

Utah State University

DigitalCommons@USU

Undergraduate Honors Capstone Projects

Honors Program

12-2020

NATO and the IFRC: A Comparative Case Study

Abigail Kosiak

Utah State University

Follow this and additional works at: <https://digitalcommons.usu.edu/honors>



Part of the [Marketing Commons](#), and the [Mathematics Commons](#)

Recommended Citation

Kosiak, Abigail, "NATO and the IFRC: A Comparative Case Study" (2020). *Undergraduate Honors Capstone Projects*. 868.

<https://digitalcommons.usu.edu/honors/868>

This Thesis is brought to you for free and open access by the Honors Program at DigitalCommons@USU. It has been accepted for inclusion in Undergraduate Honors Capstone Projects by an authorized administrator of DigitalCommons@USU. For more information, please contact digitalcommons@usu.edu.



NATO AND THE IFRC: A COMPARATIVE CASE STUDY

by

Abigail Kosiak

**Capstone submitted in partial fulfillment of
the requirements for graduation with**

UNIVERSITY HONORS

with majors in

**International Business and Statistics
in the Departments of Marketing and Strategy and Mathematics and Statistics**

Approved:

Capstone Mentor
Dr. Shannon Peterson

Departmental Honors Advisor
Dr. Alexander Romney

University Honors Program Director
Dr. Kristine Miller

UTAH STATE UNIVERSITY
Logan, UT
Fall 2019



Table of Contents

Abstract	3
Acknowledgements	4
Introduction	5
Telemedicine	6
Definition of Telemedicine	6
History of TM	6
Major Functions of TM	7
Disasters and Military	7
Rural Health	8
The Multinational Telemedicine System Project	9
Project Establishment	9
Vision and Goals	9
Process	10
Legal and Governance Challenges	10
Medical Licensure	10
Physician Credentialing Requirements	11
Medical Malpractice and Jurisdiction	11
TM Consults Versus Physical Patient Interaction	12
Technological Challenges	12
Technology Requirements	12
Data Privacy, Security, and Permissions	13
Field Demonstration	13
Experiential Data	14
South Dakota Meeting and Technology Development	14
MnTS Project Final Demonstration	15
Lessons Learned	15
The Future of the MnTS Project	16
The Red Cross Model	17
The International Red Cross and Red Crescent Movement	17
The International Federation of Red Cross and Red Crescent Societies	17
National Society Model	18
Strategic Recommendations	18
Addressing Legal Challenges	18
Addressing Operational Challenges	19
MnTS Importance	19
Capstone Reflection	21
Bibliography	23
Author Biography	25

Abstract

This research analyzes the North Atlantic Treaty Organization's (NATO) Multinational Telemedicine System (MnTS) Project and works to answer five main questions:

- 1) What challenges did the NATO MnTS Project face that are directly related to the fact that the project included members from different countries and worked to create a system that operates across national borders?
- 2) How do these challenges compare to those faced by a non-governmental organization (NGO) like the International Federation of the Red Cross and Red Crescent Societies (IFRC)?
- 3) What successes has the IFRC had with its current operational model?
- 4) In what ways could the IFRC's operational model be applied to the NATO MnTS project moving forward?
- 5) With the above information, what strategic recommendations can be given to the NATO MnTS Project as it looks to reestablish its research program?

To answer these questions, I discussed experiential data from my time working on the MnTS Project and reviewed the award-winning NATO MnTS journal article "Development and Validation of Telemedicine for Disaster Response: The North Atlantic Treaty Organization Multinational System" and the book *A Multinational Telemedicine Systems for Disaster Response: Opportunities and Challenges*. I also completed an in-depth literature review to find information about challenges NGOs – specifically the IFRC – face. Employees from the MnTS Project were also interviewed to gain insight into the difficulty of creating, conducting, and maintaining international projects.

The information from the experiential data, the literature review, and the interviews was used to create strategic recommendations for the NATO MnTS Project. Applying and improving upon the practices of the IRCM can help the countries successfully restart and expand the NATO MnTS Project. The success of this project is important because a multinational telemedicine system can improve general access to health services and increase survival rates in emergency situations.

