CMO / CARE DELIVERY

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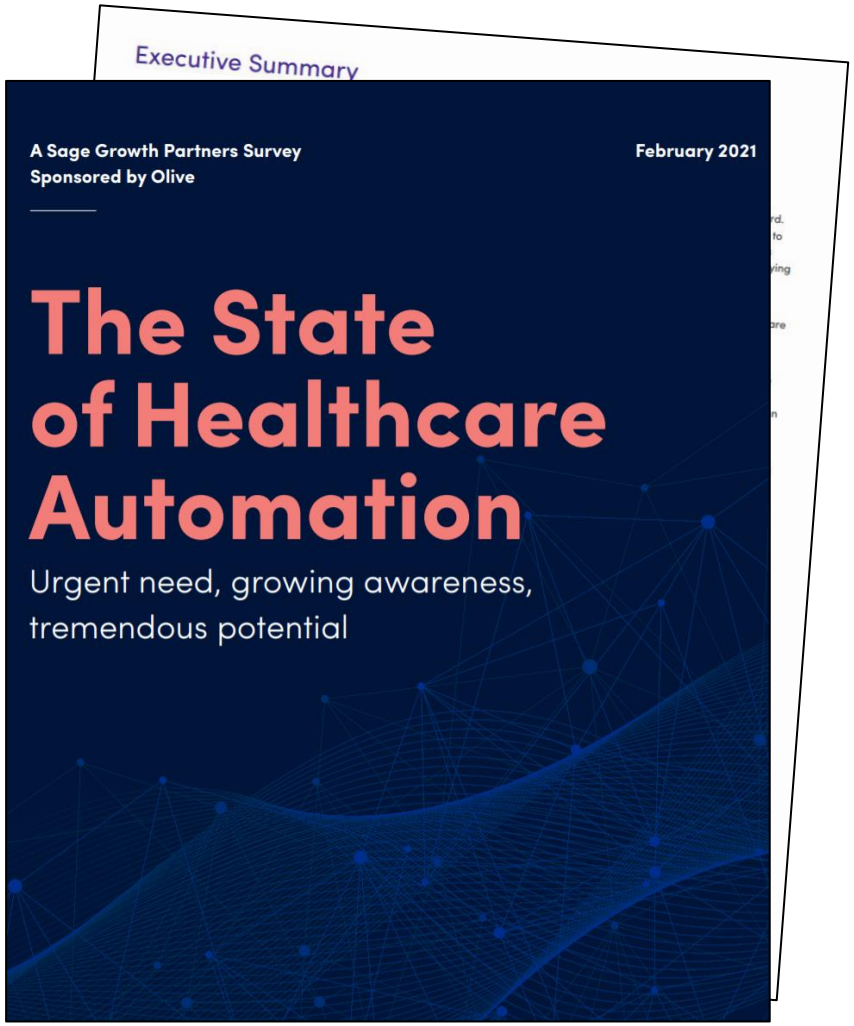
https://beckershealthcare.uberflip.com/i/1430054-december-2021-issue-of-beckers-hospital-review/37?


AUTOMATION IS THE FUTURE

Sage Partners – Automation Survey



- Respondents are 100 leaders of healthcare organizations with revenues exceeding $800M.
- Nearly half (48%) are part of health systems
- 76% are C-level executives (chiefly CIOs, COOs, and CFOs).
- The quantitative survey was supplemented by in-depth interviews with six executives.

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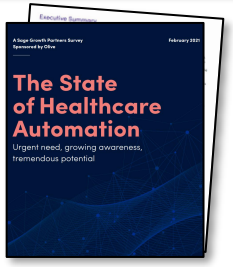
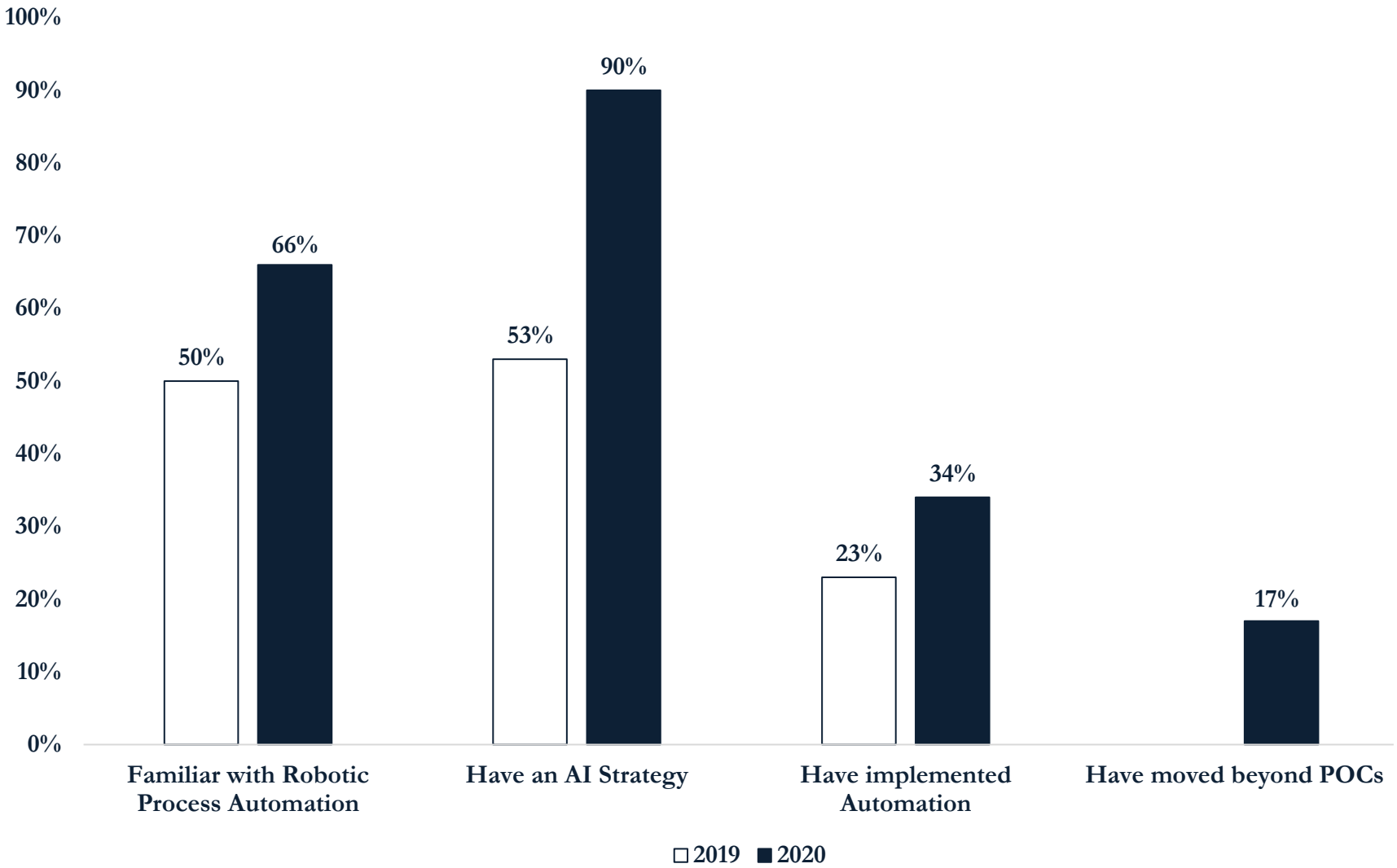
https://www.prnewswire.com/news-releases/new-report-finds-90-percent-of-hospitals-have-an-ai-strategy-up-37-percent-from-2019-301242756.html

Adoption of Automation





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Requirements for Automation

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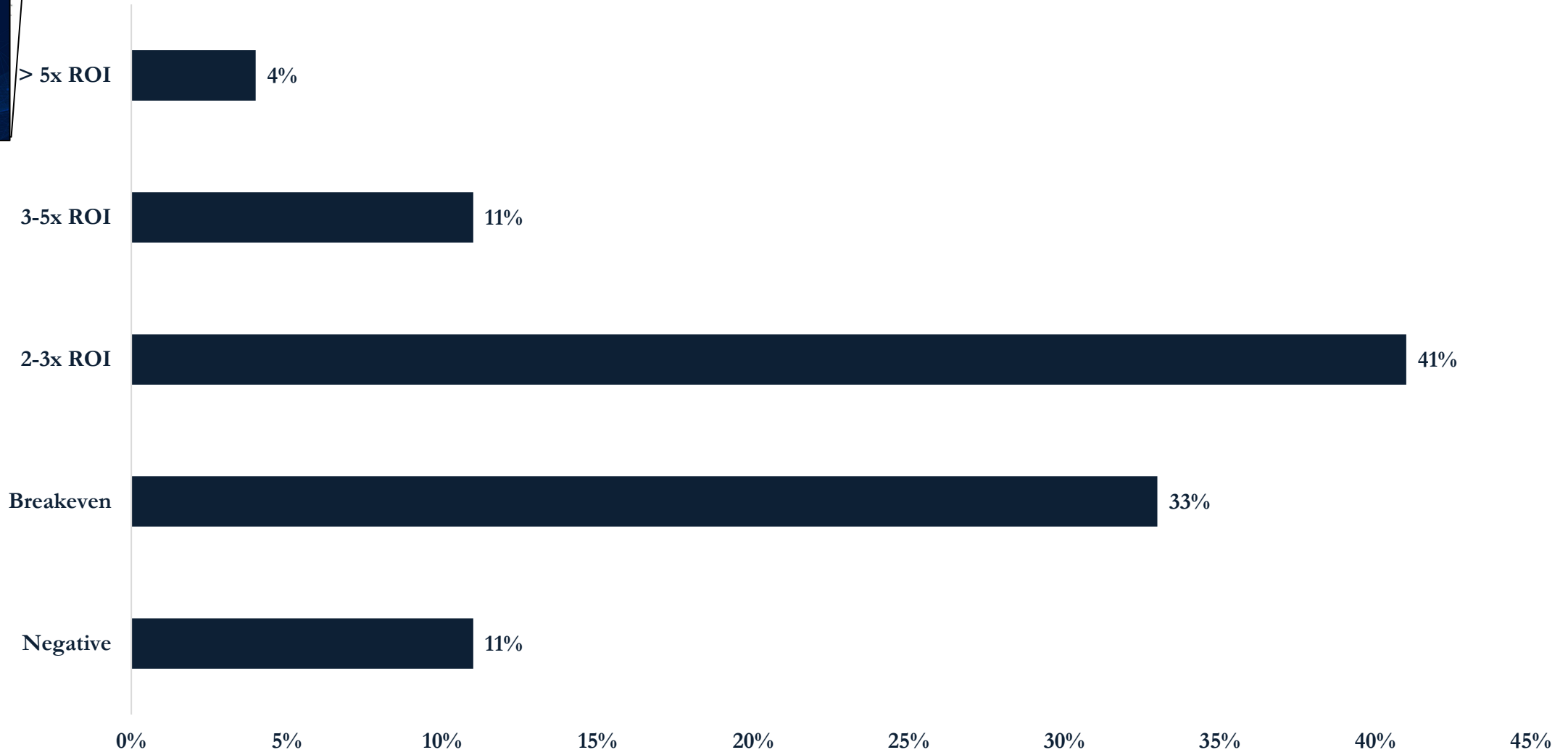
Return on Automation



