An NJHA Special Report

Loss, Lessons, Lives Saved

New Jersey's Pandemic Year

To health!
NJHA
New Jersey Hospital Association

Loss, Lessons, Lives Saved:
New Jersey's Pandemic Year

New Jersey has lost more than 21,000 people to COVID-19 in this year of pandemic, a tragedy without precedent in the recent history of our state. But New Jersey has also overcome. We have stood strong against an illness that didn't exist in our collective consciousness at the beginning of 2020. None of the lost lives can be replaced, but we can and should also recognize those saved at the hands of New Jersey's healthcare organizations and their heroes working on the frontlines.

New Jersey hospitals have saved lives in this pandemic year – more than 66,000 individuals with severe COVID illness have been successful discharged following hospitalization. That includes a projected 7,000 patients who would have otherwise died if N.J. hospitals had not bent the mortality curve through innovations and improvements in care developed over the last year.

All told, there are more than 730,000 COVID-19 survivors in New Jersey, representing those 66,000 lives saved in N.J. hospitals and approximately 664,000 individuals who contracted coronavirus but didn't require hospitalization. Each one of those lives is a light in this dark year.

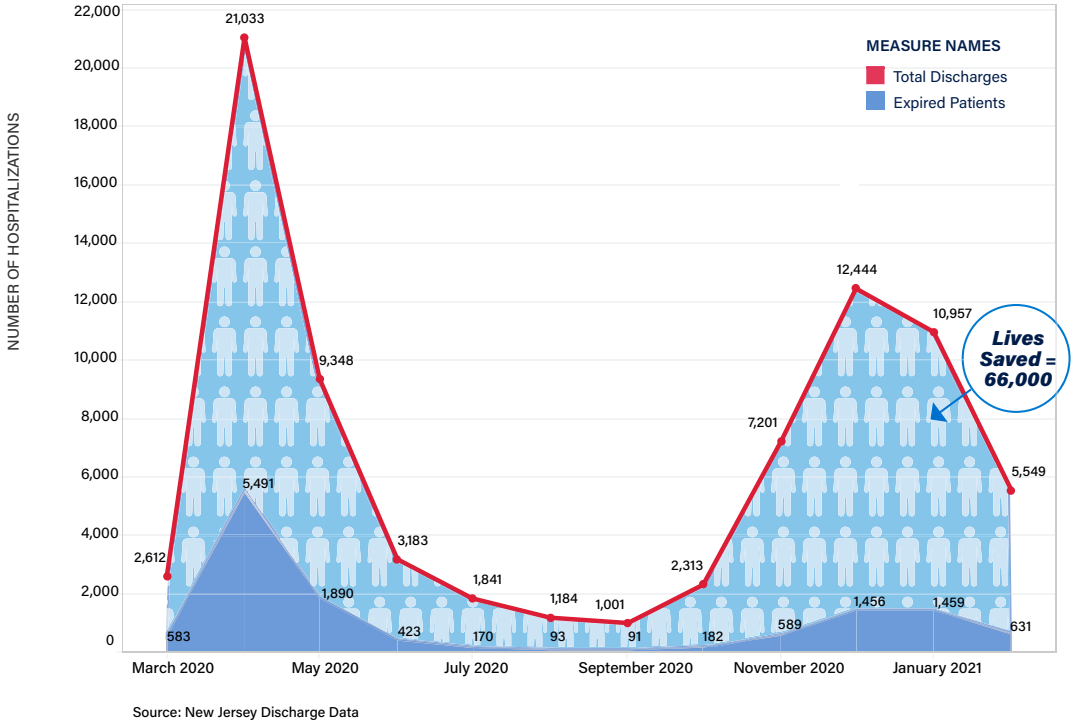
Saving Lives on NJ's Frontlines

COVID patients successfully discharged	**66,000***
Deaths averted due to hospital innovations and continued improvements in care	**7,000**

