COMBAT & CASUALTY CARE

Summer 2020
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LEVERAGING CAPABILITY TO MITIGATE A PANDEMIC

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Commander
Army Medical R&D Command and Ft. Detrick, MD

COL Andrew Barr
Director
Walter Reed National Military Medical Center
Bethesda, MD

- Models-based Vaccine Development
- Diagnostic Analysis
- Facilitating Telemedicine
- COVID-19 Countermeasures
- Advanced Antibody Testing
- Nationwide PPE Re-Supply

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for Health Affairs
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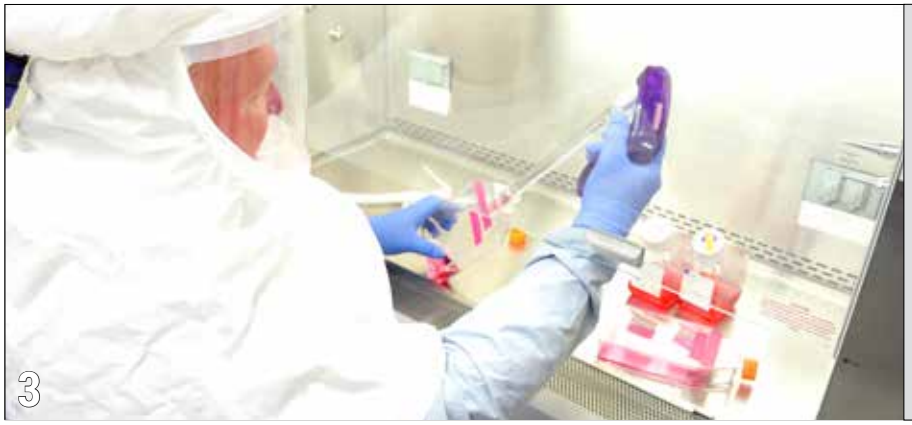

RESPONDING TO OUTBREAK

The U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) is one of several laboratories contributing to a whole-of-government approach to combating COVID-19.

By Caree Vander Linden

Features

Cover: A nurse at the Miami Beach Convention Center Community Based Testing Site conducts a COVID-19 antibody test. The Florida Guard is providing support at the Miami Beach hybrid CBTS and Hard Rock Stadium CBTS to allow the state and local partners to conduct antibody testing for first responders at both facilities. (US Army photo by Sgt. Leia Tascarini)

Departments

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INSIGHTS

As the nation continues to grapple with the effects of a pandemic, emergency first responders, both military and civil, carry on applying the greatest of skill to defeating the newest of pathogens. From models-based anti-viral research to antibody testing, scientists in some of the world's most respected defense medical institutions are pushing boundaries to combat the tiniest of foes. The Summer 2020 issue of Combat & Casualty Care takes a closer look at ways these defenders of humanity are working to best position medical science to crack the novel Coronavirus code.

At the center of much of DoD's work to track down a vaccine for COVID-19, the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID), Ft. Detrick, MD, is taking a whole-of-government approach to fighting the virus, comparing structure and properties of well-known pathogens to determine similarities, and thus potential weaknesses. From whole-of-government to whole-of-force health, C&CC had the opportunity to speak with the Honorable Tom McCaffery, Asst. Secretary of Defense for Health Affairs, on the state of and goals for the Military Health System (MHS) during and beyond national-level response to a pandemic. As a global force, DoD faces the current viral epidemic on a global scale. Representatives of Walter Reed National Military Medical Center (WRNMMC), Bethesda, MD, recognize this as one of the Department's premier installations of acute and ongoing care. A team led by COL Andrew Barr, WRNMMC Director, has been advancing hospital contingency planning to ensure new threats such as COVID-19 are met with proven preparedness.

Staying with Walter Reed, the Army Institute of Research (WRAIR), Silver Spring, MD, launched Operation Warp Speed, an aggressive public–private partnership effort introduced to facilitate the development, manufacturing, and distribution of COVID-19 related countermeasures. Working across government, industry, and academia, WRAIR has and continues to leverage knowledge from proven solutions and lessons learned to help mitigate pathogenic spread and prevent future infection. In that vein, folks over at the U.S. Army Medical Research and Development Command (USAMRDC) and Ft. Detrick, MD, led by Commanding General BG Michael Talley, have been partnering with Army Futures Command (AFC) and the Defense Health Agency (DHA) to produce a coordinated effort in leveraging best and improved practices for mission safety and treatment development.

On the industry front, Laurel Ridge Treatment Center, San Antonio, TX, gives readers a look at some multi-modal, multi-disciplinary approaches to behavioral health, whether it be post-traumatic stress disorder (PTSD)-related, combat trauma, or substance abuse-oriented issues. Rounding out the Summer issue, we get insight into ongoing efforts by the Defense Logistics Agency (DLA) Disposition Services to cooperate with U.S. inter-state agencies in bringing levels of medical supplies critical to the COVID-19 fight back to effective availability.

As always, your comments are welcome. Thanks for the readership and stay safe!

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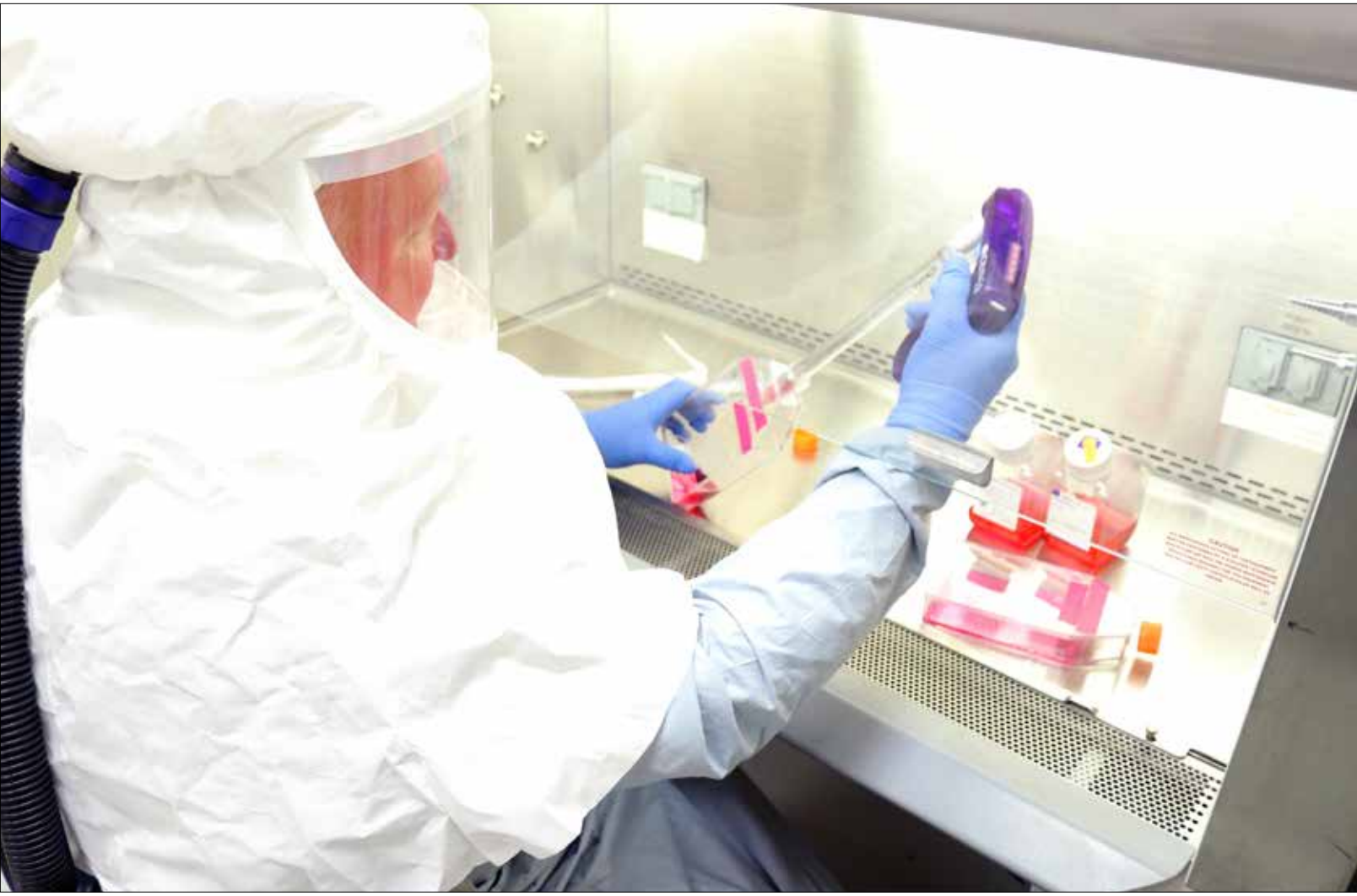
RESPONDING TO OUTBREAK

A subordinate element of the U.S. Army Medical Research and Development Command (USAMRDC), Ft. Detrick, MD, the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) is one of several laboratories contributing to a whole-of-government approach in combating COVID-19.

By Caree Vander Linden, USAMRIID



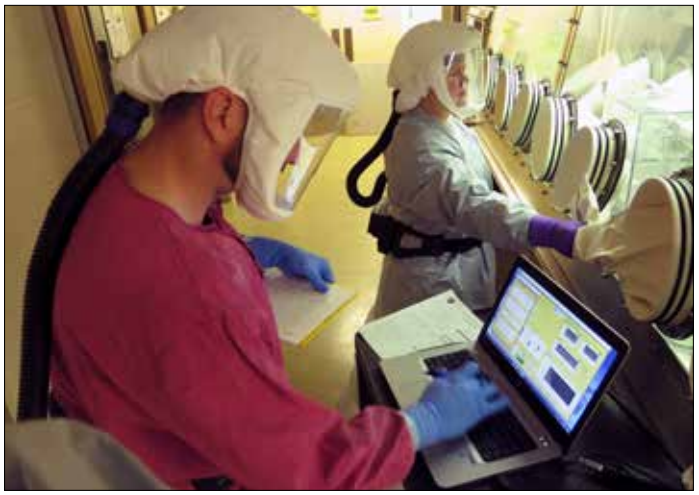
Microbiologist Brian Kearney harvests samples of coronavirus in a USAMRIID Biosafety Level 3 laboratory. This virus stock is used to develop models of infection for coronavirus, as well as diagnostic tests, vaccines and therapeutics. (Photo by John Braun, USAMRIID/Visual Information)

Since 1969, the U.S. Army Medical Research Institute of Infectious Diseases, or USAMRIID, has responded to disease outbreaks at home and around the globe with capabilities and expertise unmatched within the Department of Defense. USAMRIID's scientific accomplishments have steadily contributed to the development of medical countermeasures for protecting military and public health. Over the years, USAMRIID has shown itself to be uniquely suited to answer the nation's call, and this year—marked by the COVID-19 pandemic—is no exception.

