

EFFORTS OF MAIN LINE HEALTH SYSTEM TO BE SELF-RELIANT DURING THE COVID PANDEMIC**AUTHORS**JIBAN KHUNTIA, RULON STACEY, AMIT PRADHAN, AND
LAUREN DUFF**INTRODUCTION**

“The COVID situation faced by Philadelphia and the Main Line Health has some significant similarities to Hurricane Katrina”—opined Jack Lynch, CEO and President of Main Line Health, in a candid interview on July 8, 2020, with the authors. He further mentioned: “There had been warnings that a hurricane was eventually going to happen. Limited preventive action was done, and by the time it happened, there was not enough preparation to respond appropriately to a disaster of that magnitude.”

Aligned to Jack’s comments, it is a fact that the epidemiology scholars and practitioners have been warning for years that a significant pandemic will happen. At the same time, there has been an incredible focus on reducing spending in healthcare. While Main Line Health had recently undertaken measures to ensure safe and efficient care, it—like many hospitals—had not been heavily focusing on something like disaster preparation. In the United States, the healthcare system did not react quickly to COVID-19, and when it hit the country, most of them were not ready.

When the COVID pandemic hit New York, Main Line Health executives responded quickly, organizing a leadership group to develop a response plan if COVID reached the Philadelphia region. The Chief Medical Officer of Main Line Health started heading up bed supply and operational preparedness. He recognized that they were not going to be able to purchase enough PPE in the usual way. Also, they felt that they could not send ventilators to New York City because COVID was predicted to hit hard in Philadelphia soon.

The Main Line Health System faced the challenges of COVID and took many steps during this difficult time keeping in mind the safety of its staff and patients as well as rising to the occasion for community service.

ABOUT MAIN LINE HEALTH

Main Line Health is a not-for-profit organization that serves Philadelphia and its western suburbs. At its core, it has four core hospitals for acute care hospitals and one facility for rehabilitative care, and several other centers and

facilities. Main Line Health has more than 11,000 employees, around 1,400 licenses beds, more than 2,000 medical staff, and 2000 volunteers

Main Line Health has received several awards for clinical excellence. That includes: (1) System Magnet designation, the nation’s highest award for nursing excellence, (2) The Joint Commission’s Gold Seal of Approval, (3) Ranked among the Best Hospitals in the Philadelphia region by US News & World Report, (4) NICHE designation for elder care excellence and a host of other excellence awards and recognition¹.

The community engagement and relationship of Main Line Health is reflected through the charitable donations from the community. Charity comes in the form of donations to the annual funds or as gifts to fund new projects for new facilities or technologies. Employees are critical contributors to this philanthropy. Main Line Health continues to reinvest these charitable contributions to continue its legacy of excellence in the community.

THE ONSET OF COVID IN PHILADELPHIA

The first case of COVID-19 in Philadelphia was reported on March 10, 2020.² The patient was in contact with previously confirmed cases. Following that, the Health Department recommended that the people of Philadelphia should not attend mass gatherings exceeding 5,000 people, and subsequently, the city expected a certain level of disruption in the daily lives of people due to COVID. The health commissioner of the city of Philadelphia issued an emergency order restraining business activity and congregation on March 23, 2020³. Furthermore, on May 26, 2020, an amendment to the business activity and stay-at-home order followed.

The City of Philadelphia Office of Emergency Management and Philadelphia Department of Public Health set up a COVID Surge Facility-Liacouras Center (CSF-Liacouras Center). This facility was staffed and ready to admit patients recovering from COVID-19 beginning April 17, 2020. This facility ready to admit COVID patients starting from April 19, 2020⁴. The facility was equipped to deal with around 200 patients. Most of the equipment for the facility came from the Federal Emergency Management Agency (FEMA). Philadelphia’s health department started working for proposals from qualified organizations to implement COVID community Testing programs during the second week of June 2020.⁵ Executive orders for the

