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Message from Jeffrey A. Flaks
Hartford HealthCare President & Chief Executive Officer

COVID-19 has helped our healthcare system become “Better than Normal”

The most important promise we make to those we care for is safety. We commit to providing safe environments, performing safe care and working at every level to eliminate harm and elevate health.

Safety is not just a thing we do. It is the way we work and think. Safety is our culture.

The COVID-19 pandemic tested us in so many ways. We met unimaginable challenges, at every turn, with unequalled innovation, unparalleled compassion, unsurpassed teamwork and true tenacity. And, through it all, we learned and grew safer and stronger.

While we are all looking forward to a time when we can return to normal, the lessons of COVID-19 will leave our healthcare system “Better than Normal.” We are addressing health equity like never before; our infection prevention measures are more stringent than ever; we are leveraging technology and telehealth in ways we only imagined; and we have found ways to better meet the behavioral health needs of our colleagues and communities. This challenge really did make us better and stronger, and that will not change when the pandemic is over.

You will see examples of our ongoing efforts on these pages, including:

• How we are using technology to be a true partner in care.
• The role of innovation in our quality journey.
• Our attention to creating and adhering to best practices.

At Hartford HealthCare, we have made tremendous and measurable strides in our safety journey — earning recognition for our efforts and continually enhancing quality and outcomes along the way. We know there is always room to grow, and we will never be satisfied with excellent when there is an opportunity to do even better.

On behalf of my 30,000 colleagues at Hartford HealthCare, thank you for your interest in our quality and safety journey. It is our ongoing quest to consistently provide the best, most advanced care within a great experience for our patients and their families. Working together, we are helping people live their healthiest lives.

I am immensely proud of the efforts of my colleagues. As you will see in this report, our core values — caring, safety, excellence and integrity — are at the forefront of everything we do, and we will never lose sight of them.

Sincerely,

Jeffrey A. Flaks
President and Chief Executive Officer
Leading the way, crisis innovations pave the path for a safer, healthier tomorrow for our colleagues, patients and communities

On the one-year anniversary of the first COVID-19 patient admission at Hartford HealthCare, we took a moment to reflect on the past year. All of us have been impacted by the global pandemic in some way — our work lives changed, our home lives were affected and we have all adjusted to a new way of interacting with our patients, each other and the world around us.

Through it all, I’ve felt the most overwhelming sense of pride in and gratitude for my colleagues, our patients and our partners in the communities we serve. As we continue on this journey, we must acknowledge the enormity of the past year. Even in our darkest moments, the selflessness, commitment and resilience shown by all 30,000 Hartford HealthCare colleagues was nothing short of remarkable.

Never have Hartford HealthCare’s commitment and capabilities been more apparent than in our response to a global health crisis. Our dedicated teams have led the charge at every phase of this pandemic, acting as pioneers in advancing safety, health equity, academics, research, innovation, information, communication and collaboration, all while continuing to provide high-quality, accessible, community-based care at a time when it was needed most.

In a year irrevocably marked by COVID, we cared for 9,500 hospitalized coronavirus patients, performed 900,000 COVID tests, conducted more than 200,000 virtual visits, and delivered 180,000 vaccines. As Hartford HealthCare’s President and Chief Executive Officer Jeffrey A. Flaks said earlier this year, history is a great teacher — and each of us has lived through 12 long months that challenged us emotionally, but nonetheless taught us many valuable lessons.

Before the pandemic, we pledged to prioritize provider well-being. In response to COVID-19, our commitment to wellness became more visible than ever and grew in scope and focus to provide support, well-being and resilience resources not only for providers, but all Hartford HealthCare colleagues. Born out of necessity, and here to stay, Hartford HealthCare is committed to creating an exceptional healthcare workplace by advancing the well-being of all who care for others.

Hartford HealthCare is committed to strengthening a culture of safety — a fundamental driver for improving patient safety. We called upon all Hartford HealthCare colleagues to demonstrate their pledge to create an environment that promotes psychological safety and continuous learning. On our journey to optimizing our culture, we are guided by the high-reliability principles of transparency, communication, accountability, continuous learning and improvement. High-reliability organizations (HROs) maintain a commitment to safety at all levels, from frontline providers to managers and executives. Our standard education for HRO training ensures Hartford HealthCare employees are speaking the same safety language, adopting safety habits and deepening their personal commitment to safe practices — all of which contribute to a collective culture of safety.
On our journey to zero harm, from calendar year 2017 to 2020, Hartford HealthCare achieved a 37 percent reduction in hospital-acquired infections (HAI), which translates to 70 fewer patients suffering from the effects of these infections, highlighted by a 14 percent reduction in HAIs between 2019 and 2020. We consistently remained below target for preventable mortalities — in this case, lower is better — and showed a 23 percent reduction in patient harm from July 2019 to December 2020. This work was reflected in our 2020 Leapfrog Hospital Safety Grades, where Hartford HealthCare showed significant performance improvement. Three of our hospitals (The William W. Backus Hospital, Charlotte Hungerford Hospital and MidState Medical Center) received an “A” grade; three of our hospitals (Windham Hospital, Hartford Hospital and St. Vincent’s Medical Center) received a “B”; and one “C” (The Hospital of Central Connecticut). We are committed to a robust quality and safety program, and are persistent in our pursuit of recognition as a top performer in quality and safety improvement and outcomes.

The programs and initiatives outlined in this report reflect 2020 activity and performance, and exemplify how Hartford HealthCare defines “value” in new and original ways. The 2020 Value Report explores innovative approaches to overcoming challenges brought on by COVID-19, many of which will be sustained moving forward, to continue delivering the safest, highest-quality care to our patients.

Further, the report demonstrates Hartford HealthCare’s commitment to ever greater transparency, cost efficiency and quality in our effort to create and sustain healthier communities.

Sincerely,

Ajay Kumar, MD, MBA
Executive Vice President and Chief Clinical Officer
Hartford HealthCare
The Year in Review

January
CDC issues Health Alert for novel coronavirus in China and Hartford HealthCare Emergency Operations Center opens to monitor the situation.

February
With community spread anticipated, Hartford HealthCare activates its Incident Command Center.

March
Hartford HealthCare launches a public website, first case of COVID-19 is confirmed in Connecticut and at Hartford HealthCare, and opens first-of-its-kind Clinical Command Center with a 24/7 COVID-19 hotline.

April
The world passes 1 million COVID-19 infections and Hartford HealthCare begins state’s first mobile testing operation, increasing capabilities to reach vulnerable populations.

May
Hartford HealthCare designates May “HealthCare Heroes Month” and Connecticut moves to Phase 1 of reopening.

June
Hartford HealthCare Emergency Operations Center closes, system has only 40 inpatients and Connecticut moves to Phase 2 of reopening. Cases remain low.
July
Hartford HealthCare surpasses 100,000 COVID-19 tests.

August
Convalescent plasma is cleared for use in certain infected patients by FDA.

October
Cases begin to noticeably increase. Hartford HealthCare reopens Emergency Operations Center.

September
Human vaccine trials begin.

November
Hartford HealthCare's testing center at the Connecticut Convention Center opens as does drive-through testing at Bradley International Airport.

December
Nearly 2,000 doses of Pfizer vaccine arrive at Hartford Hospital, among the first in the nation. Vaccines are then distributed to Backus, Charlotte, The Hospital of Central Connecticut, MidState, St. Vincent’s and Windham hospitals, and the first shipment of Moderna vaccine arrives at Hartford HealthCare.
In The Spotlight
Amidst the unknowns of the COVID-19 pandemic, healthcare systems have been forced to quickly find new ways of delivering care. In order to rapidly identify problems, test improvements and lead the organization to success in the face of unprecedented challenges, Hartford HealthCare adopted the Learning System. The Learning System is one of the four foundational areas for developing a total systems approach to advance patient safety — an approach identified by the National Steering Committee for Patient Safety, which includes influential federal agencies, leading health care organizations, patient and family advisors, and respected industry experts. The Learning System model allowed Hartford HealthCare to leverage best practices in informatics, science and culture to drive innovation within the organization and achieve high-quality, safe and efficient care for our patients and colleagues. The framework consists of three main actions that form a continuous cycle: transforming data to knowledge, translating knowledge to performance, and evaluating performance with data. Hartford HealthCare teams developed multiple COVID-19 dashboards to track metrics including COVID admissions, readmissions, lab volume, health equity, testing volume and capacity, vaccine administration, and more. Disseminating COVID dashboards across the system allowed us to better prepare for and manage multiple surges and phases of COVID-19 throughout calendar year 2020.

Our agile and well-coordinated response to the COVID-19 crisis exemplifies our commitment, responsibility and passion for delivering the safest care. By aligning with the organization’s annual improvement priorities of ensuring a safe environment of care, we are proud to highlight what Hartford HealthCare is doing to become the safest place to work and receive care.

Patient Safety Indicators

Developed by the Agency for Healthcare Research and Quality, the Patient Safety Indicators (PSIs) provide information on potentially avoidable safety events that represent opportunities for improvement in the delivery of care. More specifically, they focus on potential in-hospital complications and adverse events following surgeries, procedures and childbirths. PSIs remain a significant cause of preventable medically-induced harm. These measures are used by hospitals, researchers and agencies at the federal, state and local levels as a standard tool to assess safety data, identify potential quality concerns and track changes over time. Just a 5-percent reduction in these events corresponds to 17 fewer patients harmed in our
hospitals. With a 23-percent reduction in patient harm from July 2019 through December 2020, monitoring and reducing PSIs continues to be a high priority for our Quality and Safety Department. Implementation of evidence-based care resulted in a reduction of PSIs including, but not limited to, falls and pressure ulcers. To reduce pressure ulcers, leadership at Hartford HealthCare standardized the presence of established skincare champions across the acute care hospitals and introduced Scout, a new infrared scanner technology, to assist the clinical teams with assessing deep tissue injury. To reduce the number of falls with injury, a nursing peer-review process was put into place to standardize patient evaluation through telemedicine. This "virtual sitter" program incorporates the use of video monitoring and bi-directional audio, with predictive analytics based on motion detection to react to and prevent falls.

**Reduction in Preventable Mortality**

A hospital’s risk-adjusted mortality serves as an important indicator of quality and is an essential starting point on the journey to reduce preventable mortalities. In the acute care setting, all deaths are reviewed to identify performance improvement opportunities and preventability. By focusing on evidence-based care, evaluating opportunities and optimizing clinical documentation, Hartford HealthCare's preventable mortality rate was consistently below the target of 0.94. In this case, lower is better. We are committed to a robust quality and safety program and are persistent in our pursuit of recognition as a top performer in quality and safety improvement and outcomes.
Hospital-Acquired Infections

Hospital-acquired infections (HAIs) remain a significant cause of preventable patient harm. These serious safety events can cause extended length of stay, months of follow-up and potential death. Eliminating HAIs is a high priority for our Infection Prevention and Quality and Safety departments. From calendar year 2017 to 2020, Hartford HealthCare achieved a 37-percent reduction in HAIs, which means 70 fewer patients suffering from the effects of infections.

Public Reporting

Leapfrog Safety Grades

The Leapfrog Group is a national nonprofit organization that rates healthcare quality and safety performance, and releases a biannual Hospital Safety Grades report. The Leapfrog survey allows hospitals and health systems to benchmark themselves against other hospitals locally and nationally. Each survey presents an opportunity for us to learn and get better. It is our goal to improve grades across our system of care as part of our overall commitment to “one standard of excellence.”

Hartford HealthCare acute care hospitals significantly improved performance in 2020. Three of our hospitals (The William W. Backus Hospital, Charlotte Hungerford Hospital and MidState Medical Center) received an “A” grade; three of our hospitals (Windham Hospital, Hartford Hospital and St. Vincent’s Medical Center) received a “B” ; and one received a “C” (The Hospital of Central Connecticut). Collectively, we have made great strides in enhancing quality and safety for the patients we serve — including reduced HAIs, serious safety events and blood clots — and we see much of that reflected in improved safety grades. Through our commitment to improving performance in measures that drive quality and safety, we continue our focus on reducing preventable harm — such as central line infections, falls and pressure ulcers — and eliminating preventable mortality.

At Hartford HealthCare, we are committed to emerging from the COVID-19 pandemic Better than Normal which means providing the safest, most equitable and convenient care for patients and families, even in the midst of a global health crisis. Teams worked collaboratively across the system and partnered with organizations outside the system to establish sustainable programs that will enable us to deliver a high standard of care in the safest environment and increase the likelihood patients will achieve desired health outcomes. The Quality and Safety Department will continue to utilize and strengthen process improvement methodologies to provide the safest care to our patients and families.
In years to come, we will look back on the COVID-19 pandemic as a fundamental event in the evolution of infection prevention. The urgent need to keep patients, colleagues, visitors and our extended communities safe has inspired innovations in infectious risk mitigation across the spectrum of care, from hospitals to home care. As the pandemic evolved, we were able to quickly develop and implement practices that would prove to be essential in safely delivering high-quality care. Even as work on the front lines grew increasingly demanding, it did not slow the progress our efforts to reduce hospital-acquired infections (HAIs).

The importance of proper personal protective equipment (PPE) during the pandemic cannot be overstated. Soon after the World Health Organization (WHO) designated COVID-19 a pandemic, there was a significant shortage of commodity items, including PPE. In response, the Hartford HealthCare Infection Prevention Team implemented several conservation strategies to ensure that frontline staff always had access to adequate PPE, including a rigorous process for reviewing a patient’s need for isolation and minimizing visitors. Hartford HealthCare started a PPE donation bank to keep our patients and colleagues safe during such unprecedented times. Despite the donations, the pandemic nearly wiped out our PPE supply. As a result, leadership devised a plan to maintain a year’s worth of PPE supplies to prevent any future shortages. This innovative strategy is the right and the safe thing to do, and will help Hartford HealthCare work towards Better than Normal after the pandemic.

Innovation during the pandemic sprung from the constant state of change that was created. In the first few months, the Centers for Disease Control and Prevention (CDC) and WHO were constantly updating best practice recommendations. Our infection prevention team led a collaborative with leaders from across the organization to manage infection prevention policies and support safe practice change. Hartford HealthCare’s infection prevention policies were implemented by our school and business partners, which helped maintain a relatively low COVID-19 prevalence across the state. One of many safe practice changes at Hartford HealthCare was the use of drive-through testing centers, which enabled safe and efficient testing and minimal risk of exposure for frontline staff, and eliminated the possibility of cross-infection among people being tested. The drive-through testing approach also helped Hartford HealthCare save the time and resources needed to ventilate and clean specimen collection rooms.

Despite competing priorities with the COVID crisis, our infection prevention team remained dedicated to reducing the number of HAIs across the system by focusing on several best practices andreviving the hand hygiene model. As hand hygiene has long been recognized as the most fundamental
and important element in preventing infection, it was very important that we implement a program highlighting hand hygiene while recognizing differences from one hospital to another. The program was designed as a decentralized, locally-governed model in which units manage their own surveillance and immediately intervene when necessary. Units work with infection prevention to improve compliance and validate data.

HAIs remain a significant cause of preventable harm. These infections can originate from the healthcare environment (20 percent), healthcare workers (40 percent), and the patient’s own microorganisms (40 percent). Invasive procedures, devices and overuse of antibiotics all contribute to this risk. According to the CDC, one in 31 hospital patients has at least one HAI on any given day. Elimination of HAIs is a high priority for our Infection Prevention and Quality departments. Each HAI is evaluated to determine if there is an opportunity for improvement. The bedside teams conduct analyses, and share any identified opportunities with all care teams to optimize improvement across the facility and system. Each facility has an HAI committee to identify best practices, develop strategies and implement and operationalize them in a meaningful and sustainable fashion. Evaluation of the use of invasive devices such as urinary catheters and central intravascular lines happens every day for continuity; each day these devices are present increases a patient’s risk for a developing HAI. Antibiotic use is also reviewed and clinicians look for opportunities to stop unnecessary treatment and switch from intravenous to oral antibiotics. These strategies have helped us achieve great success in HAI reduction. Across all our facilities, we have reduced our incidence of clostridium difficile infections by 79 percent and incidence of catheter-associated urinary tract infections by 55 percent since 2017.

As we continue to grow and expand as an organization, it is very important that we adopt a structure that allows us to effectively impact change throughout our care continuum. The Infection Prevention Department is structured to facilitate our growing ambulatory presence and to appreciate the need for strong regional leadership.
In many ways, crisis innovation defined 2020 and served as the adrenaline for clinical transformation that allowed so many Hartford HealthCare foundational core capabilities to be effectively leveraged to impact the communities we serve and beyond. The velocity of this transformation was fueled by the convergence of Hartford HealthCare’s culture, vibrant innovation ecosystem, agility to leverage our operating model and the discipline to focus on “what matters most.”

During the past several years, Hartford HealthCare has developed a globally-recognized digital health innovation ecosystem designed to accelerate new ideas that drive clinical transformation, new care delivery models and exponential market expansion. This ecosystem has provided a fertile environment with key differentiated internal innovation assets; business, academic and government partners; digital health accelerator capabilities; many startups; and more than 100 multidisciplinary, cross-functional, distributed innovation leaders and mentors.
Our ecosystem proved to be an accelerant for the life-saving digital health transformations which were developed and implemented rapidly in response to the pandemic, including the leveraging of artificial intelligence/machine learn (AI/ML), cloud capabilities, internet of medical things (IoMT) and virtualization (virtual health). The mindset of how we worked fundamentally shifted to embrace a cross-functional, interdisciplinary, agile, dynamic work design focused on a rapid cycle, minimally viable product (MVP) innovation loop to successfully “spin up” so many of our life-saving initiatives, a few of which are described below.

**Virtual Health and Internet of Medical Things: Delivering Care from Anywhere to Anywhere**

We successfully and rapidly deployed virtual health capabilities across all phases of care, including ambulatory, acute and post-acute domains. Massive acceleration of virtual health adaption and adoption occurred across our system of care, with a total visit count of ~500,000 over the last 12 months spanning most of Connecticut, as well as across state borders. Virtual health has rapidly become a core clinical and operational competency at Hartford HealthCare to help strengthen the connection between our patients and providers and to deliver high-quality, accessible care.
COVID-19 Care at Home Intensive Program

As our hospitals filled with COVID-19 patients, our care teams sought ways to creatively increase hospital capacity, decrease COVID-19 length of stay and improve patient satisfaction. Recovering COVID-19 patients were transitioned out of the hospital much sooner, to the comfort of their homes, with their vital signs closely monitored through biometric devices, including pulse oximeters. The hospital medicine service conducted daily virtual rounding, leveraging our virtual health capabilities, with in-home support from Hartford HealthCare at Home nurses. Within the first three months, 30 patients were enrolled in this program, which led to a three-day decrease in length of stay for a cumulative 90-day increase in hospital bed capacity and 91.3-percent likelihood to recommend. The program is evolving post-pandemic to potentially include chronic disease conditions, including chronic obstructive pulmonary disease and congestive heart failure. We are preparing to publish the success and results of this program in health policy journals.

COVID Recovery Center

Several months into the COVID-19 pandemic, it became clear that a significant number of patients had persistent symptoms following initial infection. In response to this new trend of COVID “long haulers,” Hartford HealthCare created a virtual multidisciplinary clinic, one of the first of its kind. To date, more than 600 patients who self-referred through a dedicated phone line were scheduled for virtual visit assessments with primary care providers. They received expedited referrals to specialists in a number of areas including pulmonology, cardiology, physiatry, neuropsychology, headache, behavioral health and rheumatology. The wide range of symptoms experienced by long haulers including shortness of breath, heart palpitations, dizziness, “brain fog” or cognitive difficulties, muscle pains and weakness, as well as anxiety and depression generated more than 1,000 referrals to specialty services. Despite the novel disease and unknown etiology of many of the symptoms, patient experience surveys have shown appreciation for the focused attention and therapies offered.
**Virtual Intensive Care Units (ICU)**

During the first months of the COVID-19 pandemic, Hartford HealthCare teams innovated to respond to the surge of critical care patients with new satellite units functioning as ICUs and a commitment to minimizing staff exposure and preserving limited PPE. Led by a cross-functional group of ICU specialists, nurses and operational leaders from all our regions, our virtual ICU (vICU) model was launched in a few short weeks, delivering a “cockpit” approach with access to the patients’ electronic medical records. This afforded a single ICU specialist the ability to oversee an entire ward, or multiple wards from their workstation, or even remotely, with visibility of vital information, including labs, imaging, ventilator settings and much more. The ICU specialist could also be brought virtually into the room using specialized iPad devices with full audio-visual connection. The vICU platform has opened the opportunity to distribute ICU attending expertise across our system to hospitals without ICU specialists or to cross-cover during surges and high demand.
Artificial Intelligence and Machine Learning: Delivering Personalized, Coordinated Care

Next-generation analytics, including artificial intelligence (AI) and machine learning (ML), are the fuel for transformative innovation in every business sector, and one could argue that healthcare makes for the most promising and impactful application. Hartford HealthCare has been on a multi-year journey toward developing the expertise to convert data, from Epic as well as other sources, to actionable insights using predictive, prescriptive and optimization algorithms.

