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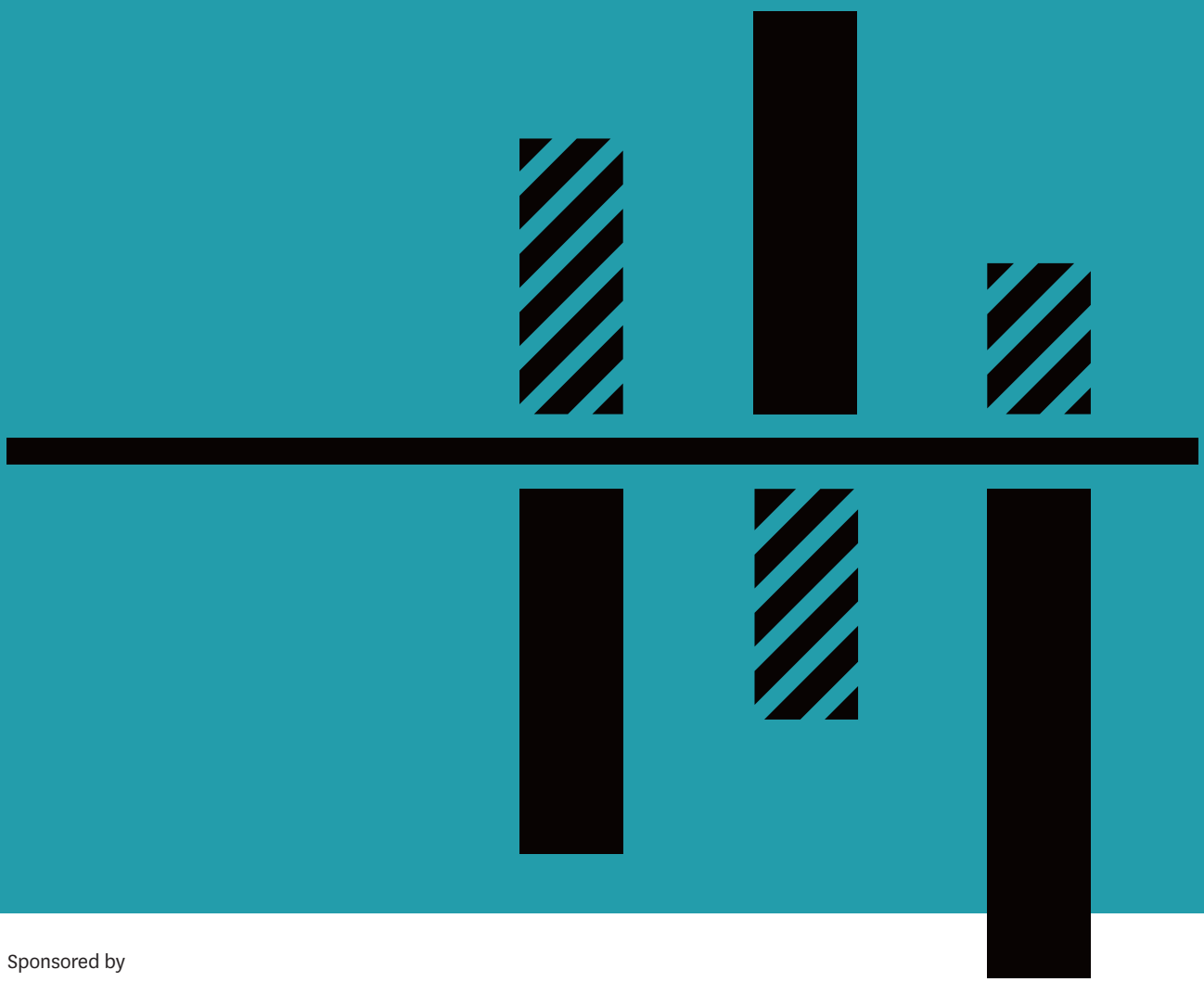
White Paper

TRANSFORMING CARE DELIVERY TO INCREASE VALUE



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Transforming Care Delivery

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Who can argue with the basic premise behind value-based care? The migration from fee for service to a more patient-centric care delivery model that rewards outcomes over services promises to transform our health care systems. In the U.S. alone, it's estimated that by 2018 up to 90% of all provider payments are likely to be value based.[1]

For anyone facing rising health care costs, clinical inefficiency, and duplication of services, optimizing the cost of care with no sacrifice in outcomes is an imperative. The need to increase productivity, close care gaps, reduce waste and variability across the cycle of care, and find ways to better deploy qualified staff are among the key challenges that our volume-driven health care systems face today.

