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The Health Experts onLine at Portsmouth (HELP) system: One-year review of adult and Pediatric Asynchronous Telehealth Consultations

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Abstract

Introduction: The Health Experts onLine at Portsmouth teleconsultation system is designed to connect health providers in the Navy Medicine East Region to specialists at Naval Medical Center Portsmouth.

Methods: A review of the first year of the Health Experts onLine at Portsmouth system was performed. Data on each teleconsultation were extracted from the Health Experts onLine at Portsmouth system database and analyzed.

Results: From June 2014 to May 2015 there have been 585 teleconsultations. Providers stationed on 36 ships/submarines and at 28 remote military treatment facilities have utilized the Health Experts onLine at Portsmouth system. Over 280 specialists in 34 different specialties were consulted. The median time to first response from a specialist was 6 h and 8 min, with 75% of all consults being addressed within 24 h. Eighteen medevacs were recommended. Thirty-nine potential medevacs were prevented, and 100 potential civilian network deferrals were prevented, resulting in an estimated savings of over US$580,000.

Discussion: Based on the 1-year metrics, Health Experts onLine at Portsmouth has provided improved access and quality of care to service members and their families throughout the Navy Medicine East Region. It has helped avoid over US$580,000 in unnecessary cost burden. Further review at the 2-year time interval will demonstrate the continued growth and effectiveness of the Health Experts onLine at Portsmouth system.

Keywords

Telehealth, telemedicine, teleconsult, asynchronous, operational medicine

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Introduction

Historically, the US military has struggled to implement teleconsultation capabilities in its more isolated installations. There was a large push in the military community in the middle of the last decade to develop a teleconsultation program that was never fully realized.[1] Previous attempts met with resistance from organizational factors, including limited education on a system's functionality, a lack of defined cost/benefit analysis, and/or a lack of specialist support.[2]

The US Navy has traditionally relied upon embedded lower level providers for primary medical care in their isolated, forward deployed units. The qualifications of these providers range from internship trained active duty Navy physicians (General Medical Officers), to advanced combat medics licensed for independent practice (Independent Duty Corpsmen), to more traditional nurse practitioners or physicians assistants. These providers deploy forward with limited training and resources to take care of US service-members. When a medical issue arises that they deem requires

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specialist care, the patient is normally medically evacuated (medevaced) to a higher echelon of care, a costly and resource-intensive endeavor.

In June 2014, Navy Medicine East and the US Navy Bureau of Medicine and Surgery (BUMED) launched the Health Experts onLine at Portsmouth (HELP) teleconsultation system. HELP is a secure web-based, Health Insurance Portability and Accountability Act (HIPAA)-compliant, asynchronous (store-&-forward) provider-to-provider teleconsultation system operated by Naval Medical Center Portsmouth (NMCP) in Portsmouth, VA. As the Department of Defense's tertiary medical care facility for Navy Medicine East, NMCP provides specialty consultation to both primary care and specialty providers across 10 different time zones ranging from the midwestern United States to the Middle East. The system was adapted from a previous military built program used in the Pacific Area of Operations called Pacific Asynchronous TeleHealth (PATH) system. This older system was based out of Tripler Army Medical Center (TAMC) in Honolulu, HI. Similar to PATH, HELP was constructed to provide improved access to care and to reduce network referrals and/or medevacs to a tertiary care center with specialty providers. The HELP webpage is designed to provide consultative advice for military health providers at primary care clinics, hospitals, and deployed military forces & ships. The low bandwitdth of the HELP system allows it to be utilized by providers in even the most isolated of environments for instance aircraft carriers in the Persian Gulf or forward operating bases in Afghanistan.

HELP utilizes a store-&-forward telemedicine platform whereby providers submit relevant clinical information to include images and audiovisual media which the specialist at NMCP can review. The effectiveness of the store-&-forward platform for teleconsultation has been previously established in the literature, and is comprable to synchronous video conferencing consultation in patient outcomes and provider satisfaction.[5] Although HELP has only been online for a year, preliminary analysis revealed significant increase in quality of patient care, both from preventing unnecessary medevacs and from recommending evacuation of multiple patients based on the teleconsultation discussion. In this retrospective review, we present the 1-year metrics of HELP in order to evaluate its impact on access to specialty care, quality of care provided, and cost-savings.