COVID-19 Predictive and Optimization Analytics, in Partnership with MIT

In the fog of the COVID-19 pandemic, a critical factor which challenged effective decision-making and hospital operational planning capability at regional, national and global levels was the extraordinary uncertainty and lack of relevant predictive models of patient risk. Fortunately, our deep and longstanding partnership with Dr. Dimitris Bertsimas of the Massachusetts Institute of Technology (MIT) and his team of systems operations researchers made way for a valuable collaboration to develop and apply AI and ML methodologies to focus on breaching this gap. In partnership with the MIT team and others, we created an unparalleled predictive model that allowed Hartford HealthCare leadership to make informed decisions around surge planning, including where patients should be transferred, PPE requirements, staffing and equipment needs, and the number of floor and critical care beds needed to proactively plan for the expected surge of COVID-19 patients. Decisions were guided by the following actionable insights from the model: expected peak dates with highest volume of COVID-19 patients; facility, staffing and equipment needed to manage peak volume; associated needs of the population for the duration of the crisis; and expected COVID-19 patients in each Hartford HealthCare region, including number of COVID-19 patients requiring hospitalization, critical care and ventilation at each of our hospitals. Additional selective global health partners participated in refining and developing the model, which became available to all on the MIT “COVIDAnalytics” website.
Upfront Partnership: Personalized and Engaged COVID-19 Vaccination Journey

Personalized, automated navigation and guidance for our community continues to be our relentless goal. Starting with a coordinated COVID-19 vaccination effort, Hartford HealthCare partnered with Upfront, a healthcare startup, to send personalized text or email using proven content grounded in health communications theory to engage and motivate patients to get vaccinated. The end-to-end patient experience is 100-percent digital and designed specifically to eliminate the typical barriers to engagement. Our digital-first approach reduces the demands on both Epic and call centers and leverages Hartford HealthCare brand and design guidelines for a singular, seamless experience. Together with Upfront, we created an infrastructure that processes and aggregates data (i.e., demographics, schedule, immunizations, etc.) for nearly 3 million patients every day. Upfront’s sophisticated identification layer analyzes the data to provide each patient with relevant information based on where they are in their COVID vaccine journey. Finally, we engage the patient to complete the necessary step in their care with personalized content and calls-to-action to educate, capture patient-reported information, schedule the vaccine, triage symptoms and/or promote additional Hartford HealthCare services post-vaccination.

Our partnership with Upfront has been emblematic of the power of our agile dynamic work design and innovation loop methodologies. The vaccine project with Upfront was implemented in just three weeks, from kick-off to go-live. Highlights include:

- As of early April 2021, we reached 1.3 million Hartford HealthCare patients with an average of two outreaches (3 million messages total) to educate and facilitate the vaccination process.
- Of the 1.3 million patients contacted, more than 500,000 engaged with their personalized, digital content.
- Achieved an overall engagement rate of 39 percent — nearly four times the national benchmark of 10 percent — across 20 campaigns, with several of the most important campaigns achieving exceptionally high engagement rates of 50 to 77 percent, including the scheduling of vaccine appointments and vaccine visit reminders targeted at teachers, marginalized racial and ethnic groups, high-risk patients, and the general population ages 18 and older.
- These 500,000 people digitally engaged an average of 3.3 times across their COVID vaccine journey (1.7 million digital interactions).
- In addition, Upfront enhanced Hartford HealthCare’s opportunities to engage with consumers. Approximately 100,000 consumers new to Hartford HealthCare proactively completed an interest form via Upfront to get their vaccine and are now being actively engaged in their COVID vaccine journey.
The Next Horizon:

We’ve experienced the “art of the possible” over the last year, which has opened the window of opportunity to accelerate digital transformation as a key driver for a frictionless consumer experience. We’ve witnessed the power of compelling engagement throughout a person’s health journey, which can be expanded to include health, wellness, prevention, self-monitoring, diagnosis, treatment, recovery, rehabilitation and monitoring and care management. An integrated digital health platform is a potent competitive edge and value proposition, and we are primed for success with our evolving layered digital health transformation platform to deliver world-class personalized coordinated care. The plan includes

- **Innovation layer**: Providing an agile and rich milieu to accelerate ideas to impact.
- **Infrastructure layer**: Data capture, curation, management, interoperability.
- **Intelligence layer**: Converting data into consumable and actionable insights.
- **Engagement layer**: Bringing platform to life, curating a delightful coordinated and personalized experience.
- **Governance layer**: Disciplined structure and strategy for competitive advantage.

HHC’s Digital Health Platform Layers

*Accelerating Differentiated Clinical Transformation*
**Health Equity**

**“Better Than Normal” embraces equity**

COVID-19 presented unprecedented challenges and those emerging challenges created opportunities to transform health equity practices across Hartford HealthCare. The newly-established Health Equity Department centered around and advocated for an equitable approach to COVID-19 awareness and testing during fiscal year (FY) 2020 as more was learned about the virus.

The COVID-19 pandemic is thought by many to have “unearthed” racial and ethnic differences in health outcomes based on socioeconomic status. For others, the pandemic was a harsh reminder of their daily lived experience. We saw how social factors determined a novel pathogen’s transmission and impact on health outcomes. In Connecticut, the age-adjusted death rate among Black and Hispanic residents (278 and 254 per 100k, respectively) was twice that of White residents (128 per 100k). As harrowing as these mortality outcomes may be, Hartford HealthCare’s resulting focus on equity and candor in not only discussing inequities, but addressing them, has been encouraging during a transformative year.

**Learning moments informed response**

In early 2020, the Health Equity Department was one of many functional areas across the system curiously tracking the emergence of what is now known as COVID-19. As COVID began to take hold in the United States, initial data reports indicated that communities of color were experiencing higher rates of infection and hospitalizations. At the time, Hartford HealthCare did not yet have line of sight into our COVID-19 hospitalization metrics by race, ethnicity, age and gender in a measurable and actionable way. The Health Equity Department led the development of Hartford HealthCare’s Health Equity COVID-19 Admissions Dashboard. This was the first dashboard of its kind for the system, visualizing COVID admissions data by race and ethnicity. Central to these dashboards has been the humanistic and intentional collection of race, ethnicity and language (REaL) data; 98 percent of COVID-19 inpatients had race and ethnicity data collected, well above the system average.
COVID-19 Rates per 100,000 by Race

Includes only CT residents

<table>
<thead>
<tr>
<th>Race/Other</th>
<th>Admission Rates</th>
<th>Recovery Rates</th>
<th>Hospice Rates</th>
<th>Death Rates</th>
</tr>
</thead>
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<tr>
<td>Black or African American</td>
<td>37</td>
<td>28.10</td>
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<td>Other</td>
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<td>White or Caucasian</td>
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<td>Asian or Pacific Islander</td>
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<td>7.19</td>
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<td>American Indian or Alaska Native</td>
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<td>19</td>
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HHC COVID-19 Rates per 100,000 by Race March-April, 2020

COVID-19 Rates per 100,000 by Ethnicity

Includes only CT residents

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<th>Ethnicity</th>
<th>Admission Rates</th>
<th>Recovery Rates</th>
<th>Hospice Rates</th>
<th>Death Rates</th>
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</thead>
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<td>Hispanic or Latino</td>
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<td>7</td>
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</table>

HHC COVID-19 Rates per 100,000 by Ethnicity March-April, 2020
The pandemic presented an opportunity for Hartford HealthCare to redefine and elevate community health and engagement while also continuing to pursue its vision of being the most trusted source of personalized, coordinated care. Simultaneous to the development of the COVID-19 health equity dashboard, outreach efforts were underway to connect patients and communities to resources. Utilizing the “Connections That Matter” platform, links to COVID information, behavioral health support lines, housing and utility protections, and services provided by community-based organizations such as Connecticut FoodShare were frequently updated so that patients and community members could find the help that they needed for free or reduced cost. Volunteer opportunities at our community-based organizations were also listed on the “Connections That Matter” platform for those who wanted to help. In March 2020, the volume of searches increased by 50 percent with food emerging as the highest need and housing following as a close second. This trend continued and FY20 saw more than 8,000 people seek help.

The need to do more in communities of color around COVID-19 awareness prompted Hartford HealthCare to be more agile than ever, creating deeper connections with local health departments and other health systems. Together, Hartford HealthCare, Trinity Health of New England, United Way and the City of Hartford created and disseminated COVID-19 educational materials in English and Spanish. Across each of Hartford HealthCare’s regions, similar education and awareness collaboratives developed such as the Bridgeport-based Health Improvement Alliance, which brought together St. Vincent’s Medical Center, Bridgeport Hospital and other organizations in the Fairfield Region to serve the needs of historically underserved populations.

COVID-19 revealed in many ways that one size does not fit all. This was seen when testing kit supplies were limited and demand was high. With safety, convenience and ease in mind, Hartford HealthCare quickly activated its drive-through testing structure. The Health Equity Department evaluated Hartford HealthCare’s testing apparatus through the lens of equity and access, and realized that drive-through testing did not serve individuals who did not have access to a vehicle or were unable to wait in line for hours. The system pivoted to offer testing to walk-ins, and expanded testing across the state to increase capacity while reducing wait time. Additionally the Health Equity Department wrote an article for Hartford HealthCare’s internal Clinical Affairs newsletter focused on where we test, who we test, how we test, and when we test. The article highlighted increased access through mobile testing, using data to guide the system’s response.
The first mobile testing was in April 2020 at The Open Hearth, a Hartford organization that helps men experiencing homelessness. Since that day, Hartford HealthCare has provided more than 30,000 mobile COVID-19 tests.

The Health Equity Department’s focus on community, equity and data was not new or novel in the broader sense, but it was new for Hartford HealthCare. By listening to the voice of the community, Hartford HealthCare was able to challenge the status quo and transform the way its teams think about equity.

**Embracing Equity**

COVID-19 and our national reckoning on race highlighted not only the need for equity, but its intrinsic value. When equity is embraced, everyone does better — health and well-being improve and disparities decrease. Continuing to prioritize the collection and analysis of REaL data will strengthen our ability to measure and improve clinical outcomes, safety, patient experience and organizational culture through an equity lens. A strong community health and engagement framework will allow Hartford HealthCare to earn the trust of systemically marginalized and underserved communities. The cross-departmental collaborations and broad-based community partnerships launched by the Health Equity team during the COVID-19 pandemic have laid the foundation for a post-pandemic Hartford HealthCare that has equity at the center.
Experience

Every moment matters. Our organizational rally cry, christened just a few years ago, became our “true north” as Hartford HealthCare navigated the COVID-19 crisis while maintaining focus on colleague and patient/customer experience. The team of directors of human-centered care, patient advocates, managers and specialists asked key questions every morning: What is the best use of my time and expertise? Where should I go? Who should I support? The result was an agile team focused on supporting crisis strategies, including rounding on patients/customers in all units, facilitating patient/family dialogues through the use of technology, staffing the newly-established Colleague Support Center, supporting testing centers, screening colleagues — the list goes on. Our focus was on enhancing the experience across the full continuum of care, wherever that took the team throughout the system. This work included our physician coaches and culture integration experts who partnered with our wellness teams to support targeted leaders and groups needing intervention.

At the height of the crisis — April through August 2020 — our patient experience scores saw substantial increases above the prior year and above target. These results were realized during times of patient isolation, visitor restrictions and safety concerns that made it extremely challenging to focus on what mattered most to our patients. Yet, our overall rating of care remained high and the anecdotal comments showed the highest levels of compassion, empathy and expertise in all areas — a true testament to our colleagues and their steadfast commitment to the patient experience.

As in many cases, the use of technology was critical in overcoming challenges specific to human-centered care. In response to the impact of increased colleague stressors during the pandemic, we stood up the Colleague Support Center in one week. This 24-hour call center, housed in a vacated suite of offices, was staffed by volunteers redeployed from across the system. In partnership with Information Oct '19

<table>
<thead>
<tr>
<th>HHC Blended Composite - Overall Score</th>
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<tbody>
<tr>
<td>Oct '19</td>
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<tr>
<td>---------</td>
</tr>
<tr>
<td>Actual</td>
</tr>
<tr>
<td>Target</td>
</tr>
<tr>
<td>Prior Year</td>
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</table>
Technology Services, Employee Services, Behavioral Health and our Lean leaders, this innovative response center offered colleagues and providers alternative housing after a potential exposure, access to groceries to bring home after long shifts, daycare support, pastoral care for those in crisis, behavioral health services for those needing help managing fear and change — all by calling one telephone number. With regards to patient/customer experience, the team worked with ITS to deploy more than 50 tablets loaded with virtual communication applications that were used throughout the system to facilitate conversations between patients and loved ones. When end-of-life care and comfort measure decisions needed to be discussed and agreed upon, these tablets helped families “spend time” with loved ones and caregivers during the peak of the pandemic restrictions.
Lessons learned from the COVID-19 experience to be sustained going forward:

• The role of family-centered care cannot be underestimated. Although restricted visitation supported a safer and more efficient care experience, our caregivers realized that the partnership with family members was critical in reducing length of stay and speeding recovery. This reality is the foundation for our new Patient and Family-Centered Care initiative that includes regional and system level advisory councils.

• Cross-functional collaboration and leveraging the support of all centers of expertise was critical in rapid problem solving and targeted crisis response. Our new patient experience model brings these centers of excellence into the mix, strengthening existing partnerships with Lean, Human Resources, Quality and Safety, Wellness and Information Technology Services (ITS).

• Trust is key to the efficacy of our care plans and strategies, and this can be enhanced by improved communication practices, including access to physicians either in-person or via virtual platforms. Our focus for 2021 is on purposeful hourly rounding to support better communication among the caregiver team, physicians and families. These practices declined due to safety issues, and are now being reintroduced and reinvigorated with new standard work.

The lessons learned and applied throughout the crisis both reinforce and echo our Every Moment Matters mindset, giving new meaning to the importance of what truly matters to our patients, customers and their families.
After nearly a decade of work supporting provider well-being, Hartford HealthCare launched a system-wide Wellness Department in October 2019, recognizing it was the right thing to do and it would help advance goals for patient and customer experience, safety and quality, growth and financial performance. The development of a Wellness Department, led by a chief wellness officer, is a major differentiator for Hartford HealthCare. At the time, there were fewer than 25 chief wellness officers in United States healthcare systems.

The new Wellness Council hosted a virtual launch in March 2020 to rally a dedicated team focused on improving the well-being of more than 5,000 physicians and advanced practice providers, and endorse this vision for wellness: “To create an exceptional healthcare workplace by advancing the well-being of all who care for others.”

A little over a week later, the COVID-19 pandemic had arrived in Connecticut and the work of the Council immediately shifted to include the well-being of not only providers, but all 33,000 Hartford HealthCare colleagues. In order to meet this unprecedented challenge, the Wellness Department team immediately developed multilayered collaborations and partnerships both within the system and in the community to accelerate colleague awareness and use of Hartford HealthCare’s well-being resources. Essential collaborations included those with Human Resources, Human Experience, Engagement and Organizational Development, Health Equity, the Behavioral Health Network, Marketing Communications, Strategy and others to effectively and efficiently shape and integrate programs, resources and ideas across the system. External collaborations with the Connecticut Hospital Association, the Greater New York Hospital Association, Jefferson College of Population Health of Thomas Jefferson University, the Accreditation Council for Graduate Medical Education, the Collaborative for Healing and Renewal in Medicine and others allowed the Wellness Department team to share and learn best ideas and practices as they rapidly evolved during that time.
COVID-19 First Wave

During the first major wave of COVID-19 — March to May 2020 — the Wellness team focused on providing support in the form of basic needs including childcare, food and housing, and encouraging hope for our colleagues. We launched a dedicated internal Wellness resource website to drive awareness and use of both existing and new resources. Throughout the course of the year, we tailored support and resources to address colleague-specific needs and experiences at different phases of the pandemic.

The Wellness Department played a pivotal role in standing up invaluable resources to help colleagues manage during the pandemic. These efforts, together with consistent messages of support, were vital signs of Hartford HealthCare’s commitment to colleague well-being during this time of great need.

Throughout the pandemic’s rapid evolution, the team sought out the voice of their customers — 33,000 colleagues across the system — both through direct interaction and indirectly using online resources. In response to feedback, an internal benchmark called “Lives Touched” was developed to assess success with colleague participation and engagement in wellness activities and resources. Examples of metrics tracked include quantity of colleague support calls, wellness webinars, consultations, peer support, focus groups and talks/presentations, along with “clicks” to access online resources. In 2020, during the pandemic, 9 percent of colleagues participated, accessed or engaged in well-being initiatives; in the beginning months of 2021, “Lives Touched” grew by 37 percent. The Wellness Department team will continue to refine, track and improve the “Lives Touched” metric.

First Wave Pivot: Using Data to Study and Adjust

Taking advantage of a decrease in COVID-19 hospitalizations from June to September 2020, the Department sought even more innovative ways to reach colleagues with relevant support and skills. The team incorporated feedback from key stakeholders to modify priorities and strategy, while remaining focused on the need of the healthcare workforce to feel heard, protected, prepared and supported.

Recognizing that the COVID-19 experience had parallels in ecological and other disaster science, the team sought skill development opportunities to support colleague well-being now and into the future. More than 25 colleagues attended a “Train the Trainer” program developed by the Department of Defense’s Center for Traumatic Stress and presented by the Greater New York Hospital Association. Following this training, the Department developed a similar program and launched a resilience training pilot featuring multidisciplinary staff across eight unique Hartford HealthCare sites of care. By training 104 leaders in strategies for recognizing and responding to distress in themselves and others, the pilot program reached more than 1,200 colleagues. At two months post-training, most participants were still actively engaging in skills learned and preliminary findings suggest improvement in their confidence to respond to distress.
The success of our communication and outreach strategies came from listening to the needs and experiences of our colleagues, and paying attention to what resonated and had an impact. Leveraging our culture and operating model helped us deliver support and resources aligned with our mission, vision and values. The innovative thinking, flexibility and agility we demonstrated during the pandemic became part of our team’s sensibility and standard processes and will continue to inform our work as we strive for well-being for all. Our charge is to prepare colleagues individually and Hartford HealthCare as an organization, now and into the future, to be **Better than Normal**. The Wellness Department has, therefore, reaffirmed efforts to cultivate existing teams, fostered leader capacity to guide through crisis and improved access to support services.
The COVID-19 pandemic prompted our clinicians to ask many scientific questions about the clinical course and treatment of an emerging disease. Hartford HealthCare responded by creating research teams to mine pandemic data with the explicit goal of improving outcomes. Our investigators sought out support for their research initiatives and looked for opportunities to participate in clinical therapeutic trials. Their work exemplified our intent to be a Better than Normal healthcare system — to learn from the pandemic and change practice based on research-informed lessons.

**Focused Research Support Teams**

Two research teams were quickly mobilized to provide oversight for the large volume COVID-19 research proposals. The Hartford HealthCare Clinical Trial Review Team composed of clinicians from pulmonary critical care, infectious disease, surgery, pharmacy and research leadership was created to expedite the evaluation of industry-sponsored clinical trial opportunities and facilitate the selection of those that offered the most promising treatments for our COVID-19 patients. The group cleared calendars to meet as needed and evaluated numerous clinical trial opportunities, ranging from small start-ups to established pharmaceutical and device companies. The team selected four clinical trials from companies including Pfizer, Regeneron and Clear Creek Bio for patient enrollment at Hartford Hospital. In addition, we received approval for the Gilead “Expanded Use Trial of Remdesivir” at The Hospital of Central Connecticut.

A second group, the Hartford HealthCare COVID-19 Research Team, was created to review and support internal COVID-19 investigator-initiated research projects. The purpose of this team was to streamline protocol development, avoid duplicate projects, share study progress and disseminate new findings. This team included more than 20 physician researchers and research administration leaders. The need to create a comprehensive Hartford HealthCare COVID-19 research registry was identified early on as many physicians required real time COVID-19 patient data to study a variety of research questions. The Research Data Management team developed a research registry of Epic data for every Hartford HealthCare
patient tested for COVID-19. The registry received Institutional Review Board (IRB) approval and served as our standard source of data for all subsequent COVID research projects. More than 20 internal projects have been developed using this data set to analyze COVID topics ranging from outcomes related to racial and ethnic disparities, to outcomes related to preexisting conditions or medication use. Other COVID research protocols have studied handheld sonography, virtual fellowship interviews, management guidelines for orthopedic trauma, the impact of COVID on violence intervention programs, alterations in the delivery of cancer care, and the emotional response to COVID-19. A new study is evaluating the association between exposure to children and the clinical course of COVID-19 patients. Studies have been initiated by investigators in nearly every institute and department, and have resulted in several presentations and publications.

Physicians have also led the contribution of COVID patient data to several international and national registries including the ECMOCARD registry: ECMO for 2019 Novel Coronavirus Acute Respiratory Disease - Jason Gluck, DO; the COVID-19 and Cancer Consortium (CCC19) Registry and The American Society of Clinical Oncology (ASCO) Survey on COVID-19 in Oncology - Peter Yu, MD; and the Surveillance and Epidemiology of Perinatal COVID-19 Infection - Juliann Sheehan, MD.