In February 2020, USAMRIID scientists received a sample of the novel coronavirus, dubbed Severe Acute Respiratory Syndrome Coronavirus-2, or SARS-CoV-2, from the Centers for Disease Control and Prevention. It came from a patient in Washington State, one of the first COVID-19 cases identified in the United States. USAMRIID's initial step was to grow the virus and prepare a master stock for use in testing diagnostics, vaccines and treatments.

Colonel E. Darrin Cox

"We also worked to characterize the virus, meaning that we looked closely at its structure and properties, and how it's related to viruses that were already known," said Colonel E. Darrin Cox, the Institute's commander. Building on that knowledge, as well as their experience with SARS-CoV-1 in 2003 and Middle East Respiratory Syndrome, or MERS, in 2014, USAMRIID scientists next turned their attention to developing animal models that represent the disease course of COVID-19 in humans.



Scientists Jeanean Ghering and Chris Jensen demonstrate a "sham" aerosol experiment with SARS-CoV-2 in a Biosafety Level 3 laboratory at USAMRIID. This technology allows investigators to model the course of respiratory infections. (Photo by Ondraya Frick, USAMRIID/Aerobiology)

BUILDING ANIMAL MODELS

Animal model development is essential to the process of getting a medical product licensed for human use, and it is one of USAMRIID's core capabilities. For example, the Institute performed the critical animal studies of the Ebola virus vaccine produced by Merck that received U.S. Food and Drug Administration, or FDA, approval in 2019. USAMRIID has Biosafety Level-3 and BSL-4 containment laboratories that enable safe study of high-consequence pathogens, including SARS-CoV-2 (a BSL-3 agent) and Ebola virus (handled at BSL-4). In addition, thanks to unique aerosol technology invented at USAMRIID, the Institute can accurately model the course of respiratory diseases, such as COVID-19, that pose a threat to U.S. service members.

Small animal models, like rodents, allow for early investigation of the disease process and preliminary testing of potential vaccines and treatments. This work builds the foundation for additional studies and helps to determine which products should advance for further testing. According to Cox, USAMRIID has developed two small animal models, the ACE2 mouse and the Syrian hamster, that look especially promising. ACE2 mice have the same receptor used by SARS-CoV-2 to enter human cells, making them a suitable model of infection, and Syrian hamsters appear to show signs of developing protective immunity when re-exposed to the virus. Importantly, both the mice and the hamsters develop clinical signs of disease that are similar to those seen in human patients.

Large animal models, such as nonhuman primates, or NHPS, are most predictive of human disease. When a vaccine or therapeutic shows promise in a small animal model, the next step is to test it in NHPS, collecting data that can support clinical trials in humans and eventually lead to FDA licensure. USAMRIID has developed two NHP species, the rhesus macaque and the cynomolgus macaque, as models for evaluating medical countermeasures to SARS-CoV-2.

"USAMRIID's unique ability to conduct multiple aerosol exposure studies enables down-selection of the most promising vaccines and treatments from among numerous potential candidates," added Cox. That aerosol technology also supports research to answer the key question of how well—and for how long—SARS-CoV-2 can survive in the air.

ASSESSING THE RISK

USAMRIID scientists evaluated three coronaviruses—SARS-CoV-1, MERS, and the novel coronavirus—to assess their ability to remain infectious in an aerosol form. Experiments took place at USAMRIID and three other aerobiology laboratories: Tulane University in New Orleans, the National Institutes of Health-Integrated Research Facility at Fort Detrick, and the University of Pittsburgh.

Their findings indicate that SARS-CoV-2 maintains infectivity in small-particle aerosol much longer than either SARS-CoV-1 or MERS-CoV. They also suggest that people infected with the novel coronavirus may produce viral aerosols that can remain infectious for long periods following coughing, shedding and airborne transport of droplets.

USAMRIID is also evaluating several environmental parameters of virus stability on military uniforms, skin and paper currency. Stability testing like this helps to evaluate fomite transmission of the virus to decrease or prevent infection among service members and the public. Fomites are inanimate objects (like doorknobs, keyboards, phones, and elevator buttons) that can become contaminated and serve as a mechanism for virus transfer between people.

Results so far indicate that SARS-CoV-2 remains stable on some surfaces for as long as 96 hours at 4 degrees Celsius (39.2 degrees Fahrenheit). It is stable for up to 24 hours on steel and paper currency at room temperature, and up to 96 hours on skin. However, heat appears to significantly decrease the virus's ability to survive at room temperature.

REFINING DIAGNOSTIC TESTS

Another core element of USAMRIID's mission is developing assays, or tests, to identify biological agents in clinical samples like blood serum or saliva. Some of these tests can also be used with environmental samples, such as soil. The Institute is working with several partner agencies to support assay development for the COVID-19 response. In general, confirmatory tests show that the virus is present in a sample; clearance tests determine whether a patient who once had the virus has cleared it from the body; and antibody tests identify specific proteins in the blood that were made in response to infection with the virus.

USAMRIID is supporting requests to perform diagnostic analysis on samples from active-duty U.S. service members, according to Cox. Specifically, the Institute is testing samples from Army and Navy personnel, stationed in the U.S. and overseas, who had "persistent positive" SARS-CoV-2 test results after 14 days of isolation. This analysis will aid in determining return to duty status for those personnel.

Samples are first analyzed using the RT-PCR assay, available under an Emergency Use Authorization from the FDA. (PCR is shorthand for polymerase chain reaction, a procedure commonly used to "amplify" a small segment of genetic material so that it can produce many more copies of itself for laboratory analysis.) Those with a positive result are processed for virus isolation testing (in cell culture), which takes an additional 7-10 days, to tell if the sample contains any live virus. The final step is serology testing using serum samples to determine the presence of SARS-CoV-2 antibodies.

USAMRIID is also collaborating with the Army Public Health Center to evaluate techniques for surveillance testing. This effort will identify methods for screening large populations of service members

while minimizing the impact on supply chains. One approach is lateral flow immunodiagnostics, which are simple to use and similar to the test strips commonly seen in over-the-counter pregnancy screening kits. Another technique, pooled testing, would involve combining swab samples from several individuals and testing them together, using highly sensitive molecular detection methods. If the pool result is positive, the samples are then tested individually. When the infection rate is low and only a few people are infected, pooled testing can significantly expand the testing capacity of the existing laboratory infrastructure and reduce the strain on testing resources.

"Improving the speed, capacity, and portability of COVID-19 testing directly supports the operational readiness of U.S. forces," added Cox.

SCREENING POTENTIAL THERAPIES

In addition to improving diagnostics, USAMRIID is playing a key role in the search for therapeutics to treat COVID-19. One avenue is to screen libraries of existing chemical compounds—the key ingredients that make up drugs—for potential antiviral activity. The Institute has hundreds of cooperative agreements with industry, academic and government laboratories, and works with its partners to identify and test compounds that look promising. USAMRIID can screen thousands of compounds at a time, if necessary, using a high-throughput system that is rapid and cost-effective.

"In fact, this is the very same system used by USAMRIID to identify remdesivir as a potential therapeutic for Ebola virus back in 2016," said Cox. Remdesivir, a drug invented by Gilead Sciences and tested extensively at USAMRIID, is now available under an investigational protocol to treat Department of Defense personnel exposed to COVID-19. It is also being evaluated against the novel coronavirus in worldwide clinical trials.

Convalescent plasma from recovered COVID-19 patients is another potential treatment option. Recent studies at USAMRIID using plasma from New York donors suggest a strong link between levels of antibody, a protective protein, and the ability of the plasma to neutralize the virus to keep it from replicating. These findings are supported by analysis of additional samples obtained from donors in Texas. Developing a laboratory test for screening convalescent plasma, therefore, would allow scientists to rapidly identify "good donors" with high levels of SARS-CoV-2 antibody. Selecting plasma from these donors would be preferable in developing a clinical product.

Monoclonal antibodies—proteins that can help to neutralize the virus—are a third approach to developing COVID-19 treatments. These antibodies can be administered before exposure to prevent infection, or after exposure to ward off disease. In collaboration with industry partners, USAMRIID has tested hundreds of antibodies for neutralizing activity against SARS-CoV-2 and identified several promising candidates. Two antibodies that demonstrated potent neutralizing activity in cells were further tested in groups of healthy and immune-suppressed hamsters. Both groups showed clear evidence of protection when the antibodies were administered pre-exposure, according to Cox. A similar effect in humans could protect high-risk and immune-suppressed populations from COVID-19. USAMRIID is continuing to press forward on this critical effort.

BEHIND THE SCENES

Despite the urgency of the COVID-19 pandemic and the related increase in operational tempo, Cox says USAMRIID's response is all in a day's work for his team of 700 military, civilian and contract personnel. Their focus is, and always has been, on protecting U.S. service members—but their research pays dividends for public health and global health as well.

"Because of USAMRIID's unique expertise and facilities, we typically play a key role in any emerging disease outbreak—whether it be coronavirus, Ebola virus, or something we haven't even discovered yet," he commented. "This is exactly why USAMRIID is here—to study these agents with a focus on prevention, detection, and treatment."