Methods

The HELP system

HELP provides teleconsultations for primary care clinics located throughout the eastern United States, Guantanamo Bay, Europe and the Middle East. It also provides teleconsultations for medical providers assigned to operational commands, both afloat and ashore, in the Atlantic Ocean, Europe, South America, Africa, and the Mediterranean Sea, as well as those deployed forward in current operational theaters in Iraq and Afghanistan. Regardless of location, health providers use the HELP system to submit teleconsultations to both military and civilian specialists at NMCP. The HELP system is HIPAA compliant, operating on a secure platform using encrypted passwords for provider authentication. Although the HELP system is managed and staffed by NMCP subspecialists, the technical platform is hosted at TAMC.

Using HELP, a remote provider submits patient information to include pertinent history, physical exam, or lab findings, as well as any associated media (images, video, sound, etc.) and concludes the submission with a consultation question. This standard consultation format ensures rapid forwarding to the appropriate subspecialist when it is reviewed by a HELP consult manager. The consult manager reviews the case and then forwards the case to the appropriate specialist(s). The specialist(s) reviews the teleconsultation and may ask for further information and/or render advice to the remote care provider. The responses of all participating providers are logged chronologically and form an ongoing discussion among all providers involved. The HELP program employs a full-time nurse consult manager and a ½-time computer programmer. The medical director and four physician HELP teleconsultation managers are all active duty Navy physicians and support the system as a collateral duty by directing consultations to subspecialists as described above.

One-year review

Approval was obtained from the NMCP institutional review board prior to accessing the de-identified patient information used in this analysis. By accessing the HELP system SQL database investigators obtained metrics to include: time of consult entry, time of forwarding to specialists, location of request, requesting provider's level of training, the number of patient transfers, the number of multimedia images (video, images, sounds, etc), and cost-savings estimate from avoided medevacs. Three independent active duty Navy medical corps physicians acting as HELP administrators reviewed all 585 teleconsultations to determine the number of prevented medevacs. A medevac was only considered as prevented if the consulting provider initially requested a medevac and the specialist deemed it unnecessary; advice-only consults did not qualify as preventable medevacs. All 3 administrators had to independently deem a medevac as prevented to qualify the case as a prevention. The cost-savings for a single patient transfer was obtained from the Department of Defense's Defense Travel System (DTS) estimates based on the location of the original consult (Table 1). For medevacs prevented from an area not designated by DTS (i.e. middle of the Atlantic, Mediterranean, Red Sea, Persian Gulf, Indian Ocean) US$11,282 was used to determine its estimated cost.[3] Guantanamo Bay medevacs are significantly higher in cost as they require a dedicated military aircraft for evacuation as

Table 1. Origination location, cost, and number of medevacs prevented by HELP specialist consultation.

Military treatment facility	Cost of medevac	Medevacs prevented
Naval Hospital Rota, Spain	US$10,885	2
Naval Hospital Naples, Italy	US$11,263	7
Navy Hospital Sigonella, Italy	US$10,466	5
Branch Clinic, Bahrain	US$12,563	2
Naval Hospital Guantanamo Bay, Cuba	US$21,158	3
Other	US$11,282	20
Mean cost saved per medevac	US$11,979	
SD	US$2717	
Total	US$467,181	

there are no civilian flights from the base back to the continental United States.

The same three HELP administrators reviewed all teleconsultations to determine if access to specialists through the HELP system prevented a referral to the civilian network for face-to-face evaluation. Referrals were deemed prevented if the consulting provider initially asked in his consultation question if a case would require further subspecialty care or a referral to the network, and following consultation both the requesting provider and the specialist deemed further workup unnecessary. The cost-savings for a civilian specialty referral was based upon only an initial specialty visit, with no costs for follow-up accounted for in this analysis. The estimated cost-savings for a single specialty outpatient visit was estimated to be US$1054.[4]

Results

There have been a total of 585 teleconsultations submitted through the HELP system, with the number of requests progressively increasing since HELP's launch (Figure 1). From June 2014 to May 2014, 286 NMCP specialists, 39 ships, and 28 remote military treatment facilities (MTF) have utilized the HELP system. The majority of providers requesting a consult are physicians located at remote, overseas MTF or aboard ships, while Independent Duty Corpsmen comprise the second largest group (Table 2). Providers have submitted teleconsultations to 34 different specialties (Table 3), leading to more than 3049 provider-to-provider interactions. HELP prevented 39 potential medevacs: 19 from overseas MTF and 12 from fleet deployed forces—and resulted in an estimated cost savings of US$467,181. NMCP specialist consultative advice via HELP prevented 100 civilian network referrals. This access to subspecialty opinion helped avoid a cost of an estimated US$105,400 in civilian referrals.