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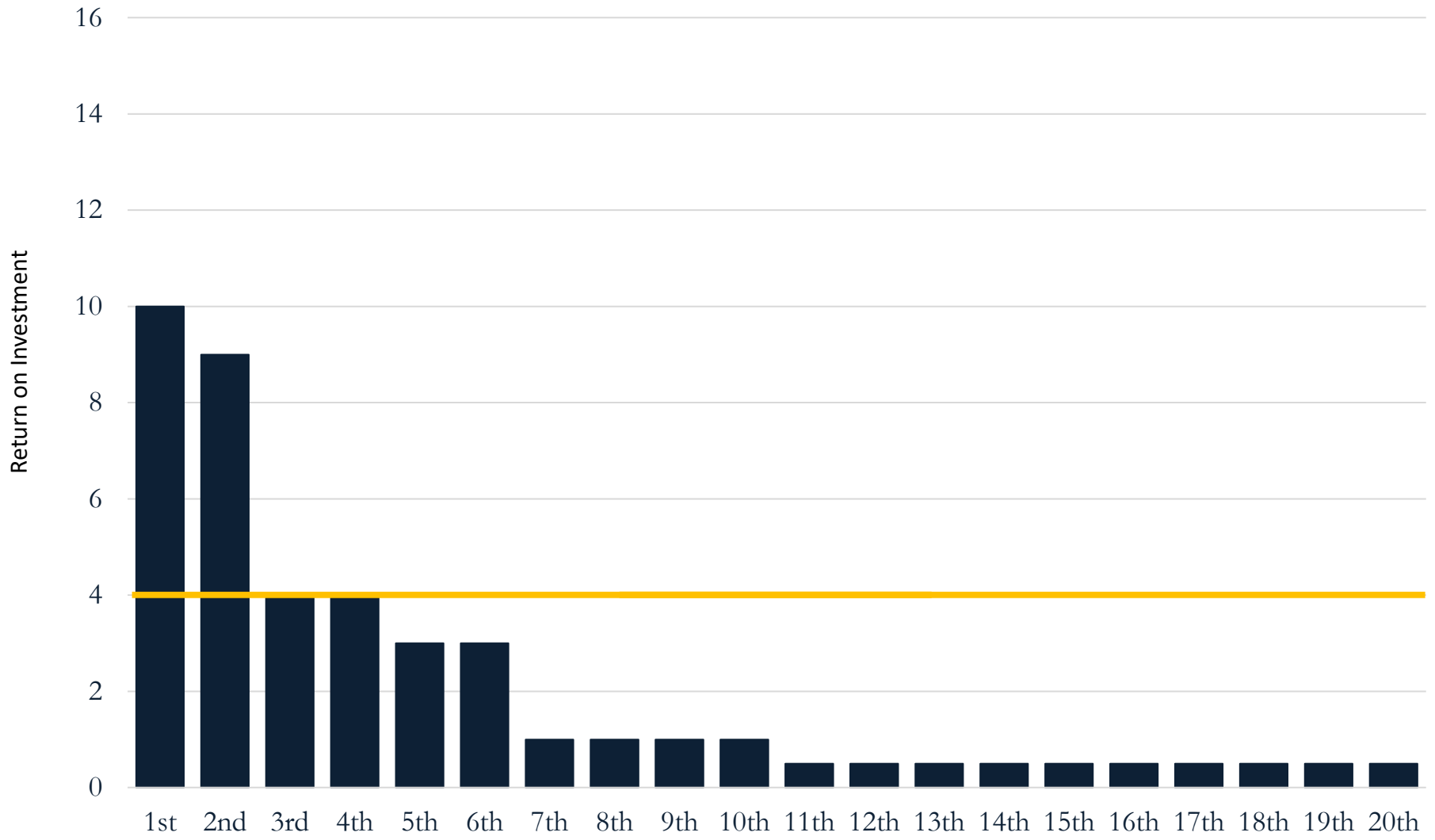
Solve It With A Platform



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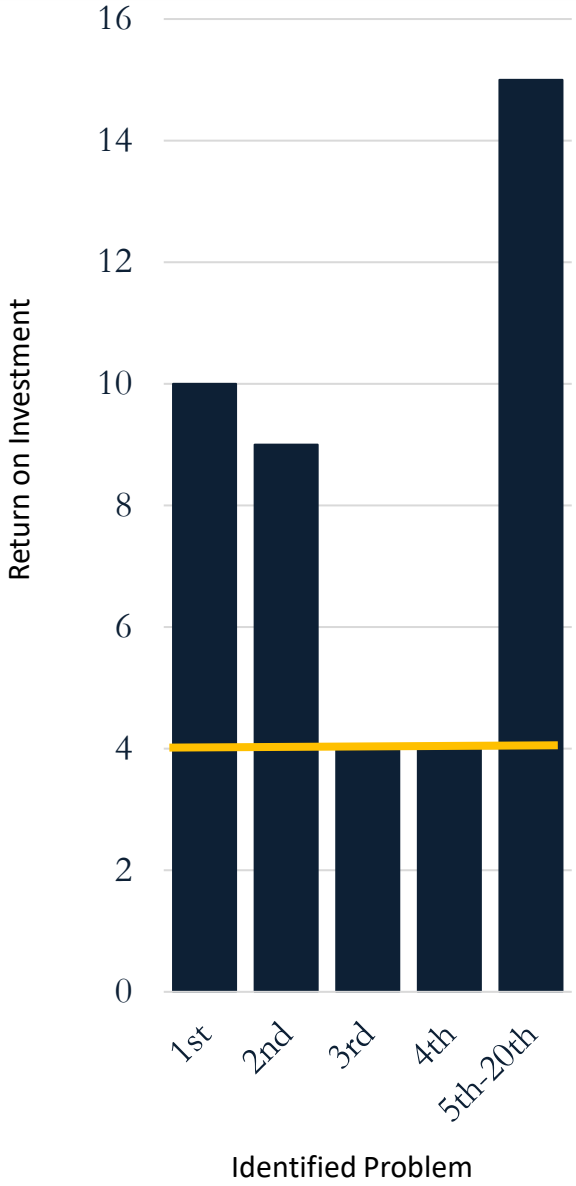
Solve It With A Platform



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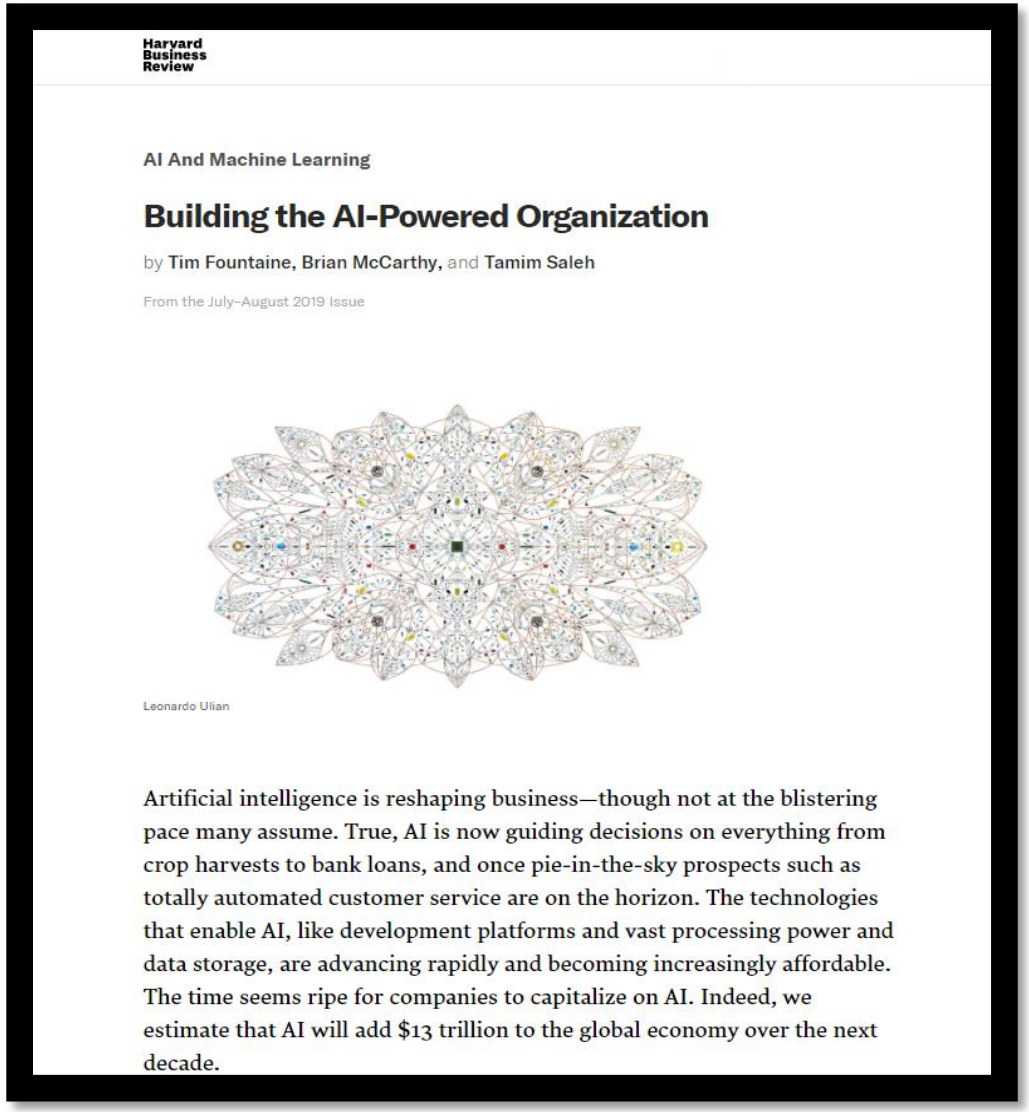
AI Organizations