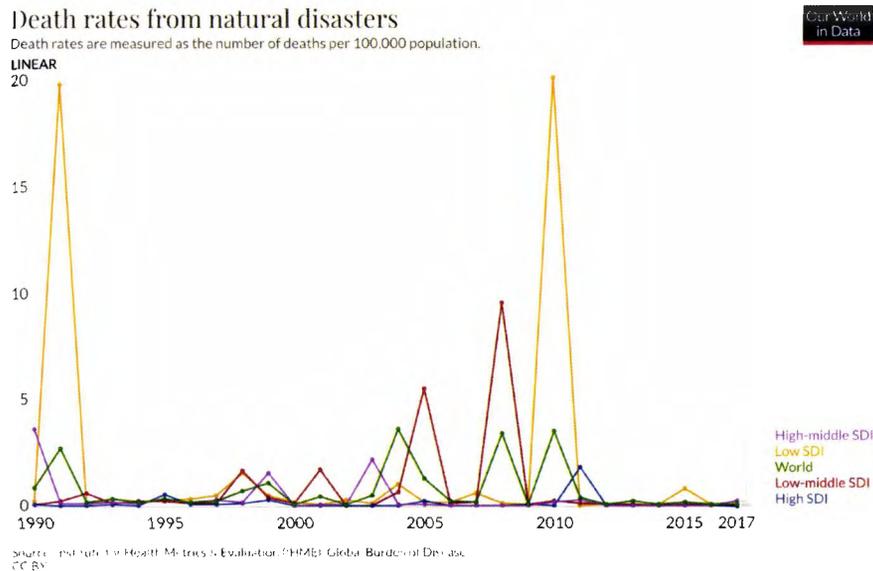
Acknowledgements

I would like to express my sincere gratitude to everyone who contributed to this research and who helped me find the resources necessary to complete this project. Specifically, I would like to thank Charles Doarn, Cathy Lester, and Dr. Donald Kosiak for their contributions and for giving me the opportunity to intern for the NATO MnTS Project.

I would also like to thank my Capstone Mentor Dr. Shannon Peterson and my Departmental Honors Advisor Dr. Alexander Romney for their continuous support and advice throughout my capstone research process.

Introduction

When a natural or manmade disaster strikes, healthcare providers are usually the first aid workers to arrive, doing whatever possible to deliver quick and urgent care. However, a common occurrence in many natural and manmade disasters is a significant impediment to healthcare delivery and communication systems in the affected areas. As a result, there is greater than usual demand for healthcare resources combined with limited resources and capacity. According to the International Federation of Red Cross and Red Crescent Societies (IFRC), fewer than half of the people estimated to be in need during the organization's major operations of 2017 were actually known to be reached by internationally supported humanitarian assistance.¹ Unfortunately, geography currently dictates the standard of care received in disasters, as shown in the chart below.



2

In 2008, 2009, and 2010, there were three strong earthquakes in China, Italy, and Haiti, respectively. All of the earthquakes measured above magnitude 6.0 and took many lives.³ However, the number of human lives lost was much greater in Haiti. While the size of the earthquake, how close it was to the Earth's surface, and the density of the population near its epicenter all played a role in the death toll, extreme poverty also exacerbates a region's vulnerability to such disasters. Unlike China and Italy, Haiti did not have the available resources to respond to the earthquake, and due to the destruction or lack of existing infrastructure it took time to get outside help in to the country. Additionally, the dense urban environment in Port-au-Prince, which was right near the earthquake epicenter, made it very difficult place for

¹"2018 World Disasters Report." International Federation of Red Cross and Red Crescent Societies, 2018. <https://media.ifrc.org/ifrc/wp-content/uploads/sites/5/2018/10/B-WDR-2018-EXECSUM-EN.pdf>.

²Ritchie, Hannah, and Max Roser. "Natural Disasters." Our World in Data, June 3, 2014. <https://ourworldindata.org/natural-disasters>.