**total through 3/10/2021*

Life & Loss

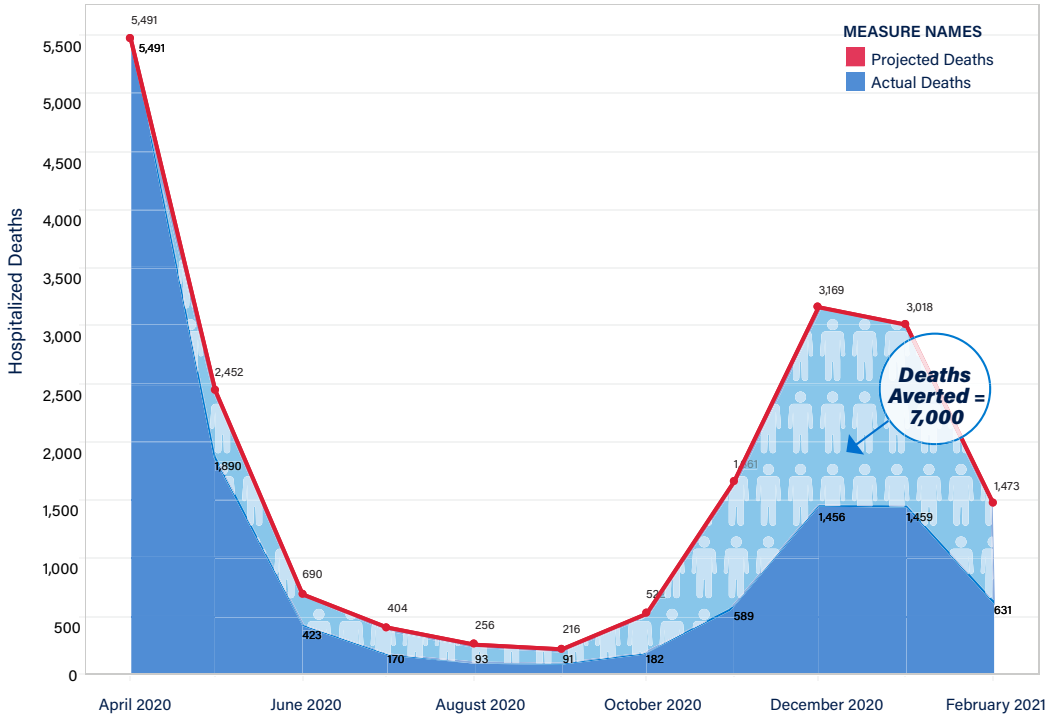
COVID-19 Hospital Discharges



Source: New Jersey Discharge Data

Bending the Curve

Mortality Case Rate



SOURCE: New Jersey Discharge Data

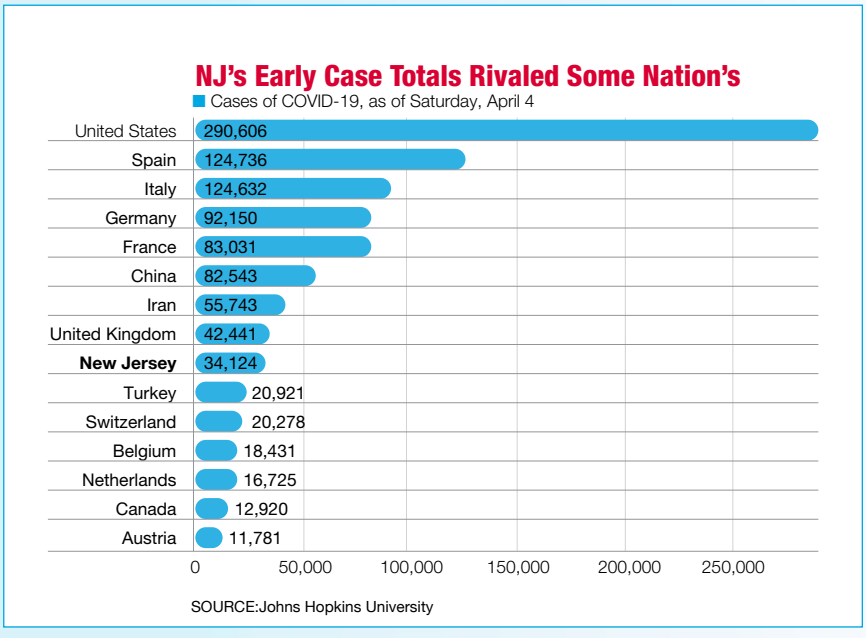
Seasons of COVID-19

Since the first case of the novel coronavirus was detected here in March 2020, New Jersey has endured the peaks and valleys of a once-a-century public health emergency. New Jersey was one of the nation's first COVID-19 hotspots. The state's first case of COVID-19 was diagnosed March 4, 2020, in a 32-year-old physician assistant from Fort Lee who would spend 18 days in the hospital. He would become not only the state's first COVID patient, but also its first survivor. The virus's spread across New Jersey was swift, the flood of patients to the state's hospitals relentless. By March 31 – just 27 days after the state's first COVID case – New Jersey would have 18,696 positive cases and 5,340 hospitalized COVID patients, according to hospital-reported counts in NJHA's data portal. The number of hospitalizations would peak at 8,270 two weeks later on April 14, 2020, testing the limits of hospital capacity, staffing, ventilators, medications and personal protective equipment.

By late summer, the number of hospitalized patients had dropped to the low 400s – a 95 percent reduction since the springtime peak. But COVID-19 was not done with New Jersey. By mid-December, COVID hospitalizations climbed back up to more than 3,700 patients – a tenfold increase from August, but still less than 50 percent of the hospital intensity of April 14, according to data from the NJHA portal. As New Jersey enters the second year of the public health emergency, hospitalizations had dipped below 2,000 in early March. Any optimism, however, is tempered by the emergence of new COVID-19 variants that are more highly transmissible and that coincide with an uptick in COVID-19 cases and transmission rates.

At the crest of COVID activity April 14, 2020, the state's hospitals and their clinical teams cared for nearly 8,300 inpatients with severe COVID illness. General symptoms of COVID-19 include fever, cough, malaise, body aches, headaches and loss of taste or smell. With severe COVID illness, patients may experience lower respiratory disease that deprives the body of oxygen and leads to respiratory failure, septic shock and multiple organ dysfunction. During New Jersey's first surge in April 2020, 2,051of those 8,300 patients required an intensive care bed, far surpassing the typical capacity of approximately 1,800 ICU beds in the state's 71 acute care hospitals. At COVID's peak, hospitals quickly added an additional 1,000 ICU beds, working with facility engineers to convert cafeterias, auditoriums and other available spaces. The creation of negative pressure spaces and centralizing monitoring equipment in hallways outside of patient rooms limited patient/staff contact, effectively stretching limited PPE supplies and protecting healthcare workers from unnecessary COVID exposure. Without those added ICU beds, New Jersey would have been 251 beds short for critically ill patients on April 14.

