

Northwestern Medicine Completes the First Known Double Lung Transplant in the United States to Save a Patient After COVID-19 and then Performs on a Second Patient Soon After

She was healthy and in her 20s. But after battling COVID-19 for six weeks while being supported by a ventilator and extracorporeal membrane oxygenation (ECMO), a life support machine that does the work of the heart and lungs, her lungs had suffered irreversible damage from the virus. The [lung transplant team](#) put her on the organ donation list for a double-lung transplant; 48 hours later, the patient received a new set of lungs at Northwestern Memorial Hospital. It was the first procedure of its kind in the United States for a patient whose lungs were damaged by COVID-19.



**Ankit Bharat,
MD, FACS**

Chief, Thoracic
Surgery
Director, Lung
Transplant & Lung
Rescue Program

“Due to the ability of Northwestern Medicine’s [ECMO program](#) to support patients with life-threatening lung failure for extended durations, the patient could get adequate time to clear the virus from her body, allowing the consideration of transplantation,” adds [Ankit Bharat, MD](#), chief of thoracic surgery and surgical director of the [Northwestern Medicine Lung Transplant Program](#).

The procedure, which lasted 10 hours, was especially difficult because of the inflammation that had occurred from the disease. Her lungs were “completely plastered to tissue around them: the heart, the chest wall and diaphragm.” Essentially, they were devastated from the disease.

But the surgical team was relentless in their quest to give the patient a second chance at life. “You have someone in their 20s, who’s otherwise healthy,” Dr. Bharat says. “We wanted to give her every option. Everybody was just rooting for her.”



**Dr. Ankit Bharat,
Dr. Rade Tomic,
Medical Director of
Lung Transplant, and
patient Mayra Ramirez**

A Second COVID-19 Double Lung Transplant

Northwestern Medicine surgeons also [performed](#) a double lung transplant on a second COVID-19 patient over the July 4th weekend. The patient, a man in his 60s, spent 100 days on ECMO. The patient became infected with the new coronavirus in late March and initially received care at a different health system. He was transferred to Northwestern for consideration of a double-lung transplant.

The patient's lungs had been damaged as a result of COVID-19. Before coming to Northwestern, he had major chest surgery after developing an invasive infection. “His lung damage was among the worst I've ever seen,” said Samuel Kim, MD, a thoracic surgeon at Northwestern, who assisted in the double lung transplant. “When we opened the chest cavity there was a lot of evidence of infection; everything we touched or dissected started bleeding, and one misstep could have led to catastrophic consequences.”

Dr. Bharat hopes other surgeons begin to consider transplant as an option for patients after COVID-19. “We want other transplant centers to know that while the transplant procedure in these patients is quite technically challenging, it can be done safely,” he says. “It offers terminally ill patients another option for surviving COVID-19. We are hoping to help patients from all over the world who are still on the ventilator despite clearing the COVID-19 virus.”

Northwestern and Shirley Ryan AbilityLab Invent First Wearable Device that Continuously Tracks Key Symptoms – Monitoring COVID-19 from Hospital to Home

The more we learn about the novel coronavirus (COVID-19), the more unknowns seem to arise. These ever-emerging mysteries highlight the desperate need for more data to help researchers and physicians better understand — and treat — this extremely contagious and deadly disease.

Researchers at Northwestern University and Shirley Ryan AbilityLab in Chicago have developed a novel wearable device and are creating a set of data algorithms specifically tailored to catch early signs and symptoms associated with COVID-19 and to monitor patients as the illness progresses.

Capable of being worn 24/7, the device produces continuous streams of data and uses artificial intelligence to uncover subtle, but potentially life-saving, insights.

Filling a vital data gap, it continuously measures and interprets coughing and respiratory activity in ways that are impossible with traditional monitoring systems.

About the size of a postage stamp, the soft, flexible, wireless, thin device sits just below the suprasternal notch — the visible dip at the base of the throat. From this location, the device monitors coughing intensity and patterns, chest wall movements (which indicate labored or irregular breathing), respiratory sounds, heart rate and body temperature, including fever. From there, it wirelessly transmits data to a HIPAA-protected cloud, where automated algorithms produce graphical summaries tailored to facilitate rapid, remote monitoring.

“The most recent studies published in the Journal of the American Medical Association suggest that the earliest signs of a COVID-19 infection are fever, coughing and difficulty in breathing. Our device sits at the perfect location on the body — the suprasternal notch — to measure respiratory rate, sounds and activity because that’s where airflow occurs near the surface of the skin,” said Northwestern’s [John A. Rogers](#), who led the technology development. “We developed customized devices, data algorithms, user interfaces and cloud-based data systems in direct response to specific needs brought to us by frontline healthcare workers.

We’re fully engaged in contributing our expertise in bioelectronic engineering to help address the pandemic, using technologies that we are able to deploy now, for immediate use on actual patients and other affected individuals. The measurement capabilities are unique to this device platform — they cannot be accomplished using traditional watch or ring-style wearables that mount on the wrist or the finger.”