¹ <https://www.Mainlinehealth.org/about>

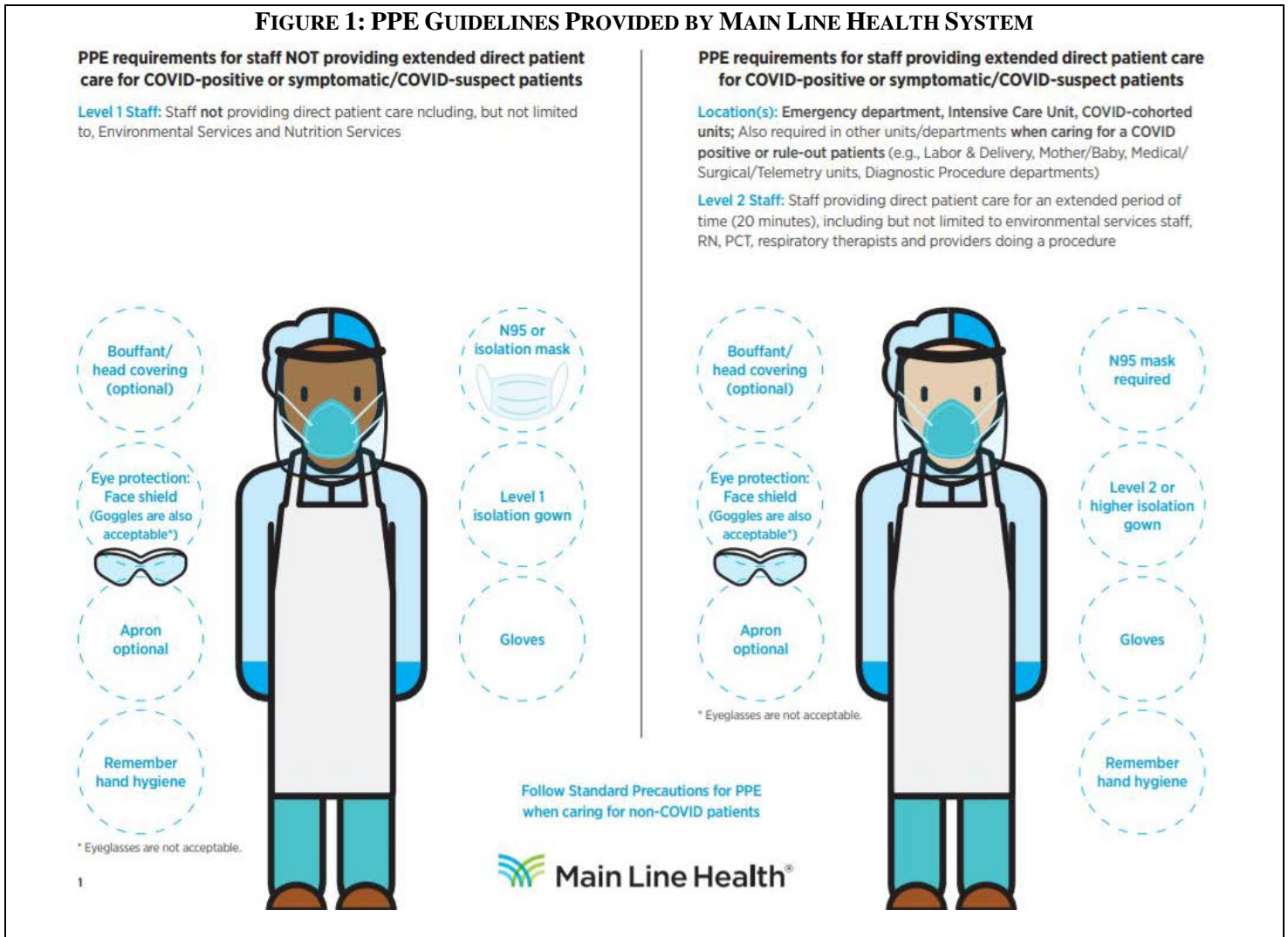
² <https://www.phila.gov/2020-03-10-philadelphia-announces-first-case-of-covid-19-coronavirus-2/>

³ <https://www.phila.gov/documents/eo-and-explanation-of-prohibition-on-non-essential-businesses/>

⁴ <https://www.phila.gov/media/20200416103817/COVID-19-Surge-Facility-Liacouras-Center-Frequently-Asked-Questions.pdf>

⁵ <https://www.phila.gov/documents/apply-to-start-a-covid-19-community-testing-program/>

FIGURE 1: PPE GUIDELINES PROVIDED BY MAIN LINE HEALTH SYSTEM



modified and restricted green phase of re-opening on July 3, 2020⁶. Green phase re-opening involves a shared responsibility of recovery by allowing economic and social activities to be resumed and simultaneously continuing to restrict the virus spread. That involves an opening cautiously some of the business activities such as casinos, indoor shopping malls, museums and libraries, recreational and sports activities, and schools and colleges.⁷

MAIN LINE HEALTH’S RESPONSE TO KEY CHALLENGES

Even though Main Line Health quickly mobilized to form a COVID response team and plan, the System—like others across the country—faced multiple challenges due to the unprecedented situation caused by the pandemic. One area of concern was a shortage of personal protective equipment (PPE). In accordance with CDC guidelines and informed by the guidance of its infection prevention team, Main Line Health began identifying ways to procure PPE and

manage its current supply to ensure employees had the PPE they needed to care for patients safely. Main Line Health set forth Systemwide guidelines to govern responsible PPE use for employees in clinical and non-clinical areas. These “PPEople” are updated based on CDC guidance (see Figure 1 for an illustrative example).