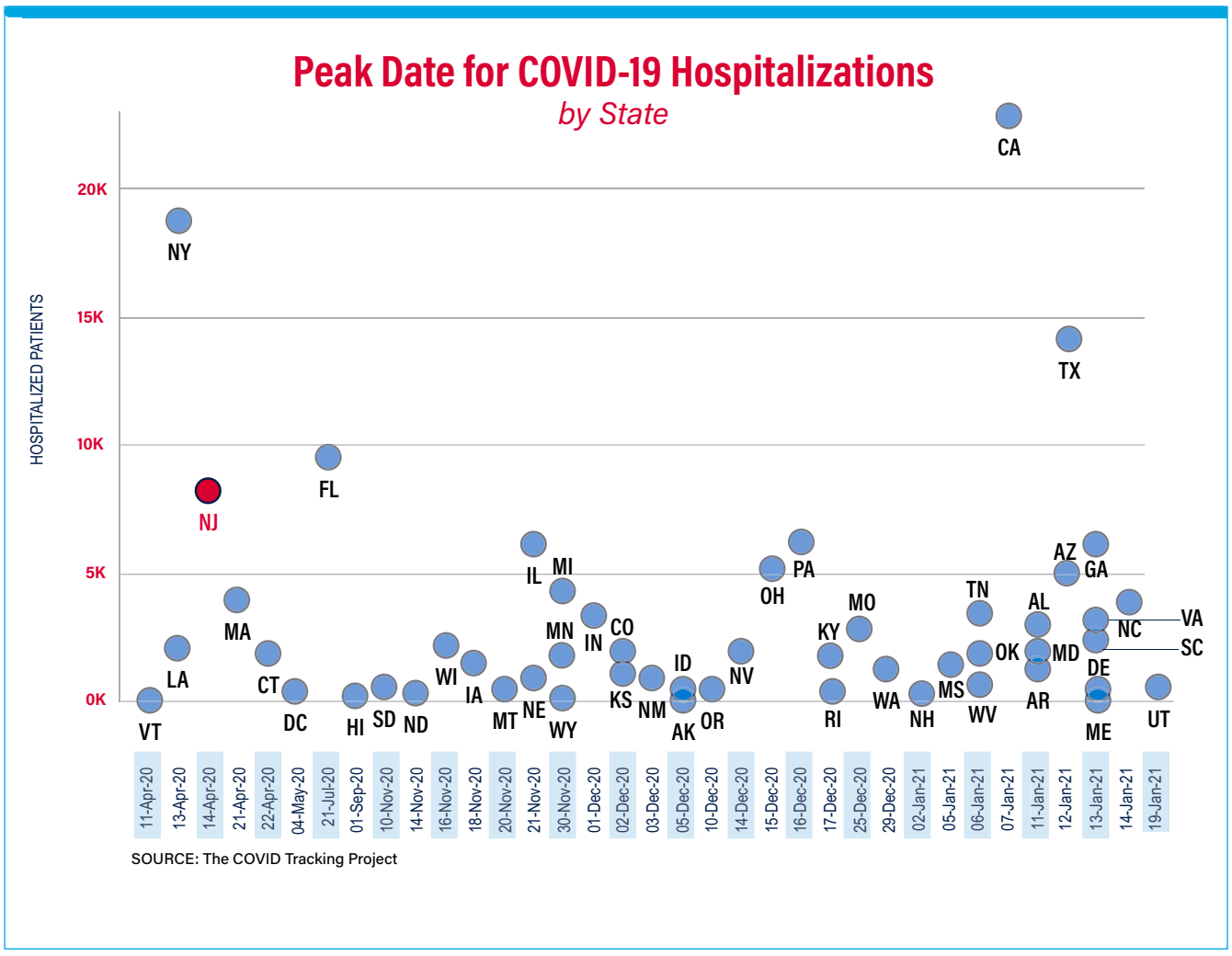
New Jersey was one of the nation's first hotspots, confronting the onslaught of COVID-19 before many other parts of the country had fully experienced the virus. Gov. Murphy signed the state-of-emergency order March 9, and in short succession enacted a number of executive orders that upended the lives of New Jersey residents – orders to stay at home, schools and childcare centers closed and elective healthcare procedures suspended. Nevertheless, the virus intensified in the Northeast hotspots. In those first weeks of the U.S. outbreak, New Jersey's case count was higher than many entire countries.



Hospitals in New Jersey were out front in responding to this emerging threat for which there were no existing evidence-based treatment protocols and when global supply chains were unprepared for the skyrocketing demand for personal protective equipment, ventilators and medications. Only three other states saw their numbers of hospitalized COVID-19 patients peak before New Jersey's high point of 8,270 COVID inpatients on April 14:

Vermont	**April 11**	**77 patients**
Louisiana	**April 13**	**2,134 patients**
New York	**April 13**	**18,825 patients**
New Jersey	**April 14**	**8,270 patients**

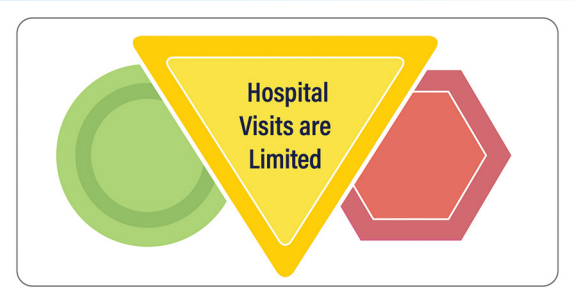
Other populous states wouldn't experience their highest levels of COVID hospitalizations until months later: July 21 in Florida, Jan. 7 in California and Jan. 12 in Texas. Nationally, the peak day for COVID hospitalizations was Jan, 6, 2021. The lessons learned and innovations applied successfully in New Jersey were available to inform the response in other states. In addition, New Jersey maintained stringent applications of universal masking, social distancing and other precautions and helped stave off a second peak that other parts of the country experienced. The following chart plots the peak date for COVID-19 hospitalizations for each state, showing New Jersey's place at the forefront of the pandemic response.



Collaborative Response

Hospitals in New Jersey confronted an array of challenges as COVID swept through the communities they served. New Jersey has the highest number of people per square mile than any other state in the nation, placing residents at higher risk for community spread. While social distancing and lockdown measures were swiftly put in place, hospitals had to be resourceful and collaborative in their approach to flattening the COVID curve. Hospitals worked collaboratively with each other and state officials to develop models and methodologies to guide a data-driven and formulaic approach to sharing and utilizing information to beat back the virus. Examples of this provider/policy/public health collaboration include:

- **Data reporting and analysis –** Hospitals volunteered to provide comprehensive COVID data on a daily basis to the COVID data portal created by the New Jersey Hospital Association. Data elements included daily COVID case counts, COVID discharges, PPE inventories, staffing shortages, bed capacity and availability, vent capacity and availability, and surge capacity. This data flowed daily to the Office of the Governor and the N.J. Department of Health, informing both hospital operations and state policy and providing valuable information for analysis and timely decision-making in the midst of the public health emergency.
- **PPE Allocations –** As individual hospital PPE inventories ran low and the state made requests to draw down from the federal strategic national stock pile, New Jersey's hospitals came together, working with NJHA to develop and implement a formulaic, data-driven approach to determine an equitable allocation for each organization. Hospital allocation totals were shared with hospital leadership. This transparency facilitated inter-hospital PPE sharing when supplies ran dangerously low. In addition, NJHA established a vetting process to identify a list of more than 100 legitimate PPE vendors, allowing healthcare providers to purchase PPE from them with confidence.
- **Executive Dashboard and Regional Coordination –** Data from the NJHA COVID portal was organized into a dashboard that fed information out to hospital CEOs on a daily basis. Areas or hospitals within the state that were under virus duress were identified and the data was stratified into regions, allowing for better cross communication between hospitals. A dashboard for the post-acute provider community also was created.



