Operational Virtual Health Modalities Increased Combat Power for 1st Squadron, 2nd Cavalry Regiment During the Enhanced Forward Presence Mission

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ABSTRACT
Introduction
Virtual Health (VH) is posited to be a force multiplier for Military Medicine, delivering digital healthcare to the point of need for the warfighter. To date, there are no studies on the impact of both synchronous and asynchronous VH modalities during a deployment. VH usage by the 1st Squadron, 2nd Cavalry Regiment (1/2 CR) during a 6 month deployment to rural Poland was evaluated prospectively to identify mission days saved for Commanders.

Materials and Methods
VH Europe staff trained 1/2 CR Garrison and Deployed Medical Staff on VH modalities. Workflows for communication to higher echelons of medical care were developed. Usage of VH was prospectively tracked to identify trends and outcomes.

Results
213 Soldier Mission Days during a 6 month deployment were saved through the use of VH versus in-person travel for care. The predominance of VH was for synchronous video VH for the Warfighter (VIEW) (90%), followed by asynchronous Health Experts onLine Portal (HELP) consultations (10%). Lost Soldier productivity of $87,330 was avoided.

Conclusion
Operational VH is a force multiplier that brings the resources of the Medical Center to the Warfighter at the point of need. The full spectrum of VH modalities offers the greatest benefit for deployed units. Expansion of these technologies throughout the Department of Defense will reduce medical evacuations, increase Active Duty Service Member time on mission, and reduce risks for Commanders.

INTRODUCTION
U.S. Department of Defense Virtual Health (VH) systems have pioneered digital healthcare delivery for almost 30 years.1 VH Europe (VHE), with headquarters at the Landstuhl Regional Medical Center and supported by Regional Health Command Europe (RHCE), supports synchronous and asynchronous VH technologies to deliver Medical Center care to the warfighter at the point of need. To date, there is zero published data on the impact of the full spectrum of VH on increasing Soldier availability throughout the entire deployment cycle.

VHE’s spectrum of communication options for forces in U.S. European Command (EUCOM), U.S. Central Command (CENTCOM), and U.S. Africa Command (AFRICOM) is reflective of the variations of available communication bandwidth. The telephonic-based Advanced Virtual Support for Operational Forces (ADVISOR) program affords 24/7/365 immediate provider to critical care specialist access. The Health Experts On-line Portal (HELP) offers asynchronous, webmail-based provider-to-provider communication, with a typical response rate in 24 to 72 hours. VHE’s web-based synchronous VH for the Warfighter (VIEW) platform delivers direct to patient evaluation by 42 clinical specialties at LRMC.

VH Europe supports synchronous and asynchronous VH operations for Tri-Service Medical Treatment Facilities, Operational Forces, and Embassies across EUCOM, CENTCOM, and AFRICOM (Fig. 1—VH Europe sites). VHE’s VIEW program uses a Health Insurance Portability and Compliance Act (HIPAA) of 1996 compliant, commercial off the shelf, web-based real time communications platform (Acano Client, Cisco Systems, San Jose, California), to deliver digital healthcare to the point of need for the warfighter. Over a 5-year period, more than 300 specialists across 42 specialties performed 23,000 synchronous video healthcare visits, bringing digital healthcare delivery to 209,000 beneficiaries across three continents who count on LRMC for specialty care (internal VHE data). In 2017, the RHCE Commanding General directed the VHE team to focus efforts on supporting operational units. Later that year, LRMC incorporated the use

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FIGURE 1. Virtual health Europe sites.

of HELP, an asynchronous platform for provider-to-provider email consultation.