Eighteen medevacs resulted from consultations that did not initially request medical evacuation—11 recommended from overseas MTF's and 6 from fleet deployed forces. In these cases, the initial consult was placed asking for assistance managing a patient and the subspecialist(s) at NMCP recommended that they be evacuated to a higher level of care.

The median time to first response from a specialist was 6 h and 8 min, with 75% of all consults being addressed within 24 h of case submission.

Following regression analysis of the 1-year data (Figure 2), projections for the 2-year metrics include a monthly savings from medevac prevention of US$140,907, and from civilian referral prevention of US$28,260. It is anticipated by that time that over 740 cases will be placed every month into HELP, indicating a distinct need to grow the current infrastructure to handle this expected increase in patient load.

Noteworthy cases over the first year

- First Afghanistan Consult: 12-year-old healthy Afghani right-hand dominant boy presented with a scar contracture to the distal digit of third and fourth fingers after sustaining a burn injury to the left hand 6 years earlier. Patient lived in Herat, Afghanistan, which is a few hundred miles from Forward Operating Base Wright/Asadabad where the Navy Fleet Surgical Team is located. No routine follow-up care was available. Pictures of the hand were submitted with the consult. NMCP orthopedist's recommendation for multiple procedures was forward to the Coalition Afghani surgeon.
- Classic Deployed Fleet Case: 23-year-old otherwise healthy male aboard the aircraft carrier USS George H.W. Bush presented with a traumatic Zone II laceration of the left fifth digit and possible flexor digitorum profundus involvement. The ship was transiting the Atlantic and not within range for medevac or carrier onboard delivery (COD) aircraft. NMCP orthopedist was consulted and provided further guidance for nonoperative management until patient was within medevac range. The patient was medevaced within a week when the ship was within COD aircraft range.
- Dermatology off of the USNS Comfort: 3-year-old host national girl in Belize with erythema without swelling of her hands and lower extremities thought to be linear scleroderma by local provider unable to provide care due to the austere environment. Through specialists at NMCP, care was established with local non-governmental organization (NGO) to provide continuing care, while recommendations from the same helped maximize the limited capacities of the local clinic in the interim.
- Distal Femur Lesion: 42-year-old active duty male aboard the USS Iwo Jima presented with a distal femur lesion on plain film concerning for cancer in the setting of acute on chronic knee pain. At the time of the consult, the ship was supporting marine operations off the coast of Yemen. NMCP orthopedic oncologist was consulted and reassured the general medical officer that the lesion was benign, ultimately avoiding a potential medevac and disruption to military operations.