³Rodgers, Lucy. "Why Did so Many People Die in Haiti's Quake?" BBC News. BBC, February 14, 2010. <http://news.bbc.co.uk/2/hi/americas/8510900.stm>.

rescue and healthcare teams to work once they were there.⁴ Introducing advanced telemedicine (TM) functionality into disaster environments like that of the Haitian earthquake is the goal of many international organizations.

The Red Cross and various international relief organizations are starting to incorporate TM platforms into their care delivery in regions of the world hit by disasters, ranging from hurricanes and earthquakes to drought and famine. The US Military and the North Atlantic Treaty Organization's (NATO) are also using the technology to improve care in high-risk areas like battle zones and natural disaster environments.⁵ This type of TM system would establish geographically independent access to quality medical expertise. As proven by a NATO Science for Peace and Security Program project, the technology to develop a multinational TM system already exists. The issue lies in finding or establishing an organization to create and operate this global TM system. This text will discuss the history and uses of TM, the purpose of the Multinational Telemedicine System (MnTS) Project, the potential issues involved in the development of a multinational TM system, a comparison to the Red Cross model of operation, and other possible models for the expansion of the NATO project into a functional MnTS.

Telemedicine

Definition of Telemedicine

The rapid development of technology has transformed many industries around the globe. Few have been as widely redefined as the healthcare industry. Technology has led to an explosion of discoveries in the field and has connected scientists and healthcare providers around the world in a collaborative network of innovation. One technological advancement that has been gaining increased focus and traction in the last decade is TM.

There are many different definitions of TM. For the purposes of this paper, TM will be described using the NATO definition as "the exchange of medical information between different sites using telecommunications and information systems in support of the delivery of healthcare."⁶ TM is different than telehealth, which also encompasses nonclinical services such as research, health promotion, training, public health, and administration.⁷

History of TM

The first idea of TM as it appears today was written in the April 1924 issue of Radio News magazine. The magazine article discussed using a television and microphone for a patient to communicate with heartbeat and temperature indicators with their doctor.⁸ At the time, this concept was simply an imagination of what the future could be like, as most U.S. citizens did not

⁴Rodgers, Lucy. "Why Did so Many People Die in Haiti's Quake?" BBC News. BBC, February 14, 2010. <http://news.bbc.co.uk/2/hi/americas/8510900.stm>.

⁵"Using Telehealth Technology for Care Coordination During a Disaster." mHealthIntelligence, October 25, 2019. <https://mhealthintelligence.com/features/using-telehealth-technology-for-care-coordination-during-a-disaster>.

⁶Doorn, Charles, et al. *Multinational Telemedicine Systems for Disaster Response: Opportunities and Challenges*. Amsterdam, Netherlands: IOS Press, 2017.

⁷Eastwood, Brian. "10 Ways Telemedicine Is Changing Healthcare IT." CIO. CIO, November 7, 2012.

⁸"History of Telemedicine." MD Portal, September 23, 2015. <http://mdportal.com/education/history-of-telemedicine/>.

even have televisions in their homes at the time. The true development of modern TM was initiated by the invention of the electrical telegraph and the telephone, as these inventions brought long distance communication into everyday life.⁹ As the telephone became the dominant form of communication, hospitals and doctors offices in major cities installed telephones. This not only allowed physicians to speak to and give patients medical advice over the telephone, but it also allowed medical professionals to connect to each other directly in order to consult on a specific issue or to exchange information. In the late 1950s, health systems and university medical centers began to transfer video, images, and complex medical data via the telephone.¹⁰

For example, in 1959, the University of Nebraska used interactive TM to transmit neurological examinations, which is widely considered the first case of a real-time video TM consultation.¹¹ Other academic and health systems followed, focusing on the transmission of medical data such as fluoroscopy images, x-rays, stethoscope sound, and electrocardiograms. Originally, TM equipment was uncommon and expensive, and the necessary infrastructure was not widely established. However, the dawn of the Information Age and the “proliferation of smart devices capable of high-quality video transmission opened up the possibility of delivering remote healthcare to patients.”¹²