These challenges also bring opportunities. Achieving true value in health care requires a significant reorientation of delivery systems and a commitment to process improvement that many institutions, understandably, find difficult to manage by themselves. For example, organizing care delivery around the patient pathways with dedicated teams working collaboratively across the full cycle of care helps eliminate activities that don't improve value for the patients.

The road to "better outcomes at lower cost"—and the concurrent shift of financial risk from payers to providers that will accompany it—is not an easy one. So the question becomes, how do you ensure value is at the heart of care delivery?

At Siemens Healthineers, we partner with health care providers around the world to design and develop new processes that improve access to care, increase workforce productivity, optimize clinical pathways, and help hospitals better manage and care for populations.

Transforming Care Delivery to Increase Value
We want to enable you and your teams with insights, ideas, and solutions on your journey toward transforming care delivery—a transformation that has already started and will finally help you achieve better outcomes at lower costs.

I hope this report will trigger valuable insights as you review how a range of health care providers are approaching these interconnected goals and the results they have achieved.

[1] https://innovation.cms.gov/initiatives/Health-Care-Payment-Learning-and-Action-Network/

TRANSFORMING CARE DELIVERY TO INCREASE VALUE

Increasing value in health care is a top priority for health systems, payers, and policy makers across the globe, as health care costs continue to escalate and consume an ever-greater proportion of national expenditures. Toward that end, policy makers have introduced value-based payment models that reward quality and efficiency, in contrast with the traditional fee-for-service model, which incentivizes volume. By 2018, for instance, the U.S. Centers for Medicare and Medicaid Services (CMS) has said it wants 90% of its payments tied to value. From bundled payments to accountable care organizations, value-based payment models incentivize providers to deliver high-quality care—efficiently.

Bundled payments, for instance, are set fees paid for a defined episode of care, such as total knee or hip replacement. Included are pre-op and post-op care services as well as all hospital charges. The cost of the episode of care under a bundled payment is about 10%–15% less than what would result under a fee-for-service model. With bundled payments, providers are incentivized to deliver high-quality care so that patients have fewer complications, shorter lengths of stay, less post-op rehabilitation, and a lower risk of readmission, saving costs and allowing the pocketing of any unspent funds from the bundled payment.

For bundled payments as well as other value-based models in the U.S., additional incentives are provided by CMS policies that levy penalties for higher-than-predicted rates of hospital-acquired infections and 30-day readmissions.

To reorient themselves around value, health systems must rethink how they deliver care. Creating greater value requires a multipronged approach. Improving access to care, increasing workforce productivity, optimizing clinical operations, and managing population health are important—and interrelated—steps. This white paper will look at how a range of health care providers, including Cleveland Clinic, Geisinger Health System, the Martini-Klinik, Mercy Virtual, and Johns Hopkins Medicine, have approached these interconnected goals and the results they achieved. Many of the organizations mentioned here employ Lean methodology, high-reliability organization (HRO) principles and systems engineering as they continually strive to improve outcomes and efficiency, aided by technology and data analytics. Whatever their particular approach, the providers discussed here share the common goal of excellence and efficiency in patient care—and a willingness to innovate to get there.

TRANSFORM CARE DELIVERY BY:

- Lowering entry barriers and increasing geographic reach to **improve access to care**
- **Increasing workforce productivity** through optimizing the skill set of your workforce while shifting routine work away
- Reducing waste and unwarranted variations with automated and standardized workflows to **optimize clinical pathways**
- Identifying and stratifying patients by disease severity to **manage population health**

The problem of access is only expected to increase, as populations grow and age, **needing more intensive services**, but there are **not enough doctors to provide the care** that is needed.

