Dr. Robert Havey spoke today about global health. Recently the Northwestern Global Health Institute was re-named the Robert Havey Institute of Global Health with three goals:

1) Educate the next generation of global health leaders
2) Provide care to the world's population that lacks access
3) Accelerate research

The Robert Havey MD Institute for Global Health has multiple centers within it. One is the Center for Global Infectious Diseases. Prior to COVID-19 there were multiple global infections including: HIV, Malaria, Tuberculosis, Viral Hepatitis, Zika and Ebola. So we have to be poised and ready that COVID will likely not be the last. The Institute also has a Global Cardiovascular Health Center. One of every 3 deaths worldwide is due to cardiovascular disease. Nigeria has a population of 200 Million. The leading causes of death in Nigeria are heart attack and stroke (similar to the US). Because of this, a lot of Global Health research impacts US citizens as well. The Center for Global Surgery was created because five billion people worldwide have no access to modern surgical care. If a patient is born in the US with a congenital abnormality of the digestive system, the survival rate is 95%. If the patient lives in a poorly resourced country, there is only a 60% survival rate. The Center for Global Oncology addresses access to cancer care, which is almost non-existent in many countries. There is also a huge need for more trained oncology specialists across the world. The Center for Global Health Education sponsors global health rotations. Northwestern is the #1 medical school in the US in support of global health rotations. Northwestern medical students travel to countries to experience global health and understand the challenges faced in real time. The Center is also training scientists in lower income countries for example in Nigeria. For $36,000 six PhDs were trained in their home country. The Ryan Family Center for Global Primary Care was recently established. There are eight billion people in the world and half do not have access to modern health care. We have to find ways to offer preventive care and timely diagnosis for conditions such as diabetes. Viruses and bacteria evolve and change. To understand and respond to this we have to understand the genomics of pathogens. The Institute has a Center for Pathogen Genomics and Microbial Evolution. Next will be a Center for Global Neurology. COVID-19 has a lot of neurologic sequelae and there are not enough trained experts. For example, our students rotate in Zambia. There are only 5 neurologists in Zambia.

Dr Havey next talked about COVID-19. In the Northwestern 11 hospital system we still have some patients admitted but it is far lower than at the peak last year. So there is some cause for optimism although the pandemic is not over. Influenza season is coming. So we should be prepared for other respiratory pathogens. (Don't forget to get your flu shot!)

Mutations of the SARS-COV2 virus have occurred during the pandemic. When mutations occur, it changes how the virus responds to treatments. There are several SARS-COV2 viral variants: Alpha, Beta, Delta, Epsilon, Gamma, etc. Alpha and Delta were the two that hit the peaks of COVID transmission in humans. Delta is more contagious and more resistant to treatment than Alpha.

What happens when an individual receives a COVID-19 vaccine? MRNA vaccines (Pfizer and Moderna) turn on antibody production and T cell responses. The Pfizer vaccine works well against both common variants (Alpha and Delta). Effectiveness against Delta was a great cause of concern, but despite the mutation the vaccines remained effective. A large Mayo Clinic study of more than 600,000 people compared Pfizer and Moderna vaccinated persons to unvaccinated persons. Unvaccinated persons had a much greater risk of COVID-19 infection. Vaccinated persons were far less likely to become seriously ill, get hospitalized or die from COVID-19.

Dr. Havey discussed use of new vaccine regimens. New research has also shown that you can mix vaccines. In Europe, researchers are mixing Astra Zeneca and Pfizer (1 dose of each) with good results. Patients have immunity approaching the two dose Pfizer results and better than two Astra Zeneca injections. For this reason, persons who received the Johnson and Johnson vaccine (not an MRNA vaccine) may be advised by their physician to get a booster with one of the MRNA vaccines (either Pfizer or Moderna).

What about booster shots? Studies from Israel were used as part of the rationale for booster approval in the US. Studies showed that after a few months protection waned somewhat resulting in breakthrough cases. However, antibody production increased and new breakthrough cases were reduced after a booster injection. Many persons in the US have already received booster shots and broader approvals are likely to come.

Dr. Havey next covered COVID-19 testing. At the beginning of the pandemic, it would take two weeks to get results! We can test looking for the antigen (viral protein marker) or use a molecular assay. What is the difference? A rapid test is an antigen test. These are available at drugstores and use a nasal swab. If there is virus protein in the swab it shows up as a positive test (looks similar to a pregnancy test). These antigen tests are about 80% accurate. A Polymerase Chain Reaction (PCR) test is different. It may also use a nasal swab but looks for viral genetic material in the sample. In a PCR test, genetic material is amplified using heat and cool cycles so that even a tiny amount of coronavirus genes in a patient's sample can be detected. These tests are highly accurate but require expensive and sophisticated equipmen.t Research is underway at Northwestern to find additional ways to test for COVID-19 infection quickly and with great accuracy.

How did vaccines get developed so quickly? Actually scientists have been working on this for quite some time. The SARS Co-V outbreak was more than 15 years ago. (see here for additional info: https://www.cdc.gov/sars/index.html) Scientists were considering ways to develop vaccines including using MRA technology since that time. We know that the virus enters the body through the nose and uses spike proteins to bind to receptors in human cells. Vaccines against spike proteins can prevent the virus from binding to cells so they cannot enter and replicate. Investigators at Northwestern who had studied SARS quickly defined the structure of the COVID-19 virus in early 2020 so they could target specific parts of the virus for vaccines or drugs to prevent its infectivity and spread. This research is publically available so other researchers can address this problem as well.

Today we were reminded about why global health is so important. Thinking locally is insufficient in today's world. For more information about COVID-19 and your health, ask your personal physician. Other resources include:

https://www.globalhealth.northwestern.edu/

https://www.cdc.gov/coronavirus/2019-ncov/index.html

Thank you to Shirley Ryan for encouraging us to continue to learn every day. You are an inspiration!

Diane B. Wayne, MD