Harvard Business Review

AI And Machine Learning

Building the AI-Powered Organization

by Tim Fountaine, Brian McCarthy, and Tamim Saleh

From the July–August 2019 Issue

Leonardo Ulian

Artificial intelligence is reshaping business—though not at the blistering pace many assume. True, AI is now guiding decisions on everything from crop harvests to bank loans, and once pie-in-the-sky prospects such as totally automated customer service are on the horizon. The technologies that enable AI, like development platforms and vast processing power and data storage, are advancing rapidly and becoming increasingly affordable. The time seems ripe for companies to capitalize on AI. Indeed, we estimate that AI will add $13 trillion to the global economy over the next decade.

3 Fundamental Shifts

- ❑ From siloed work to interdisciplinary collaboration
- ❑ From experience-based, leader-driven decision making to data-driven decision making at the front line
- ❑ From rigid and risk-averse to agile, experimental, and adaptable

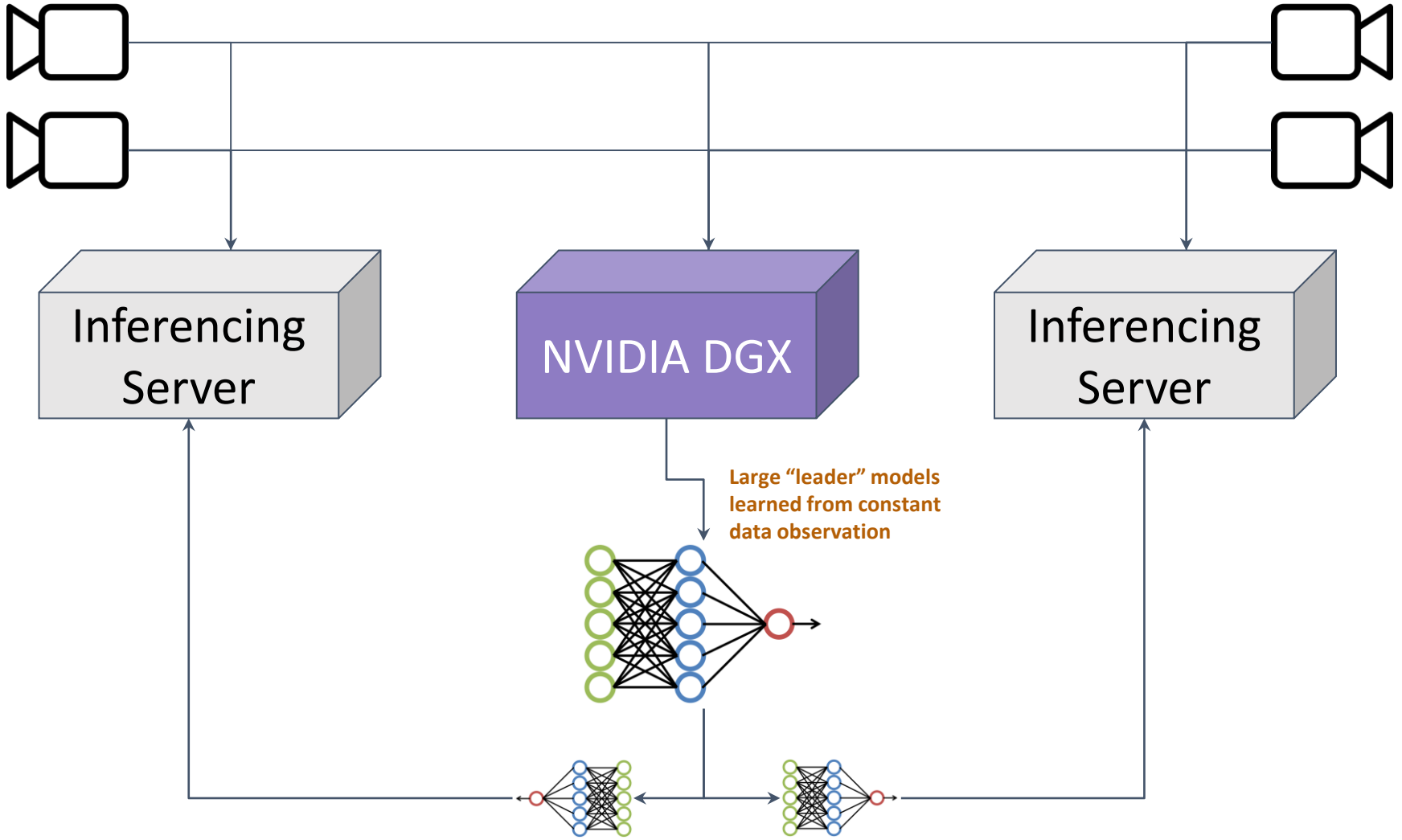
https://hbr.org/amp/2019/07/building-the-ai-powered-organization

AI DEVELOPMENT STRATEGY

Machine Learning Needs An Education

Workers at the headquarters of Ruijin Technology Company in Jiaxian, in central China's Henan Province. They identify objects in images to help artificial intelligence make sense of the world. Yan Cong for The New York Times

Self-Supervised Architecture



MIMICKING THE HUMAN SENSES

Mimic The Human Senses

Eyesight

Computer Vision

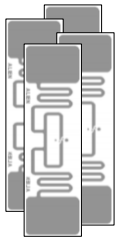
Speech and Hearing

Voice Recognition

Spatial Context

UWB

RFID



EXAMPLES OF AUTOMATION IN THE CLINICAL SPACE

Operating Room Coordination

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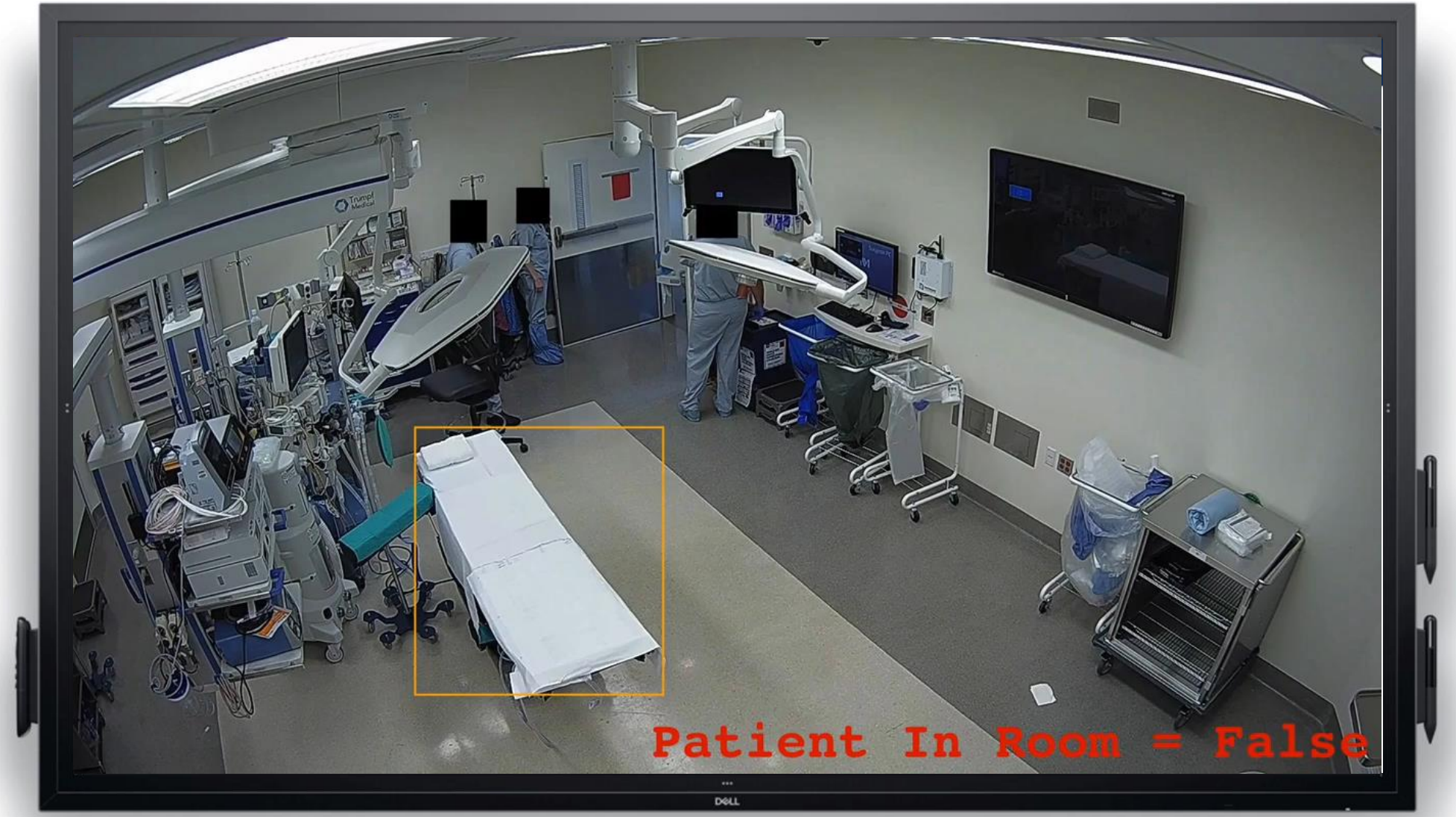
Operating Room