Increasing Access at a Time of Growing Need

Matching supply with demand in health care service delivery is challenging, given the complexity of the systems involved and numerous variables, including disease acuity and care setting. But doing so is a priority for improving access, which in turn leads to a cascade of benefits, including better outcomes, improved patient experiences, and increased throughput.

The problem of access is only expected to increase as populations grow and age, needing more intensive services, but there are not enough doctors to provide the care that is needed. According to a 2017 study commissioned by the American Association of Medical Colleges, by 2030 there will be a shortfall of between 7,300 and 43,100 primary care physicians and a shortfall of between 33,500 and 61,800 specialist physicians in the U.S.

Technology offers ways to increase access, from telemedicine that extends the reach of both primary and specialist care, to new methods to triage emergency department patients so that all receive appropriate treatment and walk-outs decrease.

Mercy Virtual does more than increase access, says its CEO, Dr. Randall Moore. "It fundamentally changes—and improves—the care process by optimizing workforce productivity, adding value by increasing quality efficiently." He points to the success of Mercy's TeleICU program, which is the largest single-hub remote ICU monitoring program in the U.S. The patients it serves have fewer complications and shorter lengths of stay than predicted, saving over 125,000 bed days per year and generating about $70 million in annualized savings while increasing throughput. Mortality is 35% less than expected, which translates to about 1,300 people going home who were expected to die.

Mercy's sepsis-monitoring program is another success. "By collecting data continually about our patients and analyzing it, we are able to get to problems faster. For instance, we can spot early signs of sepsis, which is the No. 1 cause of hospital mortality, and intervene in conjunction with the bedside care team," says Moore. Mercy's program has reduced progression to septic shock by 60%, he says.

Predictive analytics will be discussed later in this white paper, in the section "Managing Population Health for Value," but as the Mercy example shows, it is relevant in terms of access, too. In the emergency department of The Johns Hopkins Hospital, it is used to triage patients more efficiently than the standard method, increasing access and throughput while delivering treatment faster to sicker patients.

Improving Access to Care with Telemedicine

Mercy Virtual, based in Chesterfield, Missouri, offers telemedicine at scale in care models that extend the reach of specialist physicians, particularly intensivists and hospitalists. Its 650 employees include advanced care practitioners, nurses, and health coaches in addition to more than 100 physicians. The company's Virtual Care Center serves as the site for its TeleICU program, which monitors some 600 ICU beds in hospitals across dozens of states, in addition to serving as the base for Mercy's TeleHospitalist, TeleStroke, and ambulatory programs.

Emergency department overcrowding is a stubborn issue that compromises care quality and exasperates patients, who sometimes must wait hours to be seen, some eventually giving up and leaving without care. Most hospitals use the Emergency Severity Index to assess emergency department patients' acuity on a scale from 1 (most sick) to 5 (least sick) and prioritize those who need care most urgently. But the problem is that about 60%–70% of patients get assigned a 3, says Scott Levin, an associate professor of emergency medicine at Johns Hopkins University School of Medicine and a member of the Malone Center for Engineering in Healthcare, which applies systems engineering to improve health care delivery.

"In that group of level 3, there are a lot of sick people who need to be seen, but there are also individuals that should be a 4 or 5," he says. He developed a machine-learning tool that compares the patient's medical history and vital signs to those of other patients and predicts the risk of a number of clinical events, such as admission to an intensive care unit, and then suggests a score from 1 to 5, with the clinician having the final say. In the first six months after its implementation at The Johns Hopkins Hospital's emergency department, the percentage of patients fast-tracked increased 36% and the percentage of patients who left without being seen dropped 30%. Waiting times have dropped, reducing crowding and improving triage for many experiencing acute critical events.

One of his current projects is developing a system that predicts which patients are likely to be no-shows for their scheduled outpatient appointments, allowing providers to offer appointments to other patients. Some 20% of Johns Hopkins Medicine's scheduled 3 million outpatients a year are no-shows, he says, and it's a pervasive problem across the nation.

Increase Workforce Productivity

More and more, care is delivered by a spectrum of health care professionals that may include community health workers, social workers, physician assistants, and nurse practitioners in addition to physicians and nurses. The idea is that a comprehensive, coordinated team can cover care across the continuum. One benefit of this model is that more-routine work can be performed by a caregiver other than a physician, allowing physicians to work at the top of their licensure and focus on higher-level patient care.