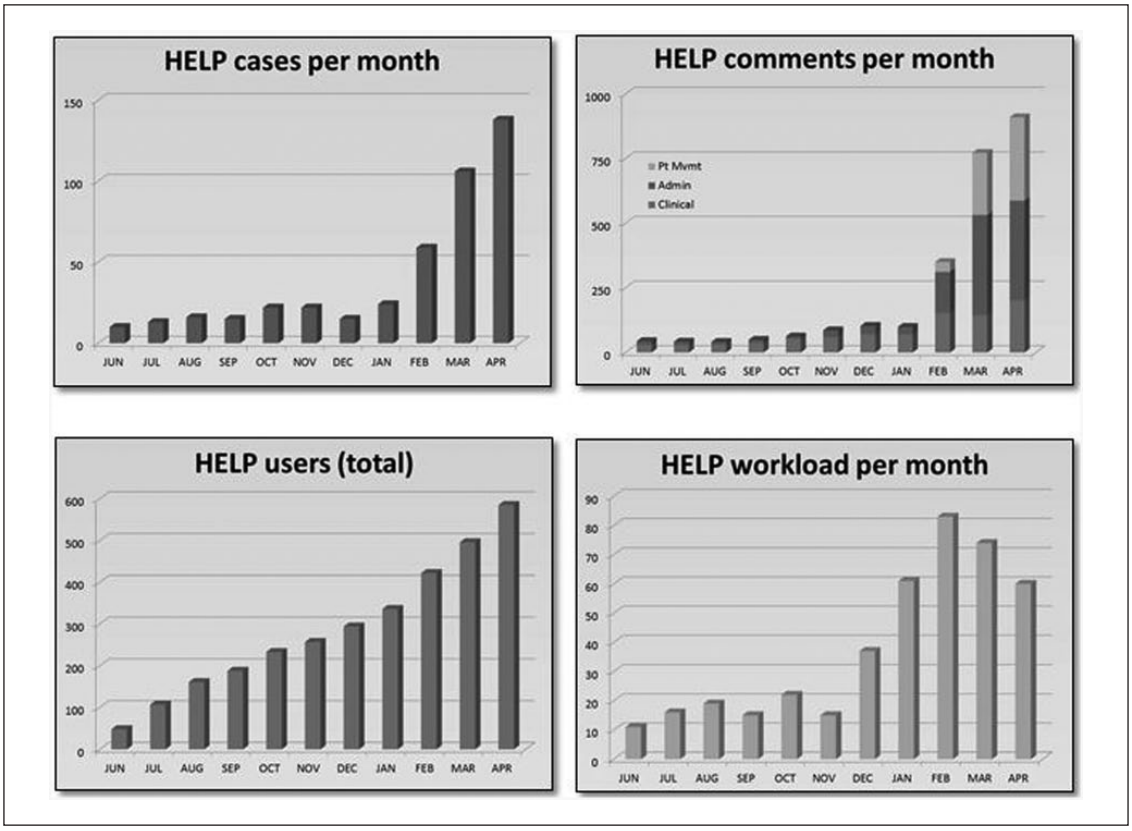

Figure 1. Monthly utilization of the HELP system.

Table 2. Users requesting a consult in Health Experts onLine at Portsmouth.

Provider type	Number of requests
Staff Physician (MD, DO)	343
Independent Duty Corpsman	47
Flight Surgeon (PGY-1+ MD, DO)	44
General Medical Officer (PGY-1+ MD, DO)	25
Nurse Practitioner	21
Physician Assistant	16
Undersea Medical Officer (PGY-1+ MD, DO)	8
Psychologist	3

Table 3. Specialties consulted through Health Experts onLine at Portsmouth.

Specialty	Number	Specialty	Number
Orthopedics	66	ENT	11
Psychiatry	51	Pulmonary	11
Dermatology	40	Rheumatology	11
Endocrinology	32	Nephrology	10
Emergency Medicine	31	Radiology	9
Gastroenterology	31	Allergy Immunology	7
Psychology	28	Physical Therapy	7
Hematology Oncology	26	Surgery	6
Infectious Disease	26	Pediatric Hematology Oncology	5
Cardiology	25	Occupational Medicine	4
Neurology	24	Pediatric Endocrinology	4
Other	20	Pediatric Gastroenterology	4
General Surgery	18	Pediatric Neurology	4
OB/GYN	14	Vascular Surgery	4
Neurosurgery	13	Critical Care	3
Internal Medicine	12	Genetics	3
Urology	12	Pediatric Nephrology	3

Others: Pediatric Rheumatology, Pharmacy, Plastic/Reconstructive Surgery, Nutrition, Ophthalmology, Oral/Maxillofacial Surgery, Pain Management, Pediatric Cardiology, Pediatric Neurosurgery, Pediatrics Developmental, Physical Medicine and Rehabilitation, Trauma Surgery, Audiology and Speech, Cardiothoracic Surgery, Colon/Rectal Surgery, Concussion Clinic, Dentistry, ENT Pediatric, General Medicine, Pathology, Pediatric Infectious Disease, Pediatric Psychology, Pediatric Pulmonary, Pediatrics General, Sports Medicine.

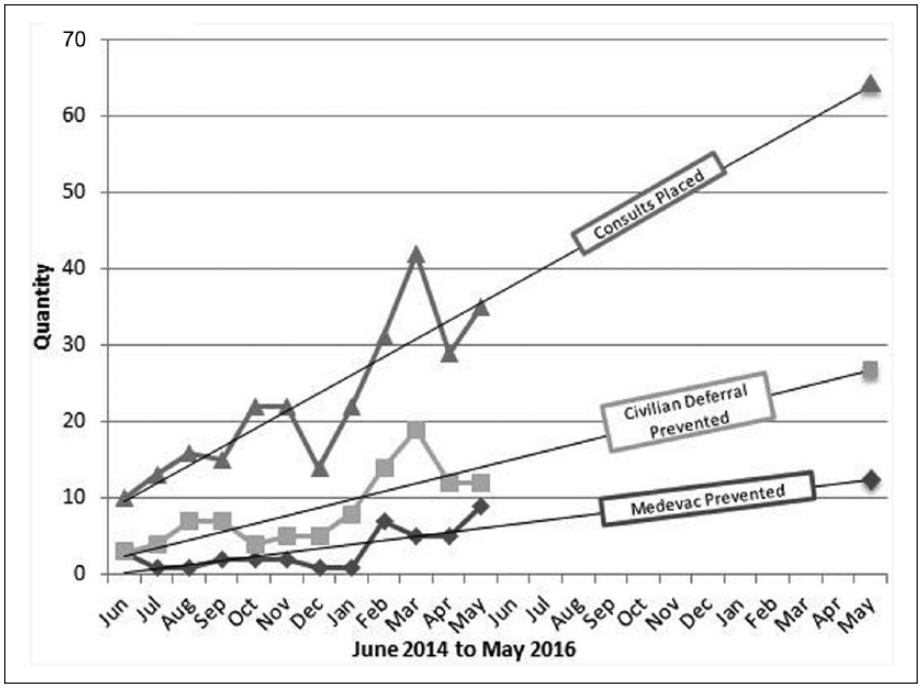

Figure 2. Monthly metrics with 1 year projections.