- **Visitation and Elective Procedure Guidelines –** Hospitals worked collaboratively to develop formulas and standards that would determine hospital visitation policies for non-COVID patients and to determine the need for rescheduling elective procedures.
- **Recommending Data Improvements –** NJHA and the state's hospitals interacted directly with the U.S. Department of Health and Human Services to provide insight and input into the type and frequency of reporting of COVID data to the federal government.
- **Regulatory waivers –** Waivers from state and federal regulations applied in conventional times were essential as New Jersey's healthcare system moved through contingency and crisis levels of care. NJHA sought and secured 135 waivers that gave healthcare providers much-needed flexibility to increase capacity, expand telemedicine and make other adaptations necessary to continue delivering care to New Jersey.
- **Regional Coalitions –** New Jersey's four regional health care coalitions (RHCCs) have been an integral network for mutual support, communication of information, coordination of care, identification and fulfillment of needs ranging from equipment to PPE and sharing of data throughout the pandemic. With leadership from within each of the four hospital preparedness regions, the RHCCs have worked with each of the regional coordinators at NJHA to effectuate federal and state requirements.
- **Partnerships Supporting Recovery –** New Jersey's rehabilitation hospitals and long term acute care hospitals have been critical partners in supporting recovery for patients who survived severe illness with COVID-19, especially those who spent weeks on a ventilator or those who suffered cardiovascular events, such as strokes. They expanded capacity and developed COVID-19 units to be able to care for these patients. Over a two-month period following the April 14 peak of COVID hospitalizations, rehabilitation hospitals expanded their capacity from 95 beds on April 15 to 312 beds by

the middle of June, tripling their capacity to cohort COVID patients. A combination of physical, occupational, respiratory, cognitive and neurologic rehabilitation modalities, coupled with the specialized medical and nursing care in rehabilitation hospitals, resulted in dozens of patients being able to walk out the door and go home following an extended rehabilitation hospital stay. In some cases, the patients continue to receive focused outpatient rehabilitation care at rehabilitation hospitals as they continue to recover from long-haul COVID symptoms. Long term acute care hospitals, which specialize in ventilator weaning and multisystem organ failure, admitted patients from hospital ICUs to start or continue the weaning process. LTCHs focus on medically complex patients who require more extensive clinical services over longer time periods. Many patients were then able to move on to rehabilitation hospitals, subacute nursing home programs or home health and outpatient services to continue regaining function and strength. These highly specialized inpatient post-acute hospitals converted parts of their operations to answer the call at a time of critical need.

Hospitals, post-acute sites and their care teams were New Jersey's frontlines in this battle. All healthcare facilities have detailed emergency plans for an array of natural and manmade disasters, including pandemics and infectious disease outbreaks. But what they didn't have were established clinical protocols for this never-before-seen novel virus. And so, New Jersey's healthcare delivery system began writing the COVID-19 playbook that did not exist. That included "proning," the practice of positioning patients on their stomachs which is frequently used with patients with advanced respiratory disease syndrome but hadn't yet been formally recognized in COVID treatment. New Jersey's hospital teams also tested existing drug therapies such as diuretics and blood thinners in the treatment of COVID patients, while also being among the first to use drugs like hydroxychloroquine (a malaria drug) and tocilizumab (an arthritis drug) in new ways. Evidence would show some of the therapies effective in the treatment of COVID-19 and others not. New Jersey hospitals became an important early setting for that new knowledge as many of these therapies would receive Emergency Use Authorization for the treatment of this novel virus.