An initial way to preserve PPE was sterilizing N95 masks, which are used by a majority of clinical staff. This sterilization process would allow for reuse and a measured burn rate. With guidance from the infection prevention team, Main Line Health selected a U.V. cleaning method called Tru-D UV Light Disinfection and provided education to staff on how to reprocess their masks after the conclusion of their shift. So far, nearly 30,000 masks have been reprocessed.

Concerning gown supply, Main Line Health also instituted a process for reuse. Usually, the health system is very strict about limiting gown reuse but, in the face of

⁶ <https://www.phila.gov/documents/covid-19-executive-order-for-green-phase-of-reopening/>

⁷ <https://www.phila.gov/guides/reopening-with-care/reopening-guidance/>

dwindling gown supply, the policy was changed to allow for an extended use model for nurses who were treating only COVID patients. The System also had a pre-existing supply of reusable cloth gowns that could be washed and turned inside out for use every day. New cloth gowns were purchased, as well.

While PPE supply has not been as great of concern over the past several months, the Main Line Health team continues to monitor the supply chain and calculate burn rates for N95 masks and all equipment. These burn rates are calculated to the best of ability to anticipate PPE shortages. Furthermore, in the face of shortages, Main Line Health leaders have demonstrated a commitment to leaving no stone unturned in procuring new PPE.

Lynch is a member of the Young Presidents Organization (YPO), an association of chief executive officers. As the pandemic started, many members of the group who has business ties to China started seeking PPE and connecting colleagues with the supply that they needed. This avenue worked well; Main Line Health had ten people working around the clock sourcing sanitizer, gowns, and masks. The group's goal is to stock six months' worth of PPE based on their maximum burn rate during the first COVID spike. YPO turned out to be a high-accountability way to identify new vendors and sources of PPE.

According to Lynch, the federal distribution process was flawed, and he learned not to rely on the federals or state government for things like this.

“Just as our nation realized that we needed to be less dependent on international oil, we now need to recognize that our dependence on other countries for PPE is a problem. It does not work when demand rises for the same supplies around the entire world”. He points to Wuhan, a hub for PPE factories that had to be shut down for weeks.

If Main Line Health had just relied on the national supply, they would have run out quickly. Additional PPE offers came through several different channels, including employees, patients, and residents of the community that Main Line Health serves.⁸ People called hospitals and offered supplies. In many cases, Lynch was personally calling people on his own and chasing down leads.

With heightened demand and desperate need, many hospitals across the country received fraudulent offers for PPE. In a rush to procure this equipment, these hospitals put themselves at cybersecurity or financial risk. With the support and thorough background research that the Main Line Health team conducted into every offer for PPE, the System did not fall victim to any of these schemes and has

accepted several orders of high-quality PPE. At the time of this interview, Main Line Health has just one order of PPE that has been delayed and has not arrived yet.

The System dealt with other concerns besides PPE supply, too. Worried about spreading COVID to their families, the hospital staff was hesitant to go home after work wearing uniforms that had been in a clinical environment all day (Figure 2 provides a photo of two staffs). While Main Line Health was not prepared to offer clean scrubs to every employee, it took a different approach. It provided hotel rooms for any staff who met specific criteria of exposure levels. For staff members not meeting the criteria, they could get a hotel room at a discount that Main Line Health had gotten from the hotels. At the peak, about 50 staff members were staying in hotels.

FIGURE 2: TESTING STAFF AT MAINLINE



The availability of testing kits hampered the testing progress. Health systems buy their equipment for routine use, appropriate for everyday needs—not those of a global pandemic. While Main Line Health had a machine or two capable of COVID testing, they did not have testing kits available and were relying on the Department of Health and a commercial lab for testing capacity. That restricted the System's ability to quickly determine who was infected, a factor that also influenced PPE use.

