

HQ USINDOPACOM

Innovation and Health Technology for Pandemics ASEAN Military Medicine Conference



26 May 2021

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Introduction

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- COVID-19 remains a global challenge that no nation can face alone: Our strong network of alliances and partnerships is critical to combating this virus.
- Crises fuels technological breakthroughs, and defense sectors in particular respond to crises with innovation. This pandemic is no exception.
- In addition to new technologies, this crisis has accelerated the adaptation and further development of defense technologies for humanitarian and combat operations as well as austere environments.
- Technologies developed by the defense sector are being used to support our civilian partners, who are facing operational conditions they do not generally encounter.



Presentation Structure

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- High-level overview of some of the innovations and technologies leveraged in response to COVID-19
 - Telemedicine
- Specific examples where U.S. Department of Defense innovation has been brought to bear in the fight against COVID-19
- Remaining key challenges and future directions
- Question and answer session



Innovation and Technology

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A vast number of innovations have been, and continue to be developed, accelerated, and leveraged in the global fight against COVID-19:

- New technologies
- Novel applications of existing technologies
- Creative approaches and problem solving
- “Out of the box” thinking
- Flexibility and resilience



Innovation and Technology

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Partnerships:

- Partnerships are at the core of our global readiness
- Quickly able to adapt and switch to the virtual world



US/Vietnam Military Medical University
Virtual Knowledge Exchange



40th Anniversary of Exercise Tiger Balm



Innovation and Technology

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- Global health security partnership with the Australian Defence Force
- Co-hosted several impactful global health security related events
- Pivoting to virtual platforms
- Military-civilian health security webinar series:
 - Military-civilian cooperation in pandemic preparedness and response
- Building on the outcomes of the webinars, held a virtual workshop on building health security exercise capacity
- Participants developed an exercise that will be run as a virtual Table-top in June 2021





Innovation and Technology

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Vaccine Design

- Gene-based vaccine technology, previously largely experimental, was quickly leveraged for COVID-19
- Design, trial, and manufacture of vaccine candidates occurred with unprecedented speed
- May usher in a new era of vaccine technology

Drug Discovery

- Use of protein network analysis to identify protein networks that SARS CoV-2 uses to replicate
- Corresponding drug targets, especially those that are targeted by drugs that have already been developed
 - E.g. drug currently used to treat cancer is being tested against COVID-19



Innovation and Technology

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- *3D Printing*
 - 3D printing of Personal Protective Equipment
- *COVID-19 convalescent plasma*
 - Really an old technology applied in an innovative way





Innovation and Technology

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- *New capabilities for patient treatment*
 - Air Force Negatively Pressured Conex
 - Safe air transport of patients without risking the aircrew



- COVID-19 Airwave Management Isolation Chamber
 - Barrier device placed over the head, neck, and shoulders of patient during surgery
 - Isolates airborne particulates
 - Used in 100+ medical procedures within MHS.



Innovation and Technology

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■ ***Wearable technologies***

- Smartphones, fitness trackers and other wearable technologies
- Real-time illness detection, monitoring of temperature, heart rate, other biometrics
- Contact tracing, hotspot mapping

■ ***Virus testing and sequencing***

■ ***Process and procedure development***

- Minimize operational impact
- Minimize risk of transmission

■ ***Telemedicine***

- *Expansion*
- *Novel applications*



Walter Reed National Military Medical Center
centralized screening and testing area



Telemedicine

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COVID-19 has broken down barriers and placed telemedicine at the forefront of the fight

- Essential component of healthcare in both military and civilian populations
- Treating patients at a distance
- Also “flipped the model” – used in hospitals to protect staff
- The advantages of telemedicine are numerous



U.S. Air Force Surgeon at Landstuhl Regional Medical Center, conducts a virtual health appointment via synchronous video.



Telemedicine

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- Maximize medical assets while protecting providers
- Minimize the risk and cost associated with patient transport
- Allows staff under restriction of movement or quarantine to continue to contribute to the mission
- Overcome the tyranny of distance in dispersed operations
- Enhance survivability due to reduced time to respond, and the ready availability of intensivist provider expertise – expand interventions possible during the golden hour



Telemedicine

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- Existing telemedicine technology was ready for innovative application
 - Accessible via portable devices – cell phone, tablet, laptop
 - Real-time communication – text, images, and video
 - Developed leveraging partnerships – mil/civ, public/private
 - Wearable, connected devices to monitor vital signs has transformed telehealth
- Need an enterprise, needs-based approach to leverage these innovations for the future
 - Operational medicine vs. garrison medicine
 - Austere civilian settings – wilderness medicine, mass casualty events, natural disasters
- Tele-critical care capability



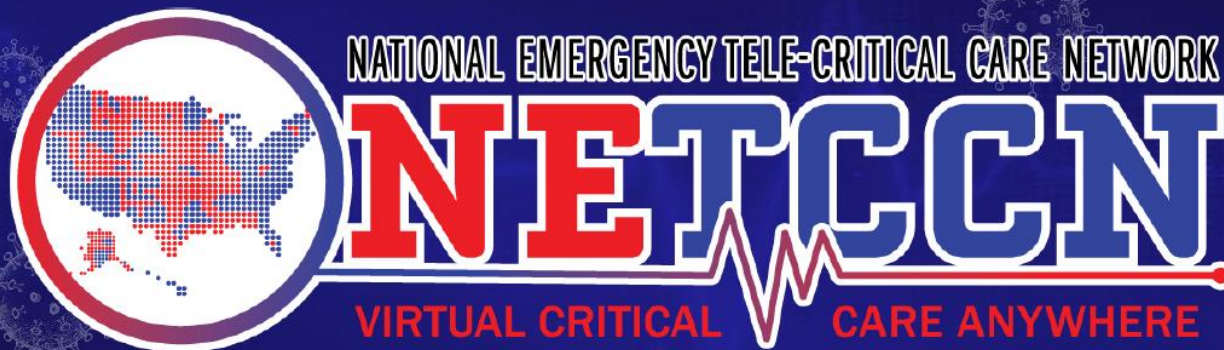
Military Examples - NETCCN

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National Emergency Tele Critical Care Network (NETCCN): In a model example of mil-civ collaboration, the U.S. Department of Defense and Department of Health and Human Services are co-funding trials of Tele-critical care in COVID-19 hotspots.