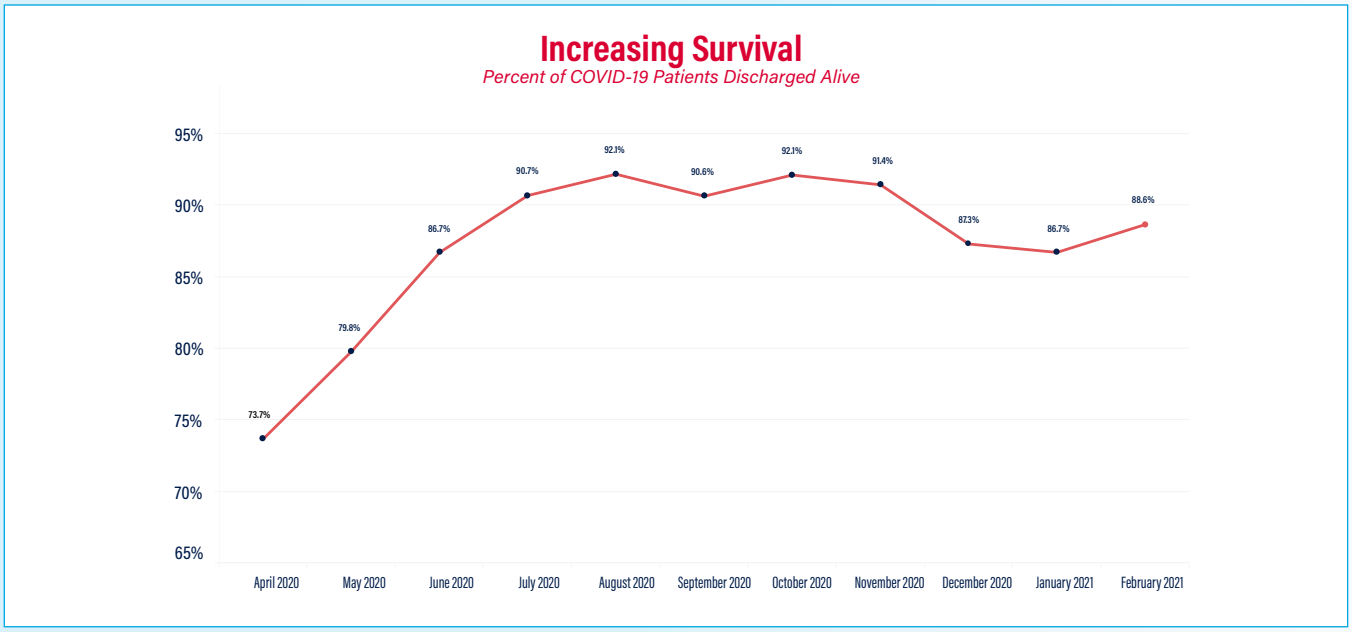
Reflection *"It was a massive effort."*

Nitin Puri, MD, Co-Director, *Critical Care Services, Cooper Health*

"Fear and anxiety were predominant emotions, but also recognition that we were in this because there was a commitment to health and science and caring for people," said Dr. Nitin Puri, co-director of critical care services at Cooper Health, recalling the first days of the pandemic. For hospital teams, this novel virus presented challenges not only in treatment, but also in logistics and safety. New Jersey competed with the rest of the world for personal protective equipment, while also adapting their facilities with new ICU beds and creating COVID-19 care teams that utilized team nursing and interdisciplinary medical teams spanning critical care, emergency medicine, anesthesiology and more. "The whole house staff of residents were focused on COVID. It was a massive effort." As the clinical teams tested new treatment protocols, the hospital kept a database of "what worked and didn't work," recalls Dr. Puri. Clinicians also joined with colleagues – and competitors – in regional coalition calls and NJHA interdisciplinary calls to share their experiences, challenges, results and lessons learned. "These were robust discussions. Everyone was so honed in on what we could do to help. It was a powerful bonding experience. Everybody would just be spit balling and thinking – and it made a difference."

