



Joseph E. Kerschner, MD

Local Efforts Making a Global Impact in the Fight Against COVID-19

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Medical schools and teaching hospitals educate the next generation of physicians, conduct cutting-edge research that saves lives, and care for the sickest and most complex patients. Collectively known as “academic medicine” or “academic health systems,” these institutions work together to educate and train the next generation of physicians, biomedical scientists, pharmacists, and other health professionals. In the best of cases, including in Wisconsin, these institutions partner with others in the health arena and the community to provide advantages for populations in the entire region. As major centers of research, they discover and pioneer new and more effective medical treatments that set the standard of care throughout medicine and raise all boats for the care of patients in their local regions and beyond.

Combating diseases and epidemics can only be sustained with continued medical advancements. The nation’s medical schools and teaching hospitals conduct 55 percent of the extramural medical research supported by the National Institutes of Health (NIH). This research has saved lives and improved the quality of life for millions, as well as produced many medical firsts and breakthroughs, including better treatments for heart disease, stroke and diabetes; new techniques such as

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organ, bone and stem cell transplants and minimally invasive surgery; novel discoveries, and cancer treatments that have saved more than 2.4 million lives since 1991; and all

the work at MCW is connected to the Midwest Respiratory Virus Program (MRVP) in MCW’s Department of Pediatrics. This group, combined with the pediatric and clinical practices,

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210 drugs approved by the US Food and Drug Administration between 2010-2016.¹

In the past few months, the novel coronavirus (COVID-19), its impact, and potential solutions, have occupied the consciousness of nations around the globe. Medical schools, including the Medical College of Wisconsin (MCW), and their associated academic health systems, stand at the front lines in the United States in developing plans, providing systems of care, and investigating potential solutions.

The benefits of a medical school and academic medicine are often felt locally – such as cutting-edge cancer clinical trials or Level 1 Trauma care for seriously injured patients. In important ways, however, local efforts can make a global impact, and this is occurring in the current fight against COVID-19. Much of

is focused on developing a rapid molecular diagnostic approach for COVID-19 that can be used in clinical laboratories, allowing a reduction in turnaround time for diagnosis of the disease from the current three days to less than one hour. We expect to translate our academic development into real-world testing in the near future.

The impact in creating new diagnostic techniques to assist diagnosis and limit disease spread was highlighted during the H1N1 (Swine Flu) outbreak in 2009, when the MRVP developed a specific type of molecular testing that allowed for rapid and highly specific diagnosis of this dangerous infectious disease. Our partnership with health systems throughout the state enabled Wisconsin to rank as one of the only states in the country to provide a large

volume of testing throughout the outbreak. A similar approach would be implemented should the spread of COVID-19 accelerate throughout the United States.

Additionally, experts in our Clinical Microbiology Research group in the department of pathology have spent the last decade working to develop and partner with commercial entities to commercialize rapid respiratory diagnostics. In a patient suspected of being infected with COVID-19, it is critical to rule out other respiratory viruses (including flu) in a timely manner. Through these advancements, the turnaround for both a flu test and comprehensive respiratory profile is less than one hour from the time the specimen is collected bedside without sacrificing test performance.

Beyond testing innovations, epidemiological surveillance (the systematic collection, analysis and dissemination of health data for the planning, implementation, and evaluation of public health programs) and strain characterization (identification of subtypes of microorganisms, such as a “flu strain”) also are critical to fighting COVID-19. An example of progress in this arena has been a program called SMAART, which encompasses a regional partnership across southeast Wisconsin comprising all of the major health systems and a number of long-term care facilities to identify sources of multi-drug-resistant pathogens (infectious agents) and to prevent their spread. Currently, this comprehensive approach includes environmental surveillance and patient surveillance to characterize the origins of the Acinetobacter outbreak (an emerging pathogen capable of causing hospital-acquired infections) and contain it. In SMAART, the epidemiological collaboration of health care systems is supported by a partnership among MCW, the Wisconsin Laboratory of Hygiene at the University of Wisconsin, and Wisconsin Diagnostic Laboratories that uses whole genome sequencing to identify what makes the pathogen resistant to antibiotics.

Also related to COVID-19 are antiviral clinical trials conducted by MCW’s department of medicine’s division of infectious diseases, which have led to multiple new antivirals that have been cleared in recent years – and which ultimately may be the foundation to treatments for COVID-19.

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