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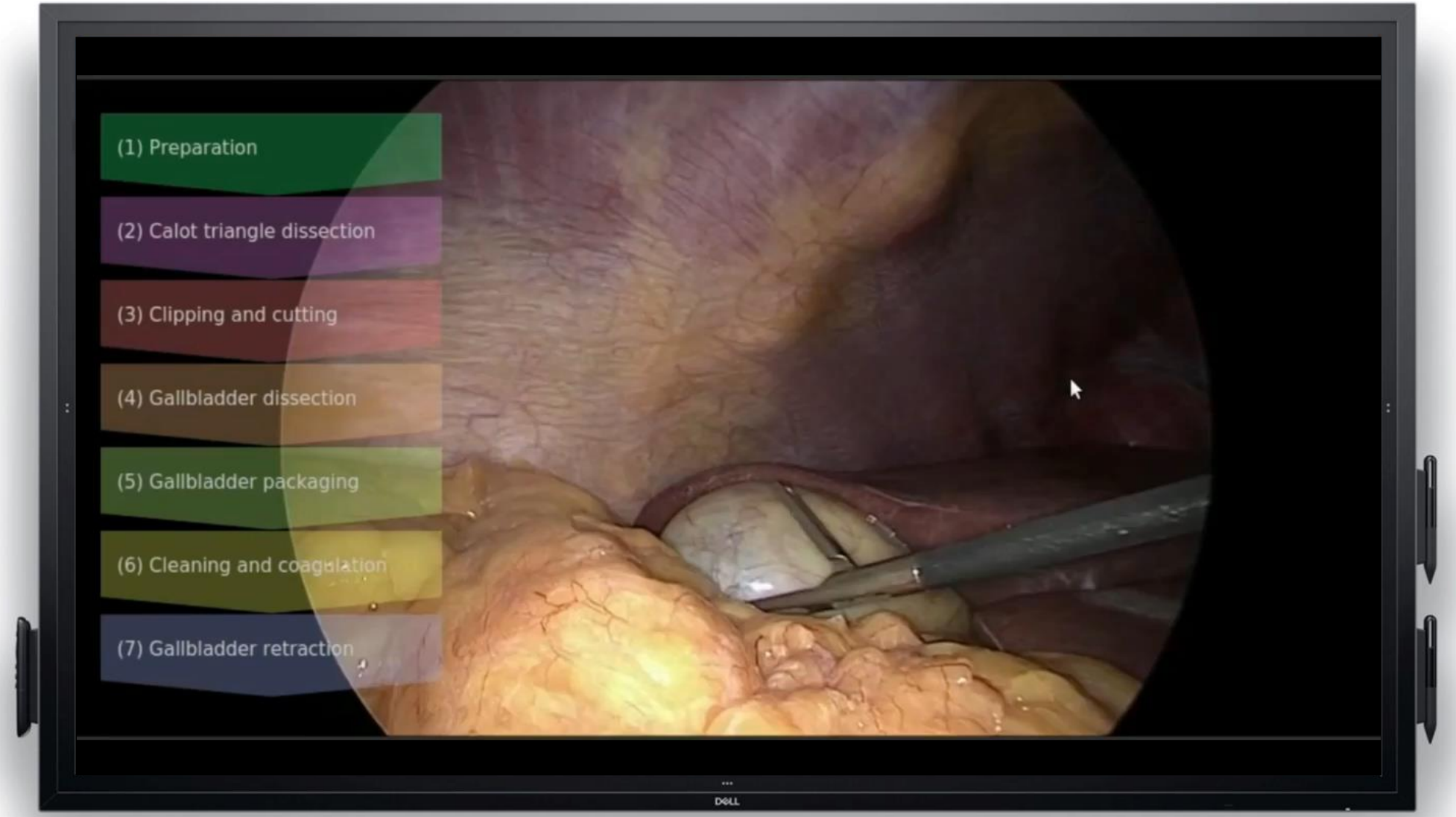
Phase Detection



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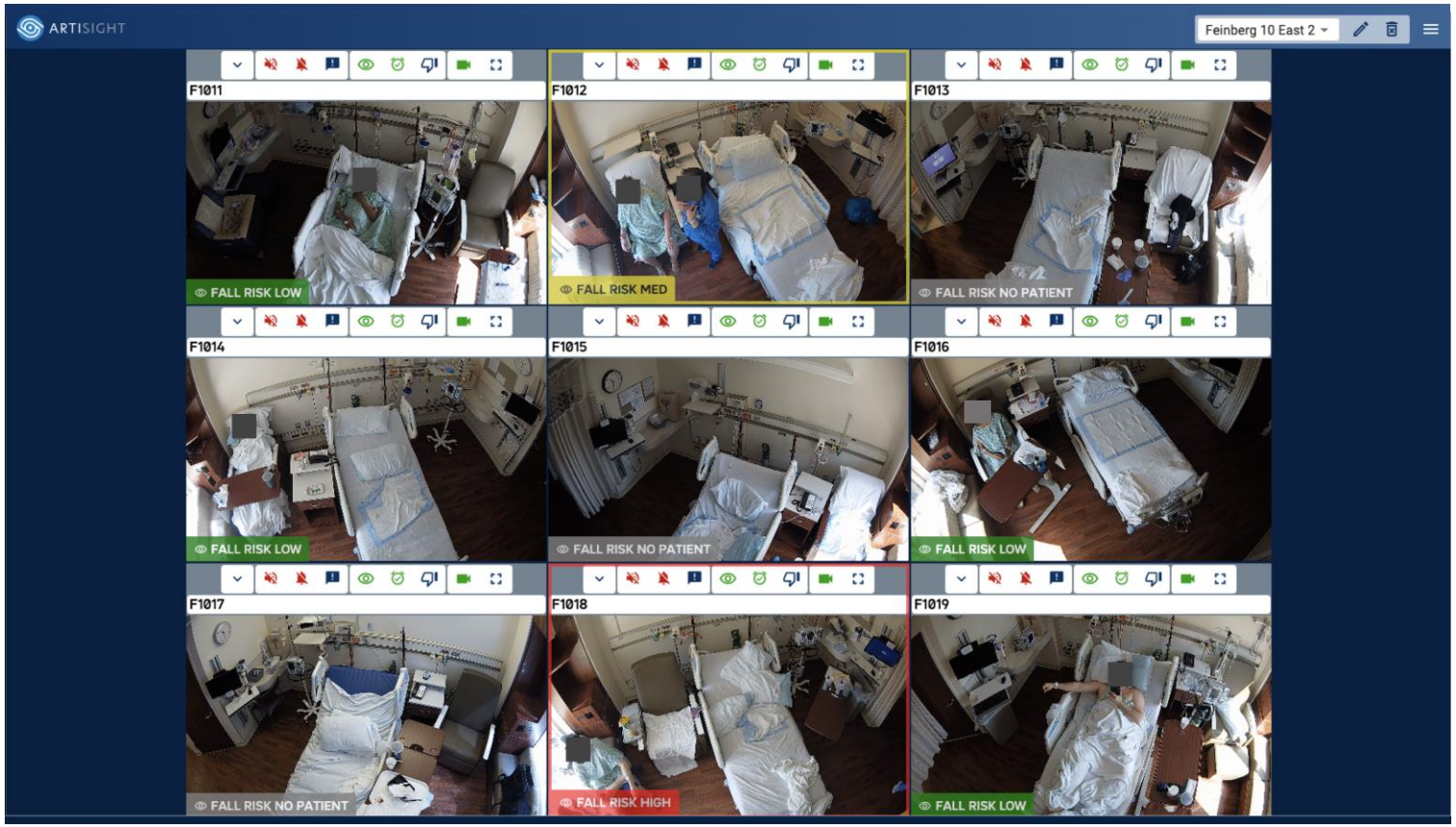
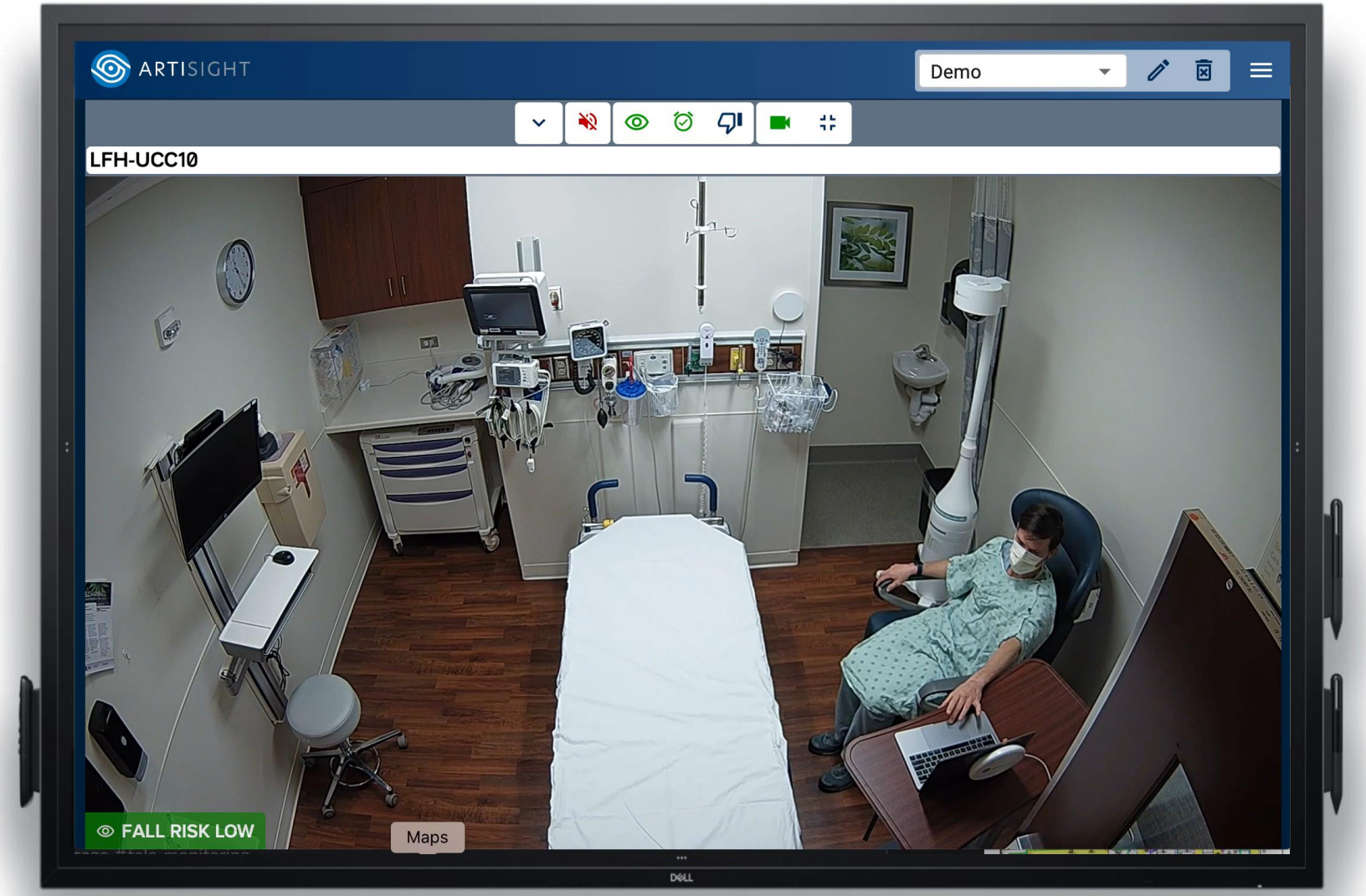
TELEMONITORING

