Combating Emerging Infectious Diseases

In 2018, the Walter Reed Army Institute of Research (WRAIR) announced the creation of a new Emerging Infectious Diseases Branch (EIDB), with the explicit mission to survey, anticipate and counter the mounting threat of emerging infectious diseases of key importance to U.S. forces in the homeland and abroad.

Building on decades of prescient investments into broad capabilities and a product-oriented research infrastructure, the U.S. Army and WRAIR have been able to consistently maintain a posture of readiness and response to the most pressing pathogens that threaten U.S. and allied forces. As the onslaught of emerging infectious diseases (EID) such as COVID-19, Ebola, Lassa fever and Zika intensifies, WRAIR is developing strategies to prevent and counter these threats.

Ebola Virus Disease

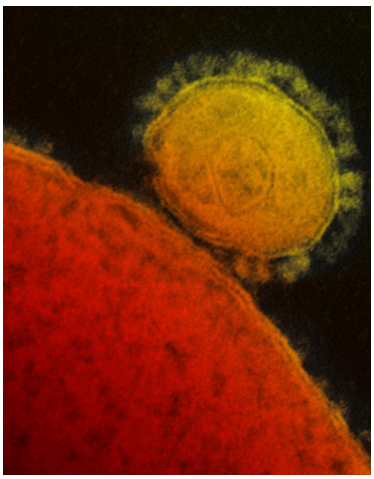
WRAIR was a pioneer in early testing of Ebola vaccine candidates, utilizing its established network of HIV study clinical study sites in Africa to pivot towards Ebola countermeasures. WRAIR conducted the first Ebola vaccine clinical trial in Africa in 2009, and was the first to test in humans the currently licensed Ebola vaccine, Ervebo. In total, WRAIR has conducted more than half a dozen Ebola or other filovirus vaccine candidate clinical trials to date.

COVID-19

EIDB scientists developed a nanoparticle vaccine, based on a ferritin platform, which offers a flexible approach to targeting multiple variants of SARS-COV-2 and potentially other coronaviruses as well. The vaccine, called Spike Ferritin Nanoparticle (SpFN), stands out in the COVID-19 vaccine landscape. Its multi-faced sphere design allows repetitive, ordered presentation of the coronavirus spike protein to the immune system, a strategy that may help provide broader protection.

With a vast international network, state-of-the-art research and development infrastructure and an array of cross-sector partnerships, EIDB and WRAIR are uniquely positioned to effectively respond to emerging infectious disease threats like COVID-19. The branch is able to leverage WRAIR's full cycle of product development capabilities to advance candidate vaccines, therapeutics and diagnostics as it is closely integrated with and guiding the Institute's surveillance, therapeutic and diagnostic work.

Middle East Respiratory Syndrome



Middle East Respiratory Syndrome (MERS), another coronavirus in the same family as the coronavirus that causes COVID-19, is a global concern due to its high fatality rate of nearly 40%. Given global deployments to the Middle East and South Korea—where large outbreaks have occurred—coupled with close living quarters in those situations, military personnel are at increased risk for exposure to MERS. There are currently no approved vaccines or specific treatments for MERS. WRAIR initiated and now has completed the first-in-human, and still only, Phase I trial of a MERS vaccine candidate intended for use in humans.

Zika

In the midst of the 2016 Zika virus epidemic, WRAIR—working in synchrony with other government agencies, academic institutions and industry partners—developed a Zika Purified Inactivated Virus (ZPIV) vaccine candidate, advancing it from initial concept to Phase 1 clinical trials within nine months. Ongoing biosurveillance at WRAIR's international sites in Southeast Asia and prior experience with other viruses of the same family gave the Institute a head start in designing a vaccine against the Zika virus. Researchers built on a previously proven platform that had resulted in a licensed vaccine for another virus of the same family, Japanese encephalitis. WRAIR's Pilot Bioproduction Facility manufactured more than 1,500 doses for clinical testing within a few months, and the WRAIR's Clinical Trials Center was the initial site that tested the vaccine in humans.

Lassa Hemorrhagic Fever

Lassa virus has been designated as a priority threat of pandemic potential by multiple agencies and governing bodies. This virus and other members of this family not only have the potential to cause naturally occurring outbreaks of fatal hemorrhagic fever, but also carry the danger of being weaponized as agents of bioterrorism and is considered a top tier infectious disease threat.

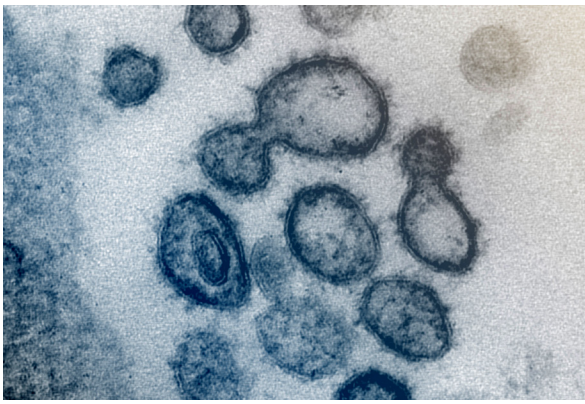
The Emerging Infectious Diseases Branch is focused on the development of prophylactic and therapeutic Lassa virus countermeasures—especially in connection with its biosurveillance networks—to promote the aims of the Global Health Security Agenda and U.S. National Security Strategy.

Tick-borne Encephalitis

In 2018, the U.S. European Command identified the threat of tick-borne encephalitis (TBE) as a key health priority endangering Force Health Protection. TBE typically causes mild or moderate febrile illness, but in a significant proportion of individuals, the disease may progress to encephalitis, leading to severe long-term neurologic complications and sometimes death. There are currently no U.S. FDA-licensed TBE vaccines available; however, there are several vaccines approved in the European Union, Russia and China. In response, WRAIR EIDB initiated a path through the U.S. Army to work with government agencies and industry partners to define the threat of TBE infection among U.S. military personnel and procure the means for U.S. personnel to access immunization.

Preparing for the Next Outbreak

WRAIR, and its new Emerging Infectious Diseases Branch, brings critical subject matter expertise, operational platforms, research and development capabilities to counter the threat of rapidly surfacing deadly infectious diseases. It builds upon established medical research programs in countries where these disease threats are most pressing. Researchers in the branch work with host nation partners to develop and test products of relevance in these endemic areas. WRAIR continues to reinforce and expand these partnerships, as evidenced by two flagship programs. The Joint West Africa Research Group (JWARG) and the Partnership for Research in the Middle East (PRIME). These programs highlight WRAIR's development of a resilient network of laboratories and clinics capable of anticipating and responding to disease outbreaks across a wide footprint.



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