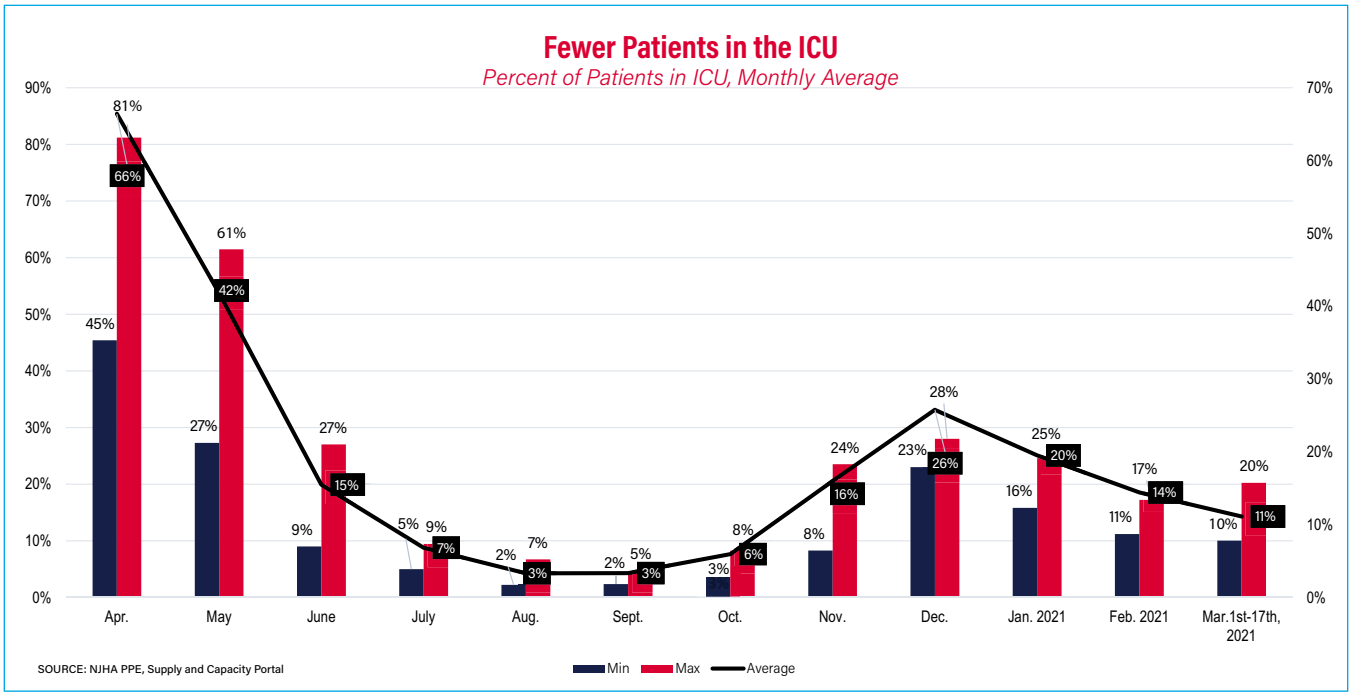
Saving Lives

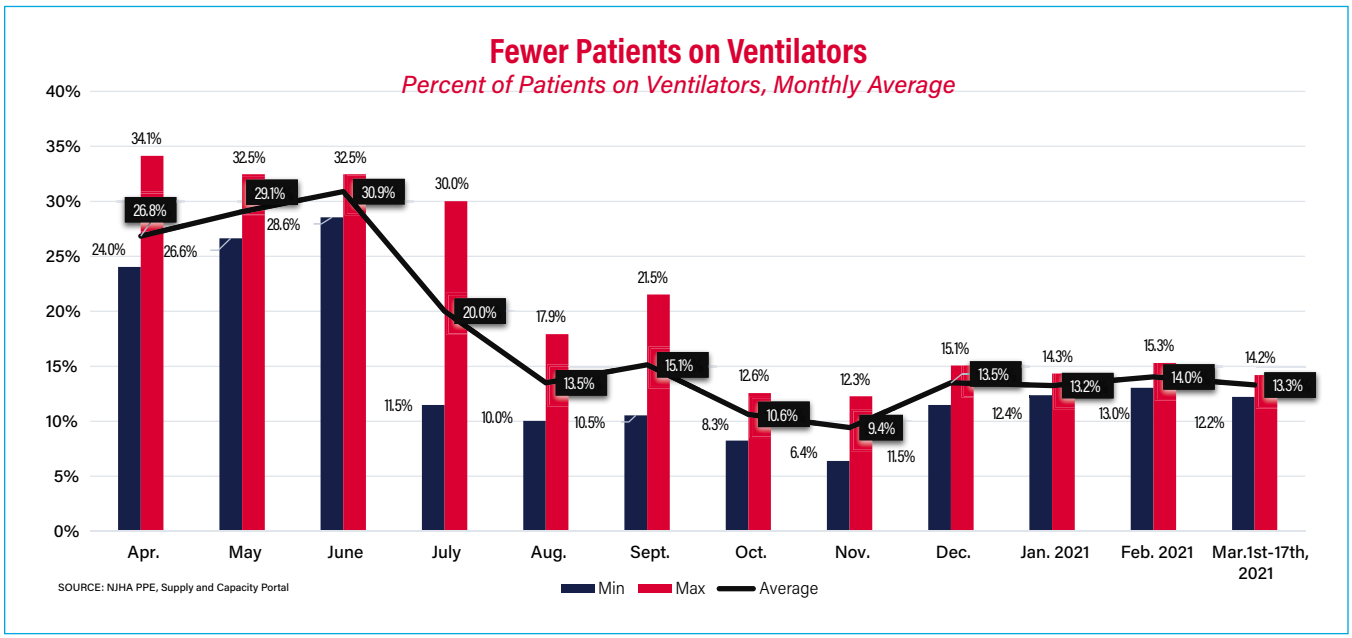
The initiative and innovation in New Jersey's hospitals have resulted in thousands of lives saved. Among the 730,000 COVID survivors in New Jersey are 66,000 hospital inpatients with COVID-19 who were successfully discharged following their hospital stay. All told, nearly 86 percent of all COVID patients admitted to a hospital were successfully discharged.



As the multidisciplinary teams at New Jersey hospitals applied improved treatment modalities and drug regimens, their efforts also were quantified in improvements in ICU days and ventilator use. Specifically:

- In April 2020, 66 percent of COVID-19 patients required intensive care; through mid-March 2021, just 11 percent of patients were in an ICU bed.
- The percentage of COVID-19 patients who required ventilation declined from 27.5 in April 2020 to just 13.5 percent by the end of 2020, a percent that continues to hold stable through March 2021.





New Jersey saw dramatic improvement in bending the mortality curve over the course of the pandemic. In the first month of coronavirus' arrival in New Jersey, hospitalized patients contracting COVID-19 had a greater than one-in-four chance of dying from the virus – a case mortality rate of 26.3 percent in April. By February, the COVID-19 case fatality rate fell to 11.4 percent in New Jersey, a 57 percent reduction. The increased odds for survival equate to approximately 7,000 deaths averted among New Jersey residents between April 2020 and February 2021. That total represents the difference between projected COVID deaths and actual COVID deaths from April 1, 2020, through March 10, 2021. Projected deaths were estimated by applying the age-adjusted mortality rate of 20.3 percent from April 2020 to COVID hospitalizations by age group for each subsequent month through March 2021. That rate, had it remained unchanged, would have resulted in as many 19,525 in-hospital deaths, but thanks to success in reducing the mortality rate, actual deaths were 12,520.

Reflection *"They are truly amazing."*

Kingman Chu, *COVID Survivor*

For Kingman Chu of Clifton, the initial symptoms of COVID-19 were not unlike a typical cold or seasonal allergy, but it soon became evident that this was no ordinary illness. As his symptoms worsened and he was admitted to Hackensack University Medical Center, the cumulative effect of physical illness, fear and isolation from his family struck with full force. "The emotional and mental impact didn't take hold until being hospitalized," he recalled. "For the first and only time in my life, I was hospitalized with a major illness that warranted such extreme response. To be isolated and detached from loved ones was both emotionally and mentally devastating for myself and my family especially my wife."

He would spend a week in the hospital, and the hospital team managed his condition without requiring the invasive use of a ventilator. He said he is "humbled by the experience" with the hospital and its healthcare professionals who returned him home to the arms of his family.

"They are in the same group of heroes like a fireman running into a burning building, a policeman running into any number of dangerous scenarios or our military personnel fighting for our country and freedom. They are truly amazing, focused and selfless individuals who allow ordinary people like me to sleep at night knowing they exist to be ready, willing and able at any given moment to do what we cannot or will not do."