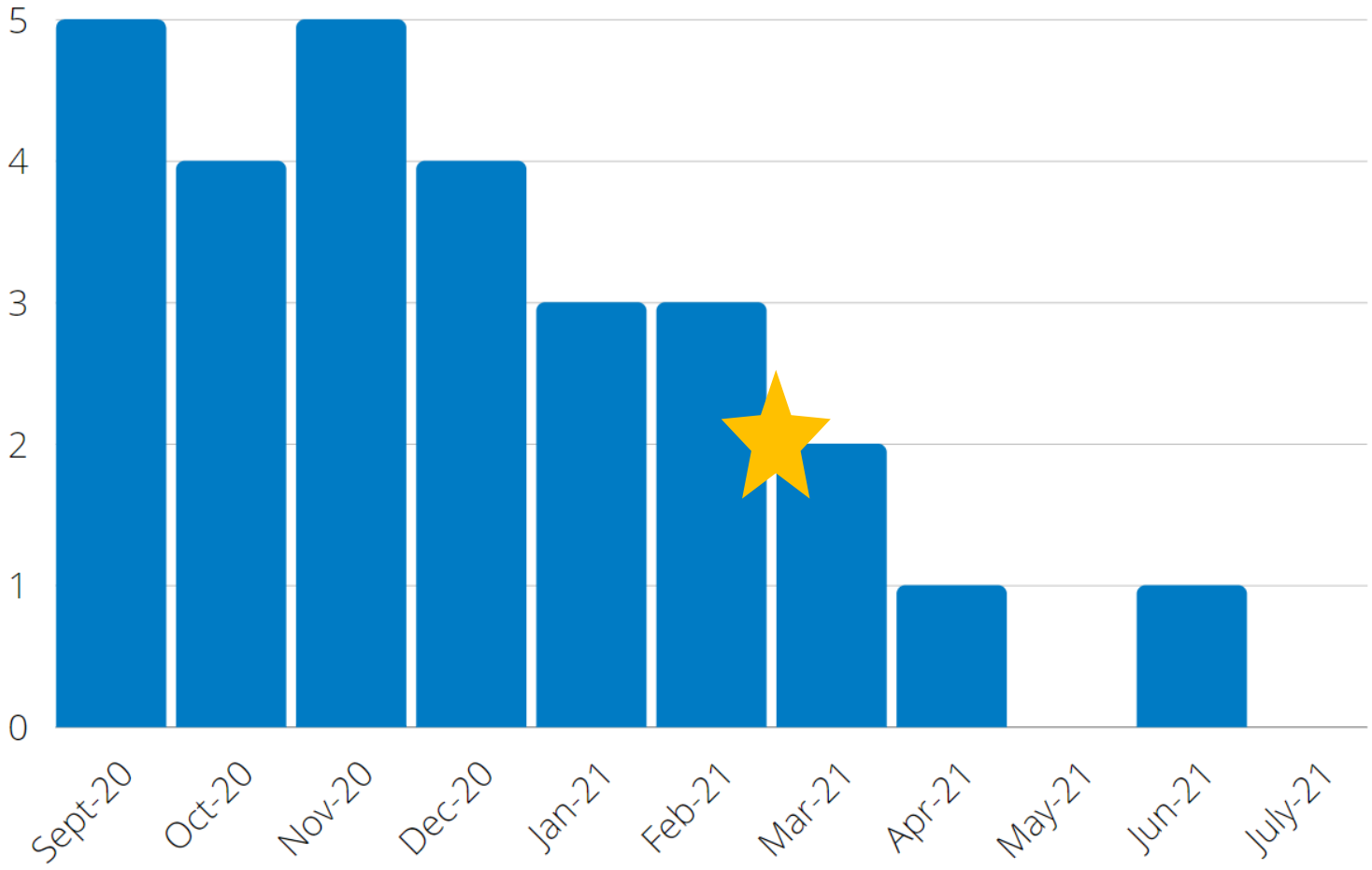


Telemonitoring with Fall Detection

Telemonitoring with Fall Detection



Total Falls FY 21 - Artisight Deployment & AI Enhancement



Falls

When Artisight was implemented

This data exemplifies the impact that our patient monitoring solution has against reducing falls. This customer was using a competitive product to monitor falls and transitioned to Artisight.

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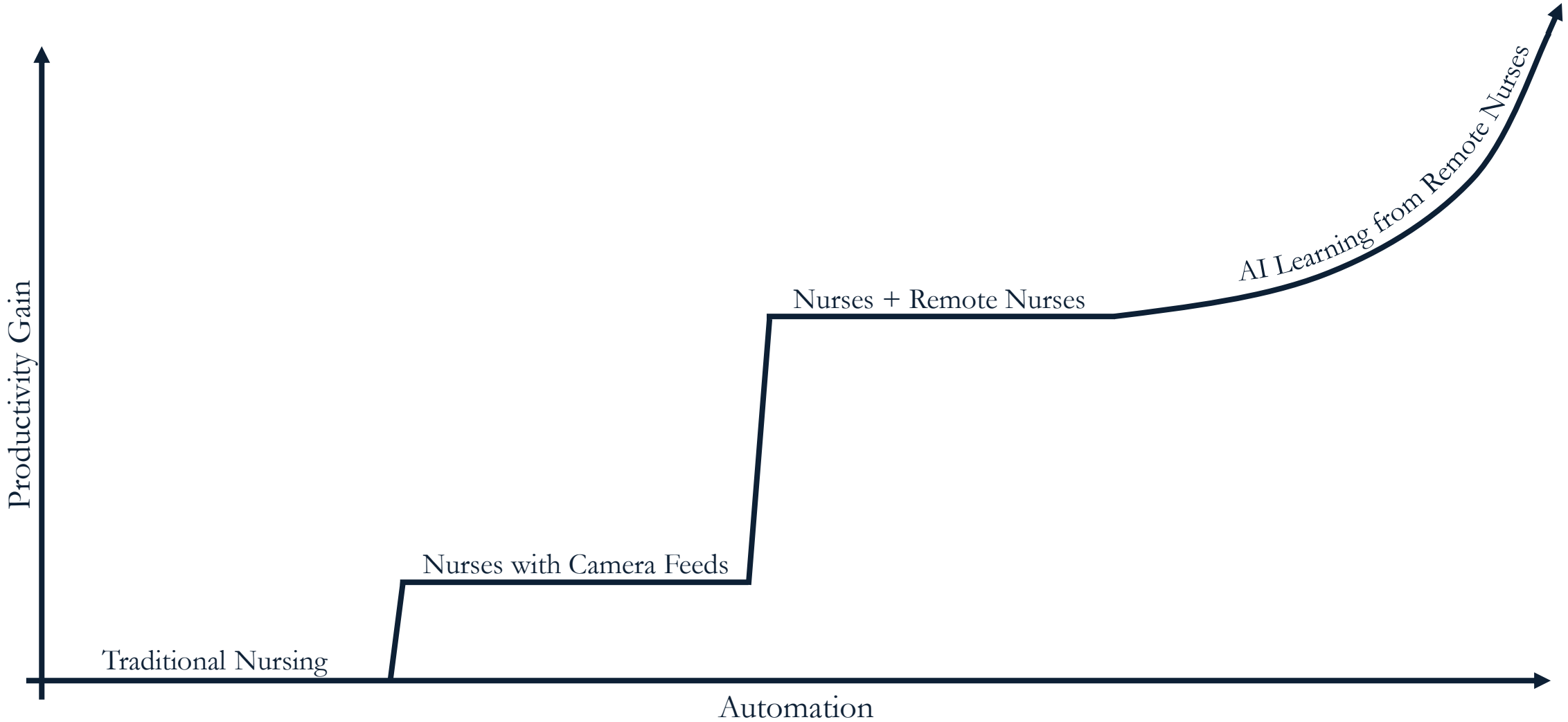
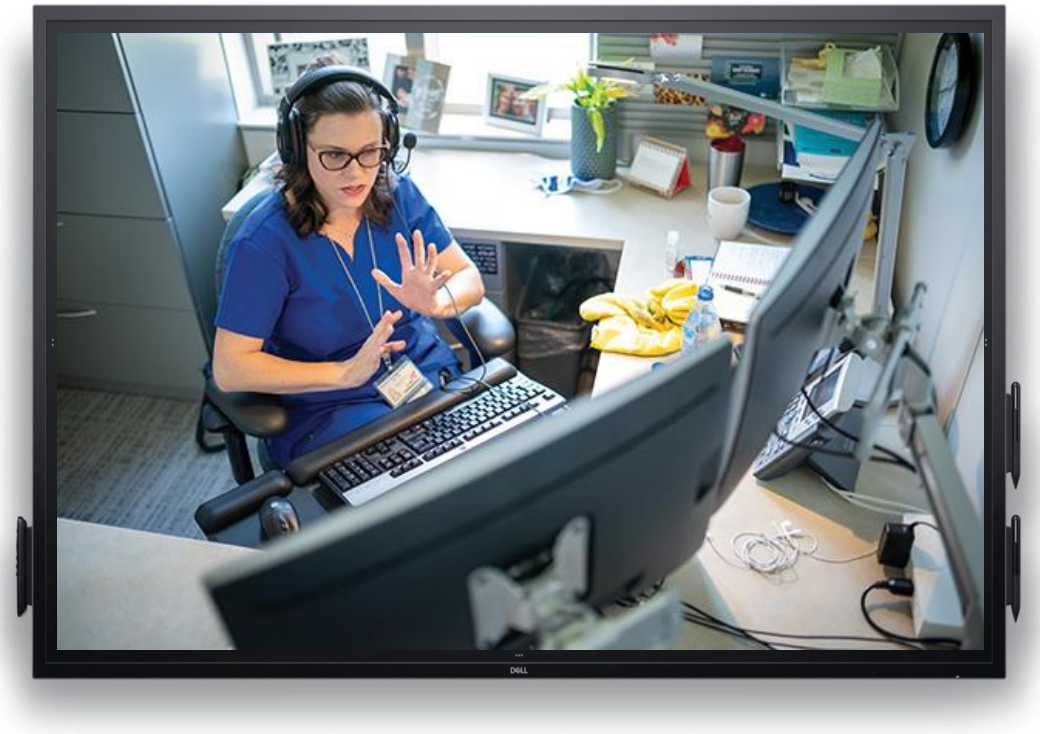
AI Deployment and Training Strategy