**System Research**

The pandemic provided the opportunity to enhance our ability to conduct system-wide research projects. The system-wide “Seroprevalence of SARS-CoV-2 specific antibodies among healthcare workers at Hartford HealthCare” (COVID-19 antibody study), led by Principal Investigator Pavlos Papasavas, MD, was the largest research study at Hartford HealthCare to date. The study enrolled 8,663 subjects and implemented new system practices that will be used in future research study project plans. The new processes were created in collaboration with the CareConnect team and included the use of MyChartPLUS for recruitment, consent, phlebotomy scheduling and participant questionnaire completion. The Project Management Office was instrumental in providing staff to coordinate study teams at all hospitals as well as the Community Network. The multidisciplinary study teams included staff from CareConnect, clinical leadership, Compliance/Legal, IT, Laboratory, Marketing Communications, Operational Excellence, Patient Access, ordering providers and Research. The findings of this study helped us understand how Hartford HealthCare had responded to the pandemic — and provided data that confirmed our use of PPE and training had resulted in exceedingly low levels of occupational infection among our colleagues.

Hartford HealthCare also participated in the Mayo Clinic-sponsored “Convalescent Plasma Expanded Access” protocol with patients enrolled at many of our system hospitals. Dr. Brad Sherburne led the collaboration between blood bank clinicians and staff across Hartford HealthCare. The protocol closed to enrollment in August with 363 patients enrolled and 495 units of plasma transfused to the participants. Colleagues were also invited to participate in a survey study designed by Dr. Kevin Young to evaluate the impact of COVID on healthcare workers, including 7,300 Hartford HealthCare participants. Dr. Young also conducted a large national survey on this topic.
Seroprevalence of SARS-CoV-2 antibodies and associated epidemiological factors among healthcare workers at a large healthcare system in CT

Pavlos Papasavas MD, Sope Olugbile MD, Ulysses Wu MD, Kenneth Robinson MD, Armita L. Roberts PhD, David O'Sullivan PhD, Tara McLaughlin PhD, Adam C. Steinberg DO, Rocco Orlando MD, Ajay Kumar MD

7,500 HealthCare Employees (HCW) invited to participate

Electronic consent
Blood draw scheduling via EMR app

IgG antibodies against SARS-CoV-2 nucleocapsid protein using the Abbott Architect

Initial blood draw
Second blood draw at 2wks
Third blood draw at 6 months

Exposure to SARS-CoV-2:
• high risk: daily or almost daily contact with COVID-19 patients or contaminated body fluids and surfaces
• intermediate risk: occasional contact
• Low risk: no known contact

Online questionnaire:
• Symptoms
• PCR testing
• High-risk exposure
• Quarantine
• Exposure to COVID-19 friend or family

May 8-June 4, 2020
N=2801 (first blood draw)

40.8 ± 12.7 years (19-81 yrs)
F:77%  M:23%

Seroprevalence: 7.2%
• AA: 10.9% C:6.6% (p<0.04)
• Hisp: 11.7% vs. 6.6% (p<0.01)
• F: 7.8% M: 5.4% (p<0.05)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Rank</th>
<th>IgG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasal congestion</td>
<td>1</td>
<td>16.0%</td>
</tr>
<tr>
<td>Sore throat</td>
<td>2</td>
<td>13.2%</td>
</tr>
<tr>
<td>Cough</td>
<td>3</td>
<td>18.0%</td>
</tr>
<tr>
<td>Muscle/body aches</td>
<td>4</td>
<td>22.7%</td>
</tr>
<tr>
<td>Extreme fatigue</td>
<td>5</td>
<td>22.2%</td>
</tr>
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</table>

Seroprevalence of SARS-CoV-2 antibodies and associated epidemiological factors among healthcare workers at a large healthcare system in CT

<table>
<thead>
<tr>
<th>Role</th>
<th>Positive</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse</td>
<td>91</td>
<td>987</td>
<td>9.2%</td>
</tr>
<tr>
<td>Physician</td>
<td>9</td>
<td>288</td>
<td>3.1%</td>
</tr>
<tr>
<td>Advanced Practice Providers</td>
<td>14</td>
<td>274</td>
<td>5.1%</td>
</tr>
<tr>
<td>Administrative Assistant</td>
<td>12</td>
<td>130</td>
<td>9.2%</td>
</tr>
<tr>
<td>Patient Care Support</td>
<td>19</td>
<td>116</td>
<td>16.4%</td>
</tr>
<tr>
<td>Radiology Technician</td>
<td>7</td>
<td>110</td>
<td>6.4%</td>
</tr>
<tr>
<td>Laboratory Professional</td>
<td>2</td>
<td>91</td>
<td>2.2%</td>
</tr>
<tr>
<td>Physical/Occupational Therapy</td>
<td>7</td>
<td>88</td>
<td>8.0%</td>
</tr>
<tr>
<td>Patient Care Coordinator</td>
<td>3</td>
<td>66</td>
<td>4.5%</td>
</tr>
<tr>
<td>Medical Assistant</td>
<td>4</td>
<td>60</td>
<td>6.7%</td>
</tr>
<tr>
<td>Pharmacist/Pharmacy Technician</td>
<td>2</td>
<td>57</td>
<td>3.5%</td>
</tr>
<tr>
<td>Hospital Administrator</td>
<td>2</td>
<td>50</td>
<td>4.0%</td>
</tr>
<tr>
<td>Respiratory Therapy Practitioner</td>
<td>4</td>
<td>43</td>
<td>9.3%</td>
</tr>
<tr>
<td>Technician</td>
<td>4</td>
<td>39</td>
<td>10.3%</td>
</tr>
<tr>
<td>Surgical Technician</td>
<td>1</td>
<td>36</td>
<td>2.8%</td>
</tr>
<tr>
<td>Manager/Unit Leader</td>
<td>3</td>
<td>32</td>
<td>9.4%</td>
</tr>
</tbody>
</table>

203 -93(110) -35(75) -11(64) -12(52) -31(21)
100%  54%  37%  31%  26%  10%

6/2,598 seronegative HCWs (0.2%) had a positive PCR test at a median time of 33.5 days (range: 0-60 days) prior to the antibody test
The COVID-19 pandemic required the Hartford HealthCare Human Research Protection Program and IRB to create innovative approaches for the safe continuation and initiation of human subject research protocols. While the goal was to minimize the risk of COVID-19 exposure and infection to the research participants, there was also the need to safely continue treatment trials and trials that required ongoing safety monitoring for the enrolled patients. To address these concerns, guidance was distributed in mid-March regarding essential versus non-essential research visits, screening, enrollment and regulatory compliance. We also evaluated and instituted several virtual methods to support the continuation of research activity remotely. Electronic processes for informed consent were developed in REDCap, a secure web application for building and managing online surveys and databases, and implemented where the regulations supported that use. Standard work was also created for the remote consenting of COVID-positive hospitalized patients. Zoom video communication protocols and staff accounts for compliant remote research subject visits were established. These new methods of remote study conduct will be sustained as a tool going forward to benefit subjects with no transportation or those living a long distance from study locations. In addition, remote monitoring and record access procedures were established for our external clinical trial monitors to avoid their presence on campus. This option will remain available for them moving forward.

**Collaborative Research**

The search for better ways to identify and treat COVID-19 further solidified our ongoing research collaboration with our MIT colleagues. We partnered with MIT on two innovative COVID research projects this year. The first involved the use of machine learning to analyze patient symptoms and predict disease severity. The project was led by Kenneth Robinson, MD, in Harford Hospital Emergency Medicine. The second project was conducted at the Core Microbiology Laboratory — led by Amity Roberts, PhD — with support from the Center for Anti-Infective Research and Development and David Nicolau, PharmD. This study evaluated the use of a new method of COVID-19 detection using spectroscopy with a comparison to standard polymerase chain reaction (PCR) testing.

As we emerge Better than Normal from the COVID-19 pandemic, our Hartford HealthCare research program will be no exception. We have learned to be flexible in order to engage new, focused research teams, create innovative procedures to protect our research participants, utilize virtual health applications, look to the entire system for research opportunities, and engage our valued partners in research and innovation.
Regional Innovations and Operations
Hartford HealthCare
Regional Leadership

Central Region
MidState Medical Center
The Hospital of Central Connecticut
New Britian General Campus
Bradley Memorial Campus
Rushford
Gary Havican
Senior Vice President and Central Region President
Jeff Finkelstein, MD
Vice President of Medical Affairs
Karen Fasano, RN
Vice President of Patient Care Services

East Region
The William W. Backus Hospital
Natchaug Hospital
Windham Hospital
Donna Handley
Senior Vice President and East Region President
Robert Sidman, MD
Vice President of Medical Affairs
Laura Currie, RN
Vice President of Patient Care Services

Fairfield Region
St. Vincent’s Medical Center
Vincent DiBattista
Senior Vice President and Fairfield Region President
Daniel Gottschall, MD
Vice President of Medical Affairs
Dale Danowski, RN
Vice President of Patient Care Services

Hartford Region
Hartford Hospital
Bimal Patel
Senior Vice President and Hartford Region President
Cheryl Ficara, RN
Senior Vice President of Operations
Adam Steinberg, DO
Vice President of Medical Affairs
Laura Bailey, RN
Vice President of Patient Care Services

Northwest Region
Charlotte Hungerford Hospital
Daniel J. McIntyre
Senior Vice President and Northwest Region President
Paul Scalise, MD
Vice President of Medical Affairs
Teresa Fuller, RN
Vice President of Patient Care Services
The COVID-19 pandemic impacted hospitals across the country — including here in Connecticut. In 2020, more than 1,400 COVID patients from more than 85 towns, who ranged in age from 18 to 101 years old, were admitted to Hartford HealthCare’s Central Region hospitals. The region experienced two surge time frames with different impacts and outcomes. The first surge, when the virus was still very new, had a major impact on our critical care units, while the second surge resulted in higher patient volumes within our medical/surgical units and, fortunately, saw lower mortality rates.

Daily COVID communications were distributed with valuable data and metrics including the number of actively admitted COVID patients, transition outcomes (including mortality) and cases involving skilled nursing facilities. Armed with the data, the Central Region Incident Command team led a number of successful interventions to prepare for and manage the impact of COVID-19.

### Critical Care Unit Expansion and Facility Modifications

It became clear in early 2020 that the COVID-19 pandemic would challenge the capacity of many hospital critical care units. In anticipation of increased volumes, the Central Region team began an intense focus on expansion. Not only was physical space required, but also the capacity to meet technology needs with medical equipment as well as integration with our electronic medical record. The collaboration between our facilities, biomedical engineering, nursing and clinical informatics departments resulted in a utilized critical care unit bed expansion at MidState Medical Center from nine to 28 rooms and at The Hospital of Central Connecticut from 24 to 42 rooms. There was also additional space made available that,
Fortunately, was never needed due to a decrease in COVID patients. Ultimately, the successful optimization of our facilities with appropriate modifications allowed our region to safely provide critical care to the community.

**Critical Care Staffing Model During a Pandemic**

In order to support the large patient volumes in critical care that required mechanical ventilation, the Society of Critical Care Medicine (SCCM) tiered staffing strategy was used during the pandemic. Training for redeployed staff involved a high acuity training module, which consisted of educational PowerPoints, tip sheets, SCCM modules on mechanical ventilation management and acute respiratory failure, and PPE training with an emphasis on donning and doffing techniques. In addition, roles and responsibilities were clearly defined for the critical care unit nurse and redeployed nurse. This enhanced level skillset created the team nurse model for caring for critically-ill patients, allowing nurses to learn new skills, expand the scope of their job, build collaborative relationships and provide effective patient care. By utilizing medical/surgical nurses to provide patient care, medication administration and plan of care, critical care nurses were able to focus on high-level patient management of those critically ill with COVID-19.

**Regional Operations Coordination Center**

In response to the increased need for clinical staff within our critical care units, the Incident Command Center team assembled a regional operations coordination center (ROCC) in March 2020 to properly identify colleagues who could be redeployed from their normal department and transitioned to the critical care setting. Due to restrictions placed on elective and non-essential procedures, a number of hospital operations were modified, making clinical staff members available for this transition. Fortunately, all impacted staff were successfully redeployed due to the high need for support. Redeployment skills included, but were not limited to, support with clinical nursing and a dedicated patient proning team. During our second surge in the fall of 2020, when staff resources were still limited but day-to-day operations persisted, the ROCC created the Central Region Incident Command Tactical Team (ICTT). ICTT identified staff who could act as “helping hands,” providing colleagues with additional support.
with patient proning, tray passing in COVID+ patient rooms, patient transport and continued screening for the well-being of our colleagues, visitors and patients. The ROCC ensured that all aspects of care delivery were successfully staffed, allowing the Central Region to maintain safe operations and support the community.

**Physician and Advanced Practitioner Redeployment**

The Central Region employs more than 30 full-time hospital medicine clinicians, including physicians and advanced practitioners. At the peak of the pandemic, intensive care services were in dire need of help and the demand for ICU beds was stretched beyond its normal staffing capacity, which required the Central Region team to think creatively. Hospital medicine physicians, who do not typically work in the critical care unit, went through ventilator management training to expand their skillset. These clinicians, along with a handful of emergency department physicians (some of whom hold dual boards in emergency medicine and intensive care medicine), joined the intensivists in the critical care unit in caring for the ill. Additionally, our outpatient colleagues flexed into the inpatient arena to provide hospital level care to lower acuity admitted patients. The redeployment of almost all hospital medicine clinicians allowed the Central Region to flex the critical care unit capacity by more than 100 percent.

**COVID-19 at Home Intensive Program**

The Central Region worked closely with the Hartford HealthCare Innovation team to create value through the COVID-19 at Home Intensive Program – a creative approach to addressing a lack of inpatient hospital capacity through community outreach. The COVID-19 at Home Intensive Program allowed the acutely ill who were on the way to recovery to recuperate in the comfort of their own home a few days earlier with their care managed by a hospital medicine physician for an average of 2.6 days. The COVID-19 at Home Intensive Program decreased this cohort’s length of stay by three full days, increased hospital capacity by 90 patient days, and maintained a 91.3-percent likelihood to recommend. The success of this program is evolving to include patients with chronic diseases like chronic obstructive pulmonary disease, congestive heart failure, acute coronary syndrome and stroke. One patient described the experience:

“I think you recover at home quicker because you’re in your own environment. When I was in the hospital, they were monitoring my oxygen, but I was able to come home and they told me about the program. I was happy to be in my own environment and physical therapy/occupational therapy worked really hard to help me. I would recommend this program to anyone. It was unbelievable!”
Central Region

Lessons Learned

The COVID-19 pandemic forced all of us to think differently about healthcare delivery. Despite the challenges, there were a number of positive aspects we will continue to utilize as we transition into a Better than Normal state:

• Regionally sharing inpatient volume to maximize efficiency.
• Optimizing telehealth services, allowing for improved patient access to care.
• Improving patient experience with daily outreach to families via phone/Facetime to offer healthcare updates.
• Emphasizing staff wellness.
• Expanding and evolving COVID-19 at Home Program.

Additionally, the COVID-19 pandemic resulted in many healthcare workers sharing responsibilities, allowing all of us to gain a better understanding and appreciation of the roles our colleagues play. By utilizing our culture and leadership behaviors, we all shared in the understanding of the collaborative effort it takes to provide safe, quality healthcare.
The impact of COVID-19 rippled across the globe in 2020, yet no two individuals or organizations experienced the pandemic in the same way. Even within the small state of Connecticut there was major variation — especially in Hartford HealthCare’s East Region.

The East Region escaped the first wave of the pandemic largely unscathed with low positivity rates across New London and Windham counties and the fewest number of admitted COVID positive patients within the Hartford HealthCare system.

Throughout the pandemic, Backus and Windham hospitals supported the needs of the internal and external communities, demonstrating their value and commitment to eastern Connecticut and delivering on their promise to bring the highest standard of care to the communities they serve. Fighting COVID-19 didn’t end at the four walls of the hospitals. Backus and Windham teams brought testing and vaccines into the community with mobile clinics and Trusted Messenger, a state Department of Public Health “train the trainer” program. The program involved the East Region medical director of quality and safety providing trusted leaders with appropriate messages in order to help overcome vaccine hesitancy among minority and underserved populations.

**Support during first wave of COVID-19**

Other Connecticut and Hartford HealthCare regions were more impacted by the first major COVID-19 surge, so Backus and Windham hospital teams stepped up to help fellow Hartford HealthCare acute care facilities. Nurses were redeployed to St. Vincent’s Medical Center in Bridgeport, which was heavily impacted in the first wave of the pandemic, and both Windham and Backus accepted transfers from across the system, including a COVID-positive husband and wife from MidState Medical Center — both who recovered at Backus Hospital.
East Region

Second surge; different story

The second wave of COVID-19 arrived in the East Region in late fall 2020, and this time around, Backus and Windham hospitals were among the hardest hit. At one point, Norwich had the highest positivity rate in the State of Connecticut, resulting in staffing shortages, high patient volumes and other challenges, all of which were compounded by a nurses’ strike that lasted two days.

In response to these unprecedented challenges, the East Region team was forced to think differently about healthcare delivery. What once seemed impossible was now doable — that’s what happens when you face a worldwide pandemic, the likes of which no one had ever seen before. The leadership team, guided by Lean principles, developed innovative approaches to overcome obstacles and continue to deliver high-quality care to patients and community. We implemented initiatives rapidly, usually starting small, studying and adjusting, and scaling fast. Some highlights included:

• A regional approach to managing patient volumes that required high levels of coordination, trust and communication. As many as 42 patients were transferred in one month from the Plainfield Emergency Care Center to open beds at Windham Hospital. The practice of patient flow redistribution has been maintained from this Care Center and now helps load level across the region on a daily basis.

• To improve patient flow during the increased demands of the pandemic, operational improvements focused on early discharges to improve movement of admitted patients from the emergency department. To date, the team has been able to more than double the percentage of discharges before 11 am.

• Focused communications to staff and clinicians, outlining changes to safety protocol and operations — including PPE, screening and COVID testing.

• The rapid launch of two prominent COVID testing sites in the East Region in response to community need. Dodd Stadium in Norwich and Recreation Park in Willimantic combined to provide 41,502 tests as of April 2021.

• As the pandemic began to subside and three life-saving vaccines emerged, the opening of the Foxwoods mega-vaccine center and another clinic at Windham Hospital allowed us to provide 13,093 vaccines as of April 2021.

Safety: A Core Value

Despite the many challenges of 2020, the East Region stayed on track to achieve target in key quality and safety goals. Achievements include

• Maintaining mortality rates below national benchmarks and meeting goals set to reduce patient harm; PSI and HAI goals.

• Earning an “A” at Backus Hospital and a “B” at Windham from Leapfrog Hospital Safety Grade for continued commitment to patient safety and the reduction of avoidable harm.
Lessons Learned: A Bright Future

Now that COVID cases are subsiding, the East Region team is taking the lessons it learned to pivot away from COVID and toward adding new programs and services. The pandemic reinforced just how agile we can be, whether it was sharing inpatient volume to maximize efficiency, managing critical care capacity, enhancing access to care through telehealth and focusing on staff wellness. These accomplishments and how we got there set us up for continued future success as we pursue a new women’s health program, neonatal ICU, surgery center in Plainfield, coordinated orthopedics program and the recruitment of many new physicians to provide comprehensive, coordinated care in the East Region. We have truly emerged Better than Normal.
St. Vincent’s commitment to high reliability standards for the past decade has resulted in progress toward achievement of key safety goals including the elimination of patient harm, preventable infections and preventable death. During the global COVID-19 pandemic, these safety behaviors, coupled with teamwork, agility and 100 percent accountability, became increasingly important, and the strong foundation built over the years positioned us well for success in providing safe, high-quality care during this extraordinary time.

Throughout the COVID pandemic, many new infection prevention protocols for symptom screening, testing, personal protective equipment and hand hygiene were developed, and colleagues and providers effectively pivoted as new CDC guidelines frequently emerged. Our teams remained in lock step with the system and the science as it evolved in order to protect our patients, colleagues and the community at large. We leveraged data and communicated with colleagues frequently. Ultimately, we provided compassionate, holistic care to more than 1,000 hospitalized COVID patients.

Regional Operations During Pandemic Early Stages

In response to the increased need for agility and pivoting to respond to the pandemic, the regional incident command center was assembled in March 2020. The multidisciplinary team convened seven days a week to address numerous issues, including the identification of appropriate staff to be redeployed, assessment of PPE requirements and distribution, and a myriad of issues ranging from supplies and environmental services to visitation and steady communication. The clinical command center — a group of clinical leaders including Emergency Department, ICU, surgery, hospitalist, pharmacy and infection prevention specialists — was also deployed to take charge of expansion planning, staffing models for expansion, evaluation and adoption of infection prevention and clinical protocols.
ICU Expansion

Due to its close proximity to New York, the Fairfield Region became part of the first COVID-19 epicenter in the United States. With patient volume rapidly climbing and many of those patients requiring mechanical ventilation, the capacity of the ICU was challenged and expansion options quickly became a priority. During this time, St. Vincent’s, having formally joined Hartford HealthCare only six months prior, was not yet fully integrated into the system’s electronic health record, which created an added challenge for collaboration with system central command operations. The coordination between St. Vincent’s physicians, facilities, biomedical engineering, nursing, environmental services and clinical informatics resulted in an ICU bed expansion in three additional areas of the hospital (emergency department, post-anesthesia care unit, cardiovascular unit), adding 30 critical care beds. Ultimately, the successful optimization of our facility with appropriate modifications led to our region being able to safely provide critical care to the entire community.

