

Quality Report Card



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PATIENT SAFETY

mRNA Vaccines Could Be the Future for Immunization

Immunizations play an important role in saving millions of lives each year by preventing life-threatening diseases and illnesses. The onset of the coronavirus pandemic in early 2020 prompted an urgent need for a vaccine that could be manufactured quickly and distributed in mass quantities. The race to find a vaccine for SARS-CoV-2, the coronavirus that causes COVID-19, prompted new innovations in vaccine technology as scientists researched the possibility of messenger RNA (mRNA) vaccines against infectious diseases.

Vaccines train the immune system to recognize and respond to the proteins produced by disease-causing organisms, such as a virus or bacteria. Conventional vaccines contain a weakened version of the live virus or a small amount of inactive virus that is injected into the body to provoke a response in the immune system. mRNA vaccines work differently by replicating the genetic code of a virus to trick the body into producing antibodies without requiring the virus itself to be injected.

Ribonucleic acid (RNA) is a single-stranded molecule found in the nuclei of cells, and mRNA is a type of RNA that carries genetic code which produces the cell's proteins. An mRNA vaccine contains instructions that direct cells in the body to make

antigens that will induce an immune response to prevent or fight disease. Once antibodies are created, the body acquires a defense against infection.

There are several advantages of mRNA vaccines over conventional ones, including safety, efficacy and production. mRNA vaccines are made with non-infectious material and are non-replicable, which means that the virus is not present in the vaccine and there is no potential risk of infection from the virus it mimics. Early clinical trials of mRNA vaccines have produced a reliable immune response with minimal side effects; however, more large-scale human trials are needed to support these initial findings. Unlike conventional vaccines, gene-based vaccines do not need to be grown in eggs or cells, a process that can be time-consuming and costly. Instead, they are produced in a laboratory from a DNA template using readily available materials that allows for rapid mass-production.

One challenge with mRNA vaccines is the requirement of ultra-cold temperatures for shipping and storage. Researchers are working on ways to make mRNA vaccines more stable, particularly for countries that have limited refrigeration facilities. Another disadvantage is the unknown length of protection that mRNA vaccines may provide against a disease – data that only can be acquired through more large-scale clinical trials.

In addition to research on mRNA vaccines against COVID-19, the technology also is being used to create vaccines that can generate antibodies to target other infectious diseases, such as HIV, Zika, Ebola and influenza. Cancer vaccines in which mRNA targets cancer-specific antigens also are being explored. Clinical trials for mRNA vaccines are being conducted for a number of cancers, including esophageal, lung, ovarian, melanoma and blood cancers.

There is great potential for mRNA vaccines to become a standard treatment in medical care, but more research and clinical trials must be performed to determine their long-term effectiveness. Two of the potential vaccines against COVID-19 being created are mRNA vaccines, which are among the first to be used in large-scale human trials. If successful, the new vaccines could usher in a new approach to fighting infectious diseases.





Patient Story – Jean Ritchey

A COVID-19 diagnosis can be frightening for patients due to the uncertainty of recovery and the ever-changing information available about the disease. Even going to a medical facility to be tested or seek treatment can be daunting as organizations attempt to limit the spread of the virus. Jean Ritchey knew it was possible she had contracted COVID when she drove to the Licking Memorial Hospital (LMH) Emergency Department. She spent the weekend with her daughter, Deanna, a clinical trainer of registered nurses, who had tested positive for the virus. Jean did not have a fever and hoped her trouble breathing could be attributed to a sinus issue.

Jean reported to the nursing facility where she is employed for a weekly COVID-19 test. She had been experiencing mild symptoms for a few days and informed the facility about her contact with a COVID-positive person. She was asked to go home and quarantine. Jean had been experiencing mild symptoms for a few days, but was feeling much worse by Tuesday. In the early evening, she could not walk from the chair in her living room to her television. Later that night, her sister called and was worried because Jean sounded like she could barely breathe. "I felt so weak and miserable, and my sister encouraged me to call 911," Jean explained. "The Emergency Medical Services (EMS) crew came to my house and checked my blood pressure and oxygen levels. The process for transporting a patient suspected of COVID was complicated, and I did not want to be a bother. They did say my oxygen level was concerning, so I told them I would drive myself to LMH."