Remote Nursing Assistant



Nursing Activities by Time		
Documentation	35.3%	147.5 min
Care Coordination	20.6%	86 min
Patient Care	19.3%	81 min
Medication Administration	17.2%	72 min
Patient Assessment	7.2%	31 min

147.5/.353 ~ 420 Minutes (7 + 1 hours)

420 – 147.5 = 272.5 minutes

147.5 minutes back on top of 272.5 of work
(**54% increase in productivity**)

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A 36-Hospital Time and Motion Study: How Do Medical-Surgical Nurses Spend Their Time? The Permanente Journal/ Summer 2008/ Volume 12 No. 3 (https://www.issuelab.org/resources/8134/8134.pdf)

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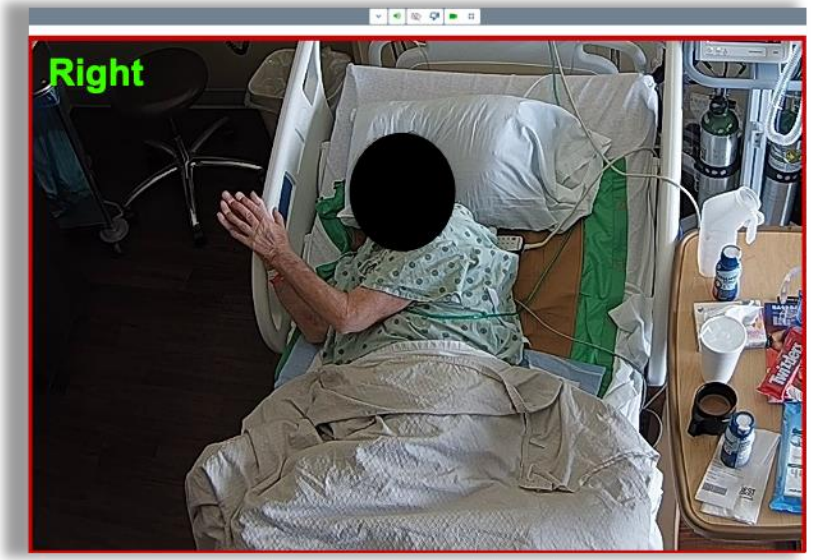
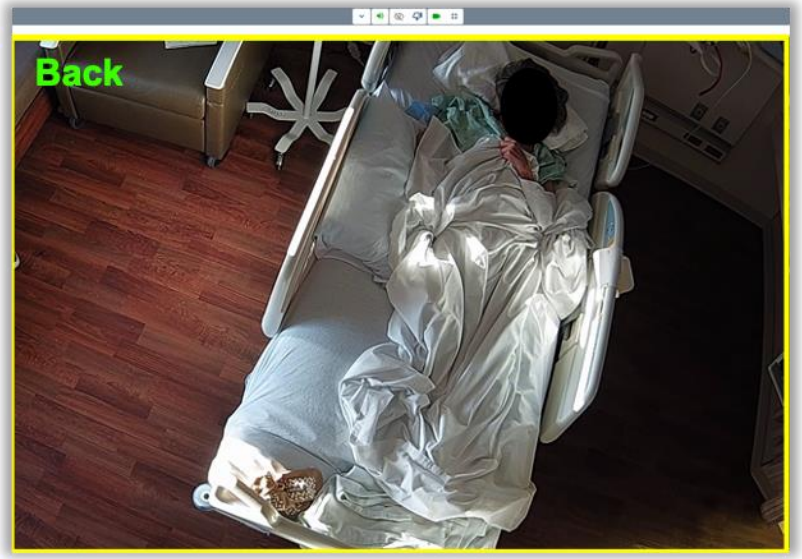
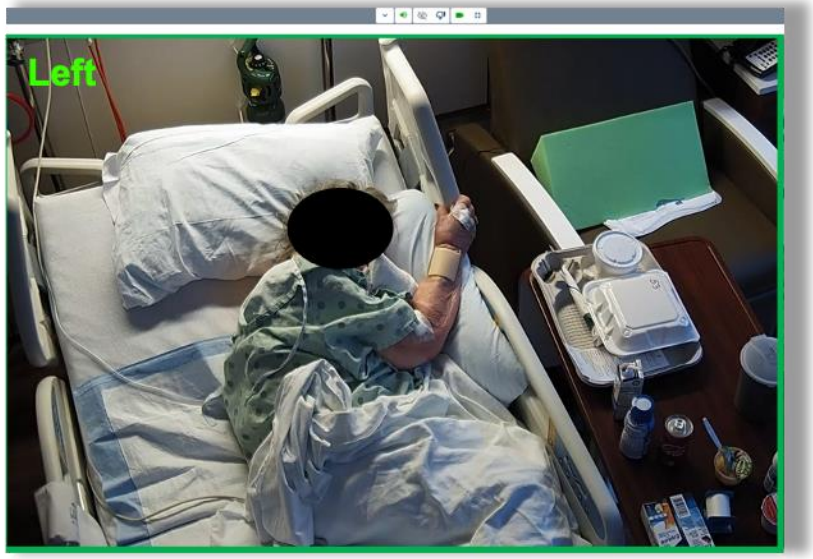
Turn Protocol Adherence







Turning Protocols:

- Nurses must turn patients every 2 hours
- Algorithms can send reminders if turns are not performed
- When turns are performed, Epic integrations automate documentation for the nurses