Provider Staffing Models During Critical Surges

With restrictions placed on elective and non-essential procedures, numerous hospital operations were modified; therefore, many providers were redeployed to serve in non-traditional roles such as critical care, from anesthesia, cardiology, acute care surgeons and hospitalists. In addition, some primary care specialists were asked to serve as hospitalists. Various advanced practice registered nurses (APRNs) complemented the palliative care team to assist with the difficult conversations during end-of-life care. In all, the dedication and support demonstrated by colleagues from across the Fairfield Region created tremendous camaraderie and was a catalyst for the tremendous task of facing an unknown disease that greatly impacted our world.

Accomplishments

We faced the uncertainty and fear of COVID with courage, resilience and hope, while continuing to focus on safe operations and remaining steadfast in our pursuit of ongoing quality initiatives.

Despite the challenges encountered throughout the year, including staff redeployment and shortages at the outset of the pandemic, we were able to continue to improve our performance in several quality and safety metrics by implementing new operations and protocols, incorporating complex and critical clinical scenarios, highlighted by:

- 18-percent improvement in PSIs.
- 48-percent decrease in HAIs.
- 22-percent decrease in reportable harm events.
These improvements led to a significant increase in our Leapfrog Hospital Safety Grade; in fall 2020, St. Vincent’s achieved a “B” grade.

The growth strategy attracted tremendous talent to our region, and we continued to achieve high marks of excellence for heart failure and stroke treatment as illustrated by the achievement of American Hospital Association’s Get with the Guidelines Gold Plus awards.

**Lessons learned**

The most valuable lesson learned through this pandemic was resilience. We were able to overcome many challenges, which at times seemed insurmountable, by supporting one another and utilizing our individual skills in collaboration. Being a member of a state-wide system offered the resources, knowledge and infrastructure that we needed in this unprecedented time, and accelerated integration through fast and efficient collaboration.

The Fairfield Region has engaged in new models of care delivery, including telemedicine, new ways of communication and outreach to families, and new collaborative approaches with post-acute care networks to assist patients with transitions through the continuum of care.

We have partnered with the communities and local officials in our common goal to provide education, testing and, most recently, vaccinations. Our alignment with the community has brought new opportunities and channels to reach out to patients in Bridgeport and neighboring towns within our service area. We can all look back and be proud for living through an historical worldwide event, for the newly found sense of purpose, and our newly developed resilience as we were able to pivot, adapt and learn at a very fast pace. We are committed to building upon these lessons, keeping safety ever-present at the foundation.
Our Story

From caring for the Harford HealthCare system’s very first COVID-19 patient to leading the system’s vaccine distribution efforts, the agility, ingenuity and dedication of the Hartford Hospital team have made the hospital a national leader in the care of COVID-19 patients and management and prevention of COVID-19 spread.

At the height of the pandemic, the hospital was caring for more than 200 COVID patients each day with nearly 20 percent of those patients on ventilators. As a large tertiary care center, Hartford Hospital became a hub for COVID care in the region — taking in the sickest of the sick and utilizing innovative new therapies and strategies that came to be replicated throughout our health system.

Thanks to the expertise and commitment of our colleagues, more than 2,400 COVID-19 patients have been transitioned out the hospital, and the hospital was better positioned to lead the fight against the virus during the second wave and beyond.

Highlights:

• On March 16, 2020, less than three days after receiving the system’s first COVID-19 patient, Hartford Hospital established a COVID-19 drive-through testing site. At the height of the pandemic, the location, which eventually moved to the Connecticut Convention Center, conducted up to 4,000 tests per day.

• Recognizing the potential for a surge of COVID-19 patients, the hospital transformed a newly completed observation unit in the emergency department into a dedicated ICU specifically for COVID-19 patients.

• A team of doctors, nurses and members of the facilities and operations teams worked together to design and activate a forward triage unit at Hartford Hospital. In this space, patients were screened and evaluated for COVID-19 before entering the hospital.
In partnership with the Connecticut Army National Guard and Connecticut Air National Guard, the Hartford Region team constructed an alternate care site at the Connecticut Convention Center with more than 600 beds to be used as an auxiliary location for patients recovering from COVID-19 in the event of a surge.

Hartford Hospital joined a consortium of 50 hospitals and universities nationwide to participate in the National COVID-19 Convalescent Plasma Project in which donors who recovered from the virus donated plasma that helps treat those who were critically ill with the virus.

The Hartford Hospital pharmacy team led the effort to distribute and administer the first doses of the Pfizer, Moderna and Johnson & Johnson vaccines to colleagues and the community. The first doses of the Pfizer vaccine arrived in Hartford on December 14, 2020, and were quickly administered to frontline workers from across Hartford HealthCare during a ceremony at the hospital, making them some of the first in the nation to receive the vaccine.

Hartford Hospital worked with community partners to make the vaccination available in underserved areas at clinics throughout the city. In March 2021 alone, Hartford Hospital vaccination teams administered more than 1,200 vaccines at 13 clinics throughout the city in partnership with groups such as the Hispanic Health Council, North United Methodist Church, the West Indian Social Club and the Spanish American Merchants Association.

Despite these unprecedented challenges, Hartford Hospital continued to deliver the highest quality care and was recognized nationally for these efforts, including:

- U.S. News & World Report #1 ranking in Hartford metro market, including recognition for high performance in the orthopedics specialty and in the following procedures and conditions: colon cancer surgery, lung cancer surgery, heart failure, aortic valve surgery, heart bypass surgery, chronic obstructive pulmonary disease, hip replacement and knee replacement.

- Cardiac surgery program was the only one in the state to receive a three-star rating in four categories from the Society of Thoracic Surgeons and College of American Radiologists — the highest rating possible from the group.

- Named a Top 50 hospital for cardiac surgery by Healthgrades.
Recognized by the American Heart Association and the Mitral Foundation for its commitment to best practices in mitral valve repair and for consistent superior clinical outcomes in individuals undergoing mitral valve repair.

Received a “B” Hospital Safety Grade from Leapfrog.

What we’ve learned:

Pulmonary and respiratory teams demonstrate expertise in determining when and when not to intubate the sickest of the sick. The treatment of COVID-19 patients in respiratory distress evolved over the course of the pandemic, revealing the nimble response of the pulmonary and respiratory teams at Hartford Hospital.

“In the beginning, the direction we were given was to intubate everyone very early,” recalled Samuel Pope, MD, Medical Director, ICU at Hartford Hospital. “We were intubating patients electively once they hit six liters of oxygen. And there were a lot of people on six liters of oxygen who had COVID.”

There was a point when 89 COVID patients were on ventilators, more than double the normal average. The problem was that intubation creates a vulnerability to lung injury. Within two to four weeks, the team at the hospital realized they could ride out the storm with higher oxygen levels as opposed to putting so many patients on ventilators. That left them with another treatment course to consider and the gears shifted in a new direction. In doing so, they needed to evaluate the risk of treatments that would create more airborne particles.

“Non-invasive oxygen ventilation like continuous positive airway pressure (CPAP) therapy could aerosolize the virus and create more particles of virus in the air,” said Dr. Pope. “But, we also learned that the PPE protected against aerosolized virus. You don’t catch COVID from patients on all these modalities if you have the appropriate PPE like N-95 masks and a shield and are wearing gowns and masks.”

Saimir Sharofi, director of Respiratory, Pulmonary Lab/Rehab and Cystic Fibrosis services at Hartford Hospital, said a lot was learned as the pandemic progressed, adding, “The initial guidance was to intubate everybody to avoid an aerosol-generating procedure. For the number of patients at Hartford Hospital in the first four months, infections were minimal for our colleagues, pointing to the success and effectiveness of PPE.”
When it became known that the virus was not spread on surfaces, but through the air, attention turned to minimizing the aerosolized spread of the virus. High-efficiency particle filters were used in rooms where patients were having aerosol-generating procedures. When COVID started, there were six of these devices in use around the hospital. Sharofi and his team moved quickly to acquire dozens more, and now there are more than 100 that can filter the air in about 20 minutes.

Currently, Dr. Pope said the team is doing everything possible to avoid putting a patient on a ventilator. “That includes things that we’ve never done before, like letting the oxygen drift down to 85, tracking closely all the while so we can avoid putting someone on a ventilator,” he shared. “We are still using steroids and Remdesivir and giving people plasma, things that have gone in and out of favor over the course of the pandemic. We’ve had good outcomes using those things aggressively.”

Pope thinks if another pandemic presented itself, it would be handled with agility borne from experience. “We’ve learned through first-hand knowledge. If it ever happened again, even a bad flu, we now know how to rapidly adapt.”
Looking back at 2020, the extraordinary and life-changing arrival of the COVID-19 pandemic to our region presented unprecedented clinical, logistical and leadership challenges to the Charlotte Hungerford Hospital colleagues and medical staff. As the region’s largest healthcare provider, caregivers at many levels channeled all available resources and time to the response, becoming a major provider of care, treatment, expertise, information, testing and vaccination for northwest Connecticut residents. Hospital and service line teams worked alongside their Hartford HealthCare colleagues, demonstrating tremendous commitment and dedication to our patients and community.

Highlights

• From the onset of the pandemic through April 2021, Charlotte Hungerford Hospital treated approximately 500 COVID-19 inpatients and performed nearly 30 monoclonal antibody therapy treatments in mild- to moderately-ill adult patients in the Emergency Department.

• From the start, Charlotte Hungerford Hospital activated its regional incident management command structure and relied upon this approach to coordinate and respond to care and treatment demands, provide daily system and staff level communications, coordinate with local officials, and problem solve. When the need arose, the hospital opened and sustained a pandemic patient overflow unit in the post-anesthesia care unit (PACU) and telemetry cardiac monitoring floors, increasing our inpatient capacity by 50 percent.

• Clinicians created and implemented a palliative care service to assist families, patients and colleagues when handling difficult end-of-life conversations and assisting those patients and families in making the most difficult of decisions. iPads and iPhones to facilitate conversations between our COVID isolation patients and their families to assist families in communicating with their loved ones throughout the course of their illness.

• Hospital public areas, entrances and critical care departments were adapted to allow for the safe treatment of COVID-19 patients and safe visitation for our recovering COVID patients when they needed their families the most. Available meeting room areas on each unit were also repositioned and maintained as “Zen Den” spaces for colleagues to rest, get a snack and hydrate.

• To maximize personnel needs, the hospital called on the medical reserve corps to help screen patients and visitors and redeployed more than 50 colleagues to assist in the COVID response including a fleet of reassigned athletic trainers who helped turn and reposition the most critically ill ICU patients. We also
cross-trained surgical services staff to assist ICU nurses by performing daily care tasks.

• Charlotte Hungerford Hospital frequently collaborated with local and regional healthcare partners and first responders including participation in the Torrington Emergency Operations Unified Command Structure and Torrington Mayor’s response group. The hospital team also educated community members to combat vaccine hesitancy and assisted local skilled nursing facilities with infection control protocols, patient transitions, and end-of-life care.

• Charlotte Hungerford Hospital opened and staffed an on-campus drive-through testing site, which was ultimately moved off campus. To date, the site has performed more than 30,000 COVID tests, as well as conducted more than a dozen mobile testing opportunities to ensure access for high-risk and underserved community members.

Lessons Learned

Be Prepared and Stay Organized as a Cohesive Unit
Before the first patient arrived in March 2020, Charlotte Hungerford Hospital administrators instituted a comprehensive, multi-tiered command structure which was used and modified at each phase of the evolving pandemic. Proven extremely effective with prior emergencies, the broader structure and rotating leadership responsibilities helped prioritize overall communications and assignments and prevent staff burnout.

Take Teamwork to the Next Level
The increased supply and staff needs brought on by both the crisis and ongoing operations compelled management teams to administer resources differently and re-deploy staff with an “all hands on deck” mentality. This allowed for the testing of standard work effectiveness, greater cross discipline support among departments, and increased agility and sense of teamwork.

Virtual Innovation Works
As a result of pandemic restrictions, there has been new importance and increased acceptance around the use of telehealth services. This was evidenced by an improvement in previous cancellation rates including a 50-percent reduction for behavioral health. More than 5,400 online visits were conducted by Charlotte Hungerford Hospital behavioral health counselors alone.

System Expertise and Support Matters
On a system level, we greatly benefitted from increased communication and leveraging of the professional and medical expertise and capabilities of colleagues from across the Hartford HealthCare system, furthering the evolution and standardization of treatment and best practices. For example, working together, staff gained new medical knowledge and care direction and expanded the ICU’s utilization of treatment algorithms, resulting in greater efficiency and care outcomes.
Agility and Adaptability
Facility and patient flow changes were instituted beyond anything contemplated before. We stood up COVID units with ingenuity and innovation, and we embraced safety protocols for colleagues and visitors that not only met the need in the moment, but re-envisioned our historic norms and made us a safer organization, not just in the moment but from this point forward.

We Work in the Context of Community
Community has always mattered to Charlotte Hungerford Hospital, but our COVID experience created a deeper appreciation for the authenticity and depth of our connection to the communities we serve. Further, COVID has yielded a greater awareness of, and appreciation for, community health and equity — work that is not only front and center, but will be sustained beyond the COVID-19 pandemic.

Quality Highlights and Innovations
During 2020, Charlotte Hungerford continued to foster professional collaborations with system colleagues to create opportunities and make profound investments that benefitted quality, safety, coordination and patient satisfaction for our patients and their families. These improvements resulted in meaningful reductions in HAIs and pressure injuries, including a more than 50-percent reduction in HAIs from 2019 to 2020 — a decrease from 12 to 5. Further, we accomplished the following:

• Achieved a Leapfrog Hospital Safety Grade of “A”, the highest possible quality and safety score.

• Created a new medical director for Quality position, dedicating a physician resource exclusively to set, monitor and account for quality improvement goals, and introduced new bedside shift reporting and the hardwiring and refinement of leadership and staff rounding procedures.

• Developed a Patient and Family Advisory Committee charter and recruited members to receive important input from key stakeholders. This helped us achieve a score of 63.0 for Overall Rating of Care in the acute care units, up from a baseline of 59.8 in the prior year. Scores in five of the final six months of 2020 exceeded our targets.

• Implemented new strategies and protocols developed through a highly successful colleague-driven Emergency Department Transformation Project with a goal of transforming the way we provide emergency and inpatient care. The idea was to bring together providers and colleagues to improve care by specifically identifying known “dissatisfiers,” including delays in throughput, feedback during stay and negatively perceived interpersonal interactions between staff and patients.

When comparing the metrics from before and after implementation, the Emergency Department team was able to reduce the time from patient registration to placement into a status of observation or inpatient. In December 2019, the average time was 252 minutes; by the following February, it dropped to 181 minutes.
Additionally, the time to bed assignment on the inpatient floor was reduced by almost 20 minutes, and the median total length of stay in the ED for a patient dropped from 585 to 258 minutes.

The Emergency Department team has also made significant strides with their overall rating of care topping 80.6 percent in May 2020. This score rose from 45.2 percent in November 2019 and has been consistently above target at 65.4 percent year-to-date in 2021. But, one of the best outcomes from the project is the visible culture change that has occurred in the department. The implementation team and staff are more engaged and working hard to identify and provide the best possible care to our patients.

**Expanding Access and Capabilities**

- The Hartford HealthCare Cancer Institute opened a new, 3,000-square-foot Infusion and Medical Oncology Center on the hospital’s main campus, increasing the presence of our regional cancer program in northwestern Connecticut. Three new medical oncology providers will partner our long-standing radiation therapy program and the region’s first fellowship-trained breast surgeon.

- Brick and mortar expansion was also key to our growth in 2020 with the much anticipated opening of Hartford HealthCare’s state-of-the-art health center in Winsted, representing one of the largest investments in the town’s history in decades. Located at the corner of routes 8 and 44, the three-level facility houses an emergency department, mammography, radiology, cardiac and physical rehabilitation, and primary and specialty care services.
Institute and Network Innovations and Operations
Hartford HealthCare Institute and Network Leadership

**Ayer Neuroscience Institute**
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Senior Vice President and Co-Physician-in-Chief  
Mark Alberts, MD  
Senior Vice President and Co-Physician-in-Chief  
Wendy Elberth  
Senior Vice President, Operations

**Bone & Joint Institute**
John Grady-Benson, MD  
Physician-in-Chief  
Stacey A. Lombardi  
Vice President, Business Operations

**Connecticut Orthopaedic Institute**
Donna Sassi, RN  
Vice President, Ambulatory Services and Connecticut Orthopaedic Institute  
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Senior Regional Director of Operations

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Medical Director  
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Assistant Medical Director

**St. Vincent’s Medical Center**
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Senior Vice President, Operations

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Patricia Rehmer  
Senior Vice President and Behavioral Health Network President

**Community Network**
Rita Parisi  
Senior Vice President  
Eric Smullen  
Vice President, Operations
The COVID-19 pandemic has changed and slowed many aspects of our lifestyles; however, diseases of the brain and spinal cord continue to affect millions of Americans, just like before the pandemic. These healthcare complications and our patients’ need for care are the drivers that continue to push us at the Ayer Neuroscience Institute to provide our community with the safest environment at all of our locations. Despite the very novel, stressful, challenging and unique circumstances that we all experienced during COVID, our patients continued to receive optimal care, and our faculty and colleagues were well supported and equipped to deal with these unprecedented circumstances. Our hope, determination and progress have strengthened our resilience and persistence to be there for our patients because neurological diseases do not stop and neither will we.

Our medical professionals and healthcare leaders work around the clock, searching for better and more permanent ways to provide the safest, high-quality care for our patients. The COVID-19 pandemic presented new stressors to all healthcare institutions; challenges like staffing, space to accommodate the mass influx of patients, and safety forced us to accelerate our thinking around care solutions for our patients. Despite the challenges brought on by COVID, our care teams never wavered in their dedication, innovation, commitment, compassion and perseverance through the pandemic. All of our services remained fully staffed in the hospital, and our clinics adapted quickly, pivoting from in-person visits to virtual and then back to in-person visits when it was safe. Even at the height of the pandemic, our clinics were staffed and prepared to manage emergent situations that required an in-person visit including injections, infusions, deep brain stimulation programming adjustments, and more. Throughout it all, great attention was paid to staff engagement and provider wellness. Using strategies that included frequent communications as well as in-person visits, our clinical leadership provided support and guidance to colleagues who were experiencing stressful personal and professional situations.

While some neuroscience services across the country experienced a decrease in volume, the Ayer Neuroscience Institute saw a consistent number of patients and, in some specialties such as the Memory Care Center, a steady increase. This was likely attributed to the fact that we never closed, maintaining the same hours, continuing our community outreach and community education, and accommodating our patients with concerns about traveling to healthcare centers by developing...
hybrid models. Such models allowed patients to take advantage of having their medical consultations and testing conducted virtually. At the Memory Care Center, for example, neuropsychological testing that has historically been in-person became virtually available to our patients, with no interruption in service. These innovative medical practices offered comfort and a feeling of safety to our patients while they still received the medical care they needed.

A constant storyline across the country was the scarcity of ICU beds in light of the mass influx of critically ill COVID-19 patients. Institutions were flooded and overwhelmed by a surge no one could have truly predicted. To absorb some of that pressure and continue serving our patients, the Ayer Neuroscience Institute clinical leaders demonstrated innovation and creativity to work through the difficult times. Some highlights include:

- Ayer Neuroscience Institute clinicians, nurses and other colleagues joined the multidisciplinary care and emergency management teams, working tirelessly to manage the influx of patients with COVID-19. Simultaneously, neurologists continued to study for evidence of COVID-19–related neurological complications. This frontline presence allowed for informed and tailored approaches to patient management.

- To manage the influx of patients, our team suggested converting the step-down unit (non-ICU) into a full-capability ICU unit, providing more capacity to care for COVID-19 patients.

- As many as 40 non-ICU nurses were cross-trained to provide ICU level patient care, while increasing the bed capacity to improve patient throughput.

- Our neuroscience ICU admissions continued unaffected during the pandemic, as our patients trusted and continued to seek the safe and excellent care we deliver.

### Neuroscience ICU Admissions

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<td>2021 YTD</td>
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</table>
Clinicians developed processes to isolate non-COVID neurology patients, such as those who suffered from a stroke, to ensure their safety and decrease chance of exposure.

Colleagues utilized video technology to keep families of COVID-19 patients connected and informed.

Our veteran neurosurgery physician assistant was integral in providing expertise, helping to scout, build, and break down field hospitals, and supporting our large testing strategies.

Clinical leaders from Ayer Neuroscience led American Heart Association and American Stroke Association COVID surge plans for Connecticut through the Thrombectomy-Capable Workgroup.

COVID-19 anxiety was felt across the country. Many patients feared for their lives and stopped seeking important healthcare screenings, appointments and treatments. We recognized the need to reach out to our community and educate our patients to continue seeking necessary medical care. We held accessible live media events on topics such as stroke, movement disorders, sports neurology, neurosurgery and memory care.

We pivoted quickly to provide virtual health visits to our patients in stroke, movement disorders, memory care and neuroimmunology diseases.

