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TELEMEDICINE

(AUSA's Institute of Land Warfare sponsors a series of small issues conferences to examine defense topics impacting on the U. S. Army. The titled conference was presented by Dr. Stephen C. Joseph, Assistant Secretary of Defense (Health Affairs). This synopsis was prepared from notes taken by the ILW staff and reported by ILT(P) Leslie Ballard, USAR. This conference was held on 28 March 1996.)

Telemedicine, a fledgling and rapidly evolving new application of emerging technology, is significantly impacting the future of military health care. According to Stephen C. Joseph, MD, Assistant Secretary of Defense (Health Affairs), telemedicine and its many dimensions can be defined as "the obliteration of space and time as obstacles to health care delivery and research." Dr. Joseph has selected his words carefully to capture the potential and far-reaching impact of information technology on the delivery of both civilian and military health care as we know it today.

Telemedicine's appeal lies in its ability to transcend space and time by using the power of electronic communications. Doctors and scientists can — on the battlefield, in an operating room or in the research laboratory — receive medical information or instructions from a distant source (even on another continent) through the use of audio and video telecommunications. Examples include real-time information on patient vital signs and teleconferencing with medical specialists located throughout the world, as well as telepresence surgery (the projection of surgical expertise to a remote location through telecommunications and robotics). Telemedicine — specifically the ability to move information

about patients and not the patients themselves — will be crucial to greater dispersion of forces on the future battlefield. As battlefield medics are well aware, when dealing with wounded personnel, time wasted determining appropriate treatment can equate to lives unnecessarily lost and bodies permanently damaged.

A number of military medical units are testing prototype telemedicine equipment. One such item is the personal status monitor (PSM), a wristwatch-like device. The PSM acts as a "beacon" by transmitting a soldier's vital signs and condition for medical assessment to a regional base medical facility and, if needed, to other on-line medical facilities anywhere in the world, depending upon the complexity of the injury and the need for on-the-spot specialized medical guidance. The base medical facility would, upon receipt of near real-time information, link the medic to the information nodule best qualified to direct the needed medical procedure on the battlefield.

Along with providing specific guidance to medics, the use of PSMs can also make remote triage possible. Medical specialists, without seeing the wounded soldiers face-to-face, can assess the severity of physical damage and pri-

oritize the order of treatment of patients based on these assessments. PSMs can also pinpoint the exact location of the battlefield medic and the wounded soldier and, if necessary, help guide an ambulance or MEDEVAC helicopter to their position. When first developed, PSMs cost well over \$400 dollars each; now the cost per unit is about \$100 dollars. The goal is to lower the cost to \$15 so that as many soldiers as possible receive PSMs.

Military telemedicine's primary goal is to focus directly on the medical needs of the soldier. Telemedicine narrows what was once a broad and general scope of medical information and training to a system that can quickly access a subject-matter expert and target the most up-to-date, real-world information to the medical treatment needs of the soldier. This capability will prove invaluable for medical mission accomplishment, training and research. For example, should a general surgeon have to operate on a soldier with a chest wound, access to a thoracic surgeon to guide the doctor through the treatment procedure via telemedicine will greatly increase the patient's chances for survival.

Although there is presently little, if any, use of telemedicine in research applications, there are many applications in teaching. For instance, pathology students can remotely study microscopic images of specimens, and students in the continental United States who are specializing in tropical medicine can remotely view a medical case in Panama. The idea is that if doctors cannot be in a specific location physically, they can be there virtually and all but touch what they see on a monitor screen.

It will be difficult to incorporate telemedicine into doctors' and nurses' daily professional lives and expect them to readily adapt. In working with telemedicine, many of the lessons learned are not realized during active application, but rather in hindsight. These lessons need to be

captured and integrated into the teaching regimens of the medical trainers.

Telemedicine is a valuable asset, an enhancement to the medical health care system. DoD is learning this and more via a telemedicine test bed underway as part of Operation Joint Endeavor in Bosnia. The test-bed physicians, nurses and medics are being educated in the use of this new technology in order to optimally increase an injured soldier's chances for survival and a successful recovery.

Telemedicine represents a major change in medicine and military medicine in particular. But both medicine and the military are changing. To prevent the entropy and stagnation of military medicine in light of these changes, telemedicine must remain flexible and interoperable to fully integrate this vital technology into military medicine. Military telemedicine will depend entirely on highly reliable communications. Although for diagnostic purposes some lag time is generally acceptable, for trauma cases real-time expert consultation can be essential for patient survival.

DoD has many issues to resolve. How far forward will telemedicine capabilities be placed on the battlefield? What level of sophistication will be needed and appropriate? How will information regarding patients be protected from unauthorized access? How will already limited signal communications capabilities be stretched to meet the requirements of a telemedicine system?

In the final analysis, military telemedicine can provide access to medical expertise otherwise not available to an injured soldier in the field. Physicians will need education in the use of telemedicine to become comfortable with its virtual characteristics and to understand its value and potential. Telemedicine education should be built in as a regular feature of deployment medicine.