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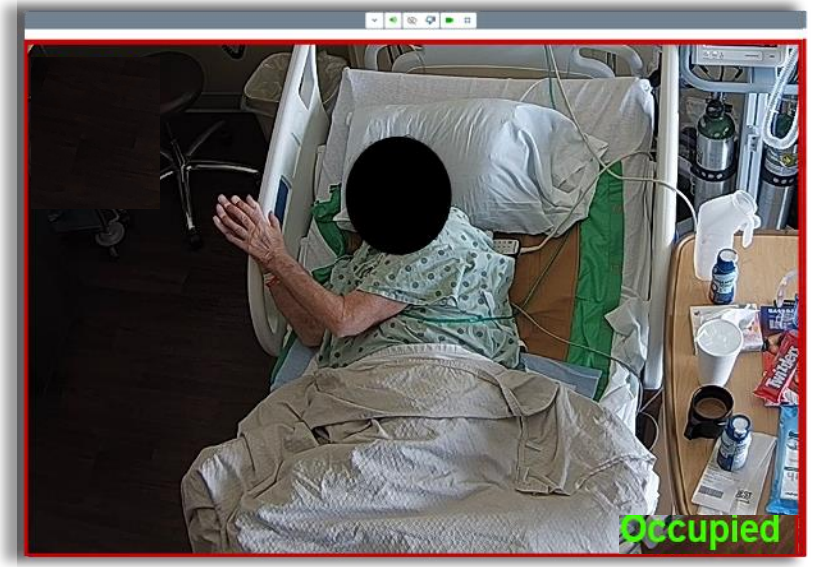
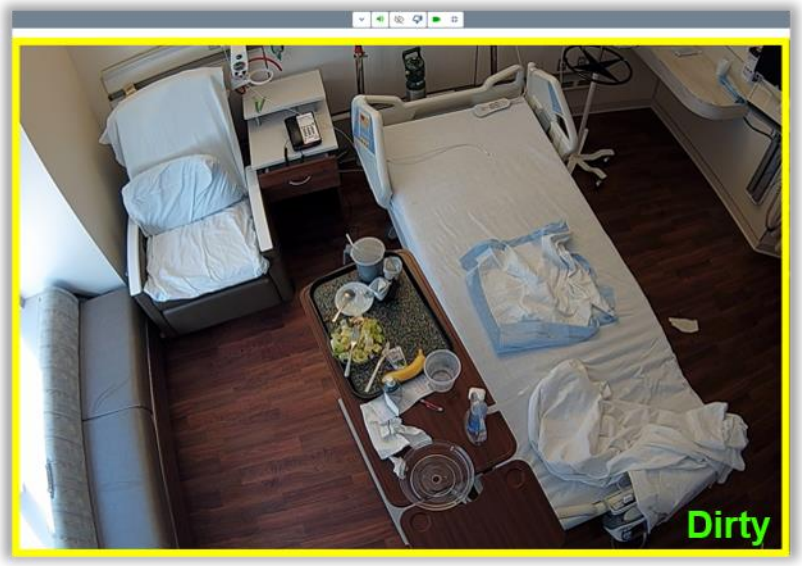
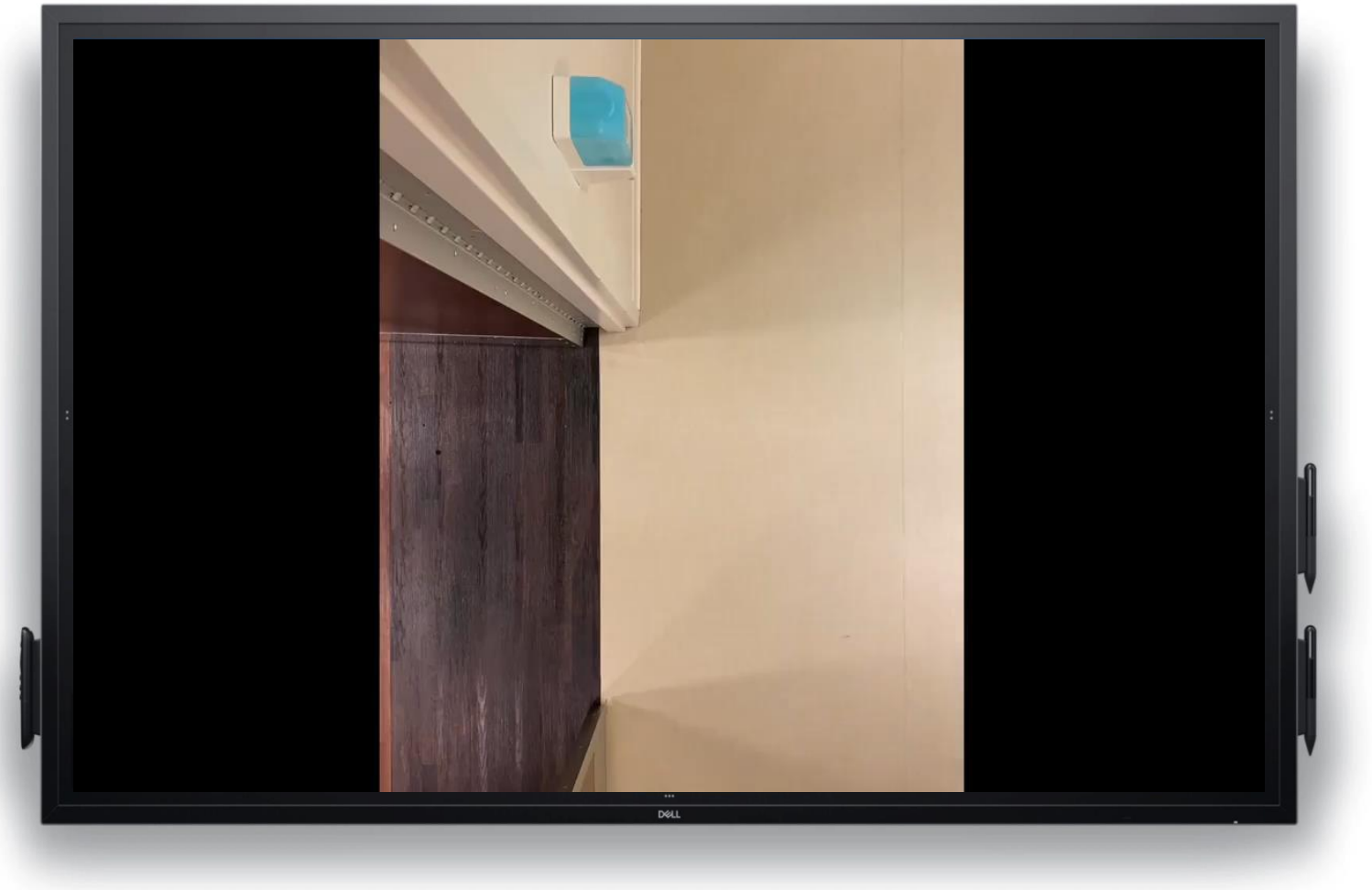
Bed Event Orchestration





HANDWASHING LEAPFROG REQUIREMENTS



Hospitals meeting the hand hygiene standard collect hand hygiene compliance data on:

- At least 200 hand hygiene opportunities
- Each month
- In each patient care unit

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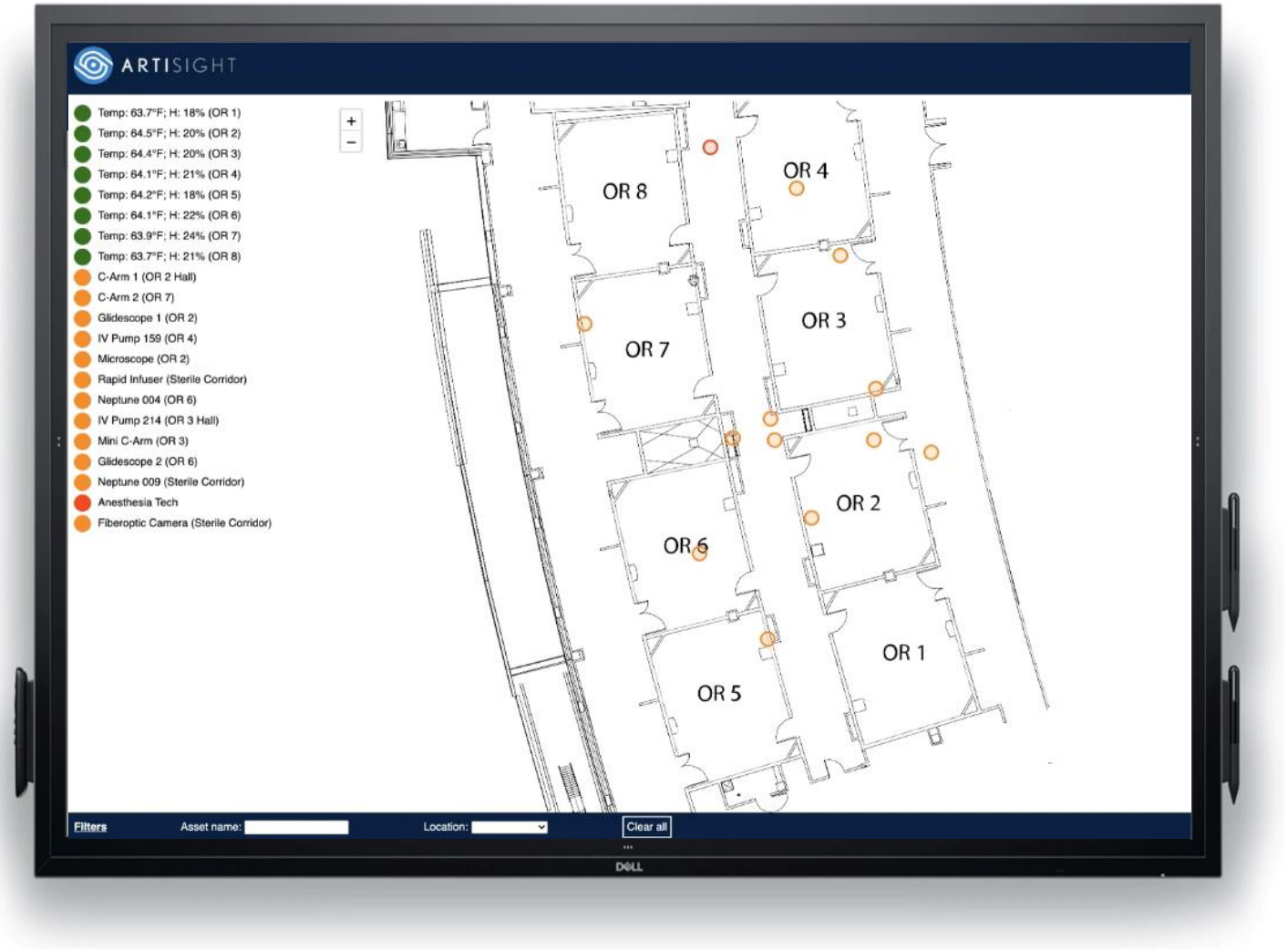
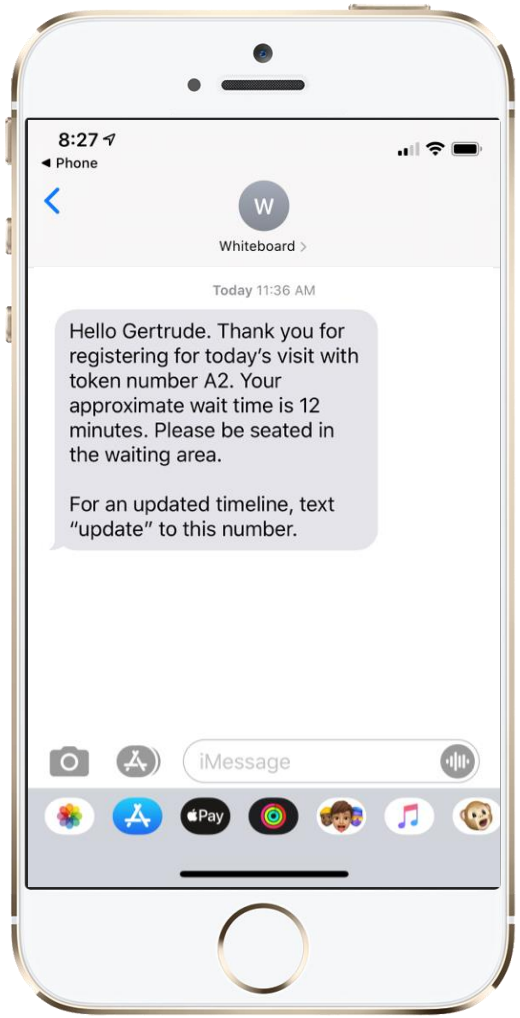
Bluetooth Location Services