Warning system for the most at-risk

Not only can the device monitor the progress of COVID-19 patients, it could also provide early warning signals to the frontline workers who are most at risk for catching this remarkably infectious disease. The device offers the potential to identify symptoms and to pick up trends before the workers notice them, thereby providing an opportunity to engage in appropriate precautionary measures and to seek further testing as quickly as possible.

Rogers hopes the device will also inform researchers about the nature of the virus itself. “The growing amount of information and understanding around COVID-19 as a disease will be critically important to containing and treating the current outbreak as well as those that might occur in the future,” he said.

This wireless sensor project is one of several current efforts led by Northwestern researchers who are [on the front lines of the COVID-19 crisis](#).



Wireless sensor gently sits on throat to monitor coughs, fevers, and respiratory activity

New Breakthrough Webinar Series Launched!

We are happy to announce that the Northwestern Medicine International Health Team will be hosting a Breakthrough in Clinical Care and Cutting-Edge Research Webinar Series to discuss the hottest topics in healthcare!

Join us on *September 24th at 7:00am US Central Time / 3:00 pm GMT+3 / 4:00 pm GMT+4* for our live global summit, **“Managing the Next Pandemic: Uniting Global Clinical Leaders on COVID-19”**.

Join a live discussion with a **Global Panel of Experts** to discuss how we can come together to manage the next global health crisis and care for our patients.

We hope to uncover and understand how each country responded with the goals of:

- Sharing unique country hospital experiences and responses
- Finding ways for continuous improvement during pandemics across hospitals
- Building vehicles to share developing learnings and observations in clinical care for future health crises

CHINA



Dr. Hongzhou Lu
Professor, Department of
Infection and Immunity
Co-Director, Shanghai
Public Health Clinical
Center,
Fudan University



Dr. Wenhong Zhang
Chief, Department
Center of Infectious
Diseases,
Huashan Hospital of
Fudan University

[Click Here to Register for this Webinar](#)

ITALY



Dr. Claudia Ruffini
Chief, Hospital Response
Plan to Mass Casualty
Incident and local EMS
Unit
Luigi Sacco University
Hospital

MEXICO



Dr. Enrique Ruelas
President and CEO,
International Institute
for Health Futures

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Dr. Ki Nam Jin
Professor,
Department of
Health
Administration,
Yonsei University

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**Dr. Nawal Ahmed
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Chief Medical Officer
- Medical Affairs,
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Dr. Michael Ison
Professor, Infectious
Diseases, Medical
Director, Transplant &
Immunocompromised
Host Infectious Diseases
Services,
Northwestern University



Dr. Enrique Schisterman
Senior Investigator and
Epidemiology Branch
Chief,
National Institutes of
Health

Other Upcoming Breakthrough Webinar Series:

The Significant Impact of COVID-19 on the Heart

Dr. Clyde Yancy discusses concerns about long-lasting damage.

January 13, 2021

7:00 am US Central

3:00 pm GMT+3

4:00 pm GMT+4

*For more information on any
upcoming International
Health events, please contact
international@nm.org*

A Message from the International Health Team



Jared C. Robins, MD
Medical Director,
International Health



Susan Helfrich, MBA, RN, BSN
Program Director,
International Health

We hope you are having a good summer in the midst of these challenging times. We want you to know that Northwestern faculty, staff, students and alumni are helping to lead the response to the global challenge that is the coronavirus pandemic.

From high-impact research, drug trials and innovative new projects, our scientists are helping mitigate COVID-19. In our communities, experts and volunteers are pitching in, performing tasks large and small to help lift up neighbors and those in need.

On campus, the fabric of the Northwestern University community is being remade in the digital space so everyone can work, learn and laugh together in ways that feed the soul and sustain us all.

We invite you to follow [Northwestern Now](#) for coverage of the pandemic and storytelling on how Northwestern is responding. As always, please feel free to reach out to Dr. Robins jared.robins@nm.org or Susan susan.helfrich@nm.org with any questions, thoughts or feedback on how we can better serve you.



Lindsey Kreutzer, MPH
Senior Practice Manager,
International Health

I am excited to join the International Health team and look forward to meeting with each of our international partners both virtually and in person. My previous position with Northwestern Medicine was as a Manager in Quality. I led a team responsible for implementing large scale, innovative quality initiatives across Northwestern Medicine utilizing rigorous quality and process improvement methodologies. I look forward to applying these skills in International Health as we continue to emphasize continuous quality improvement to further elevate the level of service we provide to our partners and every patient we serve. My educational background is in international studies and global health and it is paired with a personal love for travel and learning about new cultures. I am personally and professionally dedicated to International Health and am immensely excited to be part of this team.

COVID-19 has certainly provided many challenges not only for our patients but also for our team. It has required that our team work remotely which was a learning experience for us all. However, with each challenge there is also opportunity, and I've personally valued this time to meet and build a relationship with every member of our team. We are all dedicated to our work and cannot wait to be back in the office serving our patients. We've virtually celebrated every personal triumph of our patients whether it was a baby born to one of our IVF patients or an individual finally receiving a lifesaving organ. Our commitment is always to our patients near and far, and we are so excited to welcome you all back to Northwestern Medicine. Please always feel free to reach out to me with any questions, comments, or concerns at lindsey.kreutzer@nm.org.