And while the Institute may not always garner the biggest headlines during a crisis like this one, it's safe to assume that USAMRIID will still be working behind the scenes to deliver the medical solutions the nation needs. ▪

ADDRESSING MILITARY HEALTH READINESS DURING A GLOBAL CRISIS

HON Tom McCaffery was sworn in as the Assistant Secretary of Defense for Health Affairs on August 12, 2019.

In this role, HON McCaffery is the principal medical advisor to the Secretary of Defense. He administers the Military Health System (MHS) $50 billion Defense Health Program (DHP) budget and is responsible for ensuring the global delivery of quality, cost effective health care to 9.5 million Service Members, retirees, and their families. HON McCaffery oversees the Defense Health Agency and the Uniformed Services University of the Health Sciences.

HON McCaffery has extensive experience in the health care industry. Most recently, he served as Vice President, California State Partnerships at Blue Shield of California. In this capacity, he led the day-to-day activities governing Blue Shield's post-acquisition integration of the Care1st Health Plan, a 500,000 member health plan serving Medicaid and Medicare members. Prior to that role, he served as Vice President of Blue Shield's CalPERS sector, where he led a team responsible for all strategic initiatives, product development, marketing, pricing, and operational functions for the 400,000 member California Public Employees Retirement System (CalPERS) account.

Prior to his tenure at Blue Shield, he served as Chief Deputy Director of the California Department of Health Services, California's public health and health care services agency. HON McCaffery also served as Senior Vice President / Chief Operating Officer at the Alliance of Catholic Health Care, the public policy and advocacy organization representing California's Catholic health systems and hospitals. Earlier in his career, he served on the staff of the Washington, DC Office of the Governor of California.

Active in many community organizations, HON McCaffery has served on a number of healthcare, education and children's program non-profits in the Sacramento area.

HON McCaffery graduated from the University of Notre Dame with a degree in Government and International Relations and holds a Master's Degree in Public Policy from the University of California at Berkeley.

Combat & Casualty Care spoke with the Honorable Tom McCaffery, Asst. Sec. of Defense for Health Affairs, regarding his take on some of DoD's current and ongoing challenges as relates to force health and maintaining readiness for unexpected health crises such as COVID-19.

HON Thomas McCaffery

Assistant Secretary of Defense
for Health Affairs

C&CC: As the principal medical advisor to the Secretary of Defense, what are some of your primary concerns surrounding the U.S. military and current COVID-19 pandemic crisis?

Mr. McCaffery: Secretary Esper has clearly outlined the Department's priorities in combatting COVID-19: protecting our Servicemembers, civilian employees, and families; safeguarding our national security capabilities; and supporting the whole of nation response. The Military Health System is serving on the frontlines to support these priorities. While supporting the pandemic response, at the same time, we must advance the mission of military medicine: ensuring our troops are healthy and ready to fight and providing platforms for the uniformed medical force to sustain their medical skills. We also must ensure the 9.5 million eligible TRICARE beneficiaries continue to receive high quality care.

The pandemic has required the Military Health System to quickly pivot and adapt to this unprecedented fight. Agility and adaptiveness, hallmarks of military medicine, have proven essential in the pandemic response. We've dramatically increased the Department's laboratory testing capacity and spearheaded data tools to predict surges in cases, enabling better planning for resourcing and logistics. We've ramped up virtual health capabilities and established drive-up testing sites and pharmacy curbside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Wendy Steinhoff (right), a safety specialist from Fort Knox Safety, watches as her whole blood is separated into parts during a June 21, 2020, visit to the East End Louisville American Red Cross Blood Donation Center. She recently had the antibodies for COVID-19 and agreed to donate her plasma to help others receive treatment for the virus. Steve Holton (left), explains to Steinhoff how the process of apheresis works. Her whole blood is captured in the middle bag, and then separated into red blood cells in the right bag and plasma into the left bag. At a certain time in the process her red blood cells, along with saline, are pushed back into her vein. (Photo by Eric Pilgrim, Fort Knox)

delivery. And we've implemented policies to minimize exposure risk to both patients and providers, including a temporary pause in elective procedures, as well as ongoing subject matter expert support to develop Force Health Protection guidance for the Department.

These measures, and many more, have contributed to a comprehensive Military Health System response that supports the warfighter, cares for the patient, and advances the Department's readiness mission. We remain focused on supporting the Department in this complex and challenging environment with the best military medicine has to offer.

C&CC: With the evolution of military health care capabilities such as MHS GENESIS, do you see any changes in priorities coming out of the fight against COVID-19 and the resulting health impact to DoD/DoD support personnel?

Mr. McCaffery: The COVID-19 pandemic has, in many cases, helped reveal where military medicine is excelling and where we have opportunities for improvement. We are cataloguing lessons learned and best practices from our response efforts. We've already seen the immense value of certain tools to better support the warfighter and patient. For instance, in locations where the Department has deployed its new electronic health record, MHS GENESIS, we're leveraging data to better project, monitor, and engage with patients on health needs and follow-up care. This experience has underscored the high priority we have placed on system-wide deployment of MHS GENESIS. It is a key tool to enable the Military Health System to function as a true, integrated medical enterprise that can effectively support military requirements. We are also taking a hard look at how to expand services like virtual health capabilities to enhance access to safe, effective care for patients while minimizing exposure risk. We will continue to deploy critical military medical combat support assets like health surveillance and outbreak monitoring tools, and we'll ensure ample blood supplies, training, combat casualty care, and more.

The pandemic also has underscored the key role military medicine research and development plays, not only in support of military missions, but also how our work can be leveraged to support requirements of the larger society. The Department has extensive experience in rapid innovation and medical advances, from a battlefield evacuation system that became the foundation for the modern emergency medical services system, to advances in damage control surgery and trauma management that have informed nationwide trauma practice.

The Department's long history of investments in research and development for medical countermeasures remains a critical priority to ensure readiness of the force and direct support to the warfighter. That's why the Military Health System has enhanced partnerships across the Department in implementing a strategy to accelerate development of COVID-19 vaccines and therapeutics. This joint effort capitalizes on our enormous capacity to develop, manufacture, and distribute medical countermeasures to the force. Antibody therapeutics could play a vital role in supporting our operational missions with prophylaxis measures and post-exposure treatment options. The Military Health System's commitment to continue delivering on cutting-edge research and development, both for the military and for broader domestic support efforts, remains unwavering.

C&CC: How has the COVID-19 response impacted the Military Health System's reform efforts, and what has the enterprise learned from the pandemic as you move ahead with military medicine transformation?

Mr. McCaffery: Prior to COVID-19, the Military Health System was undergoing historic reform – the most significant change from the services in decades. We were well in to the implementation of the Department's plan for the transition or authority, direction and control of all military hospitals and clinics to the Defense Health Agency; reinvigorating our focus on readiness within the direct care system; and optimizing the size, composition, and competency of the military medical force. At the

same time, we were implementing technological tools to set us up for a successful future, having launched the Department's new state-of-the-art integrated electronic health record, MHS GENESIS, at four new sites this past September. We paused our MTF transition effort to fully focus on DoD's response to COVID-19, but are now assessing the Departments ability to resume these activities, with reassessments every 90 days to determine when we can resume these important initiatives.

In the meantime, we are learning key lessons from the COVID-19 response that are fine-tuning our approach, and, in many cases, reinforcing the value MHS reforms will bring. Over recent months, the MHS has quickly pivoted to leverage every element of military medicine to support the Department's response efforts. In doing so, we've seen the value of having a single entity – the Defense Health Agency – for developing uniform guidance and directives related to business and administrative practices. We've also seen the value of enabling the military departments to focus more intensely on combat readiness for our medical personnel and for the operational force.

C&CC: In terms of personnel readiness as it relates to overall defense health, what are some likely re-prioritizations as a result of the war on COVID-19?

Mr. McCaffery: COVID-19 is a real-time test for how we leverage our medical capabilities to prepare, protect, and care for the force, and advance the Department's priorities. And we are learning critical lessons along the way. COVID-19 has reinforced the importance of an integrated military medical enterprise – one that can meet new challenges with agility and ingenuity, and expeditiously apply best practices and lessons learned for decision-making that will benefit the warfighter, the patient, and the Department. In the past few months, the Military Health System has dramatically increased DoD laboratory testing capacity; spearheaded predictive modeling tools to plan and prepare for case surges; ensured military medical logistics deliver the life-saving medical equipment to the right place and at the right time; ramped up virtual health capabilities; established drive-up testing sites; and implemented policies and protocols to minimize exposure risk to patients and providers. Each of these areas reflects a truly integrated system of health and readiness – a gold standard in integrated organization that we continuously strive to achieve.

C&CC: Any final thoughts on military medicine's COVID-19 response to date?

Mr. McCaffery: Since the inception of military medicine, the Military Health System has been system-trained to pivot to meet new threats. The COVID-19 response has demonstrated the unique application of military leadership experience in leading through change as an immense asset for any challenge our nation faces. As early as Walter Reed's breakthrough in yellow fever in the 1900s, military medicine played a critical role in reversing the devastating trend of more soldiers dying from disease than from combat. Today, we continue to see military medicine's successes impacting the battlefield – in recent years, we've achieved the highest battlefield survival rate in history despite increases in injury severity scores. COVID-19 is no different: the Military Health System has the expertise, capabilities, and preparation to face whatever comes our way.

As we confront today's invisible enemy, we are applying decades of knowledge in how to adapt to changing security environments, bringing innovative, agile expertise and rapidly deployable resources to the fight, and mobilizing our military medical professionals to the place where they can do the most good: treating patients. At the onset of the pandemic, the Department mobilized doctors, nurses, and medical technicians – both Active Duty and Reserve – to provide the high-end capability of the USNS Comfort, the USNS Mercy, large capacity within the Javits Center, and augmentation of medical professionals directly to local hospitals. This is just one example of the Military Health System's contributions to the concerted national response to serve and support hard-hit communities, all while delivering on our mission to support the warfighter and care for our beneficiaries.