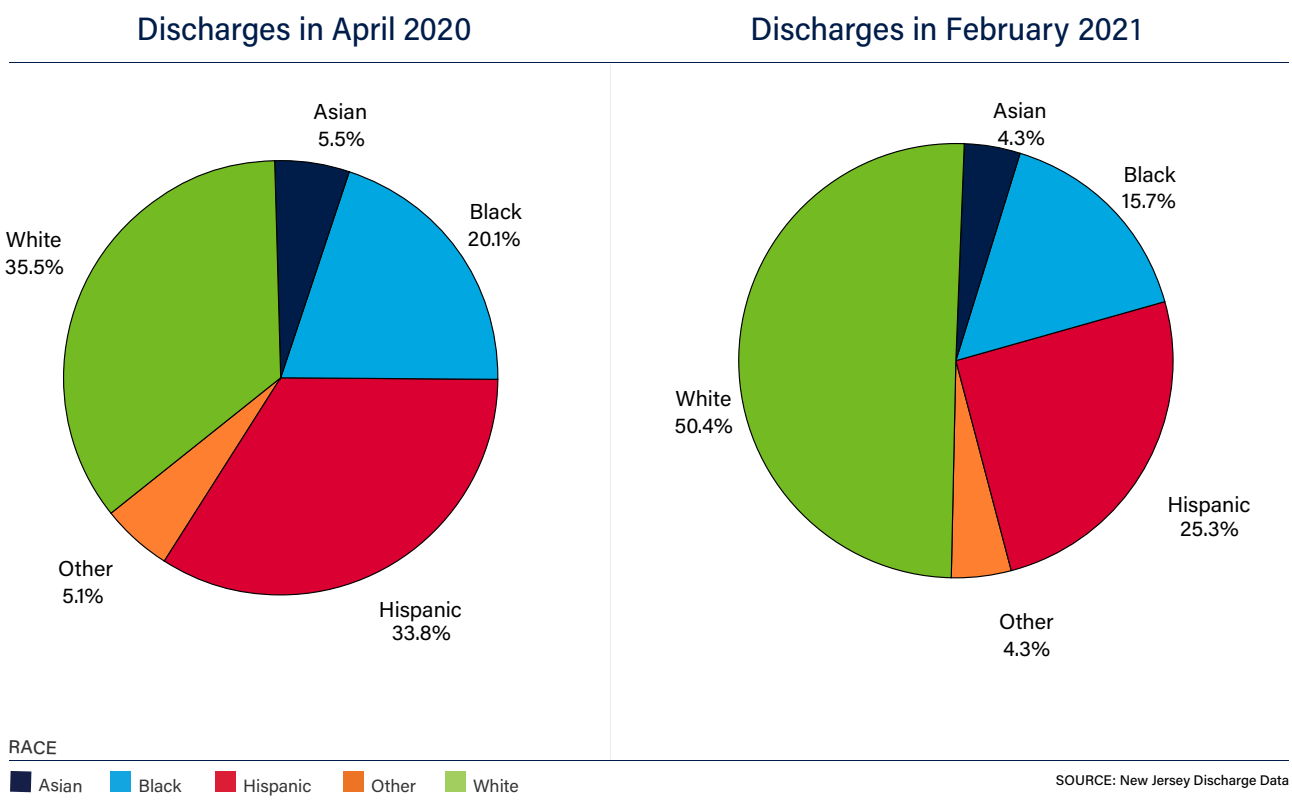
Systemic Challenges Revealed

The pandemic has also underscored systemic issues that will demand collective action. The virus has had a disproportionate toll on communities of color, reflecting social determinants like housing, transportation and employment. Identified risk factors include the population density of New Jersey's urban centers, congregant housing and multi-generational households, use of public transportation and jobs in the service sector that could not be shifted remotely, among others.

At the onset of the pandemic in the spring, the virus's impact on minority populations was pronounced. Fifty-four percent (54%) of all hospitalized COVID patients were Hispanic (33.8%) or Black (20.1%), while white patients represented 35.5 percent of all COVID admissions in April 2020. For comparison's sake, 18 percent of the state's population is Hispanic/Latino, 13 percent is Black, and 59 percent is white, according to the 2010 U.S. Census. As the pandemic played out, the impact has shifted and is more closely aligned with the state's proportions of races and ethnicities but continues to show a disparate impact, especially among Hispanics. In February 2021, Hispanics represented 25.3 percent of COVID-19 hospitalizations in New Jersey, while Blacks accounted for 15.7 percent of all COVID hospitalizations.

Disparate Impacts

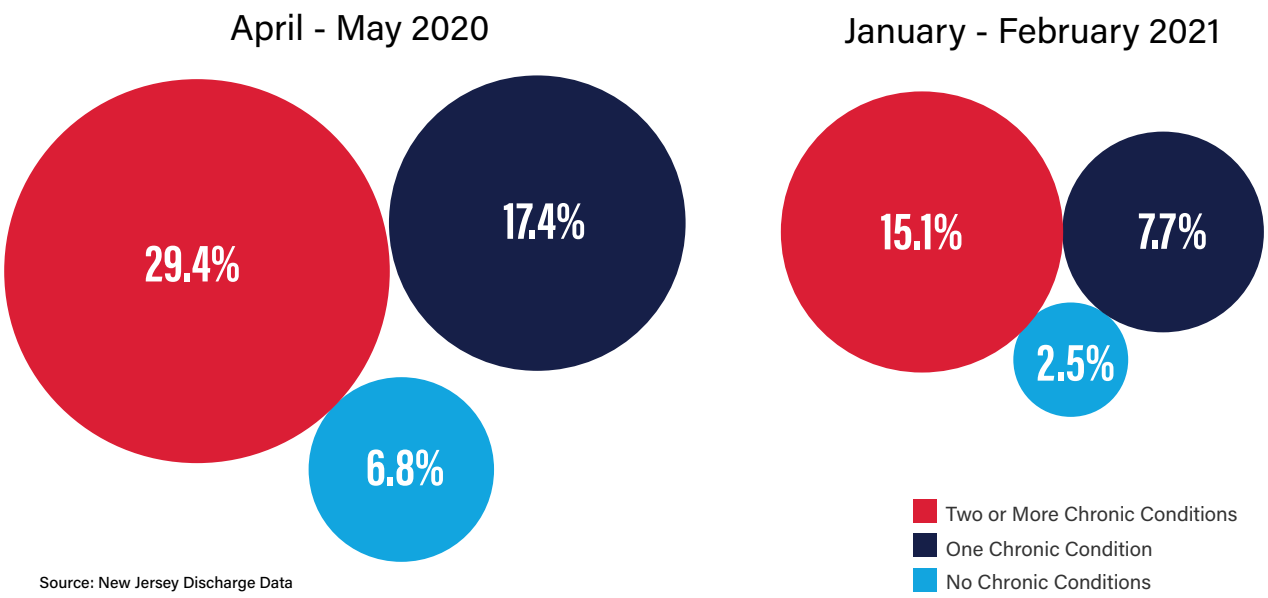
Percent of COVID-19 Hospitalizations by Race/Ethnicity



