

# The Department of Defense: pioneers of early teledermatology

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## Abstract

The United States (US) Department of Defense (DoD) has been a leader in using telecommunications technology to provide remote medical care. The DoD has been using telemedicine for more than twenty years to provide medical services to military personnel deployed throughout the world, and has largely influenced the development of teledermatology. The experiences of early military teledermatology services have yielded valuable lessons that have been essential to the creation of successful civilian programs.

*Keywords: teledermatology, telemedicine, Department of Defense, military medicine, history of medicine*

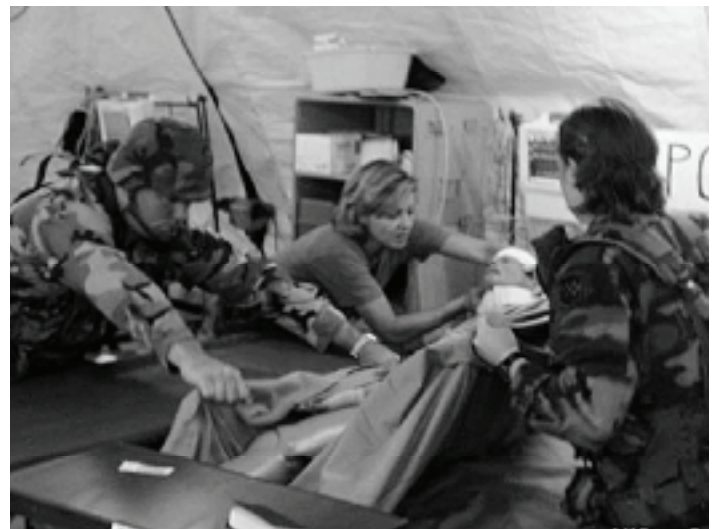
## Introduction

Telemedicine is the provision of health care remotely through the use of telecommunications technology. The United States (US) Department of Defense (DoD) has been using telemedicine for more than twenty years to provide medical services to military personnel deployed throughout the world, particularly to those in remote or austere areas. The DoD has largely influenced the development of teledermatology, as dermatological conditions account for up to 75% of outpatient visits in combat zones and skin complaints comprise 40% of military telemedicine consultations [1-3].

The first use of telemedicine in the military was in 1992, during the Operation Restore Hope humanitarian relief mission in Somalia [4,5]. Approximately 25,000 troops were deployed to a country devastated by war, famine, malaria, and dengue fever. To augment the overwhelmed on-site field hospitals, the DoD deployed a pilot telemedicine program—consisting

of just a digital camera, laptop computer, and a portable satellite transceiver—which facilitated 74 consultations over one year. This pilot program paved the way for military telemedicine throughout the next decade.

In 1993, the Tripler Army Medical Center telemedicine service used video teleconferencing (VTC) to 250 remote consultations (40% dermatologic) to troops in the South Pacific [4]. **Figure 1** depicts the early technology used to conduct military VTC telemedicine consultations. From 1993-1996, the Walter Reed Army Medical Center telemedicine program used both VTC and store-and-forward (SAF) images to serve military sites throughout the world [4]. Dermatologists provided 29% of the 240 remote consultations, and were some of the first to report



**Figure 1.** Physician at the San Diego Naval Medical Center conducting telemedicine consultation for a military spouse (on screen) in Fort Irwin, California via a live video teleconferencing. Image is from the Department of Defense Photo Gallery and is considered to be in the public domain. Available at: <http://www.defense.gov/Media/Photo-Gallery?igphoto=2001089616>. Accessed September 11, 2016.

that high-resolution SAF images were superior to VTC for making remote dermatologic diagnoses [4].

In 1996, the National Naval Medical Center, along with dermatologists at the Uniformed Services University, created the first military teledermatology service. This SAF service answered consults from aircraft carriers, amphibious ships, field units, and even a submarine [4]. The program's online integrated server allowed dermatologists to answer consults anywhere, anytime, which resulted in faster responses (typically within 12 hours). Over two years, the service provided 89 consultations and served as a proof-of-concept for teledermatology [4].

In 1998, the combined efforts of the Army and Air Force medical departments led to the creation of the Telemedicine and Advanced Technology Research Center (TATRC). The TATRC played a prominent role in developing many of the communication technologies used for telemedicine, as well as created the Forward Deployable Digital Medical Treatment Facility, which became known as the DoD's "telemedicine test bed" [6]. In addition to advancing telehealth technologies, the facility also provided simulation and training sessions to teach military personnel how to use the new telemedicine equipment in the field (**Figure 2**) [6].

In 2004, the DoD approved teledermatology consultations to be performed through the Army Knowledge Online (AKO) email system, to which all active duty, reserve, and National Guard soldiers have access [3]. From 2004-2012, the AKO service facilitated 10,817 teledermatology consultations. The most common diagnoses were eczematous dermatitis, contact dermatitis, non-melanoma skin cancers, psoriasis, and urticaria [3]. The AKO was also the first telemedicine service to provide remote skin cancer screenings for troops in Iraq and Afghanistan during Operation Iraqi Freedom [3]. The AKO teledermatology service continues to operate today, along with nine other specialty telemedicine services.

Since its first telemedicine pilot in 1999, the Veterans Administration (VA) has built the largest, standardized multi-center teledermatology program



**Figure 2.** Soldiers conducting telemedicine training session at the Forward Deployable Digital Medical Treatment Facility located in Fort Indiantown Gap, PA. Image is from the Department of Defense Photo Gallery and is considered to be in the public domain. Available at: <http://www.defense.gov/Media/Photo-Gallery?igphoto=2001085230>. Accessed September 11, 2016.

in the country [7]. Since 2002-2014, the VA provided 234,928 teledermatology consultations (6% of all consultations) to veterans without local access to dermatologists [7]. It has created standardized teledermatology practice manuals and curricula for telehealth technicians. The VA also continues to publish research on various aspects of telemedicine in the medical literature.

## Conclusion

The DoD has been a leader in using telecommunications technology to provide remote medical care. The use of teledermatology in the military provides much-needed skin care for US troops in a timely and cost-effective manner [8]. The ability to access dermatologic care remotely also reduces unnecessary medical evacuations, which can be inherently dangerous, while also triaging those that are of increased medical urgency, such as suspected malignant melanoma [3]. The experience of early military teledermatology services, and more recent demonstration of large-scale viability, have yielded valuable lessons that have been essential to the creation of successful civilian programs.

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