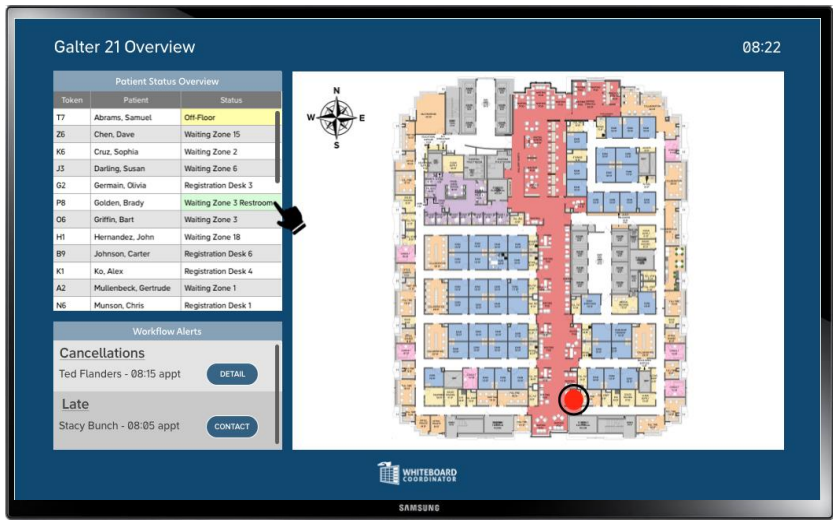


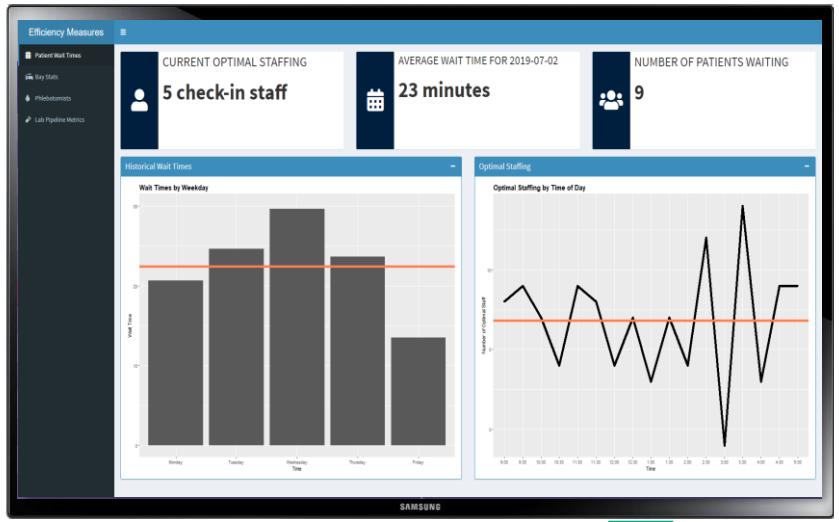
Bluetooth Tagging

- Staff
  - Collect data to optimize staffing models
  - Automate documentation and notifications
- Patients
  - Collect data to optimize scheduling
  - Automate patient communications
- Assets
  - Inventory
  - Patient room assets (IV pump, vitals monitors)
  - Imaging devices (X-Ray, C-arm)
  - Transport (wheelchairs, beds)
- Accuracy
  - +/- 18 inches
  - Updated location every 100 milliseconds

CLINIC COORDINATION







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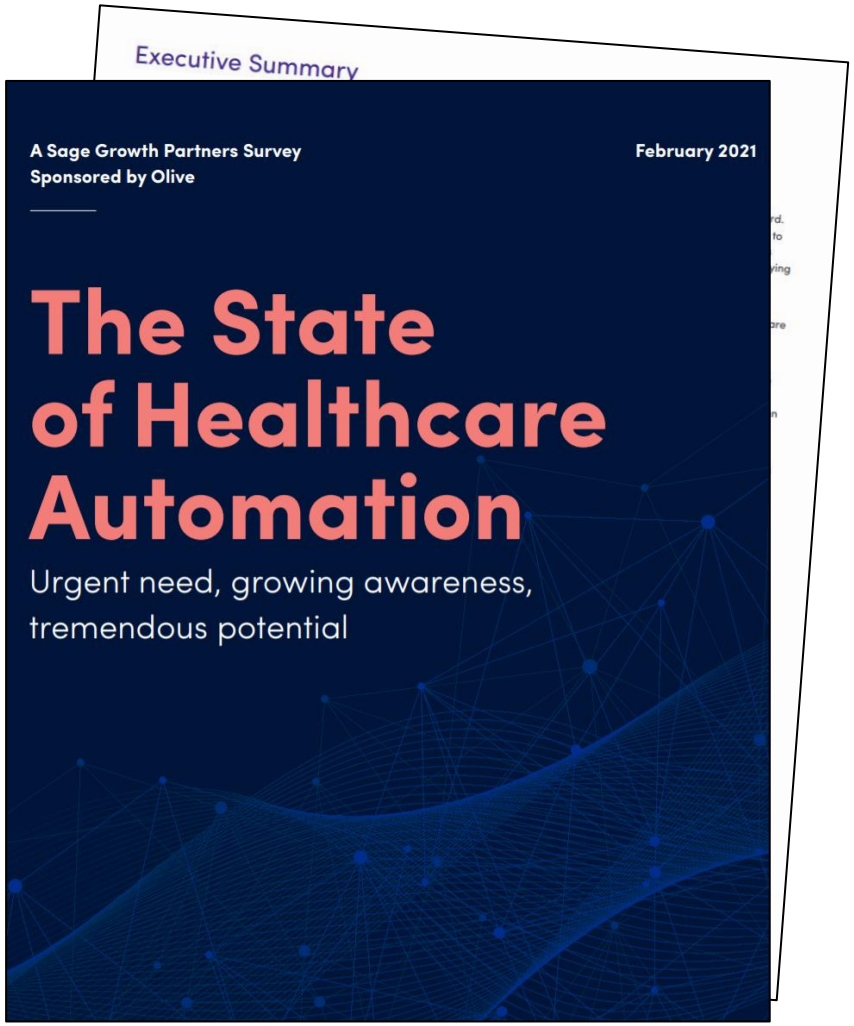
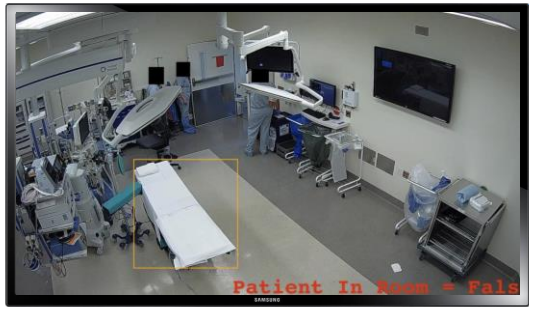
Adoption of Automation



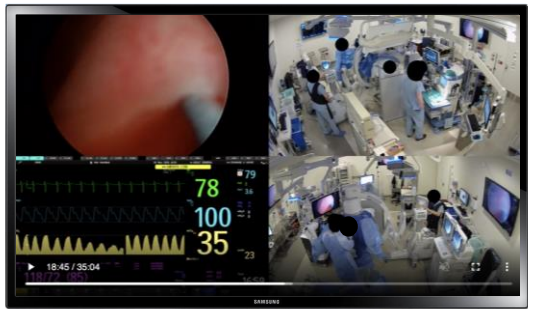
Key survey findings:

- ❑ Organizations have found that ***scaling automation is hard***.
- ❑ Respondents listed difficulty identifying ***which processes to automate***.
- ❑ There is a ***trend away from building automations in-house*** and towards full-service models that provide AI-as-aService (AIaaS). The 2020 survey found half of those with an existing automation solution prefer an AIaaS model, while only 12% prefer to build it themselves.
- ❑ Key criteria for technology providers are ***healthcare specialization, proven ROI with an enterprise-capable solution***, effective security, and performance reliability.
- ❑ These findings suggest that ***the future of AI and automation may lie in enterprise-wide AIaaS solutions*** with proven healthcare expertise and ROI.

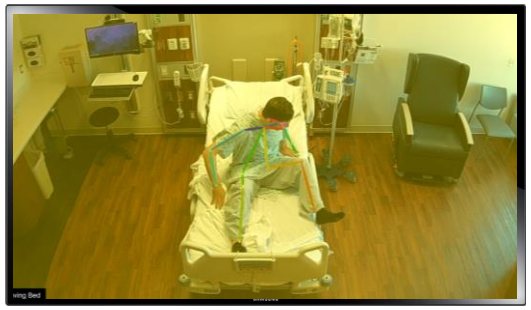
End to End AIaaS For Hospitals



OR Coordination

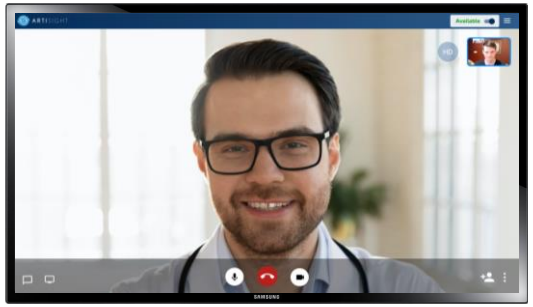


Surgical Quality Improvement



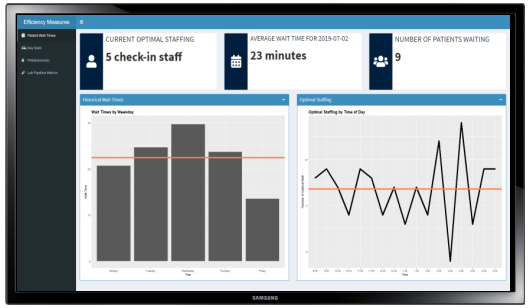
Telemonitoring

Telesitting

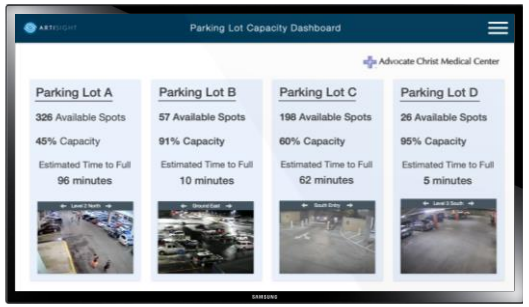


TeleHealth

Capacity Management



Clinic Coordination



Parking Lot Optimization

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Next Steps

- Do you have any follow up questions? Please let us know!
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