U.S. Army Spc. Crystal Gonzales, assigned to the 44th Medical Brigade, conducts COVID-19 testing in the mobile Analytical Laboratory System outside the Javits Center in New York City. Armed forces personnel collaborate as an integrated system in support of the New York City medical system, as part of the Department of Defense COVID-19 response. U.S. Northern Command, through U.S. Army North, remains committed to providing flexible Department of Defense support to the Federal Emergency Management Agency for the whole-of-nation COVID-19 response. (U.S. Army Photo by Cpl. Rachel Thicklin)

Across the Military Health System, our people are making a difference. The men and women who make up our military medicine enterprise are delivering today, serving on the frontlines in hospitals and clinics and, labs, and behind the scenes to advance the priorities of the Department to protect our people, maintain readiness, and support the nation.

MISSION RESILIENCY

LAUREL RIDGE TREATMENT CENTER

HOPE IS ALIVE

Laurel Ridge Treatment Center has faithfully served the children, adolescents and adults of San Antonio since 1987. Laurel Ridge's story began with the mission of Saving Lives, Healing Families and Creating Hope for individuals and families in South Texas and has done so with excellence and pride; growing and expanding to now have a compliment of over 600 employees.

In 2007, Laurel Ridge began to see the need for private treatment centers to learn more about the issues and challenges facing active duty service members, realizing that the sheer number of those in need of treatment would soon out-pace the then military system's behavioral health capabilities. Laurel Ridge began an effort to come alongside military command and meet the service member's treatment needs with the most cutting edge and evidence based treatment programs available.

2008 birthed Mission Resiliency, the Active Duty Treatment Program at Laurel Ridge. This dedicated Active Duty unit began with ten beds and all patients on the unit were on a military -specific milieu. Mission Resiliency's goal was to keep the military culture strong with this cohort and to provide the best treatment with the least amount of disruption possible while restoring resiliency to the service member. Ten beds soon became 20 beds and within a couple of years, Mission Resiliency's outcomes and evidence-based treatment resulted in a 60 bed dedicated Active Duty military treatment building on the main campus.

Since its inception, Laurel Ridge's Mission Resiliency program has successfully treated thousands of active duty service members struggling with Combat Trauma, PTSD, substance use/abuse issues, suicidal ideation, and other behavioral health conditions.

Mission Resiliency is a multi-modal, multi-disciplinary approach to intervention that addresses the service member and his or her family as a whole. Laurel Ridge utilizes evidence-based treatment programs meeting or exceeding TRICARE standards of care. Furthermore, Mission Resiliency continues to monitor outcomes, ensure fidelity of treatment, and implement the most current treatments available.

Nearly 1 in 4 active duty service members showed signs of a mental health condition, according to a 2014 study in JAMA Psychiatry. Treatment modalities such a Prolonged Exposure and Cognitive Behavioral Therapy in co-occurring anxiety disorders and Substance Use Disorders has resulted in significant improvements with addressing alcohol and drug use.

Laurel Ridge also treats Active Duty Dependants, realizing deployment related symptoms and issues are not limited to the service member who has been deployed. " says Laurel Ridge CEO, Jacob Cuellar, MD. "When one member of the family is deployed, there is a ripple effect of anxiety, shift in responsibility, and a family dynamic that also needs to be addressed."

Laurel Ridge is perfectly positioned to treat both the service member and the family - many of Laurel Ridge's clinical staff and treatment teams are made up of retired military or military spouses. ***"We not only treat these families, we have been these families,"*** says Director of Military Services, Rodney Norman Army (RET). "Many of us know the struggles, know the pain, have come

BETWEEN A ROCK & A BREAKTHROUGH

through to the other side, and are perfectly positioned point these wonderful service members and their families to hope."

AND THE PROGRESS CONTINUES

Building on its successful outcomes in treating active duty service members, Laurel Ridge celebrated the opening of the Mission Resiliency Active Duty Outpatient Treatment Program in Killeen, Texas in the Spring of 2014. "Laurel Ridge has always responded to the needs of the Community and we are proud to serve whenever and wherever needed," says CEO Cuellar, MD.

"This is why it is so exciting for us to announce the August 6th opening of our expanded campus (across from the original campus) that is a dedicated state-of-the-art Mission Resiliency Active Duty Military Treatment Center. This 120 bed Mission Resiliency campus boasts a beautiful gym, dining hall, kitchen and plenty of space for service members to perform daily PT, stay Deployment Resilient and Mission Ready.

"Our goal is not only to treat the combat trauma, the PTSD, the substance use but to actually build a better skill-set for each ADSM so that they are as proficient in processing trauma, stress, and other deployment or active duty related stressors while also maintaining a state of Mission Readiness," says Mission Resiliency Clinical Director, Angela Chavez.

Since its inception, Mission Resiliency's tag line has been: Sometimes You're Between A Rock & A Breakthrough. "That turned out to be almost prophetic," says CEO Jacob Cuellar, MD. ***"Because here, Hope is alive and breakthroughs happen every day. Every. Single. Day... and you know what," he smiles. "We are just getting started."***

For more information about Mission Resiliency at Laurel Ridge go to laurelridgetc.com or call 210-491-3591.

ADVANCING PANDEMIC RESPONSE THROUGH FOCUSED CONTINGENCY PLANNING

As director of Walter Reed National Military Medical Center, COL Andrew Barr leads the world's largest joint military medical center, Walter Reed National Military Medical Center (WRNMMC), Bethesda, MD. More than 7,000 staff include active duty military, civil service employees, contractors and volunteers. In one day, the WRNMMC staff sees nearly 4,000 outpatients; fills approximately 3,400 prescriptions; and conducts more than 40 operating room procedures, 500 radiological studies and 11,000 lab tests.

In July 2019, COL Barr joined Walter Reed National Military Medical Center after serving as the Command Surgeon, U.S. Forces Korea. COL Barr's previous military assignments include Commander, Tripler Army Medical Center, Honolulu, Hawaii; Student, U.S. Army War College, Carlisle Barracks, Pennsylvania; Commander, U.S. Army Health Center, Vicenza, Italy; Deputy Commander for Clinical Services, General Leonard Wood Army Community Hospital, Fort Leonard Wood, Missouri; Division Surgeon, 1st Infantry Division, Fort Riley, Kansas, and Basrah, Iraq, in support of Operation Iraqi Freedom and Operation New Dawn; Commander, Craven Army Health Clinic, Fort Monroe, Virginia; Student and Resident, Army-Baylor Graduate Program in Health and Business Administration, Army Medical Department Center and School, Fort Sam Houston, Texas; Brigade Surgeon, 3rd Brigade, 4th Infantry Division, Fort Carson, Colorado, and Balad, Iraq, in support of Operation Iraqi Freedom; Staff Physician, Evans Army Community Hospital, Fort Carson, Colorado; Commander, Katterbach Army Health Clinic, Katterbach, Germany; and Staff Physician, USAMEDDAC, Heidelberg, Germany.

COL Barr received his Bachelor of Science degree in Bioengineering from Texas A&M University in 1990 and was commissioned through the Health Professions Scholarship Program as a second lieutenant in the United States Army. He received his Doctor of Medicine in 1994 from the University of Texas Southwestern Medical School in Dallas, Texas, and completed residency training in Family Medicine at the Texas Tech University Health Sciences Center in Lubbock, Texas, in 1997. He is board certified in Family Medicine. He received a Master's in Healthcare Administration and a Master's in Business Administration from Baylor University in 2007 as well as a Master's in Strategic Studies from the U.S. Army War College in 2016.

COL Barr's military education includes the Army War College, Army Command and General Staff College, AMEDD Officer Advanced Course, AMEDD Officer Basic Course, Division and Brigade Surgeon Course, and Brigade and Company Command Course.

COL Andrew Barr

Director
Walter Reed National Military Medical Center
Bethesda, MD

Combat & Casualty Care was pleased to speak with COL Andrew Barr, WRNMMC Director, regarding some of the medical center's foremost efforts in the nation's fight against the COVID-19 pandemic and enhancements to treatment across DoD Joint medicine coming out of a global crisis.

C&CC: Please provide some insight into the evolution of WRNMMC COVID-19 care since initial patients starting presenting for treatment.

COL Barr: Early efforts focused on planning for surge patient capacity, codifying and disseminating guidelines from the CDC and medical literature, and protecting our staff and patients. WRNMMC also implemented its Hospital Command Center to centralize and prioritize operational efforts in support of COVID response.

Multiple planning factors and tools were used to estimate potential patient loads in outpatient, inpatient, and intensive care (ICU) environments. Phased expansion plans for inpatient and ICU operations triggered by patient load were developed and tested. Contingency inpatient clinical space was executed through tent facilities

providing space for skill training and testing of contingency plans. Didactic and simulation training programs were developed and implemented to increase critical care skills for over 1,000 doctors, nurses, and respiratory technicians. Early in the pandemic, national shortages negatively affected supply of medical logistics including masks, gloves, hand sanitizer, and culture swabs. WRNMMC's contingency stockpiles provided adequate supply of medical supplies and cross-leveling across the National Capital Region Market (NCRM) ensured supply for the entire market. WRNMMC developed a list of core logistics pacing items and detailed medical logistics tracking tools that allowed us to better understand stockage levels and burn rates. Innovative approaches to reorder and identification of new vendors allowed us to provide hand sanitizer during nationwide shortages.

A multi-disciplinary approach to problem solving was key to success in all endeavors during the pandemic. This was evidenced through innovative approaches to safety issues. WRNMMC implemented Restricted Access Control Points (RACP) decreasing entry points to the hospital from 84 to 10 each manned by 2-3 personnel who screened patients and staff for COVID symptoms through clinical questions. If identified as a risk for COVID infection, the individual was escorted to the Centralized Screening Area (CSA), a tent structure outside the Emergency Department (ED) where patients undergo a more in-depth screening and receive a swab sampling for analysis through a COVID PCR test. Creating the CSA centralized COVID screening to a group of highly trained personnel physically located outside the facility decreasing the risk of exposure for other patients and staff. The CSA also offered the option of drive-up testing allowing potential patients to remain sequestered in their cars while being screened and tested. Locating the CSA by the ED provided rapid access to increased level of care for patients with unstable or significant symptoms requiring further care. WRNMMC also developed a curbside, drive-up pharmacy delivery program allowing patients to receive prescriptions in their car without entering the facility.