The data also reveals a growing body of information on the impact of chronic conditions on COVID-19 mortality, showing the heightened vulnerability to severe illness and death for those with underlying health issues. Of the hospitalized COVID patients in April and May with at least two chronic conditions, nearly 30 percent (29.4%) died, and 17.4 percent of COVID-19 patients with one underlying chronic condition died. That toll from the first months of the pandemic improved over time. In data through the first two months of 2021, 15.1 percent of those who had two or more chronic conditions expired from COVID-19, and 7.7 of patients who had one chronic condition died. For even the most at-risk population – those with two or more chronic conditions – mortality has declined by 50 percent.

Underlying Conditions

Percentage of COVID-19 Hospitalized Patients Who Died, by Chronic Condition Status



Source: New Jersey Discharge Data

The most prevalent chronic condition among expired COVID-19 patients was chronic kidney disease, present in 75 percent of those who died from the virus between April 1 and Dec. 31, 2020. Hypertension (74%), diabetes (46%) and high cholesterol (45%) were also frequently documented in COVID-19 hospitalizations.

A Dose of Hope

As New Jersey recounts the toll of this pandemic year, including 21,530 COVID-19 deaths among 751,082 total positive cases, the grim anniversary also coincides with a hint of hope. New Jersey hospitals and healthcare professionals who have been on the frontlines throughout the pandemic are now protecting their communities through the vaccination process. The state's goal is to vaccinate 70 percent of the state's adult population – that would be more than 4.4 million vaccinated adults – within the first six months of vaccination. That penetration of the vaccine will move the state closer to herd immunity. The initial vaccination rollout in New Jersey and nationwide has been hampered by a spare and spotty allocation of the vaccine from the federal government to the states, which then flow supplies to the individual vaccination sites. However, as more vaccines are approved under Emergency Use Authorization and manufacturing escalates, supplies to states are gradually rising. As of March 23, a total of 3,638,002 doses of vaccine have been administered, with 1,289,353 New Jersey residents fully vaccinated.

Reflection *"It was pure elation."*

Teri Kubiel, RN, DNP, *Caregiver and Vaccination Advocate*

Dr. Teri Kubiel, RN, is on a mission – to get shots in arms. Her drive to protect New Jersey residents with the COVID vaccine is propelled by her own harrowing experience with coronavirus. In her role as vice president of community outreach for RWJBarnabas Health's Community Medical Center, she was charged with a sobering responsibility: assisting family members and funeral operators to make sure those who died from COVID could rest in peace. A nurse for 37 years, she says "I saw more death in those few beginning months than I saw in my lifetime." In late April, she herself would become a COVID patient. She was able to be treated at home, but spent weeks fighting both the lingering impact of the illness and the emotional struggle that many frontline heroes face. When the COVID-19 vaccine became available in mid-December, it provided a spark of hope in a devastating year. Joining with her colleagues in being vaccinated was "pure elation," she said. And it provided her a new vocation as a healthcare professional. "It's my personal commitment to get out there and get people vaccinated. I knew that was where I needed to be." She is now among hospital teams across the state who are protecting their community members through vaccination. "To be able to see science come so far so quickly, it's a wonderful thing. It finally feels like the end of this pandemic is near."

Road Ahead

The impact of COVID-19 will reverberate throughout New Jersey for years to come. After-action analysis will be critically important to fully understand the pandemic and its impact on New Jersey residents, the healthcare system, schools, economy and other social and economic institutions of our state. As we look to the road ahead from COVID-19, the following are key areas that demand frank conversations, proactive policy and sufficient resources to assure optimal performance, preparedness and outcomes:

Healthcare Resources and Infrastructure: COVID-19 has provided a dramatic reminder of the importance of health and healthcare in our society, and in our economy. We must continue to prioritize good health for individuals and communities, along with the needed funding and resources to adequately support the healthcare infrastructure, public health, emergency preparedness and the supply chain. We also must commit resources and policy reforms that reflect the innovations spurred by this pandemic, including the use of technology to expand healthcare access not just in times of infectious disease outbreaks, but also in everyday use that allows our healthcare system to meet consumers where they live and work. State and federal waivers that facilitated that type of innovation should be made permanent.

And finally, further study of the treatment modalities applied by clinical professionals in New Jersey that improved outcomes and reduced mortality can provide evidence-based knowledge that can inform clinical guidance and preparedness for future infectious disease events.

National Policy: A nationwide crisis demands a coordinated national response and uniform guidance and policies. The decentralized policy approach in this pandemic fueled an uneven response and inconsistent directives that ultimately made the nation more vulnerable as the virus transcended state borders.

Social Determinants of Health: This report was not designed to measure the influence of social determinants of health in New Jersey's COVID-19 experience, but the impact is undeniable. Housing instability, congregant housing, food insecurity, reliance on public transportation, employment in essential and service industries, lack of access to remote technology and incarceration are a short list of the social issues that revealed systemic issues of inequity. Any public health and emergency preparedness reforms stemming from this experience are incomplete without integrating the impact of social determinants of health.

Healthcare Worker Resiliency: Our healthcare heroes have been on the frontlines of this fight from the beginning. They have held patients' hands so they wouldn't die alone, they have seen their colleagues get sick, and they have risked their own health and their family's health on a daily basis. And tragically, like many New Jersey families who have lost people they love, we have lost members of our healthcare community to this pandemic. Despite all of this, our healthcare workers have risen to the occasion, saving lives and averting a growing toll in mortality, as presented in this report. There will undoubtedly be long term post-traumatic stress and other mental health impacts for these heroes, and we must ensure that the necessary supports are in place to address those issues.