Our uninterrupted ability to deliver quality care to our patients during COVID-19 times was reflected in Press Ganey patient satisfaction survey results. We saw an increase in our likelihood to recommend the practice scores, which averaged 88 percent.

Despite the challenges presented by COVID, we sustained operations, grew and celebrated accomplishments, including the following highlights:

— The Ayer Neuroscience Center received National Association of Epilepsy Centers Level 4 Comprehensive Epilepsy Center accreditation — the highest that can be attained for centers that perform complex epilepsy surgeries.


**Commitment to Quality**

The Ayer Neuroscience Institute teams are dedicated to delivering the highest quality of care to all patients. The information below shows performance data including mortality and length of hospital stay. Transparency of outcomes aims to provide our patients and their loved ones with confidence in their decision in choosing Hartford HealthCare.

The following graphs present a comparison between 2019 and 2020 observed-to-expected (O:E) ratio of some of the most important indexes to patient health and survival – length of hospital stay and mortality. Observed represents the actual number of days a patient stays at a hospital for care or the actual number of mortalities, while the expected number is the target set by the Centers for Medicare and Medicaid Services as a national benchmark. Lower is better; target performance is a rate less than 1.
Ayer Neuroscience Institute

Length of Stay

Mortality

Stroke

We’re proud to be one of the first healthcare systems in Connecticut to receive Comprehensive Stroke Center certification. The Joint Commission designation recognizes significant resources in staff and training that comprehensive stroke centers must have to treat complex stroke cases. Offering the highest level of care, including neurointensive care units, complex neurosurgical interventions and advanced brain and blood-vessel imaging, The Ayer Neuroscience Institute care teams continue to provide the best stroke care to our patients.

In our stroke program, we monitor our performance against the standards created through national disease registries such as the Get With the Guidelines® Stroke program sponsored by the American Heart Association and American Stroke Association. This national registry has been benchmarking healthcare institutions since 2003 with data points from more than 2,000 hospitals and has shared more than five million patient records for feedback and analysis.
**Ayer Neuroscience Institute**

**Length of Stay**

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<th>GM LOS - Backus, Charlotte, HOCC, Hartford, MidState, SVMC, Windham</th>
<th>Fiscal Year(s): 2020 (Jul,Aug,Sep,Oct,Nov,Dec,Jan,Feb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Stay</td>
<td></td>
</tr>
<tr>
<td>1.02</td>
<td>0.92</td>
</tr>
<tr>
<td>0.93</td>
<td>0.94</td>
</tr>
<tr>
<td>0.92</td>
<td>0.83</td>
</tr>
<tr>
<td>0.82</td>
<td>0.84</td>
</tr>
<tr>
<td>0.84</td>
<td>0.94</td>
</tr>
</tbody>
</table>

**Mortality**

<table>
<thead>
<tr>
<th>Mortality - Backus, Charlotte, HOCC, Hartford, MidState, SVMC, Windham</th>
<th>Fiscal Year(s): 2019 (Jul-Feb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td></td>
</tr>
<tr>
<td>1.48</td>
<td>1.22</td>
</tr>
<tr>
<td>1.13</td>
<td>0.74</td>
</tr>
<tr>
<td>1.13</td>
<td>0.97</td>
</tr>
<tr>
<td>0.91</td>
<td>0.97</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mortality - Backus, Charlotte, HOCC, Hartford, MidState, SVMC, Windham</th>
<th>Fiscal Year(s): 2020 (Jul,Aug,Sep,Oct,Nov,Dec,Jan,Feb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td></td>
</tr>
<tr>
<td>0.76</td>
<td>1.14</td>
</tr>
<tr>
<td>1.12</td>
<td>1.23</td>
</tr>
<tr>
<td>1.23</td>
<td>0.92</td>
</tr>
<tr>
<td>0.91</td>
<td>1.02</td>
</tr>
</tbody>
</table>

**Timely Administration of tPA:**

Tissue plasminogen activator (tPA) is a powerful drug used to break up blood clots that cause ischemic strokes. The drug is typically given through a vein in the arm. To be effective, the drug must be given less than one hour after a stroke occurs.

**Education and Rehabilitation**

Patient education following a stroke can help prevent future strokes. A stroke can cause damage to the brain that makes it difficult for a person to return to normal daily activities. Rehabilitation after a stroke can help a person live with lingering effects of a stroke and help the brain recover more fully.
COVID-19 at the Bone & Joint Institute: Early Effect

The COVID pandemic dramatically challenged all Bone & Joint Institute (BJI) providers and care teams, but like many of their colleagues across Hartford HealthCare, the BJI staff demonstrated extraordinary resilience and heroism during this unprecedented time. Embracing the catastrophe with grit and grace, all BJI healthcare teams—from administration to clinical care to the new research team — flourished and evolved to be Better than Normal.

When the COVID-19 pandemic was declared in March 2020 and the U.S. Surgeon General recommended delaying elective surgeries to preserve PPE, the BJI team initiated a cascade of communication to surgeons and colleagues to address concerns. Communications addressed COVID-19 facts, figures and concerns; reinforced the added importance of adhering to all safety behaviors; and prioritized wellness through sharing of resources and promotion of self-care. Other safety measures quickly put into place included a COVID symptom screening process at the entrance to the BJI; close collaboration with system leadership on COVID testing and visitor guidelines; the use of videoconferencing capabilities in place of in-person meetings; and implementation of FORCE Therapeutics, a patient engagement platform which provides education, communication and collects outcome data from patients prior to and following surgery.

Surgical Volume

The orthopedic teams adapted and pivoted, collaborating with system-wide healthcare colleagues to courageously continue care for emergent and urgent surgical cases. Definitions of “emergent” and “urgent” versus “elective/essential” surgeries were clearly discussed and delineated. COVID safety rules were immediately embedded as new cultural norms. The first COVID-19 orthopedic surgery — a partial hip replacement for hip fracture — was performed on March 26, 2020. The BJI teams adjusted quickly to rapidly evolving rules, policies and guidelines to maintain a high level of
patient and staff safety and awareness. Orthopedic trauma cases increased significantly during this time. A unique trauma team on-call system split up surgeons, orthopedic residents and physician assistants into “pods,” which maintained rotations while ensuring that, in the event a team member and his/her pod were infected with COVID-19, the other pod was kept safe and separated to maintain continuity of care. Nurses, physical therapists, patient care associates and others courageously volunteered to float to areas of need at Hartford Hospital, including COVID units. Orthopedic physician assistants and PACU nurses also volunteered services in the ICUs.

During the 2020 fiscal year, there had been steady year-over-year surgical volume growth which was impacted by two months of no elective surgeries. Despite this loss, the BJI completed 5,391 surgeries in FY2020 which is 96.5 percent of the FY 2019 volume. An additional 100 neuro spine cases were also performed at the BJI thanks to collaborative efforts between orthopedic and neuroscience spine surgeons during 2020 and further maturation of spine surgeon practices.

The BJI Pivot Plan: Re-open for elective surgeries; establish and maintain a COVID-safe orthopedic hospital

In anticipation of the re-opening for elective surgeries in early May 2020, the leadership team established several safety processes to instill a high level of confidence among our surgeons, staff and patients. These include:

• Identification of a BJI infection prevention (IP) point person, who worked closely with the IP team to meet and exceed recommended standards.
• Daily rounding and data collection on COVID symptom screening, mask compliance, social distancing and hand hygiene. Gaps in compliance were addressed in real-time to avoid recurrence.
• Signage and floor markings installed as visual cues for compliance with required standards.
• Established and improved pre-operative COVID testing completion, resulting in very low day of surgery cancellation rates.
• Maintained a COVID-safe orthopedic hospital with no elective surgery patients testing positive for COVID.
• Developed a post-operative questionnaire for all elective patients to assess their perception of BJI as a COVID-safe environment. Weekly results were reviewed by BJI leaders and shared with clinical staff as a continuous improvement process.
• Continued improvement on quality metrics, including Press Ganey patient experience scores.
• Hand hygiene audits resulted in 99- to 100-percent compliance with gaps addressed in real-time.
**Bone & Joint Institute**

**Improved Quality and Safety**

- BJI sterile processing services colleagues initiated a comprehensive safety and efficiency process to reduce immediate use steam sterilization and improve overall quality of instrumentation sets for surgical procedures.

- Peri-operative services staff and leadership established several process improvements driven by the clinical team such as:
  - Best practices for surgical specimen handling.
  - Trochanteric Fixation Nail – fracture types for this procedure, instrumentation and potential positioning complications.
  - How to succeed in the world of arthroscopy.
  - Surgical skin prep and surgical site infection reduction in orthopedic surgery.
  - Stress management in the operating room and beyond.

- In 2020, there was an added focus on reducing the use of blood products for all patients.

- Elective orthopedic surgery patients are optimized in the PREPARE Center, a special program that educates patients so they know what to expect at every step of treatment.
**Bone & Joint Institute**

Deep Surgical Site Infection Reduction

![Elective Total Joint Arthroplasty Surgical Site Infection Rate Graph](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>SSI Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>0.92%</td>
</tr>
<tr>
<td>2015</td>
<td>0.90%</td>
</tr>
<tr>
<td>2016</td>
<td>0.56%</td>
</tr>
<tr>
<td>2017</td>
<td>0.50%</td>
</tr>
<tr>
<td>2018</td>
<td>0.40%</td>
</tr>
<tr>
<td>2019</td>
<td>0.29%</td>
</tr>
<tr>
<td>2020</td>
<td>0.05%</td>
</tr>
</tbody>
</table>

Reduced Utilization of Skilled Nursing Facilities and Rehabilitation Centers

![Elective Total Joint Arthroplasty Transition to SNF Rate Graph](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>SNF Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>43.09%</td>
</tr>
<tr>
<td>2015</td>
<td>33.49%</td>
</tr>
<tr>
<td>2016</td>
<td>22.17%</td>
</tr>
<tr>
<td>2017</td>
<td>23.25%</td>
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<tr>
<td>2018</td>
<td>17.14%</td>
</tr>
<tr>
<td>2019</td>
<td>13.15%</td>
</tr>
<tr>
<td>2020</td>
<td>7.63%</td>
</tr>
</tbody>
</table>
Reduction of 30-day All-Cause Readmissions

Designations of Excellence

- Joint Commission Certificate of Distinction for Hip & Knee Replacement
- Joint Commission Certificate of Distinction for Shoulder Replacement
- Joint Commission Certificate of Distinction for Spine Surgery
- BCBS+ Blue Distinction Centers for Hip & Knee Replacement
- BCBS+ Blue Distinction Centers for Spine
- Aetna Institutes of Quality (IOQ) for Hip & Knee Surgery
- Aetna Institutes of Quality for (IOQ) Spine Surgery
The Connecticut Orthopaedic Institute (COI) at MidState Medical Center launched in April 2017 and expanded to St. Vincent’s Medical Center in 2021. COI is a physician-driven institute that operates with best practice programmatic guidelines developed through a multidisciplinary team approach and evidence-based research. COI focuses on quality, safety, experience (provider and patient), and operational efficiency.

Pivoting from COVID

In collaboration with Hartford HealthCare system leaders and experts, COI resumed carefully selected “time sensitive and essential” orthopedic procedures in May 2020 at MidState Medical Center, the first location within Hartford HealthCare to do so. To do this, leadership developed a pivot plan with detail on how COI could maintain operations in the midst of the pandemic and provide safe care across the continuum.

The pivot plan revolved around four domains — safety, space, staff and supplies — and was implemented across three phases of surgical care — pre-operative care, inpatient care and post-operative discharge care. Our timeline shows the countermeasures that were put in place as part of the pivot plan.

Phase I: Pre-operative care (Patient Safety and Awareness)

- Virtual pre-operative education classes and webinars for community outreach.
- Utilization of the pre-admission testing center to facilitate COVID-19 testing and minimize patient exposure pre-operatively.
- Performance of pre-operative risk assessment evaluations according to system-wide criteria.
- Enhanced marketing and patient outreach efforts around safety precautions.
Phase II: Inpatient care *(Infection Prevention)*

- Screening staff and patients at the front entrance and limited visitation at the peak of the pandemic.
- Revising PPE requirements.
- Post-operative elements including the use of staggered patient bays in PACU, six-foot social distancing and increasing cleaning of public space.
- Increased videoconferencing and physician-patient virtual rounding through the use of in-room tablet devices.

Phase III: Post-operative discharge care *(Patient Follow-up)*

- Post-discharge instructions regarding COVID-19 in the after-visit summary.
- Increased post-operative touchpoints between navigators and patients.
- Case management and staff began to receive weekly updates on the COVID-19 status of local skilled nursing facilities.
- Identification of COVID diagnoses within 14 days of surgery.

Operational Metrics and Achievements

- Total surgical case load and operating room (OR) turn-around times were comparable pre- and post-pivot plan implementation.
- Neither COI site experienced delays in surgeries due to missing COVID-19 test results.
- When elective surgeries resumed in May, 70 percent of COI patients used the pre-admission testing center.
- Marketing and patient outreach efforts communicated all COVID-19 precautions to instill confidence in our patients that we were prepared to provide safe care across the continuum of care.
- Despite the surge of new COVID-19 cases in September 2020, the COI case load remained consistent.

<table>
<thead>
<tr>
<th>MidState Medical Center</th>
<th>Metric</th>
<th>Baseline</th>
<th>May 2020</th>
<th>June 2020</th>
<th>July 2020</th>
<th>August 2020</th>
<th>September 2020</th>
<th>October 2020</th>
<th>November 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total case load</td>
<td></td>
<td>372</td>
<td>295</td>
<td>415</td>
<td>383</td>
<td>331</td>
<td>351</td>
<td>396</td>
<td>359</td>
</tr>
<tr>
<td>Average OR turn-around</td>
<td>time (minutes)</td>
<td>42</td>
<td>43</td>
<td>40</td>
<td>42</td>
<td>38</td>
<td>39</td>
<td>37</td>
<td>38</td>
</tr>
<tr>
<td>Total PACU holds</td>
<td></td>
<td>12</td>
<td>19</td>
<td>2</td>
<td>11</td>
<td>5</td>
<td>7</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Delays due to missing</td>
<td>COVID-19 test results</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total case load</td>
<td></td>
<td>197</td>
<td>92</td>
<td>251</td>
<td>274</td>
<td>254</td>
<td>264</td>
<td>293</td>
<td>272</td>
</tr>
<tr>
<td>Average OR turn-around</td>
<td>time (minutes)</td>
<td>50</td>
<td>N/A</td>
<td>30</td>
<td>46</td>
<td>50</td>
<td>52</td>
<td>47</td>
<td>52</td>
</tr>
<tr>
<td>Total PACU holds</td>
<td></td>
<td>15</td>
<td>5</td>
<td>19</td>
<td>17</td>
<td>20</td>
<td>33</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>Delays due to missing</td>
<td>COVID-19 test results</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: St. Vincent’s Medical Center resumed surgeries on May 18, 2020. With the smaller case load, it was not necessary to use the same OR for back-to-back surgeries, therefore turn-around time for that period was not applicable.
Operational Achievements

COI at MidState Medical Center

- First location within Hartford HealthCare to resume elective surgery post-COVID.
- More than 30 physician-led community outreach events scheduled.
- Surgical volume: 3,963 total cases; 1,906 total joints, 1,218 general ortho, 631 spine, 208 podiatry.
- 13 percent same-day total hip and knee discharge rate.
- Launched post-op physician tele-rounding.
- Launched the cloud-based MedTel platform for surgical scheduling.
- 98.9 percent of patients were likely to recommend.
- New construction included: three operating rooms, sterile processing department, physician and staff locker rooms.
- Launched sterile processing microsystem (SPM) in the sterile processing department.
- Developed dedicated hospitalist program for medical co-management.

COI at St. Vincent's Medical Center

- Expedited launch of pre-admission center to improve access for medical clearances and pre-op testing.
- Isolated, COVID-safe designated orthopedic unit; zero COVID diagnoses post-op within two weeks of surgery in FY20.
- Construction of new, dedicated orthopedic unit, galleria for patient arrivals and sterile processing underway with expected 2021 completions.
- Same day discharge rate for total joint replacement increased from 3 to 13 percent.
- Overall surgical volume increase by 34 percent.
- Discharge to home rate improved 13 percent from FY19 to FY20.
- Hip fracture ED to OR time continued to improve year-over-year, with a reduction of almost three hours, optimizing patients for improved outcomes.
- Anesthesia department created a new research team; their first study on the use of erector spinae blocks for spinal fusion cases was accepted for publication and presented at multiple conferences.
- Post-operative narcotic usage decreased by 85 percent, reducing length of stay, minimizing adverse effects and potential addiction from opioid usage and increasing patient satisfaction.
Connecticut Orthopaedic Institute

St. Vincent’s Medical Center COI Case Volume

<table>
<thead>
<tr>
<th></th>
<th>CY19</th>
<th>CY20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spine Cases</td>
<td>479</td>
<td>620</td>
</tr>
<tr>
<td>Total Joint Cases</td>
<td>587</td>
<td>787</td>
</tr>
<tr>
<td>COI Case Volume</td>
<td>1897</td>
<td>2556</td>
</tr>
</tbody>
</table>
Connecticut Orthopaedic Institute

Quality Metrics

- At both sites, the rate of same-day discharge increased with the resumption of elective surgeries in May 2020. These numbers indicate that our orthopedic providers were cognizant of length of stay and diligent with efficient discharge after clinical criteria were met to reduce the risk of in-hospital exposure to COVID-19.
- Average rates of 30-day readmissions were comparable pre- and post-implementation of the pivot plan. Data illustrates that we maintained a high level of care, as reflected in these comparable rates.
- No patients experienced deep vein thrombosis (DVT) or pulmonary embolism (PE) despite the fact that other groups reported an increased incidence of venous thromboembolism in patients undergoing elective arthroplasty during the pandemic.
- Most illustrative of the successful implementation of precautions was the 0-percent rate of post-operative COVID-19 diagnoses collected via telephone consultation 23 days after patient discharge for FY20.

<table>
<thead>
<tr>
<th>MidState Medical Center</th>
<th>Metric</th>
<th>Baseline</th>
<th>May 2020</th>
<th>June 2020</th>
<th>July 2020</th>
<th>August 2020</th>
<th>September 2020</th>
<th>October 2020</th>
<th>November 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of patients requiring follow-up call after surgery</td>
<td>25.0</td>
<td>23.0</td>
<td>24.0</td>
<td>24.0</td>
<td>27.0</td>
<td>30.0</td>
<td>36.0</td>
<td>30.0</td>
<td></td>
</tr>
<tr>
<td>% of patients readmitted within 30 days of surgery (total joints)</td>
<td>1.43</td>
<td>1.85</td>
<td>1.06</td>
<td>1.35</td>
<td>1.40</td>
<td>0.67</td>
<td>1.19</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td>% of patients discharged on the same day (total joints)</td>
<td>8.0</td>
<td>27.0</td>
<td>15.0</td>
<td>16.0</td>
<td>11.0</td>
<td>12.0</td>
<td>14.0</td>
<td>22.0</td>
<td></td>
</tr>
<tr>
<td>Number of patients with COVID-19 diagnosis within 23 days after surgery</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>% patients with post-operative DVT/PE (hips and knees)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
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<table>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>% of patients readmitted within 30 days of surgery (total joints)</td>
<td>2.73</td>
<td>0.0</td>
<td>0.0</td>
<td>3.0</td>
<td>5.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>% of patients discharged on the same day (total joints)</td>
<td>3.0</td>
<td>11.0</td>
<td>13.0</td>
<td>6.0</td>
<td>11.0</td>
<td>15.0</td>
<td>13.0</td>
<td>11.0</td>
<td></td>
</tr>
<tr>
<td>Number of patients with COVID-19 diagnosis within 23 days after surgery</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>% patients with post-operative DVT/PE (hips and knees)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
</tbody>
</table>

Note: St. Vincent’s Medical Center joined the COI in October 2019. SVMC uses a different platform to track post-operative navigator calls and therefore, we only have access to data on patients needing a post-operative follow-up call from MidState Medical Center.
Connecticut Orthopaedic Institute

Quality Program Distinctions and Achievements

COI at MidState Medical Center
- BCBS+ Blue Distinction® for Knee and Hip Replacement Surgery.
- BCBS+ Blue Distinction® for Spine Surgery.
- Aetna Institutes of Quality® (IOQ) Orthopedic Surgery Network — Total Joint Replacement and Spine Surgery designation.
- Joint Commission Advanced Certification for Total Hip and Knee Replacement.
- National Association Orthopaedic Nursing Orthopaedic Nursing Excellence Award focused on nursing leadership, professional development, commitment to excellence, and knowledge and competency (inaugural award).
- Fall 2020 award winner in the Premier Bundled Payment Collaborative. MidState Medical Center recognized on September 17, 2020 for success in two categories: “Positive Savings and Excellent Quality in CJR Performance Year 4” and “Most Improved in CJR Performance Year 4.”
- Comprehensive Care for Joint Replacement (CJR) model PY 4 success: 18.4 quality score.

The COI maintained continued success in the CJR model with reduced readmissions/complications leading to net payment reconciliation to the hospital and an improved quality score. The goal of the model is to promote quality and financial accountability for care within the 90-day episode of care. The model began on April 1, 2016 and will run through September 30, 2021 with a possibility of a three-year extension.