Another area that benefitted from multi-disciplinary collaboration was the interpretation of constantly changing policies and medical guidelines. The multi-disciplinary approach allowed subject matter experts and stakeholders to rapidly review the latest guidelines and develop consensus opinion for recommendations for internal policies. These policies were then rapidly disseminated throughout our organization providing guidance to staff and served as templates for Market policies in the NCRM.

After incidents involving exposure of staff to atypical COVID+ patients, WRNMMC rapidly implemented an aggressive, organization-wide personal protective equipment (PPE) posture to maximally protect our staff. This approach required staff who regularly worked within 6 feet of patients to wear hospital-provided PPE, typically a non-N95 surgical or procedure mask, and required all other staff to wear cloth facemasks. This approach was a best practice and, in conjunction with social distancing and regular handwashing, provided significant protection for our staff for the entire pandemic minimizing the number of staff exposed to COVID at the hospital.

C&CC: As the nature of the virus became more apparent, how has WRNMMC adjusted prioritization protocols to better address patient needs?

COL Barr: Throughout the pandemic, WRNMMC and the NCRM continued to offer face-to-face (F2F) care for patients with acute, urgent, emergent, required routine, and readiness healthcare issues. We evaluated each patient with scheduled surgical cases or medical procedures to assess which cases needed to proceed with caution and which could be safely deferred. WRNMMC rapidly expanded healthcare through virtual health (VH) via phone or video teleconferencing. During the first 3 months of the pandemic, WRNMMC experienced a 35% decrease in outpatient care with 85% of that being delivered in the virtual space. VH efforts were incredibly well received by both patients and healthcare providers especially for routine follow-up care and behavioral healthcare. The popularity of VH will dictate the method of future delivery of care to our patients.

WRNMMC moved to cohorting of COVID+ patients on inpatient and ICU wards early in the pandemic. This approach increased safety of exposure to staff and other patients and developed valued expertise in nursing staff. As COVID PCR lab testing expanded at WRNMMC, COVID screening was expanded from symptomatic patients to all hospital admissions and surgical and medical procedure pre-screening providing additional safety measures for patients and staff as well as appropriate cohorting of asymptomatic patients.

WRNMMC also developed novel communication techniques for command messaging and information sharing including weekly updates from the Hospital Director via Facebook Live...another best practice. Utilization of email, Facebook, secure messaging, Everbridge notifications, and intranet information portals allowed rapid dissemination of information to staff and patients.

C&CC: With signs of national curve flattening, how is WRNMMC expecting to address possible spikes in care need despite general trends?

COL Barr: WRNMMC will continue to build and utilize its lessons learned in preparation for any future increase in COVID-19 cases. Identifying maximal burn rates of hospital supplies, rebuilding stockpiles of PPE and pacing items, rotation of operational and contingency stocks, expansion and improvement of VH platforms and procedures, establishing permanence of CSA and curbside pharmacy operations, improvement of rescheduling techniques for deferred healthcare, maintenance of contingency training programs, and continuation of novel communication techniques will allow WRNMMC to remain ready for any future surge of COVID-19. Maintenance of WRNMMC's excellent PPE posture and dogged communication of personal responsibility to wear facemasks, maintain social distance, and regularly wash one's hands will prevent increased prevalence of COVID-19 at WRNMMC.

C&CC: In meeting out-patient ongoing health monitoring needs, what are some ways WRNMMC is bringing expertise to bear?

COL Barr: WRNMMC is proud to serve as a leader in readiness, research, training, and medical treatment of COVID-19. WRNMMC will continue to share best practices and lessons learned across the NCRM, DHA, and DoD.

MANAGING A CRISIS, TARGETING BETTER HEALTHCARE

The COVID-19 pandemic has exposed some of the fragilities of the U.S. healthcare system. The U.S. Army Medical Research and Development Command's (USAMRDC) Telemedicine and Advanced Technology Research Center (TATRC), is working to rapidly expand care capacity for acute and critically ill patients, even when those patients are care providers themselves.

By COL Jeremy C. Pamplin, Director, TATRC

U.S. Secretary of the Army Ryan D. McCarthy (center) listens to a question from a reporter during a news conference at the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) on March 19. (Photo Credit: Erin Bolling, USAMRDC Public Affairs)

The mission of the U.S. Telemedicine and Advanced Technology Research Center, or TATRC, is to "forge the future by fusing data, humans, and machines into solutions that optimize Warfighter performance and casualty care." We organize our team into four core research areas, including artificial intelligence and machine learning; robotics and autonomous systems; digital health; and medical modeling, simulation, and information sciences. These research areas are managed by corresponding innovation centers which include: the Biotechnology High Performance Computing Software Applications Institute (BHSAI), the Digital Health Innovation Center (DHIC), the Medical Modeling, Simulation and Information Visualization Innovation Center (MMSIV), and the Medical Robotics and Autonomous Systems Innovation Center (MedRAS). These teams work closely together to create medical intelligent systems to optimize Warfighter health – a key component of Warfighter performance – and deliver increased medical capability and capacity at the point-of-need; both of which are necessary to optimize outcomes.

COL Jeremy C. Pamplin

TATRC also manages the Advanced Medical Technologies Initiative (AMTI) program for the Army Office of the Surgeon General and the Defense Health Agency (DHA). This program supports small scale, innovative projects and technology demonstrations in various clinical contexts across the Military Health System (MHS) in order to identify solutions to pressing clinical needs. Projects in this portfolio are championed by MHS clinicians and are often adopted by the enterprise because they enhance quality and safety, reduce costs, improve access to care, and promote force health readiness. With an extensive network of partners, TATRC expertise is focused on the entire research spectrum, from early stage innovative research to studying how technology impacts casualty care on the battlefield and in the hospital. TATRC is engaged in essential medical research focused on advanced medical technologies and is dedicated to bringing innovative telehealth solutions to the Warfighter and the MHS.

Telemedicine is evolving rapidly into more complex digital health systems that support health and healthcare across a broad range

of contexts from home to space, and from maintaining wellness to optimizing surgical outcomes. Much of this pace is due to the advances in communication technologies, telecommunications infrastructure, broad mobile device adoption, elastic cloud computing, the internet of things, big data and artificial intelligence. These technology advancements are paralleled by changes in society's perspectives on technology's place in everyday life and its impact on personal freedom and privacy. In particular, people are often choosing – sometime unwittingly – to exchange privacy for personal convenience. Nonetheless, technology acceptance and use of telemedicine is expanding across all medical specialties in the United States. This expansion offers opportunities not previously available in healthcare including unprecedented access to medical specialties and improved healthcare from rural or historically under-served areas. The COVID-19 crisis has further accelerated telemedicine adoption by reducing legal and policy barriers related to billing for telemedicine and cross state licensure. These opportunities are further encouraged by the 21st Century Cures act (which was signed into law in 2016), and in particular, its Final Rule published on 9 March 2020. This rule encourages unprecedented medical data and device reform toward standardization, accessibility, sharing, and interoperability.

ADDRESSING A HEALTH CRISIS

The personal health risk for healthcare providers delivering physical care to patients, and the risk of system failure if key healthcare persons – like intensive care unit clinicians – become sick or die, are critical aspects of healthcare. Both USAMRDC and TATRC are working with the U.S. Department of Health and Human Services (HHS), the Federal Emergency Management Agency (FEMA), and the Society of Critical Care Medicine (SCCM) to develop a telemedicine solution that allows resource-rich or unaffected regions to provide critical care support using mobile technologies in the midst of a regional or national disaster. The National Emergency Telecritical Care Network (NETCCN) addresses the immediate shortage of critical care trained medical professionals resulting from the COVID-19 pandemic.

The NETCCN project intends to create a national telemedicine system using secure, cloud-based platforms that leverage the current cellular-enabled mobile device infrastructure. The project also focuses on developing models of care/staffing models that are the most efficient and safe to use during a disaster. Furthermore, a governance structure for the system must be rapidly assembled during emergencies to coordinate disparate resources into a uniform virtual critical care relief system. Ultimately, the NETCCN may evolve into a national emergency telehealth network and must be incorporated into the next generation National Disaster Medical System – an effort being led by the Office of the Assistant Secretary for Preparedness and Response (ASPR).

TELEMEDICAL HEALTH MONITORING

Telemedicine, a healthcare delivery model that has struggled to take hold in the U.S., has taken a central role for healthcare with regards to COVID-19. Although reports vary, only about ten percent of U.S. healthcare was conducted with telemedicine before COVID-19; this number has skyrocketed to 70-100 percent of care in many circumstances since the beginning of the outbreak. Telemedicine, as opposed to care in person, is now the norm. At this time, it is unclear what percentage of care each of these two models will account for in the future, but it is clear that that U.S. healthcare delivery will never return to what it was prior to the pandemic. We are likely to see telemedicine as more of a norm, especially for routine visits and follow up care, going forward.

What remains less clear is the role of telemedicine in austere care contexts – like rural America or military operational medicine – contexts were the technology infrastructure is less mature, telecommunications and network resources are less robust, and in-person capability or capacity may not be available. These care contexts are not new to the military and have been the focus of TATRC research and development for years. Necessary for success in this context are care models that anticipate network interruption, take advantage of clinical decision support and autonomous medical device technologies as well as new training models for caregivers that emphasize the necessary skills to find answers to unexpected challenges encountered in resource limited contexts.

Other important issues related to technological enhancements and integration into the continuous monitoring of the health status of a population – in particular the military population – are related to privacy, operational security, and data quality.