When Jean arrived at the LMH ED, she was checked for a fever and had none, but reported having an extreme headache. Staff members made her comfortable and began running tests that soon revealed that she did indeed have COVID-19. The ED physician explained that she would be admitted to the COVID unit and would receive a plasma transfusion which would help her fight the disease. "The physician and nurses started working right away to get me settled in a room and comfortable. In addition to

COVID, they discovered I had a urinary tract infection (UTI) and pneumonia," Jean said. She was very curious about all that was going on around her and began asking questions. "Edna Goodwin, R.N., took her time with me and answered as many of my questions as possible. She was so gentle when it came to inserting the needles for shots and the like," Jean shared. "I felt reassured, and the staff made me feel so comfortable that I was able to fall asleep and rest."

Jean was very concerned about receiving the plasma transfusion. She was unsure what the process entailed and how it would affect her. While in the ICU, Philip Savage, D.O., attended to Jean and explained convalescent plasma therapy. The process begins with blood donated by people who have recovered from a disease or illness such as COVID-19. The donated blood is processed to remove blood cells, leaving behind the liquid known as plasma and antibodies which can be given to people with COVID-19 to boost their ability to fight the virus. The therapy was authorized by the U.S. Food and Drug Administration (FDA) as a treatment for COVID-19. "I was so impressed with Dr. Savage. My daughter was on the phone and he allowed her to ask questions as he stood by my bedside and carefully explained my treatments to Deanna and me," Jean said.

In addition to convalescent plasma therapy, Jean received a number of medications specifically found to assist in the recovery of COVID-19. Remdesivir is an antiviral medication that targets a range of viruses. It was originally developed over a decade ago to treat hepatitis C and a cold-like virus called respiratory syncytial virus (RSV). The medication works by interrupting production of the virus. Coronaviruses have genomes made up of ribonucleic acid (RNA). Remdesivir prevents the virus from multiplying by interfering with one of the key enzymes the virus needs to replicate RNA. After studies completed earlier in 2020, the results indicated that remdesivir accelerated recovery for hospitalized patients with COVID-19 and it became the first drug to receive emergency use authorization from the FDA as a treatment for the virus. Jean also was given dexamethasone, a corticosteroid used in a wide range of conditions for its anti-inflammatory and immunosuppressant effects. Physicians and researchers have found that COVID-19 can cause an overreaction of a patient's own

immune system leading to some immune cells attacking healthy tissue as well as the virus. The immune cell attacks can cause permanent damage to the lungs. Dexamethasone suppresses the immune system making such attacks less likely.

Wednesday, after the transfusion and medications, Jean's oxygen levels quickly returned to normal and Dr. Savage told her she was ready to go home. "I could not believe it, but Dr. Savage said I had recuperated well, and he felt confident that I could safely continue my recovery in my own house," Jean said. "I did purchase a portable blood oxygen sensor so that I could make sure my level stayed in the 90s." Jean spent two weeks at home working to regain strength and complete her recovery from the virus, UTI and pneumonia. "Dr. Savage is a true asset to LMH. He is knowledgeable, kind and willing to take time to talk with his patients. I am so grateful to him and the staff at LMH for all they did for me." Jean is 1 of 13 siblings, and many of whom still live close offered their support during her recovery. Her two grandchildren, Bryce and Celeste, also were a comfort to her.