Technology plays an important role in enabling this task-shifting, explains Rick Cnossen, general manager of health IT and imaging analytics at Intel Corporation. Intel worked with Zhejiang University in China to increase the speed and improve the accuracy of cancer diagnosis in thyroid nodules. China faces a shortage of physicians, including radiologists, at the same time its cancer rates continue to climb; cancer is the leading cause of death in the country.

Imaging machines were placed in a number of primary care settings. Artificial intelligence–enabled technology reviews the images and assigns a risk category, triaging the patients so that more critically ill ones get priority treatment from a radiologist. "The project has allowed work to be shifted to less skilled providers, while increasing accuracy, specialist access, and throughput—and value," Cnossen says.

Optimizing the workforce includes knowledge transfer, so that best practices are shared and refined continuously. The Martini-Klinik, based in Hamburg, Germany, stands as a shining example of the excellence that can be achieved through rigorous attention to best practices backed by robust data. The Martini-Klinik, which specializes in prostate cancer treatment, has collected follow-up data on its patients at least yearly for 25 years, asking about such issues as urinary incontinence, erectile dysfunction, and cancer recurrence.

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Initially, says Dr. Detlef Loppow, its CEO, the clinic asked referring urologists those questions, but received little in response. "Then we recognized that a patient who's had a cancer diagnosis and undergone prostatectomy is very aware of his own health, his PSA levels, so we started to ask patients directly."

Its surgeons have a twice-yearly review comparing their patient results with those of their peers. By collecting and analyzing this follow-up data on nearly 25,000 patients, the clinic has been able to significantly improve surgical best practices and, hence, outcomes. In 2007, the rate of incontinence in the clinic's patients who had undergone prostatectomy was about 8%–10%; now that rate is less than 5%. The surgeons' learning from each other and continually improving account for the Martini-Klinik's outcomes, which are markedly better than those for similar patients in the country as a whole.

Optimize Clinical Processes and Operations

Unwarranted variation in medical practice is associated with poorer outcomes, so health care delivery systems and hospitals are defining clinical pathways for specific procedures. For example, Johns Hopkins Medicine Clinical Communities focus on defining care pathways for specific procedures, bringing together physicians from its five Baltimore and Washington, D.C., hospitals and partnering with finance and supply chain to look at costs and medical supplies.

In one year, three clinical communities —focused on spine, joint, and blood management—achieved remarkable results. By agreeing to a vendor-capping model, the spine and joint clinical communities realized cost savings of $3 million and $1.5 million dollars, respectively. The blood management clinical community decreased blood product utilization, achieving $1.2 million. And a clinical community-like group of surgeons, by standardizing sutures and other surgical supplies, saved the health system $5.6 million.

Lean methodology, based on the Toyota Production System, is used by many of the organizations profiled here to optimize processes for efficiency and quality, and hence increase value. UMass Memorial Health Care, based in Worcester, Mass., has applied Lean widely across the enterprise and seen improvements

Sustaining Results Achieved Through Lean

Brandon Carrus, a senior partner at McKinsey who specializes in Lean, notes that only about 30% of Lean quality-improvement projects see results sustained beyond three years. What distinguishes the percentage that succeed, he says, is that they focus on enterprisewide transformation, take account of interdependencies, and look to improve the entire continuum of care from the patient's perspective.

He points to the approach taken by a large, not-for-profit, integrated health care delivery system in the U.S. that manages a population of over 1 million unique patients, including several hundred thousand members in their health plan.

Under a renewed mandate from its CEO, the organization implemented a Lean transformation across the enterprise, with the goal of improving care outcomes, the patient experience, and access. There was a heavy focus on cross-function collaboration in engineering solutions designed to deliver value to the patient, which ran counter to the traditional management approach organized around functional units and clinical departments.

Access increased by approximatelyl 10,000 specialty visits per year, wait times dropped 20%–40%, quality outcomes increased across most clinical categories, and the total economic value created totaled over $60 million per year.

in patient outcomes, caregiver engagement, patient satisfaction, and financial performance, going from a junk bond rating in 2013 to an A- rating in its fourth straight profitable year.