ADVANCING WITH LESSONS LEARNED

In general, key areas of development for telemedicine and medical technology that will be affected by the crisis are in telehealth policy and data/device interoperability. From a policy standpoint, the nation must accept care delivered using telehealth as healthcare. They are the same. Therefore, the billing rules that have made telehealth encounters equivalent to in-person encounters must remain in affect long term. Furthermore, cross state licensure and credentialing barriers must be reduced or eliminated. While care during a disaster requires physical tasks, many of these tasks can be performed by less trained or even untrained persons under the supervision of a remote expert. Incorporating telemedicine and telemedicine clinicians into the future National Disaster Management System (NDMS) should be considered so that fewer clinicians must be physically mobilized to provide response to physical disaster location.

A national emergency telehealth network and data-structure – one that multiple technology platforms can connect-to and read-from – would facilitate real-time situational awareness of the population's health, medical assets, and resource priorities. A plug-and-play network of devices and data sources (e.g. medical records), especially if built upon a backbone of mobile health, would be valuable and save lives during disasters. This type of system supports the goals and adheres to the requirements of the 21st Century Cures Act Final Rule; this type of system, built for a disaster, could have broad ranging impacts on the overall healthcare economy moving forward.

TATRC has a rich history of fueling telemedicine adoption across the U.S., the U.S. military, and indeed across the globe. We are encouraged by the growth across U.S. healthcare and the continued potential for telemedicine, telehealth, and digital health to shape U.S. healthcare in the future. While we don't know what the future will look like post COVID-19, it is clear that telehealth and other advanced medical technology that has been implemented during this time will secure their places in the future continuum of healthcare. Medical technology will continue to evolve and we will adopt it as permanent parts of our lives; bringing our "doctors" back into our homes – just as in the days of house calls – will forever change how the healthcare system helps people live happy, healthy lives. ▪

ENSURING READINESS FROM CAPABILITIES CREATION TO DELIVERY

Brigadier General Talley volunteered for military service in 1983, serving with the 1st Infantry Division, 197th Separate Infantry Brigade, and William Beaumont Army Medical Center. He achieved the rank of Sergeant and was honorably discharged in 1989. He earned a Bachelor of Science degree with honors from the University of Texas at El Paso and commissioned as a Distinguished Military Graduate in 1991.

Brigadier General Talley has led in several previous command and key staff assignments, to include: Troop Commander, 3rd Armored Cavalry Regiment; Logistics Officer, 7th Special Forces Group (Airborne); Observer/Controller (Project Warrior), Mechanized Infantry Task Force and USAMEDDAC Chief of Logistics, National Training Center; G3 War Plans Officer, XVIII Airborne Corps; Director/Instructor, Combined Logistics Captains Career Course; Senior Task Force O/C, Joint Readiness Training Center; Commander, Defense Distribution Depot Tobyhanna, Pennsylvania; Commander, 6th Medical Logistics Management Center; Assistant Deputy Chief of Staff G-3/5/7, Office of the Surgeon General & US Army Medical Command; Commander 44th Medical Brigade; US Army Forces Command Surgeon; and most recently, Deputy Commanding General, Regional Health Command – Atlantic.

He served OIF combat tours as the Executive Officer of 261st Medical Battalion (ABN) and S3, 507th Corps Support Group (ABN), in addition to a deployment to Saudi Arabia as the Assistant Program Manager for Health Affairs, Office of the Program Manager, Saudi Arabian National Guard (OPM-SANG) Modernization Program.

Brigadier General Talley's professional military education includes the Combined Logistics Officer Advanced Course, Command and General Staff College & School of Advanced Military Studies, and the Army War College. He holds two Master of Military Arts and Sciences degrees from the Command and General Staff College; a Master of Strategic Studies degree from the Army War College; and a Master of Arts degree from Webster University.

Brigadier General Talley's awards and decorations include the Legion of Merit, Bronze Star, Defense Meritorious Service Medal, Expert Field Medical Badge, and Master Parachutist badge. He is a Military Historian designee, and a member of the Armored Corps' Order of Saint George and Army Medical Department's Order of Military Medical Merit. He is also a National board certified respiratory therapy practitioner.

BG Michael J. Talley

Commanding General
U.S. Army Medical Research and Development Command and Ft. Detrick, MD

Combat & Casualty Care magazine recently had the opportunity to speak with Brigadier General Michael J. Talley, Commander, USAMRDC and Ft. Detrick, regarding some current and ongoing focus areas both the Command and Installation are facing in light of current and ongoing pandemic mitigation efforts.

C&CC: It is fair to say that your first year at USAMRDC and Fort Detrick has been anything but routine. Please explain some of the challenges – including the current pandemic – that you've faced since you began your current role in 2019.

BG Talley: When I assumed command last July, USAMRDC had been through many changes. They had recently re-structured and were in the middle of realigning to Army Futures Command; an effort which required the standard shifting of various staffers and assumption of new mission priorities to suit our new directives. In the eight months before COVID-19 struck, I performed a number of deep dives to learn the intricacies that go on behind the scenes to make our subordinate commands so successful. I was blown away, not just by the incredible

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A U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) scientist works in a Biosafety Level 4 (BSL-4) laboratory. (Photo Credit: USAMRIID Public Affairs)

work this command does, but also by the team's dedication to creating, developing, acquiring, and delivering capabilities for the Warfighter. However, in addition to having a new name, and a new chain of command, they had in me, a new commanding general; this was a substantial amount of change. The best way to meet these challenges successfully was with a team approach. I made team leadership-building a priority. This decision paid off because leadership and team cohesion are certainly key components needed to effectively support the whole-of-government response to COVID-19. Each day I am amazed at how hard this team works yet how effortless they make it seem – and I know it's not effortless. As essential employees, many of our researchers and scientists and managers have been going to their workspaces and laboratories despite the pandemic. And, the non-essential staff on our workforce are overcoming challenges created by the need to work from home so they can continue to support both the COVID-19 response as well as keeping us on mission. I am so proud of the team at USAMRDC; despite the many challenges they are facing, when it comes to our priorities, they are not missing a beat.

C&CC: In general terms, what role has the USAMRDC taken in response to the pandemic?

BG Talley: Emerging infectious diseases, like COVID-19, are one of the reasons a global network of military infectious disease laboratories, conducting surveillance and programmatic research, exist around the world.

Military medical research and development is a constant force designed to support the Warfighter, and the public, in every conceivable circumstance. Through both emerging science and technological advancements, combined with development efforts and a refined acquisition process, our team here at USAMRDC delivers medical capabilities with agility and efficiency.

USAMRDC has research and development programs in many areas, such as combat casualty care, military operational medicine, chemical and biological defense, aeromedical medicine, trauma and burn care, and many others. A key in our ability to provide immediate support the whole-of-government response to the COVID-19 pandemic is USAMRDC's existing extensive capabilities and international research infrastructure to combat infectious disease threats. Our program enables our scientists to anticipate and develop countermeasures against emerging infectious diseases. For example, back in March when the pandemic began, our laboratories were able to immediately design unique COVID-19 vaccine candidates based on their previous work and expertise on related diseases and pathogens. Their expertise, background, previous work, and relationships with other experts around the world made it possible for us to immediately pivot and rapidly develop vaccine candidates and identify treatment efforts, such as new drug candidates, to respond to COVID-19 infection.

Together, with our United States Government partners, we are progressing at a substantial pace in order to deliver effective treatment and prevention products that will protect U.S. and global citizens, and, preserve the readiness and lethality of our Service Members.

C&CC: A pair of USAMRDC labs – both the United States Army Medical Research Institute of Infectious Diseases (USAMRIID) and the Walter Reed Army Institute of Research (WRAIR) – seem to be at the forefront of COVID-19 vaccine research and, also, the overall pandemic response. How is their work progressing? What do people not know about the work USAMRDC is doing on the vaccine front, and the interplay between all USAMRDC labs in an effort like this one?

BG Talley: The USAMRDC, of course, is just one of the many DOD entities working to combat COVID-19. The support we receive from Congress, the Army Futures Command (AFC), and the Defense Health Agency (DHA) is integral to our efforts. Complementing those larger contributions is the USAMRDC's unique ability to access diverse internal resources while also leveraging our vast network of external partnerships in order to find the solutions we need. Further, and using the current pandemic as an example, the Command routinely coordinates across the larger DOD to leverage expertise and capabilities to address the growing spectrum of related needs such as research and development for medical countermeasures, manufacturing, and more.

The examples here are legion, and include the USAMRDC's partnership with the Medical Technology Enterprise Consortium (MTEC); a nonprofit corporation designed to accelerate the translation of medical technologies into solutions focusing chiefly on the health of U.S. military personnel and veterans. An integral part of MTEC's partnership with the DOD – and certainly an integral part of its efforts as related to the COVID-19 fight – rests within its use of the OTA (or, Other Transaction Agreement), a unique tool which allows MTEC to operate a solicitation and award process in a more open, transparent, and collaborative manner; tearing down traditional acquisitions barriers restricting government-industry interactions. As part of that process, MTEC is currently working a number of short-turnaround efforts in topic areas related to COVID-19, ultimately seeking to solicit ideas and award funding as expeditiously as possible.

Then, of course, there's the enduring benefit of USAMRDC with regards to the acquisitions process, as we house both science and technology (S&T) and advanced development (AD) capabilities under the same command structure. This feature allows USAMRDC to keep the hand-off of medical countermeasures from early development to late development under one, single roof. This capacity allows us to avoid in large part the so-called "valley of death" for medical products – or, in other words, the lag time associated with such a comprehensive process. This is the kind of USAMRDC-specific feature that makes us an integral player in the enduring quest to care for the Warfighter.

More specifically in this arena, I am proud to say that our scien-

tists at WRAIR have designed a unique COVID-19 vaccine candidate. What makes it unique is the platform; its base can be used for targeting multiple strains of a coronavirus in one vaccine. For this vaccine, or the others that are part of the government's Operation Warp Speed effort, I can tell you that safety will not be compromised. Certainly, getting the most efficacious vaccine candidate to the front of the line, or across the line is prevalent, but what we don't want to do is jeopardize safety in the name of speed.