LMHS continues to monitor the situation surrounding COVID-19 and is taking all necessary steps and precautions to keep patients, staff and visitors safe. Per guidance from the Centers for Disease Control and Prevention, if you have had close contact with someone who has a confirmed case of COVID-19 – within six feet of an infected person for a cumulative total of 15 minutes or more over a 24-hour period, and if you are exhibiting symptoms of the virus, you should be tested. A Walk-in Testing Clinic, located at 131 McMillen Drive in Newark, is available for those who are experiencing COVID-19 symptoms including fever, a new or worsening cough, shortness of breath, and muscle pain or fatigue. Patients may visit the LMH Walk-in Testing Clinic, Monday through Friday, from 12:00 Noon until 5:00 p.m. Patients will be directed to remain in their car until a numbered parking spot is available. Once parked, they may enter the Testing Clinic where staff will complete a screening and determine if testing is appropriate. Testing also is available at select primary care physician offices or one of three LMH Urgent Care locations – Granville, Pataskala or Downtown Newark; however, any co-pay associated with a physician or urgent care visit will apply. Only those with severe symptoms should visit the LMH Emergency Department.

Patient Safety – How do we compare?

At Licking Memorial Health Systems (LMHS), we take pride in the care we provide. To monitor the quality of that care, we track specific quality measures and compare to benchmark measures. Then, we publish the information so you can draw your own conclusions regarding your healthcare choices.

1. The Institute of Medicine published a report in 2000 that highlighted the stunning effects of medication errors. The report set forth a national agenda for reducing errors and improving patient safety by designing a safer health system. Although the medication error rate at Licking Memorial Hospital (LMH) is significantly better than the national benchmark, we make continuous efforts to improve the process. LMH dispensed 1,213,614 doses of medication in 2019.

	LMH 2017	LMH 2018	LMH 2019	National ⁽¹⁾
Medication errors per 1,000 doses	0.015%	0.015%	0.015%	0.310%

2. Protecting patients from hospital-acquired infections is a primary patient safety goal. LMH has an ongoing program to prevent and treat infections in patients. Per the Centers for Disease Control and Prevention (CDC) recommendations, LMH tracks high-risk patients, including those with an increased risk of infection due to the presence of an invasive device, such as a ventilator, catheter or central venous line. The following data reflect how many infections occurred during 1,000 patient days compared to the national benchmarks.

	LMH 2017	LMH 2018	LMH 2019	National ⁽²⁾
Urinary tract infection rate for ICU patients with urinary catheters, per 1,000 days of usage	0.6	0.0	0.4	0.6
Urinary tract infection rate for patients outside of ICU with urinary catheters, per 1,000 days of usage	1.83	0.49	0.78*	0.48
Bloodstream infection rate for ICU patients with central venous catheters, per 1,000 days of usage	1.7	0.0	0.0	1.1
Bloodstream infection rate for patients outside of ICU with central venous catheters, per 1,000 days of usage	0.0	0.0	1.08*	0.18

*Throughout a period of 1,000 days of device usage in 2019, two individuals were diagnosed with a urinary tract infection, and one individual was diagnosed with a bloodstream infection.

3. LMH conducts a comprehensive assessment to determine if a patient is at risk for a fall at admission and during the Hospital stay. Personal alarms and bed sensors help alert staff to a potential fall.

	LMH 2017	LMH 2018	LMH 2019	Goal
Inpatient falls, per 1,000 patient days	2.6	2.9	3.8	less than 3.0

4. Acute care mortality refers to patients who pass away while admitted as inpatients in the hospital. While mortality within the hospital is not uncommon, it can be a valuable indicator in determining how effectively the hospital manages crisis situations as well as its ability to rescue the patient in an emergency. Other factors, such as nurse staffing levels, staff knowledge and experience, and early recognition of patient deterioration all can have an impact on inpatient mortality. Sepsis is a body's overwhelming and life-threatening response to an initial infection of microbes that can be bacterial, viral or fungal. It can be difficult to diagnose. LMHS has safety measures in place to detect early signs of sepsis. Lower rates are preferable.

	LMH 2017	LMH 2018	LMH 2019	National ⁽³⁾
Inpatient mortality	1.20%	1.34%	1.24%	2.22%
Sepsis mortality rate, per 1,000 patients	8.9%	10.3%	9.3%	State⁽⁵⁾ 14.9%

5. During the annual influenza (flu) season, keeping the LMHS employees healthy by providing flu vaccinations can, in turn, protect patients from potential influenza infections. LMHS is committed to encouraging and providing free, easily accessible flu vaccines to all employees.