![CJR Composite Quality Score(CQS)](image-url)
Connecticut Orthopaedic Institute

COI at St. Vincent’s Medical Center

- Reorganized operational and programmatic initiatives in the development of the COI at St. Vincent’s Medical Center with an official ribbon cutting in spring 2021.
- Joint Commission Core Certification as a Center of Excellence in Hip and Knee Replacement; applied for and awaiting visit for Advanced Certification.
- Aetna Institutes of Quality® (IOQ) Orthopedic Surgery Network Spine Surgery designation
- Regional anesthesia fellowship established to launch in 2021, centered around COI patients.

Our metrics and the pivot plan demonstrate the successful resumption of surgery post-COVID in terms of both efficiency and patient safety. This was a COI team collaboration successfully implemented at two different hospitals offering elective orthopedic surgeries to a varied patient population with a recapture rate of 80 to 90 percent of cancelled cases.

### Total Joints Discharged Home

<table>
<thead>
<tr>
<th>FY 2019</th>
<th>FYTD 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>80.47%</td>
<td>93.90%</td>
</tr>
</tbody>
</table>

### Hip Fracture Average ED to OR Time

<table>
<thead>
<tr>
<th>FY 2018</th>
<th>FY 2019</th>
<th>FY 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>30:00:00</td>
<td>28:48:00</td>
<td>27:36:00</td>
</tr>
</tbody>
</table>
Cancer Institute

Cancer and COVID-19

At the onset of the pandemic, there were heightened concerns about how COVID-19 would impact cancer patients. Our Cancer Institute Disease Management Teams (DMT) reviewed the limited data available along with guidance from national/international organizations to address difficult questions — could some treatments be interrupted or delayed without compromising outcomes? Were there alternative treatments that could be considered that would reduce patient and staff risk of exposure, such as shifts from inpatient to outpatient care or substituting intravenous therapies with oral therapies?

The cancer-specific DMTs (breast, gastrointestinal, thoracic, etc.) developed guidelines that were implemented across the Cancer Institute to provide safe and sometimes creative care to maximize the health and well-being of our patients. Additionally, individual patient treatment plans were reviewed at the existing multidisciplinary cancer conferences (also known as tumor boards), which moved to virtual conferences where clinicians could discuss the optimal way to proceed with care. In fact, many cancer conference attendees found the online meetings more convenient since they saved travel time, improved visibility of radiology and pathology images, and allowed more people to attend. As a result, virtual attendance will be a permanent option for participation in cancer conferences post-pandemic.

Although all our sites of care remained open and, in some cases, offered extended hours, virtual visits with patients proved to be tremendously helpful, especially for routine follow-up appointments, support services discussions and care of patients who traditionally have a more difficult time getting around, such as our geriatric population. Virtual visits reduced the number of people patients were exposed to, ensured the inclusion of family members since visitor restrictions were in place at all clinical sites, and reduced the utilization of PPE which was in short supply at the beginning of the pandemic. The experience with and benefits realized from virtual visits motivated us to launch a quality improvement project to see how virtual medicine post-pandemic could enhance hospice care by creating closer and more frequent collaboration between the patient, caregiver, oncology team and the hospice care team.
The Hartford HealthCare Cancer Institute was an early participant in the COVID-19 and Cancer Consortium (CCC-19) registry to collect data about patients with cancer who were diagnosed with COVID-19. The CCC-19 registry has so far led to two publications that list Hartford HealthCare authors, with several other papers and abstracts submitted or in preparation for submission. While there are many signs of progress in the fight against COVID-19, we must continue to learn from our experience and gain a better understanding of the long-term impact of the virus on cancer patients.

**Quality and Outcomes Measures**

Cancer mortality rates are an important tool for tracking our progress in the fight against cancer. The risk-adjusted observed to expected methodology (O/E) illustrated in the graph below takes into account many patient-specific factors such as age, other chronic conditions and stage of disease. The observed value is what actually happened and the expected value is the calculation including the many factors. In this case, lower is better. A ratio of less than one means the outcomes were better than expected. In order to make this comparison, Hartford HealthCare uses data from Premier, the nation’s largest healthcare alliance. The Cancer Institute’s efforts to reduce mortality are driving performance in a positive direction (down), despite the impact of COVID-19.

**Hartford HealthCare Cancer Institute Overall Inpatient Mortality Ratio**
**Cancer Institute**

Consistent with Hartford HealthCare’s goal to be number one in patient experience in the Northeast by 2023 — #123 — the Cancer Institute team closely reviews and shares survey results with our caregivers and other colleagues to identify opportunities to improve the delivery of care and overall experience of patients. Results from our Press Ganey surveys show that our medical oncology practices are in the top quartile for likelihood to recommend. We monitor patient experience in all our sites, including our infusion and radiation oncology centers which perform to similar levels.

### Hartford HealthCare Medical Group Medical Oncology - Recommend Practice Top Box

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<td>Actual</td>
<td>89.9</td>
<td>96.7</td>
<td>88.7</td>
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<td>94.8</td>
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<td>Prior Year</td>
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<td>90.8</td>
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<td>85.4</td>
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<tr>
<td>Natl Rank</td>
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<td>99</td>
<td>91</td>
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<td>78</td>
<td>93</td>
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### Process Measures: Commission on Cancer Rapid Cancer Reporting System

The Rapid Cancer Reporting System (RCRS) is a quality data platform from the Commission on Cancer’s (CoC) National Cancer Database (NCDB). RCRS is a web-based data collection and reporting system that advances hospital-based quality improvement by providing measures of high-quality and coordinated patient care. The tables on page 78 illustrate the performance of three Hartford HealthCare hospitals for 2018 and 2019. Nearly all of the measures met or exceeded the established performance rates.
### Backus Hospital

<table>
<thead>
<tr>
<th>Metric</th>
<th>2019 Estimated Performance Rate</th>
<th>2018 Performance Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiation therapy is administered within 1 year (365 days) of diagnosis for women under age 70 receiving breast-conserving surgery for breast cancer</td>
<td>98.46% [95.47%-100.00%] 90%</td>
<td>97.87% [93.75%-100.00%] 90%</td>
</tr>
<tr>
<td>Tamoxifen or third-generation aromatase inhibitor is recommended or administered within 1 year (365 days) of diagnosis for women with AJCC T1cN0M0, or stage IB – III hormone receptor-positive breast cancer</td>
<td>96.25% [92.09%-100.00%] 90%</td>
<td>95.16% [89.82%-100.00%] 90%</td>
</tr>
<tr>
<td>Image or palpation-guided needle biopsy to the primary site is performed to establish diagnosis of breast cancer</td>
<td>97.73% [94.61%-100.00%] 80%</td>
<td>95.83% [91.22%-100.00%] 80%</td>
</tr>
<tr>
<td>At least 12 regional lymph nodes are removed and pathologically examined for resected colon cancer</td>
<td>85.00% [69.35%-100.00%] 85%</td>
<td>95.24% [86.13%-100.00%] 85%</td>
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</table>

### Hartford Hospital

<table>
<thead>
<tr>
<th>Metric</th>
<th>2019 Estimated Performance Rate</th>
<th>2018 Performance Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiation therapy is administered within 1 year (365 days) of diagnosis for women under age 70 receiving breast-conserving surgery for breast cancer</td>
<td>95.17% [91.68%-98.66%] 90%</td>
<td>94.62% [90.74%-98.50%] 90%</td>
</tr>
<tr>
<td>Tamoxifen or third-generation aromatase inhibitor is recommended or administered within 1 year (365 days) of diagnosis for women with AJCC T1cN0M0, or stage IB – III hormone receptor-positive breast cancer</td>
<td>97.59% [95.26%-99.92%] 90%</td>
<td>90.28% [85.44%-95.12%] 90%</td>
</tr>
<tr>
<td>Image or palpation-guided needle biopsy to the primary site is performed to establish diagnosis of breast cancer</td>
<td>83.45% [77.28%-94.63%] 80%</td>
<td>83.13% [75.08%-91.19%] 80%</td>
</tr>
<tr>
<td>At least 12 regional lymph nodes are removed and pathologically examined for resected colon cancer</td>
<td>87.78% [81.01%-94.54%] 85%</td>
<td>94.52% [89.30%-99.74%] 85%</td>
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</tbody>
</table>

### The Hospital of Central Connecticut

<table>
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<tr>
<th>Metric</th>
<th>2019 Estimated Performance Rate</th>
<th>2018 Performance Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiation therapy is administered within 1 year (365 days) of diagnosis for women under age 70 receiving breast-conserving surgery for breast cancer</td>
<td>85.94% [77.43%-94.45%] 90%</td>
<td>93.44% [87.23%-99.65%] 90%</td>
</tr>
<tr>
<td>Tamoxifen or third-generation aromatase inhibitor is recommended or administered within 1 year (365 days) of diagnosis for women with AJCC T1cN0M0, or stage IB – III hormone receptor-positive breast cancer</td>
<td>93.65% [87.63%-99.67%] 90%</td>
<td>87.32% [79.58%-95.06%] 90%</td>
</tr>
<tr>
<td>Image or palpation-guided needle biopsy to the primary site is performed to establish diagnosis of breast cancer</td>
<td>93.02% [88.63%-97.42%] 80%</td>
<td>93.28% [88.78%-97.78%] 80%</td>
</tr>
<tr>
<td>At least 12 regional lymph nodes are removed and pathologically examined for resected colon cancer</td>
<td>96.97% [91.12%-100.00%] 85%</td>
<td>89.66% [78.57%-100.00%] 85%</td>
</tr>
</tbody>
</table>

*Note: In each square, the top number is our performance, the middle row is the confidence interval, and the bottom number is the CoC established performance rate.*
Throughout the past 13 months, the healthcare industry has contended with the COVID-19 crisis that has brought unprecedented challenges. Since the start of the pandemic, Heart & Vascular Institute (HVI) physicians, advanced practice providers, nurses and other healthcare professionals have worked together to provide the highest level of patient care to some of the sickest COVID-19 patients.

HVI physicians brought their expertise to Hartford HealthCare’s COVID-19 Recovery Center, caring for patients with prolonged physical effects from the virus and contributing to the development of an international clinical data registry of COVID-19 patients, providing vital data that allowed clinicians to make more informed decisions.

COVID-19 transformed digital health services and technologies into an integral part of care delivery with unprecedented levels of consumer interest and clinical adoption. Since the start of the pandemic, HVI physicians leveraged the use of digital technologies to maintain patient-provider connections and access to cardiovascular care without face-to-face visits, completing more than 15,000 virtual health visits to date.

In addition to virtual health visits, HVI physicians utilized advanced technologies to manage the cardiac care of patients from the comfort of their homes. Pulmonary artery sensor monitoring (CardioMems) is one of the newer tools in outpatient heart failure management. The sensor is implanted in the pulmonary artery in an outpatient setting and transmits clinical data points to clinicians on a daily basis. This technology has been shown to decrease hospital readmissions related to cardiac heart failure and contribute to overall improvement in quality of life for patients. Hartford HealthCare has developed a state-wide, comprehensive CardioMems program that provides heart failure patients access to this outpatient treatment option for managing heart failure.

To learn more about treating patients with severe cardiopulmonary failure due to COVID-19, HVI advanced heart failure physicians participated in the COVID-19 Critical Care Consortium — a partnership between the Extracorporeal Life Support Organization (ELSO), research groups, Hartford HealthCare and several other major healthcare systems. Hartford Hospital was the first in Connecticut and one of the first in the Northeast to join the Consortium. Throughout the pandemic, Consortium members met weekly to discuss regional COVID-19 trends and develop an international clinical data registry of COVID-19 patients. Access to this registry has provided HVI teams access to real-time data regarding the treatment of COVID-19 and continues to drive the Institute’s clinical pathways for navigating the pandemic.
**Heart & Vascular Institute**

**Extracorporeal membrane oxygenation (ECMO)**

Extracorporeal membrane oxygenation (ECMO) is a life-saving therapy used by some of the most advanced healthcare systems across the world. Hartford Hospital has been offering ECMO to its most critical patients since 2013. Patients experiencing life-threatening heart or lung failure, or a combination of both, can be placed on ECMO to keep them alive long enough to either recover from the source of their underlying disease or receive other advanced therapies such as a heart or lung transplant or durable left ventricular assist device (LVAD). This therapy is provided by a team of highly-trained physicians and clinicians and is only available at very specialized hospitals.

Hartford Hospital’s ECMO program continues to grow every year. In 2020, the program saw its highest number of cases to date, largely due to the pandemic. COVID-19 patients brought a very unique set of clinical challenges, and ECMO offered the sickest of these patients the best opportunity for survival. As one of the only providers of mobile ECMO services in the Northeast, Hartford Hospital’s “ECMO on the GO” program regularly offers ECMO services to regional community hospitals that do not offer this life-saving therapy. The ECMO on the GO team evaluates a patient’s candidacy and, if they meet the criteria for ECMO, works with LIFE STAR Air Medical Services to coordinate their care. The team flies to the hospital where the patient is receiving treatment, places the patient on ECMO, and transports them back to Hartford Hospital for the remainder of their care. In 2020 alone, Hartford Hospital received more than 200 requests for ECMO on the GO from across New England.

![ECMO Cases (Runs) vs ECMO on the Go](image)

The Extracorporeal Life Support Organization (ELSO) is an internationally-recognized consortium of ECMO centers dedicated to the improvement and innovation of ECMO therapies. ELSO houses a clinical data registry of all of their registered centers to foster research and improve patient outcomes across the globe. In 2019, Hartford Hospital became an ELSO center. The following year, the hospital was awarded Silver Award Status — the first adult ECMO center in Connecticut to achieve this status.
Heart & Vascular Institute

Heart Transplant

Hartford Hospital completed 28 heart transplants in calendar year 2020 — a record for the hospital, surpassing the 21 transplants completed in calendar year 2019 and the five-year historical average of 15 from 2014 to 2019. The latest report released by the Scientific Registry of Transplant Recipients in January 2021 highlights the Hartford Hospital heart transplant program’s performance, reporting key clinical outcomes. This report found Hartford Hospital’s one-year survival rate after heart transplantation to be 94.7 percent, which far exceeds the U.S. national average of 91.6 percent. Additionally, the report documented that the hospital’s organ acceptance ratio is 2.38 — one of the highest in the U.S. — identifying Hartford Hospital as one of the most progressive programs in the country with regards to accepting organs offered for heart transplantation. The organ acceptance ratio is based on the observed-versus-expected acceptances when a donor heart is offered to patients who are wait-listed at a specific transplant center. Accordingly, Hartford Hospital’s ratio of heart transplants performed compared to patients added to the waiting list in 2020 was 1.2, the highest in the U.S. This exemplifies the program’s efficiency and ability to deliver heart transplantation to those patients who are added to its waiting list, demonstrating the Institute’s commitment to increasing access to heart transplantation for those patients who suffer from advanced heart failure.

Over the past two years, heart transplant programs nationwide have adapted to a new allocation policy, introduced in 2018, which classifies patients across six categories. The patients who require the highest level of care are designated with a “status 1 to 3.” These patients are hospitalized and some are placed on temporary mechanical circulatory support while they await heart transplantation. Hartford Hospital’s program has dealt admirably with the need to provide heart transplantation to this more complex and sicker cohort of patients. In 2020, the hospital completed four heart transplants for “status 1” patients, representing 14.2 percent of completed transplants, exceeding the percentage of status 1 patients transplanted nationally (7.4 percent) and regionally (13.9 percent). Hartford Hospital also completed seven heart transplants for less acute “status 6” patients who were not hospitalized but awaiting heart transplantation while living at home. Due to a perceived lack of available donor organs, only 3 percent of heart transplants in the U.S. are performed on status 6 patients. In contrast, 25 percent of completed transplants at Hartford Hospital in 2020 were for status 6 patients. This highlights the uniqueness of the program, demonstrating that all patients who are awaiting heart transplantation at Hartford Hospital, irrespective of the urgency, have unparalleled access to donor organs and benefit from the program’s excellent outcomes.

Cardiac Surgery

The Mitral Valve Reference Center

The Mitral Foundation and American Heart Association have recently partnered on a new initiative to promote centers of excellence for mitral valve repair. Mitral valve repair is considered a niche specialty in cardiac surgery, and the likelihood of repair depends on the skill and experience of the surgeon.
Heart & Vascular Institute

Compared to replacement, mitral valve repair is known to provide lower post-operative morbidity and mortality, better left ventricular function, avoidance of anti-coagulation, lower risk of endocarditis, and a lower likelihood of future surgery.

The Mitral Valve Repair Reference Center Award identifies the nation’s best hospitals and surgeons for mitral valve repair surgery based on objective performance measures. This special recognition is achieved by demonstrating a record of superior clinical outcomes, as well as an ongoing commitment to reporting and measuring quality and performance metrics specific to mitral valve repair. Hartford Hospital’s application was recently approved, making it only the 10th center recognized in the U.S. and the first in New England.

In addition to the highly successful repair rate for mitral surgery, Hartford Hospital’s team has had extensive experience with the less invasive mini thoracotomy incision, which avoids sternotomy and promotes rapid recovery. The team’s expertise in minimally-invasive mitral surgery provides added benefits to Hartford Hospital patients compared to reference centers in the region.

The Society of Thoracic Surgeons Recognizes Hartford Hospital

Twice a year, the Society of Thoracic Surgeons (STS) provides cardiac surgery performance ratings of hospitals in the United States. The rating applies to five categories, and Hartford Hospital has achieved the maximum “3 STAR” rating in four. Achievement of the 3 STAR rating for any one of these categories places a hospital in the top performing 4 to 9 percent of all hospitals participating in the STS National Database. By attaining the highest STS rankings in multiple surgical categories, Hartford Hospital is placed among the most elite cardiac surgery centers in the country.

STS Star Ratings for Hartford Hospital (2016-2020)

<table>
<thead>
<tr>
<th></th>
<th>Coronal Artery Bypass</th>
<th>Coronal Artery Bypass with Aortic Valve Replacement</th>
<th>Aortic Valve Replacement</th>
<th>Mitral Valve Repair &amp; Replacement</th>
<th>Mitral Valve Repair &amp; Replacement with Coronary Artery Bypass</th>
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<td>2016</td>
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Heart & Vascular Institute

Following establishment of the Heart & Vascular Institute in 2016, there has been a concerted effort by the cardiac surgery department — led by Sabet Hashim, MD — to improve patient outcomes and safety across all aspects of cardiac surgery at Hartford Hospital. Procedural outcomes have been positively affected by a multi-disciplinary approach to coordinate and optimize pre-operative, intra-operative and post-operative decision-making and patient care. This process has resulted in a sustained growth of multiple 3 STAR ratings over the past four years as depicted in the chart on the next page.

Interventional Cardiology

Same-Day Transition of Patients Following Interventional Procedures

Previously, all patients who underwent cardiac interventional procedures remained in the hospital overnight for observation. In the medical literature, there is considerable data supporting that these patients can be safely transitioned home on the day of their procedure. Over the past four years, there has been a focus on same-day transitions for this patient population at Hartford Hospital and St. Vincent’s Medical Center. Protocols were developed to ensure that patients met specific transition criteria and had adequate home support along with appropriate follow-up. The patients were also provided contact information should they have any difficulty or questions post-transition. This has several benefits including improved patient satisfaction, as most patients feel more comfortable recovering at home.

The following chart illustrates the percentage increase in patients over the past four fiscal years who have been transitioned on the same day following percutaneous coronary intervention, a cardiac interventional procedure. From FY2017 to FY2020, the percentage of same-day transitions has increased from 5.8 to 34.8 percent at Hartford Hospital and from 13.8 to 74.9 percent at St. Vincent’s Medical Center.
Streamlined Care of Acute Myocardial Infarction Patients

Historically, it was standard practice at Hartford Hospital to admit all patients with ST-elevation myocardial infarctions (STEMIs) to the Cardiac Intensive Care Unit. Based on a growing body of evidence in the medical literature, a new protocol has been developed to assess patients for inclusion in a low-risk pathway and coordinate their admission to the step-down floor.

At Hartford Hospital, a multidisciplinary team was developed with representation from the Cardiac Intensive Care Unit staff, Cardiac Step-Down Unit staff, interventional cardiology staff, and Care Logistics Center. Using an evidence-based approach, a protocol was developed to assess patients for inclusion in a low-risk pathway and coordinate their admission to the step-down floor. This has resulted in a reduction in length of stay from 3.5 days in 2018 to 1.9 days in 2020. The goal is to further reduce this length of stay to 1.6 days.

Structural Heart Program: One of the Largest in New England

The structural heart programs at Hartford Hospital and St. Vincent’s Medical Center offer minimally-invasive solutions for disease within the heart’s valves, congenital defects or other cardiac structures. Both programs offer therapies including transcatheter aortic valve replacement (TAVR), transcatheter mitral valve replacement (TMVR), MitraClip, paravalvular leak closure, patent foramen ovale closure, atrial septal defect closure, and left atrial appendage occlusion utilizing the Watchman device.