With respect to therapeutics we are well positioned in this fight. Early on in the pandemic, USAMRIID received samples of the COVID-19 virus which allowed them to safely replicate the virus. They then began moving forward on multiple countermeasure development fronts at the same time; two of which – convalescent plasma and monoclonal antibodies – are the subject of current research efforts regarding their ability to halt viral growth. USAMRIID and WRAIR are collaborating on a third effort, high throughput screening of existing drugs. Our laboratory capabilities allow us to screen tens of thousands of drugs on a weekly basis which means we are constantly looking for novel and repurposed drugs that could be used for treatment.

It's this type of interplay and cooperation – coupled with our commitment to communication and readiness – that allows USAMRDC to pivot quickly and focus on a pressing national need.

C&CC: How has the larger DOD responded to the USAMRDC's specific work with COVID-19? More simply, how is the DOD supporting your efforts?

BG Talley: Over the course of these past few months, the USAMRDC has learned a number of key lessons. Not only have we gained a greater understanding of our role in the myriad partnerships within both the DOD and the AFC, but we've also been able to broadcast that message – that message being the importance of our mission, of course – to both the greater public and our various stakeholders; which in turn allows for the transparency required to build and encourage trust. All of that to say, by understanding how our medical efforts – chiefly our ability to marry science and technology efforts with advanced development efforts under one roof – fit into the larger picture of the wants and needs of the U.S. military and the wider public, we can in turn ensure that we operate accordingly and in the most efficient manner possible to drive towards a solution. It is perhaps an overused metaphor, but by playing our own, dedicated role on this larger team to the best of our ability, we have been able to augment and facilitate the overall mission, which is driven currently (with regards to the COVID-19 pandemic) by the federal government's whole-of-government approach to developing a vaccine and associated countermeasures. Further, by supporting our teammates within the DOD and in the private sector, and by using the guidance and support offered by Congress via our funding, we can ensure we are contributing to the solutions required at the moment and, also, the solutions that may be needed down the road.

C&CC: Outside of vaccine research, USAMRDC -- and Fort Detrick as a whole -- had a large role in the response; including (among many other functions) dispatching service personnel and ensuring proper supply chain coordination. What is your opinion of the larger USAMRDC and Fort Detrick effort regarding the pandemic?

BG Talley: The Fort Detrick response has been as robust as you might imagine. Many of the Installation's tenants are now focused on pandemic response efforts using their own unique communities of research and acquisition personnel.

One example is the National Interagency Confederation for Biological Research (NICBR), a consortium of eight federal research agencies working together to secure the overall health of the nation. NICBR serves as a framework for facilitating action among member organizations with areas of mutual interest. The benefits for the Army, and its ability to respond to the pandemic, include the ability to share technical expertise and scientific services with other cabinet-level entities including the U.S. Department of Health and Human Services (HHS), U.S. Department of Homeland Security, and others.

The National Biodefense Analysis and Countermeasures Center (NBACC), which is also headquartered at Fort Detrick, is also a major player in this effort. NBACC is currently partnering with the Department of Homeland Security, Science and Technology (S&T) Directorate, to conduct research that will help scientists better understand the coronavirus that causes COVID-19, and methods to prevent its spread. NBACC's unique combination of capabilities in Virology and Aerobiology are integral to this specific effort, and will allow researchers to evaluate the impact of a range of conditions can have on the virus's ability to survive in the air, in respiratory fluids and on various types of surfaces.

The U.S. Army Medical Logistics Command (AMLC) – which is subordinate command of the U.S. Army Materiel Command (AMC) – ensured

the delivery of life-saving medical supplies for three Army hospital centers charged with supporting both New York and Washington – two of the states hit hardest by COVID-19. Supply packages included syringes, suction tubes, various blood products and oxygen. Similarly, the Medical Communications for Combat Casualty Care (MC4) team – whose Product Management Office is headquartered at Fort Detrick responded to the pandemic by supplying equipment and direct technical and training support to Army units who use MC4 IT systems. With regard to deployments, the 6th Medical Logistics Management Center (6MLMC) deployed 22 Soldiers across the U.S. to support federal efforts to combat the pandemic, with six teams originally dispatched to such hotspots as Washington, California, Louisiana and New York.

Beyond that, our Medical Communications for Combat Casualty Care (MC4) office continues to sustain Army and Navy units deployed to aid pandemic relief efforts. Since mid-March, MC4 field service representatives (FSRs) – teams which include trainers, system administrators and engineers – have provided units with the appropriate hardware and software to support medical providers who document healthcare electronically. From mid-March to the mid-May, training was provided to 330 medical personnel from 72 Army and Navy units, with a total of 248 MC4 systems fielded to units assigned COVID-19 missions.

Additionally, and at the very beginning of the federal response effort, the 6th Medical Logistics Management Center (6MLMC) deployed 22 Soldiers across the U.S. to help combat the pandemic. Tasked chiefly with tracking medical materiel, supporting medical maintenance operations, and integrating with federal entities such as the Federal Emergency Management Agency (FEMA), a total of six teams were dispatched to such hotspots as Washington, California, Louisiana, and New York during early increases in case numbers in those specific states.

Elsewhere on the Installation, the Barquist Army Health Clinic (BAHC) has initiated efforts to hold the bulk of their current appointments – including behavioral health appointments – virtually to meet social distancing requirements. Further, patients who must attend the clinic in-person are pre-screened via an outdoor "drive-through" to determine individual risk levels of COVID-19 exposure and transmission before entering the facility. Patients requesting COVID-19 testing outright are screened via the same "drive-through" process.

The entire Fort Detrick community – including those entities outside of the biomedical research field and including the U.S. Army Garrison (USAG) team – has answered the call for help in the face of the pandemic by relying on their own unique capabilities and partnerships.

C&CC: Please feel free to discuss other goals, challenges, and areas of importance for both USAMRDC and Fort Detrick moving forward.

BG Talley: Under our National Security Strategy and National Military Strategy we are asked to defeat and deter multiple threats at the same time. We don't have the luxury of picking the time, the place, or the location. But the good news is that this is what we plan for, and the Department of Defense has been doing pandemic planning for the last twenty years.

While no one knows what kinds of challenges we'll face in the future, USAMRDC is both ready and well-equipped to support the Warfighter and the nation. The novel coronavirus is demanding a lot of our attention and USAMRDC is dedicated to confronting this challenge head-on. While some of our workforce is supporting the whole-of-government response to defeat this virus, we haven't taken the foot of the gas when it comes to supporting the Service Member. Each day we continue to work towards our mission which is to 'responsively and responsibly create, develop, acquire, and deliver capabilities for the Warfighter' and we continue to support both readiness and force lethality.

With a focus on the future, we will continue to leverage our unique capabilities and partnerships both inside and outside the federal government and the DOD to provide solutions for the Warfighter and the American public at large.

PIVOTING TO COUNTER A PANDEMIC

Since January 10th, the day Chinese scientists published the genetic sequence of a novel coronavirus, researchers at the U.S. Army Medical Research and Development Command's (USAMRDC) Walter Reed Army Institute of Research (WRAIR) have been working diligently to advance research efforts to prevent, diagnose, and treat this latest threat to global health and force readiness.

By Samir S. Deshpande, WRAIR

Walter Reed Army Institute of Research (WRAIR) facility in Silver Spring, MD. (Photo Credit: WRAIR Public Affairs)

Building on decades of strategic investment in broad capabilities and product-oriented biomedical research infrastructure, both the U.S. Army and the Walter Reed Army Institute of Research (WRAIR) have been able to consistently maintain a posture of readiness and response to emerging infectious diseases that threaten U.S. "Based upon WRAIR's long experience developing vaccines for other viruses and recent work on coronaviruses, we have been able to move quickly in advancing a vaccine candidate against COVID-19," said Dr. Kayvon Modjarrad, director of WRAIR's Emerging Infectious Diseases Branch (EIDB).

Dr. Kayvon Modjarrad

Dr. Nelson Michael

Late last year, Modjarrad's team published early findings from the first-in-human clinical trial of a vaccine against Middle East Respiratory Syndrome, an infection from the same family as the virus that causes COVID-19. Currently, the EIDB is leading efforts to develop a safe and effective vaccine to prevent COVID-19. WRAIR initially developed more than two dozen prototypes – which were, in turn, administered to nearly one thousand mice – to study the most promising binding and neutralizing antibody response in preclinical studies.

IDENTIFYING A PROTOTYPE

In June, researchers identified the most promising vaccine prototype, along with two backups, for future testing in human clinical trials, which are currently slated to begin in the early Fall. WRAIR's vaccine, called the Severe Acute Respiratory Syndrome Coronavirus-2 Spike Ferritin Nanoparticle (SpFN) is one of many vaccines currently in development across both the public and private sectors. WRAIR scientists are working closely with other institutions – and, simultaneously through the federal government's Operation Warp Speed – to advance other vaccine candidates.

Researchers hope the ferritin vaccine platform will also pave the way for a universal vaccine to protect against not only the current virus, but also other currently known coronaviruses and unknown species that could arise in the future. The adjuvant being tested as part of the vaccine effort, ALFQ, was also developed at WRAIR and was awarded a patent in 2019.

"This is what we do, and we have a strong track record," said Dr. Nelson Michael, director of WRAIR's Center for Infectious Disease Research (CIDR). "WRAIR has played a role in the development of nearly half of the vaccines available today."

As part of WRAIR's commitment to the aforementioned Operation Warp Speed, which is the aggressive public–private partnership effort introduced to facilitate the development, manufacturing, and distribution of COVID-19 related countermeasures, Army scientists partner closely with researchers at other U.S. government agencies to coordinate efforts and leverages capabilities. "We are working non-stop, along with our interagency partners, academia and private industry, to ensure we have a safe and effective tool to prevent new infections," Michael said.

ADVANCING ANTIBODY TESTING

As an example of WRAIR's enduring commitment to combatting the pandemic, back in February the Institute's Diagnostic Countermeasures Branch engaged an industry partner to develop a high throughput platform to scale up the Army's ability to rapidly and accurately test Soldiers and their beneficiaries for COVID-19 infection as well as antibody tests to determine who, exactly, had been infected. The branch continues to work extensively with military treatment facilities to leverage regional diagnostic laboratories for COVID-19 testing to help clinicians triage and manage patients.