In Spring, 2018, 1st Squadron, 2nd Calvary Regiment (1/2 CR) located in Vilseck, Germany deployed to Bemowo Piskie Training Area (BPTA) in Northeast Poland as part of the North Atlantic Treaty Organization’s Enhanced Forward Presence military posture. BPTA is 1,194 km from Vilseck with travel on a wide range of paved road quality. Although not identified as a combat deployment, the mission stands as an important one with the mission to deter near-peer threats and enhance the NATO alliance. A primary goal of the mission included the deployment of more than 90% of the Squadron’s combat power including personnel, vehicles, and equipment. The Squadron’s largest threat to not meeting the 90% personnel threshold was Soldiers with a medical nondeployable status.

Medical leadership of the 2nd Cavalry Regiment, Vilseck, Germany, embraced the use of VH platforms to maximize the deployment of combat forces beginning at Soldier Readiness Processing and to minimize Soldier redeployment for healthcare requirements. This article details the 1/2 CR’s use of VH modalities before and during a 6 month deployment to maximize combat power for Commanders and meet Army Medicine’s goal to ‘Conserve the Fighting Strength’.
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METHODS
Two months prior to deployment, the 1/2 CR medical team conducted Soldier Readiness Processing. Soldier Readiness Processing ensured that Soldiers were medically ready to deploy and initiated the medical waiver process with U.S. Army Europe (USAREUR) medical leadership when Soldier suitability for deployment could not be determined at the local level.

The 1/2 CR Medical Concept of Support relied on LRMC for specialty care delivery, and organic unit Behavioral Health assets for Behavioral Healthcare needs using VH technologies (Fig. 2—1/2 CR VH Concept of Support). VHE staff trained the Squadron medical team on the ADVISOR, HELP, and VIEW platforms and developed VH workflows (Fig. 3—VHE Connectivity Guide). Virtual Exam Rooms were established for unit providers to deliver digital healthcare to the point of need using the VIEW program.

The Squadron Aid Station (SAS) was established the following movement to BPTA in April 2018. This SAS consisted of a Family Medicine physician supported by multiple Army Medics. A private location was identified in the SAS for VIEW visits, and VH workflows and modalities were validated. Medical leaders validated connectivity to Vilseck and LRMC specialty providers through RHCE’s web page via the military’s Non-Classified Internet Protocol Router network using a commercial browser under the guidance of the RHCE Video Network Center.

Mission days saved were calculated through a conservative process. Two days travel for healthcare was allocated for travel to either Vilseck or to LRMC, and 1 day for evaluation. A patient escort was not allocated in mission days saved calculations, although it is required when Soldiers were seen at Host Nation facilities or when requiring movement to Vilseck or LRMC. The average cost of a Soldier per day of $410 was calculated from the average of two studies analyzing the cost of Active Duty Service Members²,³; per diem was not part of the cost calculations.

RESULTS

Predeployment
The 1/2 CR medical team submitted nine waivers to USAREUR to allow Soldier deployment due to ongoing Service Member’s behavioral health treatment requirements. Due to the availability of longitudinal behavioral healthcare through VIEW, seven Soldiers received waivers to deploy to BPTA, increasing combat power by 1%.

Deployment
Beginning in May 2018 and following the establishment of the SAS, VH systems were utilized every week of the 6-month deployment. A total of 64 VIEW appointments were performed by 29 Soldiers during deployment. Sixty-one of these visits were with organic unit behavioral health providers in Vilseck. Twenty-three of these appointments were for Substance Use Disorder Clinical Care Behavioral Health appointments. An additional three appointments were for Substance Use Disorder Clinical Care Behavioral Health appointments. An additional three appointments were for the Army Body Composition Program. Three of the 29 Soldiers who used VIEW had received a USAREUR waiver. Of the Soldiers who utilized VIEW, 22 were Military Occupational Specialty 11B (Infantryman), followed by 13B (2), 25U (2), 68W (1), 12B (1), and 27D (1). Five Soldiers were E-5 and above; 24 were E-4 and below; and zero were O-1 and above. Of the 29 soldiers who used VIEW, only two had to be evacuated for a higher level of care.