Aortic stenosis is one of the most serious cardiac valve disorders since patients who develop symptoms from severe aortic valve narrowing have approximately a 50-percent chance of dying within two years and an 80-percent chance of dying within five years if their aortic valve is not replaced. The only definitive treatment of severe, symptomatic aortic stenosis is to replace the aortic valve. There are currently two ways to replace the aortic valve, either with conventional open-heart surgery with surgical aortic valve replacement (SAVR) or with TAVR. TAVR is a less invasive technique involving implantation of a new aortic valve using catheters that are introduced through a peripheral artery (i.e., femoral artery in the groin, subclavian artery in the chest, carotid artery in the neck).

Since the approval of TAVR as an alternative to open-heart surgery in 2011 by the U.S. Food and Drug Administration (FDA), Hartford Hospital has performed more than 1,600 TAVR procedures in patients who have severe symptomatic aortic stenosis, making it the largest TAVR center in the State of Connecticut and one of the largest in New England. St. Vincent’s addition to Hartford HealthCare expands access to this life-saving procedure for patients across Connecticut and surrounding states.

Hartford Hospital physicians have served as the principal investigators for numerous multi-center national trials documenting the safety and efficacy of TAVR, which has led to FDA approval for TAVR use in extreme-risk, high-risk, intermediate-risk and, most recently, low-risk patients. To date, successful valve replacement has been performed with both balloon-expandable and self-expanding TAVR valves, utilizing transfemoral, subclavian, carotid, direct aortic and transapical approaches.
Hartford Hospital structural heart physicians have been leaders in establishing the routine use of conscious sedation, rather than general anesthesia, as the predominant TAVR technique used in patients with adequate transfemoral anatomy. Equally important, they have pioneered routine use of the transcarotid approach as an alternative-access TAVR procedure, and Hartford Hospital has been designated a regional teaching center for this technique. Finally, use of cerebral protection with the sentinel device to avoid procedure-related strokes and percutaneous closure of paravalvular leaks are two newer procedures currently being performed.

Current clinical outcomes as published by the STS/American College of Cardiology Transcatheter Valve Therapy Registry rank Hartford Hospital among the top performing hospitals in the U.S., earning a 3 STAR designation for registry reporting years 2017 to 2019. Hartford Hospital has also been selected to participate in several pivotal research trials surrounding new transcatheter mitral valve devices.

Hartford HealthCare completed a total of 1,753 cardiac surgery and TAVR/TMVR cases in FY20.

Hartford HealthCare completed a total of 2,371 electrophysiology cases in FY20.
Despite the impact of COVID-19, both Hartford Hospital and St. Vincent's Structural Heart programs were able to maintain excellent clinical outcomes with both programs focused on transitioning patients earlier in order to reduce patient exposure risk.

**Vascular surgery**

The Division of Vascular and Endovascular Surgery exemplifies Hartford HealthCare’s values of integrity, caring, excellence and safety. The division provides the most advanced and integrated vascular care to our community with emphasis on treating the patient as a whole rather than a specific disease process. This demands not only exceptional procedural outcomes but also active partnership with patients and families to ensure lifestyle modifications and long-term follow up. Our team-based and patient-centered approach to patient care is reflected in our long-term patient follow up rates approaching 90 percent, which are far superior to the national benchmark of about 70 percent. Despite the COVID-19 pandemic, the vascular division successfully launched multi-specialty collaborative limb preservation programs in Hartford HealthCare’s Central and East regions.
Aortic
Aortic diseases are inherently complex and management of which can be associated with significant morbidity and mortality. The Center for Comprehensive Aortic Care at Hartford HealthCare provides patient-centered, cutting-edge care to patients with aortic aneurysms and dissections in a multi-disciplinary, team-based fashion. Our focus is on healing the patient from this life-threatening condition while, at the same time, preserving their quality of life. Our vascular and cardiac surgeons collaborate to provide the full complement of both open and endovascular treatment to patients with exceptional outcomes. At Hartford Hospital, we had 0 percent in-hospital mortality following elective open aortic aneurysm repair in 2020, which exceeds national benchmarks. Our portfolio of clinical trials in novel stent grafts, including fenestrated and branched graft technology, allows us to be the only center in Connecticut that offers endovascular and open repair for the entire spectrum of aortic disease.

Cerebrovascular
Almost 800,000 people suffer a stroke each year. More than 140,000 die and many survivors face serious long-term disability. Carotid stenosis is the leading cause of stroke but it is also preventable. The vascular surgeons at Hartford HealthCare play a vital role in stroke prevention by diagnosing and managing carotid artery stenosis using cutting-edge medical and surgical interventions. While aggressive medical therapy remains the cornerstone of stroke prevention, carotid artery revascularization is necessary in patients with inadequate response to medical therapy. Carotid endarterectomy (CEA) remains the “Gold Standard” procedure for carotid revascularization. Year-over-year, the vascular surgeons at Hartford Hospital continue to perform CEA with outcomes that are far superior to the national benchmarks in patients with asymptomatic carotid stenosis for stroke prevention. Our peri-operative stroke rate following CEA for asymptomatic carotid stenosis remained at 0 percent for 2020. In addition, our vascular surgeons have led the way in Connecticut in adopting the trans-carotid artery revascularization (TCAR) procedure for the management of carotid stenosis. This minimally-invasive procedure complements CEA and is being increasingly adopted nationally for management of carotid stenosis. Initially named in 2019, Hartford Hospital remains the only TCAR Center of Excellence in Connecticut and the only preceptor teaching site for TCAR in New England.
COVID-19 Response
Keeping patients safe is our priority.

Sustained Operations
The Hartford HealthCare Tallwood Urology & Kidney Institute is a leader in Connecticut for overall urology and kidney disease. As a leader in urologic health, patients seek us out for care and, year-over-year, more patients receive their urology care here in areas including urologic cancer, men’s health, kidney stones, chronic kidney disease, and pelvic health and incontinence.

During the COVID-19 pandemic, we continued to deliver high-quality care to our patients. The patient volumes listed below represent inpatient and hospital outpatient department ambulatory surgery in FY2020.

<table>
<thead>
<tr>
<th>Tallwood Urology &amp; Kidney Institute</th>
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</table>

- **88,932** arrived visits  
  (25 percent of all specialty visits in the Hartford HealthCare Medical Group)

- **11,535** episodes of care  
  (in hospital-based settings)

- **8,207** surgeries

With more access to care comes more opportunities for our physicians to interact with patients. The experience and engagement of our physicians in complex and routine procedures and visits translates to better outcomes for patients. When a patient visits a Tallwood office, providers explain in a way the patient understands, listen carefully, provide clear instructions and show respect for what the patient has to say. Our patient survey results around effective communication demonstrate this commitment to patient experience.
The readmission and length of stay rates listed below represent inpatient data only. Despite the complexity of these cases, readmission and length of stay rates were better than expected. With a safe decrease in length of stay, patients return to their homes and daily activities while connected to care through their physicians’ practice.

Source: Press Ganey, FY2020

Source: Premier Outcomes, July 2019-June 2020
The Hartford HealthCare Tallwood Urology & Kidney Institute, in collaboration with the Hartford HealthCare Cancer Institute, is a tertiary referral center for Connecticut and New England. Our team of fellowship-trained urologists, nephrologists, medical oncologists and radiation oncologists care for the most complex cancer cases. The focus on establishing clinical standards of care through the Urologic Oncology Clinical Council structure has resulted in better-than-expected complication rates related to urologic cancer, continuing to ensure the safety of our patients during a pandemic.

**Crisis Innovation**

Safety is one of our core values. The examples listed below demonstrate how the Tallwood Urology & Kidney Institute team responded to the COVID-19 pandemic, ensured patient safety and continued to make services available.

- Triaged patients based on emergent, urgent, elective diagnoses and procedures.
- Decongested waiting rooms.
- Extended office hours including early morning, evening and weekend hours.
- Launched virtual health visits — with 4,240 virtual visits performed in just three months.
- Launched a prostate cancer multidisciplinary virtual visit (MDVV) initiative.
- Instituted contactless registration.

**Prostate Cancer Multidisciplinary Virtual Visit (MDVV)**

To help newly-diagnosed patients learn about treatment options without having to leave the safety of their homes in the era of COVID-19, Hartford HealthCare piloted a nurse navigator–driven multidisciplinary virtual visit (MDVV). Patients diagnosed with prostate cancer now have the opportunity to participate in a virtual consultation with a multidisciplinary oncology team consisting of urologists, radiation oncologists and medical oncologists. As patients complete the two-hour MDVV session, they understand their treatment options and can begin to work with the nurse navigator to take the next steps toward their treatment goals. Patients participating in the MDVV overwhelmingly report a high level of satisfaction with both the “clarity of communication” and “coordination of care.”
A Contactless Registration Process for Urology Patients

Presented at the 2021 Practice Management Program of the American Urological Association (May 2021).

As the coronavirus pandemic impacted the delivery of healthcare throughout the country, healthcare systems were faced with the challenge of implementing practice changes that would ensure patient safety yet maintain operational efficiency. In response to this challenge, the Tallwood Urology and Kidney Institute team implemented a new process of contactless registration. When a patient arrived in our parking lot, they notified the practice of their arrival by calling a designated phone number. The patient then waited in their car until the exam room was ready. As they were waiting, a staff member completed a full registration with them over the telephone. When the exam room was ready, the medical assistant greeted them in the waiting room, screened them for COVID-19 symptoms at the entrance, escorted them to the restroom for a urine sample and then to the exam room. Once the provider completed the exam, the patient was escorted out of the practice and proceeded directly to their car with no further contact between patient and staff. Twenty-four hours after the appointment, a staff member called the patient to schedule a follow-up appointment. Integral to the contactless registration process is the Workstation on Wheels, a mobile computerized system that enables the medical assistant to complete all aspects of registration in the exam room, including collection of co-payment and patient signatures consenting to treat. Our contactless registration process allowed us to avoid bottlenecking of patient flow through the facility and decreased the chance of contact and subsequent exposure to contagion among patients and colleagues.
The Behavioral Health Network (BHN) encountered unique challenges during the COVID-19 pandemic, creating opportunities for innovations in safely caring for our patients. Core treatment modalities within behavioral health rely upon therapeutic groups and social interactions as a path toward recovery, making it even more challenging to ensure sustained operations, quality of care and safety.

**Emergency Services**

Often, as the first point of contact for patients seeking behavioral healthcare, emergency department staff are faced with the challenge of evaluating acutely ill psychiatric patients. During the pandemic, they had the added responsibility of stratifying patients for risk based on COVID exposure and other factors. Crisis innovations within behavioral health emergency services included the following:

- Utilization of telehealth with a clinician virtually meeting a patient in the ED to complete a complex psychiatric evaluation, a practice which became a model for other services.
- Shifting daily work to ensure communication with families and loved ones of patients was a priority during a time in which visitation was restricted.
- Expansion of patient access to recovery support staff as a resource for patients in their recovery, which was integral as part of crisis innovations but is also a sustained best practice. A Health Resources and Services Administration (HRSA) grant, funded at more than $2.2 million, provided an opportunity to shift the Recovery Leadership Academy online so that we could continue to provide the 40 hours of training required for certification by the state. These Recovery Support Specialists (RSSs) work in both inpatient and ambulatory settings. The grant has allowed the BHN to increase RSS support by hiring interns who are paid stipends through the grant.

**Inpatient Psychiatry**

The congregate nature of inpatient psychiatric care made physical distancing difficult. Unlike inpatient medical services, psychiatric units are architecturally designed with large communal spaces that integrate meals together, group therapy and a social milieu. In addition, high turnover and asymptomatic conversions of patients increased the risk of contagion. Yet, the need and demand for acute psychiatric care were higher than ever due to the stressors of the pandemic.
Crisis Innovation: COVID Positive Unit
As the pandemic evolved in March 2020, the BHN team made the important decision to transform a six-bed psychiatric unit at the Institute of Living (IOL) into a COVID-19 isolation unit. The unit was designated for medically stable behavioral health patients with COVID who needed psychiatric care. This unit was ideal for conversion as it has private rooms, making it easy to isolate the patients from the rest of the population. Unit staff were trained with all the information they needed to know to care for COVID-positive patients and persons under investigation. The unit was opened quickly, within five days, on March 23, 2020. Between March and June, more than 20 patients were successfully transitioned out of the unit, having both their psychiatric and medical needs met during their hospitalization. Lessons learned for sustained operations included having developed the expertise and agility in the network to stand up specialized units in emergency situations effectively.

Crisis Innovation: Admissions Processes
As the pandemic continued to emerge, the BHN team implemented mandatory COVID testing for all psychiatric patients prior to admission to inpatient units. Admissions decisions and post-admission protocols were based on risk stratification and risk mitigation algorithms. One noteworthy admissions innovation involved admitting patients into “couples” — patients who tested negative prior to admission and were risk-stratified as “low risk” were admitted in pairs and quarantined together prior to joining the milieu. The couplet admission process enabled the BHN to meet the need for access while managing the COVID risks inherent in congregate settings. After implementing the couplet admissions protocol, several asymptomatic positive conversions were captured during quarantine, but there was no communal spread.

Ambulatory Services
The BHN provides more than 600,000 direct contact patient visits every year including outpatient treatment provided to psychiatric patients in multiple levels of care utilizing both individual and group treatment. These current approaches to care delivery presented a high risk for COVID-19 transmission to an at-risk population. Treatment approaches needed to be modified during the pandemic in order to continue to provide vital services to our population while minimizing risk of exposure. A significant risk for our population and service system was that the closing of outpatient care would likely have resulted in patients flooding emergency departments and overwhelming inpatient and emergency capacity.

Sustained Operations: Telehealth
In the absence of in-person care, the BHN team shifted to telehealth solutions for the delivery and facilitation of individual and group therapy. Within 24 hours of pivoting to remote care, ambulatory program areas developed new policies and procedures to ensure ongoing and continued quality of care
through a virtual option. Each patient was assessed, and the modality and frequency of treatment were determined based on the risk level and their available telehealth resources. Programs increased huddles to ensure communication, continuity of patient care and risk mitigation for patients. Many program locations did remain open with limited staff on-site to coordinate tasks, organize referrals and address any patients who came in person.

**Sustained Operations: Suicide Risk**
The BHN team recognized that, despite all efforts to ensure continuity of care to ambulatory patients, the pandemic had the potential to significantly impact the overall health and wellness of the patients we serve. The pandemic enhanced risk factors such as anxiety and depression, fear and uncertainty, family and relationship discord, social isolation and financial burden, and decreased access to healthcare and basic needs. Zero Suicide best practices were enhanced using telehealth to best support assessment, identification and treatment of patients at risk for suicide. This included revising or enhancing

- Suicide risk assessment protocols to ensure that ambulatory patients received a screening at each telehealth encounter, minimally once per day.
- Caring Connection (post-discharge) phone call processes to shorten the timeframes in which discharged patients were contacted during the pandemic (within 24 hours and then within seven days of discharge).
- Epic clinical documentation to convert paper processes into Epic notes during this time. This included the suicide risk assessment and safety plan.

**Sustained Operations: Infection Prevention in Ambulatory**
In May 2020, the BHN began the pivot back to in-person care in ambulatory settings, with the first programs welcoming back patients on May 26, 2020. The success of the re-open was reliant upon a go/no-go decision-making process to ensure compliance with infection prevention best practices. Decision-making was based upon a comprehensive checklist with 59 items detailing expectations for infection prevention practices, including PPE supply, screening, facility layout, signage/visual cues, cleaning protocols and management of patient flow. Partnership and collaboration between quality and operational excellence departments in this work ensured crosschecks of each program at two points in time — prior to open and approximately six weeks later — thereby ensuring safety of the program upon opening as well as sustainability. Core safety practices supporting infection prevention were also integrated into Interactive Leader Rounding to ensure that each time a leader rounds in a program area, there is a crosscheck of compliance with safety protocols. To support the ongoing work locally, an ambulatory infection prevention champions program was implemented and is supported through system infection prevention.
A challenge faced when pivoting back to on-site care was that groups had to run at less than 100 percent capacity in order to comply with physical distancing guidelines. As a result, many programs provided a “hybrid” model of care, offering a combination of virtual and on-site services. This allowed programs to serve more patients, as well as accommodate those who were not yet comfortable receiving on-site care.

Schools

Just as ambulatory programs pivoted to remote services at the start of the pandemic, so did the BHN school programs. In order for educators and school leadership to best support the needs of students and families, there were several crisis innovations identified and implemented, including providing deliveries of academic materials to students’ homes, facilitating home visits to support student attendance and family needs (i.e., food, medical, clinical care), and ensuring IT support for students. Through service excellence, which included continued personalized experience for students and full implementation of individualized education plans, increased access to clinical supports and community partnerships, students continued to receive a high-quality education through the BHN schools.

Despite the barriers faced during the pandemic, the BHN was able to meet the needs of every patient and continued providing high-quality care.
Hartford HealthCare’s Community Network provided care and services, and supported the system during the height of the COVID-19 pandemic. Using our Lean model, the team supported transitions home, redeployment and staffing support where and when it was needed most. The Community Network team worked together for the post-acute care needs of COVID-19 patients by mobilizing trainers and staff across our service lines.

**Hartford HealthCare at Home** was able to take care of 730 COVID positive patients when many other home care agencies could not. This allowed the acute care centers to transition people out of the hospital, freeing up capacity during the surges.

**Hartford HealthCare Independence at Home** was awarded the Best of Home Care, Employer of Choice 2020 Award by Home Care Pulse. Only 15 of the 660 licensed private duty agencies in Connecticut received this award for 2020. This places Independence at Home in the top 2 percent of Connecticut homecare agencies related to caregiver satisfaction.

**Hartford HealthCare Senior Services**

Southington Care Center, Jefferson House and Jerome Home are among the 21 percent of U.S. skilled nursing facilities recognized by U.S. News & World Report as a Best Nursing Home for 2020-21. These nursing facilities earned Best Nursing Homes status by achieving a rating of “High Performing,” the highest possible, for short-term rehabilitation and long-term care. U.S. News gives the designation of Best Nursing Home only to those homes that satisfy its assessment of the appropriate use of key services and consistent performance in quality measures.

**Hartford HealthCare Center for Healthy Aging** created virtual community education on a variety of topics seniors were facing, including aging and dementia. They also created a virtual dementia support group at the onset of the pandemic. The Center team continued communications during the pandemic with seniors and their families to help connect them with resources.
The Center for Healthy Aging’s FY20 outcomes included:

- 35,038 client communications
- 5,044 community connections
- 3,183 assessments and consultations
- 2,394 in-home support connections
- 427 virtual events
- 8,016 event attendees
- 529 referrals to providers
- 544 dementia coaching sessions

Additionally, the Center opened new locations in Cheshire and at St. Vincent’s Medical Center and created a virtual memory café to assist clients with dementia.

Hartford HealthCare Rehabilitation Network (HHCRN)

Lymphedema

HHCRN’s lymphedema program has been named a Center of Excellence in Lymphatic Disease by the Lymphatic Education & Research Network (LE&RN). LE&RN Conservative Care Centers of Excellence in Lymphatic Disease are designed to increase access to the best possible clinical care and services for people affected by lymphedema and their families through a geographically diverse network of local and/or regional clinical centers. The Center of Excellence designation is granted after vetting applications to guarantee compliance with set standards for five distinct categories of care created by a team consisting of leaders in lymphatic medicine from Stanford, Harvard, the University of Southern California, University of Chicago, Memorial Sloan Kettering, and UT Health. The reviewed categories include diagnosis, conservative management services, assessment tools, research and collegiality.

Spine

HHCRN maintained its commitment to providing value-based care and modified operational processes in order to continue collecting functional outcomes within the outpatient division during the pandemic. Despite the challenges of the pandemic, the network collected outcome measures on 5,715 cervical and lumbar spine patients in FY20, compared to 8,785 in FY19. In addition:

- Functional and pain outcomes were maintained at a consistent level from FY19 to FY20, demonstrating high-quality care.
- STarT Back Tool training continued for all outpatient clinicians. Twelve additional trainings were completed. The tool is utilized to alert clinicians to the right treatment for low-back pain, and psychologically-informed physical therapy training.
**Community Network**

- Creation and distribution of a quarterly spine newsletter. The newsletter contains spine-focused content covering current contemporary concepts focused on examination and treatment, as well as metrics focused on patient outcomes, compliance with standardization and optimization of care projects.

HHCRN continues to collaborate with system partners to develop an evidenced-based care process model for acute low back pain patients. The Hospital of Central Connecticut Spine Center continues to provide efficient high-level care, and the network was involved with the opening of the Hartford HealthCare Acute Spine Program in the East Region in May 2020.

**Proning Teams**

These teams stepped up during the height of the COVID pandemic, providing critical care to the patients who needed it most. Being thrust into a situation that they had not faced before was an enormous challenge, yet they pulled together as a team and worked tirelessly to support their patients and each other. Made up of inpatient, outpatient and homecare staff, their primary role was to turn COVID patients receiving care at Hartford Hospital and The Hospital of Central Connecticut to help improve their breathing, providing a critical component in their recovery. For critically ill, sedated ventilator patients, this process can require as many as five to six staff, for a true team effort.

Despite the fear, anxiety and exhaustion they faced every day, this team was able to lean on each other to get through each day successfully. Their heroic efforts truly made a difference for all of their patients. Together, they celebrated the successes as they saw patient oxygenation rise and mortality rates drop. They also shared sadness as other patients did not survive. Through it all, the resilience and collaboration this team demonstrated was truly special.