Discussion

In its initial 1-year period, the HELP system has provided military physicians around the world better access to care while reducing the number of potential patient transfers. It has shown a favorable cost/benefit analysis as well as a growing user base, both of which demonstrate the staying power of the HELP system within the US military system. While the cases within HELP this past year represent only a fraction of the tens of thousands of cases seen annually within the area of operations of Navy Medicine East, the cases in the system were of a significantly higher complexity than a typical case seen. HELP was designed with the purpose of allowing general practitioners at remote primary care clinics or aboard ships at sea the ability to consult specialists for further guidance on diagnosis, management and treatment. The basic premise of HELP, aside from improving access and quality of care, is to reduce the number of potential medevacs and civilian network referrals, both in the United States and overseas. The economic burden of overseas patient transfers can be quite costly when considering the need for transportation, meals, and lodging over an indefinite time period.

Since HELP was only recently launched, the system is still relatively unknown to many hospital providers and general medical officers. In the months following its initiation, more providers have begun requesting user accounts and the number of monthly consults is increasing every month (Figure 1). As the system gains more widespread acceptance in the US Fleet Forces, it is anticipated that this trend will continue into at least the near future.

The effectiveness of a military telehealth consultation system has already been proven with the PATH System. Since 2000 PATH has provided specialty consultation to military health providers throughout the Pacific Region. Based on this preliminary review of HELP we have found that the majority of teleconsultations originated from primary care providers overseas or aboard ships at sea. With an estimated cost-savings of over US$460,000 from the prevention of 39 patient transfers alone, the HELP system, in its first year, has already recovered BUMED's initial US$150,000 used to fund the creation of this system.

The data regarding the prevention of civilian network referrals are in keeping with the current BUMED initiative to recapture care lost to the civilian sector. To that end HELP has been successful in preventing civilian referrals, saving over US$100,000 in initial specialty care costs, not accounting for the costs of continuing civilian specialist care that would likely be required in most cases.

HELP has been utilized primarily by overseas MTF's even though it is available to military health clinics throughout the continental US (CONUS) as well. This is multifactorial but its limited use by CONUS personnel is most likely due to the robust civilian network stateside. Providers outside CONUS are more likely to utilize the system as an alternative to referring to an unfamiliar foreign civilian network. Looking forward it will likely begin to find a larger role stateside as it helps to keep patients within the military system and prevent referrals to the civilian network.

This analysis is limited by its nature as a retrospective analysis. Potential sources of bias include the 3 HELP

administrators who determined through independent review if a medevac had been prevented or recommended through subspecialty consultation. This aspect of the review relied primarily upon their experience within the military medical system to provide the basic data used in this analysis. A prospective evaluation of this system would be beneficial to help eliminate potential bias from the study and strengthen its statistical power.

That said, based on this 1-year review of the HELP system we can conclude that HELP has both proven a beneficial impact on Navy Medicine and has great potential for growth within the military medical system. In future analyses, it will be expected to see an increase in user account requests (as interns will be graduating from internship and headed out to the fleet) and monthly teleconsultations, as well as continued ability to prevent unnecessary patient transfers and to maintain patients within the military healthcare system. It also provides benefits that are admittedly difficult to measure to include secure and proper documentation of teleconsultations, as well as mentoring opportunities for general medical officers in the fleet. There is every indication that HELP will continue lead to more cost-savings by preventing unnecessary patient transfers, but more importantly improve access to care and quality of care.

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Declaration of conflicting interests

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Ethics approval

Ethical approval for this study was obtained from Naval Medical Center Portsmouth IRB, approval number: NMCP.2015.0023 "The Health Experts onLine at Portsmouth (HELP) System: Review of Adult and Pediatric Asynchronous Telehealth Consultation" Principal Investigator: Andrew Lin, MD.

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Human ethics committee statement

This study and its use of patient information was approved by an Human Ethics Review Board at Naval Medical Center Portsmouth.

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