Major Functions of TM

Disasters and Military

In the national healthcare industry of the United States (U.S.), TM technology is most frequently used for remote follow-up visits, chronic illness management, medication management, specialist consultations, and rural health supplementation.¹³ The last two national uses — specialist consultations and rural health supplementation — will be discussed at length in this paper, as they relate the most to the use of TM as an emergency response method for victims of natural disasters or military conflicts. The use of TM for disaster response is not a new practice. In the last several decades, TM has been used in national and international settings to support disaster recovery efforts. These TM applications mainly came about through space programs or military sponsorship. In the U.S., NASA has also been a key organization in the application of TM to disaster response, mainly through technology advancement and satellite connectivity.¹⁴ Military research has actually been a major source of TM development, as militaries around the world have increasingly deployed TM capabilities on the battlefield. As militaries are often called upon for support during natural or man-made disasters, TM has been making its way into humanitarian efforts for disaster response.

⁹“History of Telemedicine.” MD Portal, September 23, 2015. <http://mdportal.com/education/history-of-telemedicine/>.

¹⁰“What Is Telemedicine?” Chiron Health. Accessed November 9, 2019.

¹¹Marilyn J. Field, *Telemedicine: A Guide to Assessing Telecommunications in Health Care*. Washington, D.C.: National Academy, 1996.

¹²“What Is Telemedicine?” Chiron Health. Accessed November 9, 2019.

¹³Eastwood, Brian. “10 Ways Telemedicine Is Changing Healthcare IT.” CIO. CIO, November 7, 2012.

¹⁴Doam, Charles, et al. *Multinational Telemedicine Systems for Disaster Response: Opportunities and Challenges*. Amsterdam, Netherlands: IOS Press, 2017.

Rural Health

TM also has much to offer for patients in rural areas and developing countries, where healthcare services are often scarce and of questionable quality. Avera eCARE is the largest TM provider in the United States. Avera operates centralized, virtual hospital hub called the eHELM in Sioux Falls, South Dakota. Physicians, pharmacists, nurses, and TM staff work 24/7 to provide remote care for 179 hospitals across 30 states.¹⁵ According to Avera eCARE, “We partner with health care systems, rural hospitals, outpatient clinics, long-term care, and correctional facilities to reach medically underserved populations and help ensure that all people, regardless of location, get health care where and when they need it.”¹⁶ Physicians for Avera eCare never see or touch their patients in-person. According to an article from *The Washington Post*, physicians “respond to more than 15,000 emergencies each year by using remote-controlled cameras and computer screens at what has become rural America’s busiest emergency room, which is in fact a virtual ER located in a suburban industrial park.”¹⁷

Avera eCARE’s operational model has had a major influence on the TM community. In June of 2015, project representatives from NATO nations, including Romania, the United Kingdom and the U.S. traveled to Sioux Falls, South Dakota, to study Avera’s TM system.¹⁸ NATO wants to be able to connect worldwide medical experts instantaneously with health care professionals working at a disaster site, which is why the organization established the MnTS Project. Dr. Raed Arafat, a Romanian interior ministry official and the NATO director for the project, said the group is working with Avera because of the health system’s wide experience with remotely delivered healthcare services. The main goal of the visit was to examine the technology and equipment available to provide healthcare services from distant locations.

Dr. Donald Kosiak Jr., the former medical director for Avera’s TM services and a member of the NATO project, said developing universal software and technology that can allow physicians from many countries to provide their expertise through TM can accomplish a number of things.¹⁹ An MnTS would offer another beneficial tool in emergency response — response teams could consult experienced physicians from a distance. These long-distance providers can be called on quickly, whether for trauma advice, infectious disease control, or other medical areas. An MnTS also allows physicians to stay in their communities and offer assistance for a day or two instead of having to travel overseas for weeks or longer. This will hopefully increase the number of physicians willing to participate in disaster aid. According to Dr. Arafat, the NATO project is aiming to prove that it is possible to create a multinational TM system for the purpose of responding to major situations, disasters, and civil emergencies.²⁰

¹⁵ “Who We Are.” Avera eCARE. Accessed November 17, 2019. <https://www.averaecare.org/ecare/who-we-are/>.