In addition to the VIEW visits, the 1/2 Squadron Surgeon utilized the HELP program for seven specialty consultations. Specialties consulted included orthopedics, dermatology, and gastroenterology. No Soldiers were required to be evacuated.
Virtual Health Support for Operational Forces: A Guide for Tri-Service Role 1 to Role 3 providers in EUCOM, AFRICOM, CENTCOM, and SOCOM

> Specialty consultative care is available via phone, email, and real-time VTC for Deployed ADSMs.

- Allergy / Immunology
- Gastroenterology
- Nutrition
- Rheumatology
- Army Body Comp. Prgm
- General Surgery
- Nutrition / ABCP
- Sleep Medicine
- Audiology
- Gynecology
- Orthopedics
- SUDCC
- Behavioral Health
- Hematology / Oncology
- Pain Management
- Speech Pathology
- Cardiology
- Infectious Disease
- Plastic Surgery
- TBI
- ENT
- Internal Medicine
- Podiatry
- Urology
- Endocrinology
- Neurosurgery
- Pulmonology
- Dermatology

How to reach a Landstuhl RMC / MEDDAC-Bavaria Medical Provider:

1. Emergency Telephonic consultation (24/7/365)
   - PRIMARY: ADVISOR Line: Emergency Critical Care Consultation—ICU, Medicine, Surgery Providers: +1
     Note there is frequently a pause while the computer routes your call—do not hang up.
   - ALTERNATE: LRMC Emergency Room: DSN , Comm: +49 (0)

2. Non-Emergency Care via Email or Real-Time VTC
   - If able, begin with secure email consultation
     -- Health Experts on-Line Portal (HELP): Supported by LRMC and Navy Med East specialists
     -- Register at: CAC not required & registration is simple
     -- HELP will ‘mini-register” the ADSM, and messages are returned within 24 hours
   - “Real-time” VTC for routine specialty consultation (M-F, 0730-1600, GMT + 1)
     -- Recommend starting with HELP consult to specialties above to determine if VTC is appropriate
     -- The specialties above support real-time, synchronous VTC
     -- Your site may / may not have VTC capabilities. Contact the RHCE Virtual Health Office at DSN , or comm. +49 to assist with scheduling your ADSM’s Virtual Health appointment or establishing your site as a Virtual Health site.

Patient movement and tracking:

**LRMC Patient Gateway Center & Deployed Warrior Medical Management Center (DWMMC) Staffed 24/7/365**

One-stop HUB for all patient movement, tracking, administrative actions, and updates:

- Website:
- Email:
- Telephone: DSN , Comm:

**LRMC Medical Detachment (MTD)**

- Active Duty Patient Movement Office: DSN: , Comm: +49 (0)
- Army LNO: DSN: , Comm: +49 (0)
- Navy LNO: DSN , Comm +49 (0)
- Marine LNO: DSN , Comm +49 (0)
- Air Force LNO: DSN : Comm: +49 (0)

**FIGURE 3.** VHE connectivity guide for operational providers.
who were evaluated through the HELP program. Zero consults were placed through the ADVISOR program.

A total of 213 mission days for ADSMs were saved through the use of VH modalities rather than traveling for in-person care to LRMC or Vilseck (Table I—VH Use During eFP). The use of VH modalities avoided $87,330 in lost Soldier productivity during this 6-month period. The 1/2 CR commanders avoided $40,896 in per diem costs through the use of the VIEW program.

CONCLUSION
This is the first data set to report the impact of multiple VH modalities during a deployment. VH modalities saved 213 mission days for 1/2 CR commanders by avoiding in-person travel for healthcare and increasing the combat power of the deployed unit. With the recent decision by the Defense Health Agency to decrease the number of medical providers, VH will be even more necessary to deliver timely and appropriate care by the relevant specialists. Innovation including VH will be critical as well on the battlefield of the future which is theorized to be a multidomain battlefield requiring new solutions to address challenges including antiaccess/aerial denial which will limit aerial medical evacuations, as well as the challenges of significant distances and large numbers of casualties.