To address this, Main Line Health is using a combination of testing platforms to maximize their capacity. They started with Cefeid and then added BioFire. Subsequently, they brought NxGen MDx up and are adding another platform in August 2020. Main Line Health has the strength of an extensive, \$2 billion healthcare system. *“There was much clinical talent on our team. We did not need to listen to news outlets or the President regarding testing and treatment. Our*

⁸ <https://montco.today/2020/03/amidst-shortage-of-personal-protective-equipment-across-nation-main-line-health-seeks-donations/>.

staff was on the cutting edge of treatment options,” stated Lynch.

While Main Line Health still does not have a single high-volume platform that allows for rapid testing, it is reserving rapid tests for COVID-suspected patients and sending patients who are not COVID suspected to Quest for testing. Main Line Health is expecting another high-volume testing platform to become available in the fall. This will optimize the use of PPE and reduce the likelihood of COVID spread in urgent procedures when a patient’s COVID status is not known.

Third, there was a challenge of disseminating constantly changing information to a staff of more than 11,000. There was a critical need for effective management and leadership during such an unprecedented crisis. Phil Robinson, President of Lankenau Medical Center and Chris Torres, Vice President, Materials Management, led the charge on procuring PPE. Barbara Wadsworth, DNP, RN Senior Vice President and Chief Nursing Officer (CNO), led the charge on usage and distribution of PPE. In the structure of the leadership team, Main Line Health built-in redundancy in an overlapping structure so that if someone went out, others could take over.

Lynch was joined by other members of the leadership team for a virtual town hall at least once a week, typically about an hour and a half, open to all staff. The goal was to be transparent about Main Line Health’s COVID response – exposure counts, PPEs supply, and financial impact. Decisions on layoffs and merit increases were also discussed. At the time of this interview, Main Line Health still has about 1,200 people logging on to watch these town halls live, and even more who are watching the recording. It is impossible to over-communicate, and it has to come from the top.

Another important COVID response consideration was staffing. “*You cannot grow people on trees,*” stated Lynch as part of the interview. “*We did re-allocate people to new territories, but if a single ICU staff gets sick, it will be a big problem.*”

The leadership team was very mindful of employees working overtime. Staff needed to get rest for their safety and the safety of those they worked with and cared for. Wadsworth monitored staff time to check all working overtime, and re-deployed staff as necessary. To address the staffing gaps, and more so for direct-care staff, Main Line Health also explored ways to provide offsite child care support for the staff while ensuring the safety and

minimizing the risk of exposure for the staff and their children⁹. Main Line Health also directed non-clinical staff to work from home where possible, while the human resources department worked with the information technology department to make sure anyone who needed a laptop or special software to do their jobs had to access¹⁰

Staffing was also affected by the fact that the Main Line Health was furloughing staff who had possibly been exposed. Early on, when the number of cases was increasing exponentially on a daily basis, they asked Montgomery County Department of Health to announce community spread, and this allowed them to stop furloughing asymptomatic exposed staff, reducing the likelihood they would not be able to staff enough to provide patient care.

Whenever the leadership team was presented with a challenge, its focus was on safety. If there is an economic impact, but there was a safety priority, the leadership team went with safety as the priority.

OTHER TAKEAWAYS

Main Line Health adopted several measures and took some different steps during this crisis that is worth mentioning.

Visitor restrictions were put into place on March 13, 2020¹¹. Main Line Health continued to monitor CDC guidelines closely. The restrictions applied to all inpatient and outpatients in all hospitals and health centers. Visitors were permitted only for maternity patients and patients in an end-of-life scenario. All approved visitors had to pass a risk assessment screening before entering the facility. To communicate these restrictions—and the continuing measures in place to protect its staff and patients from the spread of COVID—Main Line Health continues to maintain a page on their website that details COVID response, as well all the media stories about expertise and insights from the health system’s staff and clinicians¹².

There was a shortage of paralytic drugs for ventilator use around April 2020. Ventilators require that a tube is inserted into the body to assist with breathing when a patient cannot. However, the human body quickly rejects any foreign substance. Paralytic drugs are given to the patients on ventilators to reduce the feeling of the tube inside the body. About 20% of Pennsylvania hospitals did not have a supply of two common paralytic drugs. It was unprecedented because many of the COVID patients require about one or two weeks of ventilator use. There was also concern around the scarcity of metered-dose inhalers to optimize the usage

⁹ <https://www.inquirer.com/health/coronavirus/schools-closed-pennsylvania-new-jersey-hospital-staffing-20200315.html?outputType=amp>

¹⁰ <https://www.Main Linehealth.org/news/2020/06/08/covid-19-news>.