¹⁶ *Ibid.*

¹⁷ Saslow, Eli. “The Most Remote Emergency Room: Life and Death in Rural America.” *The Washington Post*. WP Company, November 16, 2019.

¹⁸ “NATO Working with South Dakota Telemedicine Hub.” *Modern Healthcare*, June 23, 2015.

<https://www.modernhealthcare.com/article/20150623/NEWS/150629959/nato-working-with-south-dakota-telemedicine-hub>.

¹⁹ *Ibid.*

²⁰ *Ibid.*

The Multinational Telemedicine System Project

Project Establishment

In the early 2000s, the U.S. Army deployed a field TM system with its forces in Iraq and Afghanistan. This system was strictly national in scope. However, it soon became clear that other NATO allies could benefit from the use of such a system. Rather than each country developing its own TM capabilities, a Teleconsultation Memorandum of Agreement (MOA) was established between NATO and the U.S. Army Medical Department (AMEDD) for the U.S. national system to be made available to other NATO-related forces.²¹ Despite this multinational access, TM use was stilled extremely siloed by country. In other words, U.S. physicians would reach out to U.S. physicians, German physicians to German physicians, and Romanians to other Romanians. The need for a more collaborative system became evident, and the MOA created between NATO and AMEDD established the underlying foundation for the NATO MnTS Project.

Vision and Goals

While NATO is primarily a military alliance, the organization also contributes to the science community through the Science for Peace and Security (SPS) Program. This program helps promote innovation in topics of international interests, including counter-terrorism, environmental issues, and cyber security. TM is a new focus of the SPS Program. NATO's SPS Program funded the MnTS Project from 2013 to 2017, linking several nations together to develop and prove the concept of TM in disaster response. The project was established between Romania, Finland, Moldova, and Ukraine and had a subject-matter-expert delegation from the U.S.

According to Ambassador Sorin Ducaru, the Assistant Secretary General for Emerging Security Challenges at NATO, "The MnTS was the starting point for an important journey that connected great minds from different countries around one vision: to increase survival rates in emergency situations by linking national TM capabilities for a common response system."²² The overarching goal of the MnTS Project was to establish the foundational research and analysis of what it would take to design a multinational system. The project worked to (1) develop the technology required to connect various national TM capabilities; (2) cultivate an international network of medical specialists willing to participate in the multinational system; (3) and create the procedures to get the technological and medical capacities working together to accomplish the vision stated above.²³ TM would thus be used to enable an international network of medical specialists to assess and diagnose patients in real time during major disasters. Once created, an MnTS would allow advanced care to reach those in need across the world when transportation, communication, and public health services are limited in disaster settings.

²¹Doam, Charles, et al. *Multinational Telemedicine Systems for Disaster Response: Opportunities and Challenges*. Amsterdam, Netherlands: IOS Press, 2017.

²²Ibid.

²³Ibid.

Process

The NATO SPS Program's MnTS Project was a three-year, three-phase project, with each phase lasting one year. The goal of the first phase was to prove the viability of the MnTS concept by developing a concept of operations (CONOPS) and connecting three national TM systems in a field operation. Phase Two focused on building upon and improving the MnTS concept from Phase One. Finally, Phase Three looked at possible methods for expanding the MnTS concept into operational system.

As a large international project, the MnTS was divided into three disciplines: governance, IT, and medical. The governance team led research into management and legal issues related to international TM applications, analyzed a possible structure for the MnTS based on the multinational collaboration surrounding the International Space Station, and developed the MnTS CONOPS document. The IT team was responsible for designing, developing, verifying, and deploying the technological infrastructure and software modules that linked medical devices from field kits to hubs and allowed for different national TM systems to communicate with each other. The medical team developed complex medical protocols, established required medical training and expectations, and evaluated which medical devices were incorporated into the MnTS field kits. Over the course of the projects, the teams met for face-to-face meetings and workshops in Romania, Belgium, and the U.S. and virtually via applications such as Basecamp and Skype.²⁴ The purpose of the MnTS Project was to prove that the technology to create an MnTS exists and can be used in an international capacity. Additionally, the project aimed to develop a detailed roadmap of the legal, political, and technological challenges associated with designing an MnTS.