UMass Memorial trains all system employees in Lean process improvement and actively seeks their input. In the past four years, some 45,000 front-line staff ideas have been implemented, says Dr. Eric W. Dickson, president and CEO. "We tell everyone: We want you to be part of redesigning work every day to improve the caregiving experience."

Employees' efforts have paid off. One hospital in the health system saw its rate of observed versus expected mortality, a measure of quality, move from the bottom decile to the top decile at the same time its patient satisfaction scores jumped. All outpatient metrics have improved year over year, he says, as has financial performance.

And its total joints program has earned back millions from Medicare for hitting quality targets while reducing costs. To achieve those results, Dickson says, everyone involved in the patient's journey through the program came together, including orthopedic surgeons, anesthesiologists, nurses, case managers, schedulers, and social workers. "The group established this goal: Get the patient up and home, rather than to a rehabilitation facility, as soon as possible, with minimal pain, and saying, 'I am so glad I had my knee replaced.' Then they asked what had to take place for that to happen."

In doing its value-stream analysis, the group recognized that case management was being engaged too late in the process to help with setting up the patient's home for recuperation post-discharge. As a result, some patients had to be sent instead to rehabilitation facilities, where patients have higher complication rates than those discharged to their home. Case managers now get involved at the beginning of the process, when surgery is being scheduled.

"By engaging everyone, we designed a better process that costs less, reduces complications, and gets patients home sooner, which they like much better," says Dickson.

Several organizations interviewed emphasized that they are relying on principles and practices that define high-reliability organizations (HROs) as well as Lean to guide their quality improvement efforts, especially as related to patient safety. HROs are high-risk organizations that manage to be safe and reliable, such as nuclear power plants and naval aircraft carriers. With medical error accounting for as many as 250,000 deaths yearly in the U.S. alone, improving the safety and reliability of health care delivery is critical.

"HROs are agile, adaptable learning systems that respond well to the unexpected," says Kathleen Sutcliffe, Bloomberg Distinguished Professor at Johns Hopkins University, whose work studying wildland fire fighting is foundational to the field. Their high levels of safety and reliability are based on five practices:

1. A preoccupation with failure. HROs are alert to any failure, however small, because deviations can result in tragedy—and are always aware of what could go wrong.

2. A reluctance to simplify. Complexity is a given in HROs, and they do not go for easy answers when a problem arises.

3. Sensitivity to operations. Front-line workers are in a better position to recognize problems than executive leadership, and HROs welcome their input on how to improve.

4. Commitment to resilience. In an ever-changing environment, HROs continually look for potential problems and innovative solutions.

5. Deference to expertise. Expertise matters more than authority for HROs, which recognize that on-the-ground workers may well know more than their leaders.

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5 Practices That Ensure Safety at HROs

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3. SENSITIVITY TO OPERATIONS

Front-line workers are in a better position to recognize problems than executive leadership, and HROs welcome their input on how to improve.

4. COMMITMENT TO RESILIENCE

In an ever-changing environment, HROs continually look for potential problems and innovative solutions.

5. DEFERENCE TO EXPERTISE

Expertise matters more than authority for HROs, which recognize that on-the-ground workers may well know more than their leaders.

The Joint Commission, which accredits health care organizations, promotes HRO practices in health care settings, led by its president and CEO, Dr. Mark Chassin. He cautions that health care has a long way to go to achieve HRO levels of safety, however. That said, he sees room for optimism.

"In the last five years, there's been increasing buzz about HRO practices and using them to achieve the goal of zero patient harm—and zero missed opportunities to provide ideal care."

One organization that has widely diffused HRO principles through the organization is Cleveland Clinic, says Dr. Aaron Hamilton, its medical director of patient safety and clinical risk management. HRO, with its focus on robust process improvement, full engagement of all team members and respect for them regardless of rank, and vigilance for potential risks, has helped the clinic drive improvements in value, an explicit goal of the organization. Its ACO has beaten benchmarks and generated savings two years running, and it has a four-star rating on the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), which measures quality and safety from the patient's perspective.