This study offers insight into the broader utilities of VH deployed within Europe and to a nonkinetic environment. It is the first data to highlight the predeployment impact of down-range availability of synchronized VH modalities to increased deploy combat power. Consistent with internal RHCE Operational VH data for Operation Atlantic Resolve and reflective of the historic use of sVH in deployed environments, 90% of VIEW visits addressed Behavioral Health requirements. The Joint Mental Health Advisory Team-7 Report (February 22, 2011) noted that behavioral health personnel are “low supply/high demand” assets who have been “some of the most active and forward-reaching of all medical occupational specialties” during Operation Iraqi Freedom and Operation Enduring Freedom. Dailey et al. noted the use of both the Combined Enterprise Regional Information Exchange System network and Secure Internet Protocol Router network were the barriers to the delivery of telebehavioral healthcare in Afghanistan due to requirements for dedicated computers, connectivity, and security that is often not present in an Aid Station. RHCE’s VIEW program avoids these challenges by using commercial browsers accessed through Non-Classified Internet Protocol Router and requiring no proprietary network system or software, demonstrating the import of flexibility and ease of use in VH success.

Cost calculations are conservative in alignment with return on investment principles. Reimbursement was not included for patient escorts as travel was frequent between BPTA and home station via the unit’s transportation motor pool vehicles. More than $40,000 in cost avoidance for medical travel are significant and are funds that were instead resourced to Soldier Readiness and training. The dichotomy of the military units financially benefiting from VH technologies not resourcing VH delivery will have to be addressed as VH moves forward across the Defense Health Agency and broader military. Clear delineation of responsibilities between the Defense Health Agency as a Combat Support Agency, and military service commands is a foundational requirement for advancing VH.

Future directions in Europe include the development of the Virtually Integrated Role 2 concept, increasing the capacities of NATO Role 2 medical treatment facilities through augmentation with Medical Center (MEDCEN) services including TeleRadiology, TeleDentistry, and TeleAudiology. Additionally, the impact of VH on Rotational Forces is being studied to quantify at the Brigade and larger level how VH supports the Warfighter. Finally, future studies should examine the benefits of VH for the Warfighter at an individual level, such as the impact of being able to remain forward with their units rather than having to redeploy for care. These studies will find data collection challenging as in this study. The success of VH will likely parallel that of cell phone use, where data usage was once closely monitored however forgotten as the technology matured. The VIEW program autonomously tracks the minutes of usage; however, it does not yet provide a feedback mechanism for either the provider or patient to review on the value of the visit. Automated data collection will be critical for future research.

In a future antiaccess/aerial denial environment where mission requirements limit communications options, a spectrum of VH modalities will be critical to maximize communications opportunities. In contrast to the current communications permissive environment in Europe, medical communications in the future battlefield may be more analogous to tools available on a submarine—intermittent, limited, and asynchronous. Military leaders would be wise to develop forcing functions in the Garrison environment to develop provider fluency in VH through the use of this spectrum of connectivity tools at the Readiness platforms of Medical Treatment Facilities. These forcing functions could range from utilizing HELP in Garrison to place a request for asynchronous care before placing a specialty care consult.
to training Residents to utilize the ADVISOR line prior to admitting a patient to their Intensive Care Unit.

This study demonstrates that in an environment where ADSMs are based at fixed facilities, VH modalities offer significant impact for commanders and providers. For example, in EUCOM, patient movement frequently requires an escort to accompany the patient requiring evaluation, while a VIEW visit requires no movement of the ADSM or their escort. Entire missions are dedicated to medically evacuate an ADMS for more forward deployed ADSMs in a combat zone, putting additional lives at risk and pulling more ADSMs away from their primary mission. VH will continue to bridge the divide between the remote ADSM and higher echelons of care, bringing the MEDCEN care to the warfighter.

CONFLICTS OF INTEREST
There are no funding sources nor conflicts of interest.

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