Legal and Governance Challenges

Medical Licensure

Medical licensure (ML) encompasses the minimum necessary requirements to qualify a professional as a licensed physician who can provide medical diagnosis and treatment. ML is currently specific to an individual nation and can even differ within a nation, making international healthcare law highly complex. For example, in the U.S. alone, each of the 50 states have jurisdiction over which providers are licensed to practice medicine within state borders.²⁵

Medical education, training, and licensure standards are all determined by specific authorities within each nation. Because of the complexity this introduces the adoption of medical licensing compacts has become more common. In the U.S., these compacts allow physicians and other clinical professionals practice in multiple states. In the European Union (EU), most of the member countries are part of the European Union of Medical Specialists, which permits physicians to move and practice across member nations. The ML component of the MnTS could be addressed by establishing an MnTS Medical Review Committee. This committee would be

²⁴Doarn, Charles, *et al.* "Development and Validation of Telemedicine for Disaster Response: The North Atlantic Treaty Organization Multinational System." *Telemedicine and E-Health* 24, no. 9 (September 2018): 657-68. doi:10.1089/tmj.2017.0237.

²⁵Ibid.

responsible for ensuring that MnTS member physicians have met the established education, training, certification, and experience standards.²⁶

Physician Credentialing Requirements

Credentialing is the process of obtaining and verifying the documented evidence of licensure, training, education, and other qualifications of a practitioner seeking to provide care. In the U.S., both the federal government and individual states have agencies responsible for the credentialing of physicians. However, as TM has expanded, credentialing regulation has been amended to allow for what is called “proxy credentialing.” This type of credentialing allows a non-primary hospital wishing to credential a physician to rely on that physician’s primary hospital’s credentialing process. Thus, the physician is able to engage in TM services with the non-primary hospital without having to go through another intensive credentialing process. This is relevant to the MnTS development process because the traditional credentialing process would be impractical for the temporary and remote environments of the response situations. Therefore, proxy credentialing to create a global MnTS physician pool will likely be the best path forward.

Medical Malpractice and Jurisdiction

Medical malpractice is a deviation from accepted medical standards that results in the injury or death of a patient for whom the physician has a duty of care.²⁷ Medical malpractice tends to be a confusing issue in the world of TM, as the definition of “duty of care” becomes blurred when the consulting physician never physically sees or touches the patient. Additionally, medical malpractice insurance has not been significantly updated to reflect the introduction of TM in the healthcare industry. In the U.S., for example, malpractice insurance only covers face-to-face interactions between a doctor and patient within the state in which the practitioner is licensed. Doctors who provide TM services across state borders can therefore be exposed to uninsured malpractice claims.

As a result, an MnTS must establish a way to handle medical malpractice insurance and suits. This will be particularly difficult because of the jurisdictional problems that arise with international humanitarian aid. Jurisdiction is the authority of a court to hear a case and to declare judgement. Consider this situation: a doctor from the U.S. is consulting a Romanian paramedic who is caring for a Finish national during a natural disaster in Romania. If that patient is injured or dies as a result of the care received during the disaster, determining which country bares the responsibility of or jurisdiction over a medical malpractice suit becomes extremely difficult. Ideally, the MnTS would develop its own form of medical malpractice process and insurance to protect both the physicians and the system as a whole. Additionally, a specially designated NATO court would likely be the most efficient method for handling jurisdictional issues.

²⁶Doam, Charles, et al. "Development and Validation of Telemedicine for Disaster Response: The North Atlantic Treaty Organization Multinational System." *Telemedicine and E-Health* 24, no. 9 (September 2018): 657-68. doi:10.1089/tmj.2017.0237.

²⁷Doam, Charles, et al. *Multinational Telemedicine Systems for Disaster Response: Opportunities and Challenges*. Amsterdam, Netherlands: IOS Press, 2017.