¹¹ <https://www.Main Linehealth.org/news/2020/03/12/covid-19-response>.

¹² <https://www.Main Linehealth.org/news/2020/06/08/covid-19-news>.

TABLE 1: MAIN LINE HEALTH SYSTEM FACILITIES
LANKENAU MEDICAL CENTER, WYNNEWOOD, PA

A longtime teaching and research hospital, Lankenau Medical Center is committed to maintaining high-level expertise across all clinical areas—from primary care and disease prevention to medical and surgical management of all diseases and disorders.

BRYN MAWR HOSPITAL, BRYN MAWR, PA

A 234-bed, not-for-profit acute-care teaching hospital dedicated to helping the community stay well ahead on the path to lifelong health.

PAOLI HOSPITAL, PAOLI, PA

A 231-bed, not-for-profit acute care hospital and Level II Trauma Center

RIDDLE HOSPITAL, MEDIA, PA

A not-for-profit, acute-care hospital with 204 inpatient beds and 23 Transitional Care Center beds.

BRYN MAWR REHAB HOSPITAL, MALVERN, PA

It is one of the most comprehensive rehabilitation systems in the Mid-Atlantic and delivering advanced rehabilitation services for more than 40 years.

MIRMONT TREATMENT CENTER, MEDIA, PA

It is one of the Northeast region's leading facilities providing alcohol and drug addiction treatment for patients throughout the Mid-Atlantic and Philadelphia region since 1985.

HEMOCARE & HOSPICE, RADNOR, PA

Provides the full spectrum of home health, hospice, and private duty services to residents of Chester, Delaware, Montgomery, and Philadelphia counties.

MAIN LINE HEALTH CENTERS

Located in Broomall, Colledgeville, Concordville, Exton, Newtown Square, and King of Prussia all in PA, these centers offer primary care, specialists, laboratory, radiology, rehabilitation, and other outpatient services.

LANKENAU INSTITUTE FOR MEDICAL RESEARCH

A non-profit biomedical research organization on the campus of Lankenau Medical dedicated to advancing cancer and cardiac research.

MAIN LINE HEALTHCARE

It is located in Philadelphia and its western suburbs, the region's largest multi-specialty physician network.

of paralytic drugs. Metered doses are required for lessening the continuous inflow of infusions for patients who can be given regular, frequent dosages. Main Line Health addressed this issue by diverting resources between its various locations within its network.¹³ They also reached out to their regional partners for help, and another system shared their resources with Main Line Health.

Fifty-one hospitals at Pennsylvania were allocated Remdesivir, a promising antiviral drug, for the treatment of COVID. However, the federal government's process of allocating this drug to states was not made clear. Main Line Health was unhappy with this lack of transparency of allocation, especially considering the number of cases Pennsylvania had with the number that some other states had. For example, Rhode Island had around 12,000 cases, whereas Pennsylvania had around 62,000 cases when this allocation was made, and both the states got the same amount of Remdesivir.¹⁴ *“Remdesivir was federally allocated, and Pennsylvania was not one of the 13 states receiving it initially even though it ranked 5th in case count. Depending on the news source, patients and families wanted hydroxychloroquine or Remdesivir,”* said Lynch. An initial study on Remdesivir showed a non-significant reduction in mortality and a significant reduction in days at the hospital. *“The initial problem was access. Now we have the drug, and it is allocated based on medical need.”*

At a virtual town hall meeting held in mid-April 2020 with the regional experts, infectious disease specialist Dr. Brett Gilbert from Main Line Health outlined some of the steps taken by the organization to respond to the COVID pandemic. In early March, Main Line Health activated its command center at its corporate headquarters in Radnor, Pa. and elevated it to an orange status—which indicates a regional disaster. Main Line Health also came up with a surge plan that included a three-tier surge model that will have the capacity to treat 1,600 patients at one time.¹⁵

The command center that was set up for COVID had three teams of about 13 people from across several areas of the organization working for over 12 hours a day, seven days a week to determine and operationalize the protocols to ensure the safety of the patients and the staff. Protocols were updated to address multiple areas and operations such as, (1) directing patient flow inside the hospitals, (2) addressing the number of beds that will be required, (3) reviewing and optimizing testing procedures, and (4) Occupational Health, Infection Prevention, Infectious Disease, Information Technology, Performance Engineering, Communication,

¹³ <https://www.witf.org/2020/04/14/philly-area-hospitals-grapple-with-shortage-of-drugs-to-put-patients-on-ventilators/>

¹⁴ <https://why.org/articles/51-pennsylvania-hospitals-get-doses-of-covid-19-drug-remdesivir/>

¹⁵ https://www.delcotimes.com/news/coronavirus/delco-officials-detail-steps-to-battle-pandemic/article_3a03e408-7eac-11ea-b9cb-bb7fa88c6d43.html

and Logistics were additional critical players in the command center.