Currently, WRAIR scientists are also conducting research to identify other novel therapies for COVID-19. Using artificial intelligence and high-throughput screening technology, they are testing millions of compounds for activity against COVID-19. The most promising candidates are then tested in cells at a partner laboratory. In addition, they are conducting studies to identify and characterize monoclonal antibodies (mAbs), a type of immunotherapy. WRAIR has proven experience in this area, having successfully isolated mAbs for other viral pathogens. ▪

PENTAGON UPDATE ON DOD COVID-19 RESPONSE

COVID-19 has presented local leaders and commanders in the Department of Defense with unprecedented decision-making challenges in the past few months. Thomas McCaffery, assistant secretary of Defense for Health Affairs, voiced confidence in the response of these leaders who are using Military Health System (MHS) data to make decisions about COVID-19 for their commands. McCaffery made his remarks during a July 1 press briefing at the Pentagon in Arlington, VA.

"Decision-making is very much tied to what is happening in their local community," McCaffery said. "[The MHS] tracks [COVID-19] cases and get reports on a daily basis, and that information is shared with the commanders on the ground to make well-informed decisions about what to do."

McCaffery was joined in the briefing by Thomas Muir, director of Washington Headquarters Services, and Lernes Hebert, deputy assistant secretary of Defense for Military Personnel Policy. The officials described how the Military Health System is supporting community leaders across the nation facing pandemic re-opening decisions by offering timely data and sharing information. The leaders also noted the vast system of medical specialties, professions, and research that informs the total effort to give commanders the medical resources they need.

The officials said the COVID-19 pandemic affects each population center differently and at different times. As the country experiences "hot spots" of pandemic activity, community leaders and military commanders together decide protocols for public safety on a case-by-case basis, backed by Pentagon and CDC guidance and updated health surveillance data.

"The installation commanders are following local public health guidance and making sure that we have a well-informed force, as evidenced by the behavior they've exhibited throughout this pandemic," Hebert said.

MHS gathers and analyzes data on the novel coronavirus and COVID-19 largely through the Defense Health Agency's Armed Forces Health Surveillance Branch. AFHSB monitors the spread of the virus and other emerging pathogens that may threaten the safety of U. S. service members.

The Washington Headquarters Service's Muir shared how the Pentagon uses the most current medical surveillance data as employees slowly return to the office.

"We look at the same data from authoritative sources," Muir said. "We are fortunate in the DC area that [COVID-19 cases] are all trending downward. Working with local public health authorities and our Public Health Office here in the Pentagon drove us to make the decision to move into Phase 2 of our resilience plan, so we're seeing a return of the workforce."

Signs are posted all over the Pentagon, Muir said, to encourage employees to social distance in the workplace when possible and wear cloth face coverings. Face coverings are provided to employees arriving without one at the building. Muir reported strong compliance with the new procedures, complimenting the workforce for their flexibility.

"We're seeing great behaviors from a well-educated and informed workforce," Muir said. "They know what they need to do to protect themselves and their families."

MHS redoubled military medicine's research and development efforts to focus on diagnostic testing and has previously announced a $75 million investment in vaccine research candidates. McCaffery noted that DoD is supporting Operation Warp Speed, the whole-of-government initiative to deliver 300 million doses of an effective vaccine for COVID-19 by January 2021.

"It's natural that we do research on vaccines because we want to make sure if our troops are deployed somewhere that they have protection against infectious diseases," McCaffery said. "So some of the research that we have been doing for military purposes on several vaccine and therapeutic treatments is a part of the all-government effort to meet that Operation Warp Speed goal."

More info: Health.mil

ADVANCE IN MICROBIAL INFECTION TREATMENT

Antibiotic resistance is on the rise and is recognized by both the CDC and the U.S. Military as a current – and formidable – global health threat. The U.S Department of Defense has long documented the warfighter's outsized risk of exposure to infectious disease, including the increasing number of multi-drug resistant (MDR) organisms that have challenged military wound care in Iraq and Afghanistan3. Despite this looming crisis, there has been a notable exodus of pharmaceutical companies from the antibiotic space, as well as several high-profile failures of biotechnology companies focused on antibiotic development4. Current therapeutics to combat microbial infections, including MDR microbes and bacterial biothreats, are insufficient to meet the growing need, and existing methods to develop new treatments are too slow and/or costly to combat emerging drug resistance in pathogenic microorganisms.

The U.S. Defense Advanced Research Projects Agency (DARPA) Harnessing Enzymatic Activity for Lifesaving Remedies (HEALR) program aims to utilize a new therapeutic design toolkit and novel strategies/modalities to effectively treat microbial infections. Specifically, HEALR seeks to develop new medical countermeasures (MCMs) by recruiting native cellular machinery to recognize and clear disease-related targets for treating these infections. These advances could result in host-driven degradation or deactivation of pathogen targets, which may not only inhibit but could stop the pathogen in its tracks.

"HEALR presents the opportunity to identify drugs that are safer, more effective, and better address drug resistance and bacterial infections than existing therapeutic modalities," noted Seth M. Cohen, Ph.D., program manager for the DARPA HEALR program. "By harnessing innate cellular processes, such as those exploited by proteolysis targeting chimeras (PROTACs) and similar approaches, HEALR intends to achieve superior outcomes over existing therapies."

More info: Darpa.mil

ENSURING CRITICAL RE-SUPPLY

Half of all U.S. states have requested excess military medical supplies and equipment from the Defense Logistics Agency (DLA) since the national COVID-19 pandemic response began in March.

By Jake Joy, DLA Disposition Services

The city of Camilla, GA, recently received a 2005 Hyundai HL770-7 scoop loader originally worth about $250,000 from the DLA Disposition Services property disposal site in Gimcheon, South Korea. (DLA)

The Defense Logistics Agency (DLA) has recently funneled the supplies, originally worth over $4.5 million, to qualified state agencies from DLA Disposition Services sites where military units relinquish taxpayer-purchased property they no longer need. By mid-June, states had made about 1,300 requests for 1.5 million medical items, including vital signs monitors, anesthesia machines, gloves, gowns and surgical drapes.

"Some states will typically pull material only from their regional [disposition] sites," while others request items from distant locations, said Property Disposal Specialist Cassie Gilbert, a 20-year agency employee who supports state customers. She said items DLA donates to the states are free apart from shipping costs.

VARIED AND WIDE DISPERSAL

Tennessee is one of several states to increasingly rely on DLA excess property, Gilbert added. Officials there requested over 450 individual medical items during the pandemic, including defibrillators, monitors, beds, stretchers, masks, and surgical bandages and tape. The items came from 17 surplus property sites in 14 states as far away as Alaska.

State officials' exposure to military surplus can depend on base proximity. Those with few or no major installations may not factor federal excess property into contingency planning compared to those with a large military presence. Idaho, for example, requested various medical supplies and equipment from DLA for its coronavirus response but sourced requests only from a large disposal site at Hill Air Force Base in adjacent Utah. However, Texas, which has multiple major bases, requested a galaxy of used and excess medical items during the pandemic. Officials there received blankets, surgical drapes, pulse oximeters, various mask types, resuscitators and much more.

"They are a huge operation," Gilbert said of the Texas surplus agency. "They travel around and pick up property nationwide on a regular basis."

DLA Disposition Services employees strive to provide accurate property descriptions and quickly process equipment requests. Despite stringent safety guidelines at field locations and work being done remotely due to the pandemic, DLA has also provided an additional $6 million in non-medical equipment since March, bringing its total in equipment donations to $10 million.

Kaelene Borkowski, who oversees surplus property requests for South Dakota, said the program enables small communities and eligible non-profit organizations to save money while acquiring items that otherwise wouldn't be available.

INTERNATIONAL AND STATEWIDE ASSETS

DLA Disposition Services continues to work with U.S. and foreign partners to facilitate the movement of critical equipment to places where it's needed. "An example that comes to mind is the large military snow blowers that we have been able to provide to the Department of Transportation. They currently have several that are used across the state and still have a need for additional units to get the job done during the major snowstorms we've been experiencing," Borkowski added.

South Dakota officials recently acquired scarce, high-demand medical items like masks, gloves, thermometers and protective clothing.

"Our counties, cities, hospitals, and Department of Health are a few of the programs that quickly grabbed onto those items and asked for more," Borkowski said. "It makes sense that this equipment and other personal property items, originally paid for by taxpayers, should go back to help their communities when the federal government no longer needs them. When we use our resources to build local communities, everyone wins." ▪

CALENDAR OF EVENTS

AUG 11 – 13
Global Explosive Ordnance Disposal
Virginia Beach, VA
Ndia.org

AUG 25 – 26
Police Security Expo
Atlantic City, NJ
Police-security.com

AUG 27 – 30
PA Hazardous Materials Technicians Conf
Seven Springs, PA
Pahazmat.org

AUG 31 – SEP 2
Counter UAS Summit
Washington DC
Idga.org/events-counteruas-usa

SEP 15 – 18
Virginia Hazmat Conference
Norfolk, VA
Virginiahazmat.org

SEP 22 – 24
Modern Day Marine Expo
Quantico, VA
Marinemilitaryexpos.com

SEP 29 – 30
TechNet Fort Bragg Symposium
Fort Bragg, NC
Technetfortbragg.com

SEP 29 – 30
Autonomous Capabilities for DoD
Alexandria, VA
Autonomy.dsigroup

SEP 30 – Oct 1
Human Performance & Biosystems Summit
Washington, DC
Humanperformance.dsigroup.com

OCT 12 – 14
AUSA Annual Meeting
Washington, DC
Meetings.ausa.org

Oct 27 – 28
Insider Threat Symposium
Alexandria, VA
Insiderthreat.dsigroup

Oct 28 – 30
Hypersonic Weapons
Washington, DC
Idga.org

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- DLA VIPA Agreement: VMP-1412-03
- FSS Contract 65IIa/GSA Schedule - V797D-30127

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