	LMHS 2017	LMHS 2018	LMHS 2019	LMHS Goal	National ⁽⁴⁾
LMHS employees receiving the seasonal influenza vaccine	94%	95%	95%	greater than 80%	64.3%

6. Warfarin (also known as Coumadin) is a blood thinner, which also is called an anticoagulant. It is used to help prevent and treat blood clots. The most common side effect of warfarin is bleeding in any tissue or organ. It is important for patients to have a prothrombin time (PT) and International Normalized Ratio (INR) blood test regularly to help the physician determine the blood clotting rate and whether the dosage of warfarin should change. The testing is very important and must be accomplished at recommended intervals in order to keep the PT/INR result in the best and safest range for the medical condition. Licking Memorial Health Professionals (LMHP) has adopted this recommendation as a safety measure. Note: Patients who visit the Licking Memorial Medication Therapy Clinic are not included as LMHP patients.

LMHP patients on warfarin having a current PT/INR within recommended guidelines	LMHP 2017 93%	LMHP 2018 94%	LMHP 2019 97%	LMHP Goal greater than 90%
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7. Metformin (trade name Glucophage) is a medication that is used in the treatment of diabetes mellitus and polycystic ovarian disease. It is an effective medication for treatment of both of these unrelated disease processes, but must be used cautiously in patients with compromised renal (kidney) function. It is recommended to monitor renal function prior to initiation of therapy and at least annually thereafter. LMHP has adopted this recommendation as a safety measure.

LMHP patients on Metformin with a renal function test within last year	LMHP 2017 92%	LMHP 2018 93%	LMHP 2019 92%	LMHP Goal greater than 90%
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Data Footnotes: (1) *To Err Is Human – Building a Safer Health System*, National Academy Press, Washington D.C., 2000. (2) CDC National Healthcare Safety Network pooled median (ICU only) from January 2006-December 2007, issued November 2008 (3) Comparative Data from the Midas Comparative Database. (4) Centers for Disease Control and Prevention (CDC), Interim Results: Seasonal Influenza Vaccination Coverage Among Health-Care Personnel, *MMWR* April 2, 2010 / 59(12); 357-362. (5) OHA

Health Tips – Patients with COVID-19 Encouraged to Seek Medical Care

It is important for individuals to seek medical care when needed, especially if they are experiencing symptoms of COVID-19. A delay in medical care could result in health complications later, which can lead to costly treatments. Licking Memorial Health Systems (LMHS) has implemented a number of safety policies and procedures to ensure that medical visits are safe for patients, visitors and staff.

Individuals who have a scheduled medical appointment and are exhibiting symptoms of COVID-19 should notify their healthcare provider before visiting the facility. Healthcare staff will be able to instruct patients on steps to take, such as wearing a face mask and remaining in their vehicle

until their scheduled appointment time, which will ensure a safe visit for everyone involved. In cases of emergency, it is recommended to call 911 or go to the Licking Memorial Hospital (LMH) Emergency Department (ED) immediately and to notify the operator that the person seeking medical care may have COVID-19.

Symptoms that may require examination and treatment at the LMH ED include:

- Acute chest pain
- Shortness of breath
- Fainting
- Sudden weakness or drooping part of the body
- Difficulty speaking
- Changes in vision

- Acute headache
- Abdominal pain that is severe or does not resolve in a few hours
- Prolonged vomiting
- Suicidal thoughts

LMHS has several policies in place to make sure its healthcare facilities are safe environments during the COVID-19 pandemic. Employees undergo daily temperature checks and are required to wear appropriate personal protective equipment when performing their duties. Patients with COVID-19 are isolated, and Environmental Services staff maintain a frequent sanitization schedule of surfaces and equipment in all LMHS buildings.



Licking Memorial Health Systems

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Please take a few minutes to read this month's report on **Patient Safety**. You'll soon discover why Licking Memorial Hospital is measurably different ... for your health!

The Quality Report Card is a publication of the LMHS Public Relations Department. Please contact the Public Relations Department at (220) 564-1572 to receive future mailings.

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