Managing Population Health for Value

As more individuals live with chronic conditions such as diabetes and heart disease, organizations are using their electronic health records (EHRs) to identify care gaps—for instance, a patient with diabetes missing a regular eye exam for retinopathy, which causes blindness, or a foot exam, to target resources to keep these patients as healthy as possible. Closing those gaps is a high-value activity, as providing regular and appropriate care prevents disease escalation that would require higher-intensity care in a costlier setting. Risk stratification allows health care systems to focus resources on higher-need patients to minimize escalation of illness.

Geisinger Health System, a large integrated health system with 500,000 subscribers to its health plan, is applying robust analytics to its patient data. "We look at care protocols for a certain disease, say coronary artery disease, then identify care gaps. Same with diabetes. Close those gaps, keep them as healthy as possible," says John Kravitz, its chief information officer.

More and more, predictive analytics are used to identify patients likely to visit an emergency department or have a hospital admission, so that health care providers can take steps to deliver appropriate care and prevent escalation or inappropriate utilization.

"We have more data than at any other time, and data is the means to improving the health and well-being of populations," says Jonathan Weiner, professor of health policy and management at the Johns Hopkins Bloomberg School of Public Health, who helped develop the Adjusted Clinical Groups (ACG) Case Mix System, the most widely used predictive tool in health care, touching some 150 million lives. It models and predicts individuals' health over time using data from medical claims, electronic medical records, and demographics like age and gender, stratifying by risk—for instance, likelihood of a hospital admission in the next six months—and identifies patients who would benefit from focused care management.

Cleveland Clinic is orienting itself toward population health, says Dr. Matt Kalaycio, its chair of the Department of Hematology and Medical Oncology, and has developed models to focus on cancer, geriatric internal medicine, diabetes, and heart and vascular care.

"Like a lot of health systems, we were taking a largely reactive approach to health care. By focusing on population management, we are proactively identifying patients who need services and reaching out to them," says Dr. Nirav Vakharia, associate chief quality officer for population management at Cleveland Clinic. Predictive analytics

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By employing predictive analytics, Kaiser Permanente was able to identify newborns at high risk for sepsis and give just those infants antibiotics, versus prophylactically treating all newborns, including those at low risk. Their change in practice cut antibiotic use by half without increasing infections—creating value for the babies and their parents and the health system through reduced resource use.

What's Ahead?

Without a doubt, health care is getting more complex—and expensive—and those trends won't end. An increasing disease burden among the population, a predicted shortfall of physicians, and ever-growing costs invite forward-thinking health care organizations to look for ways to deliver greater value as they deliver care.

And that requires optimizing for both quality and efficiency along every step of the way, for value is a function of both. The leading organizations discussed here, including Cleveland Clinic and Johns Hopkins Medicine, have taken disciplined approaches to opening access to care, increasing their health care workforce's productivity, continually refining clinical operations, and managing population health. Lean process improvement and HRO principles guided many of the efforts described here, allowing all who interact with a patient, of whatever rank, to fully contribute to deliver safe and highly reliable health care. But the real game-changer is technology and a treasure trove of data to drive continuous improvement, with the patient as the ultimate beneficiary.

EXPERT INSIGHTS

CLEVELAND CLINIC
DR. NIRAV VAKHARIA, ASSOCIATE CHIEF QUALITY OFFICER FOR POPULATION MANAGEMENT
DR. MATT KALAYCIO, CHAIR OF THE DEPARTMENT OF HEMATOLOGY AND MEDICAL ONCOLOGY

GEISINGER HEALTH SYSTEM
JOHN KRAVITZ, CIO

MARTINI-KLINIK
DR. DETLEF LOPPOW, CEO

INTEL CORPORATION
RICK CNOSSEN, GENERAL MANAGER OF HEALTH I.T. AND IMAGING ANALYTICS

MERCY VIRTUAL
DR. RANDALL MOORE, CEO

UMASS MEMORIAL
DR. ERIC W. DICKSON, PRESIDENT AND CEO

JOHNS HOPKINS UNIVERSITY SCHOOL OF MEDICINE
SCOTT LEVIN, ASSOCIATE PROFESSOR OF EMERGENCY MEDICINE

JOHNS HOPKINS UNIVERSITY
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