The fear of COVID kept many patients away from hospitals out of fear of contracting the virus. Main Line Health saw a reduction in hospital care and in the volume of patients who reported to the emergency department for heart attacks, strokes, or infections. While the cases of hospital visits due to COVID increased, the cases of hospital visits due to other health reasons went down¹⁶. Additionally, the hospitals began cutting down on elective surgery and rescheduling them as required. For routine patient visits, Main Line Health turned to telemedicine.¹⁷ Main Line Health administrators want to see a steady, two-week decline in COVID-19 hospitalizations before phasing in elective procedures, which Lynch said he hopes will come by mid-May. As of the last week of April 2020, the system had reported 230 coronavirus patients. The number had gone down from 280 as of April 15, 2020. However, the trend is uneven.¹⁸

The COVID pandemic has also had a significant impact on seniors. As dictated by the CDC, seniors need to be socially isolated as much as possible. This has created additional health problems for an already vulnerable population, including reports of anxiety and a general feeling of loneliness, which can impact physical and mental health.¹⁹ Mental health has been an important consideration during this crisis, and it has not been unique to seniors.²⁰ A national survey of 5,600 people by the Main Line Health Center for Population Health Research at the Lankenau Institute for Medical Research found that more than half of respondents under age 40 had anxiety levels that would typically warrant talking with a mental health professional²¹. As Main Line and other Philadelphia hospitals prepared for COVID surge²², they were hit by the dilemma of how to provide adequate hospital care with inadequate facilities. Main Line Health and Penn Medicine became the latest hospitals to introduce

drive through testing for people with referrals from their doctors for COVID testing²³. Pop-up COVID testing sites drew worrying patients²⁴ run by nearby Penn Medicine and Jefferson Health. Main Line Health had drive-up tents for people to be tested without getting out of their cars. Of the

2,000 people that were tested as of March 27, 2020, around a quarter of them had positive results. Main Line Health had access to 259 ventilators and had ordered additional dozens. If required, the intensive care units could be expanded from 131 beds to 250 beds by utilizing other areas such as pre-operative and post-operative areas.²⁵

CONCLUSION

Since it faced its first COVID cases in early March, Main Line Health has been quick to respond to this pandemic, always with the safety and health of its patients in mind. While Main Line Health, like many hospitals across the world, faced many new challenges, it has continued to maneuver through difficult times by keeping the safety and wellbeing of its community in mind. “Our response to this crisis was only possible because of the dedication and expertise of our team members. They deserve the credit for saving so many lives and caring for so many that unfortunately succumb to the disease,” said Lynch.

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¹⁶ <https://philadelphia.cbslocal.com/2020/04/21/coronavirus-latest-doctors-say-fear-of-covid-19-could-be-keeping-patients-from-hospitals/>

¹⁷ <https://www.inquirer.com/health/coronavirus/coronavirus-covid-19-philadelphia-health-system-restrictions-20200316.html>

¹⁸ <https://www.MainLinehealth.org/news/2020/06/08/covid-19-news>

¹⁹ <https://6abc.com/society/how-coronavirus-is-changing-daily-life-for-seniors-/6025378/>

²⁰ <https://6abc.com/health/minding-your-mind-during-the-covid-19-crisis/6047100/>

²¹ <https://www.MainLinehealth.org/news/2020/06/08/covid-19-news>

²² <https://www.inquirer.com/health/coronavirus/philadelphia-coronavirus-cases-hospitals-testing-covid-20200327.html>

²³ <https://www.inquirer.com/health/coronavirus/coronavirus-penn-medicine-drive-through-testing-confusion-20200316.html>

²⁴ <https://www.inquirer.com/health/coronavirus/coronavirus-covid19-testing-sites-philadelphia-20200317.html>

²⁵ <https://www.inquirer.com/health/coronavirus/philadelphia-coronavirus-cases-hospitals-testing-covid-20200327.html>