NETCCN basic capabilities include:

- Secure, mobile communication
- Asynchronous messaging
- Real-time documentation
- Team organization tool
- Secure, mobile communication
- Patient registration and cohorting
- Data collection, and reporting
- Survey and consent tools





Military Examples - NETCCN

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- NETCCN is being integrated into the planned U.S. National Disaster Medical System
- Additional enhancements are being planned:
 - Remote monitoring
 - Device control
- Applications for:
 - Mass casualty events
 - Natural disasters
 - Austere environments
 - Rural populations



Virtual health exercise at Madigan Army Medical Center.
(U.S. Army photo)



Military Examples - Guam

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- Innovative approach to military support to civil authorities during an unprecedented set of challenges.
- The U.S. Federal Emergency Management Agency (FEMA), as the lead federal agency for the U.S. COVID-19 response, received a request from the Guam government.
- Guam was experiencing a surge in COVID-19 cases island-wide, with patient numbers exceeding bed capacity and the number of critical care providers on site.
- DoD was able to respond to the request for support using NETCCN software, and the DoD's Joint Tele-critical Care Network.
- Activation of a network of 11 hospitals across the DoD medical enterprise, to support Guam Memorial Hospital.



Military Examples - Guam

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- Navy Medical Center San Diego provided support to Guam's COVID-19 response from over 6,000 miles away
- Nurse support active 24/7
- Physician support mostly at night
- Real-time support
- No travel associated risks or lost time
- No impact on Navy Medical Center San Diego staffing levels



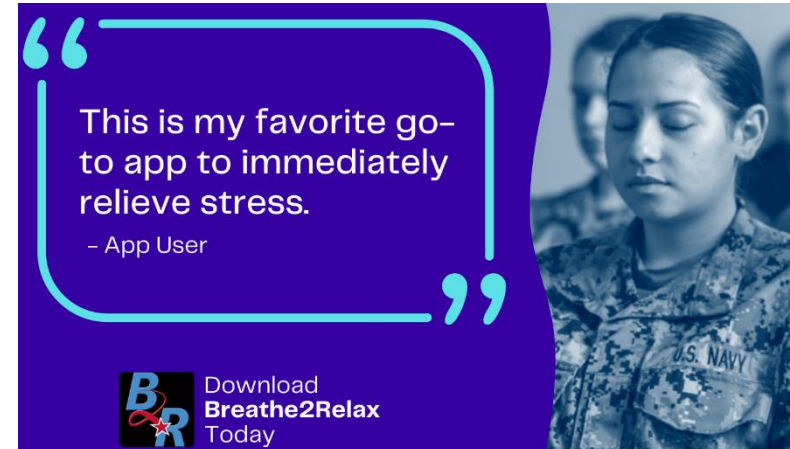
A nurse specialist assigned to Naval Medical Center San Diego's JTCCN, provides support to a remote intensive care unit via teleconference Sept. 17, 2020.



Tele-Mental Health

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- “mHealth” tools, developed to support Active Duty and Veteran populations
 - Computer/smartphone facilitated coping skill training and support
 - “Breathe2Relax” app, developed by the Defense Health Agency
 - Expand to video visits for psychotherapy and psychotropic medication management
- Leverage these existing tools to support providers and others
- Leverage advances in telehealth to increase the scope of remote mental health support
 - Active Duty and Veteran populations
 - Quick, secure, remote
 - Video visits for psychotherapy
 - Video visits for medication management





Challenges Remain

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- Despite the successes of telemedicine in addressing needs during COVID, challenges remain to both improve the technology, and to maintain the advances made so far
- General
 - Uptake and acceptance
 - International standards
 - Organizational – insurance, link to electronic medical records
 - Cyber security
 - Credentialing, training
 - Equitable access
- Maintain, improve, and expand



Future Directions

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- Must be able to “transition current practices to future capabilities in a way that takes full advantage of what telehealth has to offer the military, and by extension, some aspects of civilian medicine” Pamplin et al. 2019
- Quite prophetic, and COVID-19-driven urgency spurred progress
- Developed not only for contingencies, but also for steady state operations
 - Force multiplier
 - Enhancer of technological resilience
- We must continue science-driven adaptation and innovation, but with an eye toward sustainable capacity



Future Directions

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- The strides made in telemedicine in response to COVID-19 have implications ranging from deep sea medicine, across the most remote locations on earth, to outer space.
- Further development must incorporate a needs-based, enterprise level approach.
- We must continue innovation, avoid complacency, and prevent the re-establishment of barriers that were rapidly swept away during this pandemic.
- A ready and able force, enabled by digital health solutions.
- Expand access and capability with allies and partners – we are all in this together.
- Work together, mil-mil, mil-civ, domestically, bilaterally, regionally and globally to achieve shared goals of freedom, sovereignty, partnership, security, and prosperity.



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QUESTION & ANSWER SESSION