**Post-Acute COVID Task Force**

The mission of this team was to compile a multidisciplinary approach to the management of patients and community members who were affected by COVID. This team was made up of occupational therapy, physical therapy and speech-language pathology professionals from across the continuum of post-acute care, including home care, skilled nursing facilities/sub-acute rehab, and outpatient. Working together in a quickly-evolving and new territory, they researched and compiled best practice guidelines, safety modifications and precautions while also collaborating with discharge planning nurse staff, care coordinators and physical medicine and rehabilitation staff to ensure seamless and continuous coordination of care for all individuals and their families.

This team exemplified all of our Hartford HealthCare core values of Excellence, Safety, Integrity and Caring, and demonstrated great discretionary effort in order to help their colleagues as well as the communities we serve.
Virtual Health Team

In response to the COVID-19 pandemic, the virtual health (VH) team rose to the challenge to design, construct and implement a new telehealth platform. They worked collaboratively to build the infrastructure, formulate workflows, test, train and modify, leveraging their technical and healthcare knowledge, leadership skills and innovative vision.

Some of their accomplishments included:

- Multiple Zoom staff training sessions.
- Formulation of VH Newsletter with tips of the week.
- Ongoing advocacy and training to encourage VH adoption and growth.
- Construction of a VH dashboard to track metrics.

The mission of this group was to provide high-quality, evidenced-based care that would reach all patients in a socially-distanced and sheltered-in-place world. Their efforts not only enabled HHCRN to evolve and adapt to new, innovative technology, they also allowed us to reach community members during a challenging and uncertain time.

Inpatient Rehab Unit (IRU) at Hartford Hospital

The IRU admitted 677 patients, who stayed an average of 12.6 days to receive state-of-the-art, evidence-based acute rehab care. The care provided on the unit exceeded our quality, safety and experience targets, including:

- Discharge to the community: 81 percent compared with 72 percent in the region and 78 percent nationally.
- Average functional change motor: 34.2 percent compared with 30.4 percent in the region and 31.2 percent nationally.
- Self-Care: 15 percent compared with 12.1 percent in the region and 13.1 percent nationally.
- Percent of patients that meet or exceed risk-adjusted expected value compared with 60.88 percent in the region and 66.33 percent nationally.

Hartford HealthCare Campus Care

- Provided 1,830 flu shots to students and faculty.
- Provided campuses with 26 hours of infection control support from our senior system director for infection prevention at Hartford HealthCare.
Hartford HealthCare Medical Group Leadership

Hartford HealthCare Medical Group

Mark Prete, MD
Senior Vice President and Hartford HealthCare Medical Group President

Cynthia Heller, MD
Vice President and Physician-in-Chief

John Foley, MD
Vice President, Medical Affairs

Susan Barrett
Vice President, Primary Care Operations

Mark Vye
Vice President, Specialty Care Operations
Innovative Approaches

When COVID-19 prevented patients from safely visiting our practices, the Hartford HealthCare Medical Group leveraged existing video and telephonic technology to launch a robust virtual health program in a matter of weeks. This provided patients the opportunity to be seen by their healthcare provider without physically coming into the office for an appointment. By the end of April 2020, the Medical Group transitioned from 0 virtual appointments in March to more than 40,000 (accounting for more than 70 percent of all visits). Additionally, virtual health operating model resources — including workflow and process guides, instructional videos and tip sheets — were made available to all staff and providers through our intranet. Our virtual health capabilities continue to be a core strength of our operations, providing significant flexibility during ongoing COVID challenges and significant weather events. The Medical Group is continuing to explore ways to use virtual health as a tool to access specific populations within our community, leading to better continuity of care and adherence to treatments plans, and improved quality metrics.

Virtual Registration and eCheck-In
The Medical Group also began offering virtual registration for in-office appointments using eCheck-in, a special function in the MyChartPLUS patient portal platform. This allows patients to complete the check-in process from home (on either a computer or smartphone) to save time once they arrive to their appointment. With eCheck-in, patients can easily complete the appointment questionnaire, answer travel screening questions, verify insurance information, electronically sign documents and more. The 91 percent overall patient satisfaction rate continues to reflect an extremely positive patient experience.

Hospital Coverage Redeployment
With low patient volumes in our ambulatory offices during the initial COVID surge, the Medical Group was able to redeploy 35 ambulatory physicians and physician assistants to work on the floors of all Hartford HealthCare hospitals. This required all redeployed providers to undergo inpatient Epic training, as well as collaborating with credentialing to provide necessary security access within the hospitals to execute a rapid response to the growing need in our ICUs.

Pre-Op COVID Testing
The need for testing pre-op patients for COVID was recognized very early in the pandemic as a necessity to prevent the virus’ spread from asymptomatic surgical patients to hospital staff and other patients, and to minimize the morbidity in patients by ensuring a safe elective surgery. The Medical Group team played a large role in the development of system-wide pre-op COVID testing workflows,
led by Bret Schipper, MD, a surgical oncologist. The standardized workflow continued to evolve throughout the pandemic, resulting in a more patient-centric experience through the implementation of designated pre-op testing hours, appointment scheduling and expanded test locations.

**Sustained Operations**

**Strengthening Organizational Collaboration**

The Medical Group advanced existing services available throughout the Hartford HealthCare system, to deliver the highest quality of care to our patients at a time when it was needed most.

- Teams worked with the Hartford HealthCare Rehabilitation Network to align our patient screening standards, as our two divisions share more than 20 practice locations. In some instances, screening responsibilities were shared between the two groups to help ensure the safety of all patients and staff in the facilities.
- The Medical Group collaborated with infection prevention to support our practices and provide clear and comprehensive guidance for our colleagues throughout the pandemic. Additionally, they trained our environment of care advocates to become “infection prevention champions,” monitoring such issues as proper hand hygiene, patient screening, preparedness and medical and hazardous waste.
- With rapidly changing information, weekly calls with infection prevention were scheduled to ensure the Medical Group was operating with the most current standards. This meeting continued after the COVID surge to include expanded infection prevention topics.
- Nurse preceptors in the Medical Group became an extension of Colleague Health, performing contact tracing for COVID-positive employees and determining return-to-work dates following infection.
- The Medical Group partnered with supply chain to order and distribute necessary supplies. This relationship has continued to now include discussions on supplies for PPE kits.

**Communications and Cascading Information**

The Medical Group continued to rely on existing communications channels to quickly and efficiently share information to physicians, office managers and staff. Efforts included:

- Creation of a special page on a shared internal site, containing updated documents, revised policies, resources and forms for all COVID-related topics. Managers could order supplies, staff could download procedural guidelines, and providers could access new Medical Group-specific clinical guidelines.
- Regular video conferences for providers to address specific physician-related challenges and changes relating to COVID, as well as answer any immediate questions.
- Daily meetings for all primary and specialty care practice managers, providing important updates to policies, procedures and necessary safety protocols. The information was then cascaded from the meeting to their practice staff in daily huddles.
• Using the weekly Medical Group newsletter to reinforce all COVID-related updates and changes for Medical Group colleagues. It also provided colleagues an opportunity to send in their questions and concerns to a special email address maintained by our quality and safety team.
• Establishing a daily conference call for practice managers and Medical Group leadership to address challenges and operational changes relating to COVID. Following the surge, the call transitioned to weekly, and continues today, with engaged participation, to review general operations topics and answer questions.

**Experience, Wellness, Resilience**

The Medical Group worked to provide all colleagues with resources to support physical and emotional wellness throughout the pandemic. Wellness tips were shared in the weekly electronic newsletter to all colleagues, and the patient experience team provided regular support in weekly virtual practice manager meetings. Additionally, Human Resources provided colleagues flexibility in their regular work hours and locations to assist with challenges including child care, home schooling and transportation issues or compromised health.

**Quality and Safety**

**Incident Management Team**
At the beginning of the pandemic, before the system saw its first COVID-positive patient, the Medical Group assembled its incident management team. The group, composed of leaders representing all aspects of the organization, met daily to assess the evolving situation, calculate the potential impact on our practices, and develop and execute necessary countermeasures. The team worked to maintain patient access to medical professionals, as well as ensure the health and safety of all colleagues and visitors in the offices by creating new standard processes, including:

• “Cardinal rules” – the standard, high-level safety measures all colleagues were accountable to adhere to every day in the offices.
• Best practice tools, later adopted by other Hartford HealthCare entities, including door and seating decals, Plexiglass barriers and infection prevention advocates.
• A central inventory and supply distribution process for cleaning supplies and essential PPE, including masks, goggles, gloves and face shields.
• Planning, implementing and continuously adjusting standard work for screening and Epic documentation of colleagues, patients and visitors into our outpatient practices.
**Hartford HealthCare Medical Group**

**Vaccine Clinic**

The Medical Group team transformed the administrative building in Wethersfield into a fully-operational vaccination clinic in less than a week. Initially, the vaccine was administered to Hartford HealthCare colleagues, starting with those who work in patient-facing environments. Front-line, non-employed healthcare workers were also vaccinated, including staff from our private practice affiliates.

Our experts from quality and safety, patient experience, and Lean teamed up with our practice operators and other administrative leaders to design a “patient-focused” workflow. Working from floors plans of the buildings, the group developed a layout that would move patients through the building efficiently while still maintaining safe social distancing guidelines. Multiple “dry runs” were conducted prior to the first day of vaccinations, allowing the planning team to identify any barriers and adjust the process accordingly. The model was replicated at other Medical Group clinics in Shelton, Southington, Mystic and Meriden, as vaccination eligibility transitioned into the general population.

The team members worked closely with Hartford HealthCare’s pharmacy team to ensure efficient vaccination usage, resulting in little-to-no waste. Special refrigeration was acquired to adequately store the doses, with strict temperature monitoring workflows to protect their stability once the doses were opened.
Hartford HealthCare
Integrated Care Partners
Leadership

**Integrated Care Partners**

**James Cardon, MD**
Executive Vice President and Chief Clinical Integration Officer  
CEO, Integrated Care Partners  
Interim Co-Physician-in-Chief, Heart & Vascular Institute

**Debra Hayes**
Vice President and Chief Operating Officer, Integrated Care Partners

**Naomi Nomizu, MD**
Vice President, Medical Affairs

**Tricia Hasselman**
Vice President, Contracting & Payer Relations
The COVID-19 pandemic demonstrated the value of integrated delivery systems in responding to the needs of the communities we serve. Hartford HealthCare was able to provide community testing and vaccinations, prepare and deliver complex care to critically ill patients in our facilities, and build alternative care sites to prepare for potential surges. There was focused effort on enhancing the coordination of care we delivered across the continuum to meet the needs of our patients. In 2013, Hartford HealthCare created Integrated Care Partners (ICP) to build the necessary capabilities to drive population health for the system. Hartford HealthCare recognizes that population health is the cornerstone of a resilient health system that is better prepared to improve public health and mitigate risk in a value-based paradigm.

Hartford HealthCare Rapidly Leveraged ICP Capabilities to Address the Challenges of the Pandemic

COVID-19 Testing

A standing need throughout the COVID-19 pandemic was access to safe, reliable testing. ICP led the initiative with key Hartford HealthCare clinical leaders at the center of the development of process and protocols. Drive-through operations became a statewide Hartford HealthCare initiative, representing all regions of the system with expandable services to meet the demands of testing for hundreds of people per day. At the direction of ICP leadership, Hartford HealthCare stood up eight drive-through testing
locations, testing 173,000 patients across the State of Connecticut. Average testing volume in our drive-through locations from April to June ranged from 5,000 to 6,000 per week. In addition, to keep our colleagues and patients safe, we completed testing for more than 4,000 colleagues.

For the most vulnerable populations in need of access to COVID-19 testing, ICP teams led efforts in mobile COVID-19 testing with eight team members fully deployed to meet the challenges of operational leadership, project management and system implementation, staffing coordination, provider support and ordering, roster management and test resulting. ICP and Hartford HealthCare led 724 mobile testing events in 38 cities and towns throughout all five regions of our system. Hartford HealthCare mobile testing operations reached an average of 70 sites per week, testing about 50,000 people in skilled nursing, assisted living, residential care facilities, shelters, congregate housing and other community and faith-based organizations. ICP operations, in collaboration with Hartford Hospital philanthropy and development, was granted $400,000 by Connecticut Health & Educational Facilities Authority (CHEFA) to provide testing events that reached the most vulnerable populations throughout Connecticut, working in close partnership with the Hartford HealthCare Health Equity team. Connecticut was nationally recognized for being one of the best in the country for COVID-19 testing with Hartford HealthCare conducting more than 30 percent of all testing throughout the state.

**Care Management**

ICP ambulatory community care management was the first to redeploy several full-time resources to the Community Care Center (CCC) on day one of its go-live, a commitment that remained in place for 12 months. The CCC answered a total of 446,227 calls around the clock, including 56,722 from Hartford HealthCare colleagues, regarding concerns about the pandemic and COVID-19 testing.

Additionally, the ICP ambulatory community care management team took on outreach calls to all patients with a COVID-19 diagnosis transitioning from our acute facilities to home without the safety net of home care in place. The outreach calls were completed seven days a week at 24, 48 and 72 hours post-transition to support the patients’ clinical and psychosocial needs. Hospital account records (HARs) demonstrated patients who engaged with ICP Ambulatory Care Management had a lower readmission rate (13 percent) than those who did not engage with these services (46 percent).
ICP was also tasked with the oversight of the build of our alternative care site at the Connecticut Convention Center in Hartford. In partnership with the State of Connecticut and the Connecticut National Guard, a multidisciplinary team from all segments of Hartford HealthCare built and was prepared to operate a 600-bed facility to care for recovering COVID-19 patients. Thankfully, we never had to admit a patient to the facility.

The Care Management Executive Leadership Team (ELT) met seven days a week in huddle to meet the system needs around COVID-19, specifically throughput/transition management for patients moving from the acute to the ambulatory setting. They developed several interdisciplinary standard processes related to the management of COVID-19 patients including:

- Access to a primary care physician (PCP) through the Medical Group for COVID-positive patients in need of home care services who did not have a PCP.
- The development of an innovative intensive COVID care at home program enabling COVID-positive patients to return home sooner, supported by home care services and telehealth visits by a hospitalist.

In late October 2020, the vice president of medical affairs for ICP led the development and operationalization of a multidisciplinary virtual COVID recovery center clinic. This clinic supports “long hauler” patients with lingering symptoms after COVID-19 infection. In five months, the Center has seen more than 500 patients and generated more than 900 referrals to pulmonology, rehabilitation medicine, cardiology, neuropsychology and behavioral health.

**ICP Integrated Behavioral Health**

In response to the pandemic, ICP Primary Care Behavioral Health (PCBH) services, which are fully embedded in 22 of the 46 Medical Group primary care offices, transitioned 100 percent of their services to telehealth. PCBH was able to extend support to cover all 46 Medical Group primary care practices. With this expansion, the productivity of PCBH clinicians has been consistently 125 percent of budgeted volume. The program has continued to deliver results including a 30-percent decrease in depression screening and a 22-percent decrease in anxiety screening scores.
Integrated Care Partners

Post-Acute Network Management and Support
One of the segments of the population hardest hit by the COVID-19 pandemic was the post-acute care system — primarily skilled nursing and assisted living facilities. In addition to taking an active role in the state-sponsored testing program, the ICP Operations team led a series of initiatives to strengthen the collaboration with our integrated Community Network, which includes skilled nursing facilities, home health and assisted living partners. These initiatives included:

- Weekly huddles to review system updates, transitions and provider status checks.
- System of communication between Hartford HealthCare care management and its post-acute partners to ensure safe patient transitions.
- Weekly survey creation for daily skilled nursing facility and home health agencies regarding COVID-19 census and admission status.
- Monthly post-acute medical director huddles to share best practices for COVID-19 management.
- Weekly Department of Public Health collaborative meeting.
- Establishing standard work and tracking for use of CMS post-acute waiver.
- Supported daily order entry for Hartford HealthCare skilled nursing facility COVID-19 testing add-ons through ICP pharmacy.

ICP Payor Contracting
In the midst of the pandemic, the delivery of healthcare quickly adjusted to provide necessary care to our patients. This adjustment included a quick pivot to using virtual technology as well as other new and innovative solutions. The ICP payer contracting team ensured new services were reimbursed fairly by the payors. The team developed a process to monitor, address and communicate the frequently changing payor policies and created a system-wide report for Hartford HealthCare executive leadership to assess the financial impact of COVID-19. The team engaged payors to collaborate on solutions such as continuing the waiver for skilled nursing facility authorization, helping support timely throughput during periods of high COVID-19 admissions. Despite the pandemic, it was critical that the usual work of the managed care contracting team continued. The team successfully completed agreements with Anthem, Aetna and United over this period without patient disruption, supported the Epic conversion for St. Vincent’s Medical Center, and managed accounts receivable.

Provider Support and Clinical Integration
One of the key needs throughout the phases of the COVID-19 pandemic was to have clear and consistent communication to ICP community providers. The Hartford HealthCare marketing and communications team, led by the ICP VP of medical affairs, put forward strategic messaging for COVID-19 protocols and access to testing. The ICP Pharmacy team prepared weekly updates on emerging data regarding possible medications to treat COVID-19. During 2020, provider opening of on-demand communications showed a 12-percent increase over baseline.
**Growth**

ICP grew from 1,851 to 3,178 members in FY2020 due to expansion in the Fairfield area.

**Clinical Resource Management (CRM)**

Historically, the utilization management function was unique to each individual Hartford HealthCare acute care hospital. To enhance efficiencies and support standard work, ICP led the development and transition to a centralized Utilization Management (UM) department called CRM. CRM had only been in existence for a few months when the team had to transition to a fully remote model due to the COVID-19 pandemic. Despite this fact, the CRM team successfully developed new centralized workflows to determine patient status upon admission, provide on-going assessment of patient status, update clinical information to payors and manage medical necessity denials and appeals. In addition, the UM process, which was historically supported by an outside vendor, was brought fully in-house and managed by the newly-hired and trained CRM physician advisor team under the direction of CRM Medical Director Swathi Rachoor, MD, saving almost $500,000. As a CMS condition of participation, a system-wide UM committee was implemented. CRM also assumed responsibility for the management of a new patient class of emergency department observation – behavioral health.

**Quality Performance**

ICP has been focused on the improvement of our CMS Star ratings, which are a critical measure of success as we embark further into our joint venture Medicare Advantage plan — CarePartners of Connecticut. The ICP health economics team continues to enhance its robust quality reporting capabilities, develop enhancements in the quality data repository, automate standard reports, improve supplemental data, create new reports to support the CarePartners of Connecticut and ICP focus on Medicare Advantage Stars ratings, incorporate HEDIS and CMS Stars data for better benchmarking abilities, and more.

Despite the challenges of the pandemic, ICP community practices and the Hartford HealthCare Medical Group continued to make progress on quality performance. Through thousands of chart audits, the teams were able to identify and close performance gaps. The findings and submission enhanced our Star performance from 4.45 to 4.55 out of maximum of 5. This improvement significantly increased ICP projected shared savings. ICP anticipates achieving above a 4 Star performance for measurement year 2020 in our CarePartners of Connecticut Medicare Advantage program. This achievement is extremely rare, especially in a health plan’s first year of Star measurement.
Hartford HealthCare
Clinical Affairs Leadership

Ajay Kumar, MD
Executive Vice President and Chief Clinical Officer

Stephanie Calcasola, RN
Vice President, Quality & Safety

Eric Arlia
Director, System Pharmacy

Keith Grant, APRN
Senior System Director for Infection Prevention

Sharon Kiely, MD
Vice President, Chief Wellness Officer and Associate Chief Medical Officer

Susan Marino, RN
Vice President and Chief Nursing Informatics Officer

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Lizabeth Roper
Director of Research

Barry Stein, MD
Vice President and Chief Clinical Innovation Officer

Peruvamba Venkatesh, MD
Vice President and Associate Chief Academic Officer

Ulysses Wu, MD
Infectious Disease
The Quality and Safety Committee is a standing committee of the Hartford HealthCare Board of Directors responsible for assisting the Board in ensuring the health and well-being of the communities Hartford HealthCare serves by overseeing the quality of clinical care, patient safety and patient services provided throughout the system and across the entire care continuum; reviewing the effectiveness of the comprehensive system-wide quality and safety program at each of Hartford HealthCare’s acute hospitals and the Hartford HealthCare non-acute clinical Member Organizations; and advising the Board on matters relating to hospital medical staffs.

Committee Members:

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Hartford HealthCare Board Quality & Safety Committee  
Interim Chair  
Fairview Capital Partners  
Managing Partner

Edward Arum  
Hartford HealthCare Board Quality & Safety Committee  
Member

Greg Deavens  
Hartford HealthCare Board  
Chair  
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Charlotte Hungerford Hospital  
Noninvasive Cardiologist and Director of Echocardiography Lab

James Carroll, MD  
MidState Radiology Associates  
Radiologist

Irfan Chuhtai, MD  
Connecticut Nephrology Associates

Carmen Cid, PhD  
Eastern Connecticut State University  
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University of Connecticut School of Nursing  
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