TM Consults Versus Physical Patient Interaction

For legal reasons, it is important to establish a clear difference between physician to physician TM consults and physician-patient TM visits. Differentiating between these two interactions provides clarification as to which physician maintains the primary clinical responsibility for the patient's health and wellbeing.²⁸ Additionally, unless a physician-patient relationship is truly established, the treating TM physician does not have the legal right to order diagnostic tests, pharmaceutical prescriptions, or any other form of treatment. As a result of this legal issue and the likelihood of intense complexity during a disaster situation, the MnTS should focus only on TM consults as a way of providing clinical support during disasters. These consultations to other physicians will support the on-site provider while maintaining that provider's medical responsibility and liability for the patient. As a result, any potential medical malpractice claim will be held against the primary provider, and the nation requesting TM services should expect to provide immunity to consulting physicians so that participating MnTS providers do not face exposure to medical liability.

Technological Challenges

Technology Requirements

One of the most influential issues during a disaster event is the lack of ability to communicate effectively. Mortality rates could be lowered by establishing fast and reliable telecommunications systems, especially systems directed toward the medical field.²⁹ The MnTS is meant to assist in natural or manmade disasters when there is a shortage of medical specialists in a given area. To establish and maintain an MnTS, there needs to be a set of minimum technical requirements that every member country must follow. The MnTS technology must be able to deliver healthcare services in environments limited by tough or damaged terrain, hostile entities, and severe weather. These services include the diagnosis, treatment, and monitoring of a patient and the transmission of medical information.

TM services can be divided into audio/video connectivity and information exchange of actual medical data. To be fully functioning, an MnTS should include the following technological components: information technology (IT) capabilities, peripheral medical devices, standard protocols for medical information exchange, and trained professionals. Because disaster situations often require rapid response to critical injuries, the MnTS would need a direct connection between the field and the operations center, as a store-and-forward system would likely take too long. Satellite was found to be the most reliable Internet connection option, specifically Very Small Aperture Terminal (VSAT) or Broadband Global Area Network (BGAN) connectivity.

The emergency medical technicians deployed to a disaster zone will have to use field kit devices to collect data from patients and transmit that data with a live audio or video feed to the

²⁸Doarn, Charles, et al. *Multinational Telemedicine Systems for Disaster Response: Opportunities and Challenges*. Amsterdam, Netherlands: IOS Press, 2017.

²⁹*Ibid.*

MnTS operational hub. This hub is a hardware and software platform designed to work as one system with the same methodology, regulations, and requirements. The hub integrates vendor-free and cross-platform technologies for low-bandwidth and secure communications via a software module designed by project team members. All of the technology and software was developed with open-source platforms to encourage collaboration. The MnTS hub was also integrated with OpenMRS, a widely-used electronic medical records platform. It should be noted that it will take significant effort to not only develop national TM systems but also to develop the required connectivity between them through the center MnTS hub.³⁰

Data Privacy, Security, and Permissions

The modernization of healthcare has resulted in the expansion of storable and transmittable health data. While extremely beneficial to physicians and patients, this data has also brought about many regulatory and privacy issues. TM requires bidirectional communication of sensitive, personally identifiable health information. There are many privacy risks associated with TM, including a lack of control over the collection, use, and disclosure of this sensitive information. Documentation and storage of this medical data and information is also a privacy issue, as patients are entitled to know of and consent to this process.

In the U.S., the Health Insurance Portability and Accountability Act (HIPAA) and the Health Information Technology for Economic and Clinical Health Act (HITECH) set clear protocols, controls, and requirements to protect identifiable health information.³¹ This protection of personally identifiable health data is extremely important, as cyber security threats are now a common factor to consider in business and government activity. As the MnTS will operate TM services around the world, the data collected from patient care must conform to acceptable national and international privacy policies. The most likely solution would be for the MnTS to follow the regulations of the strictest country to raise the security of health data to the highest level possible. A clear outline of data capture and storage standards must be established. Additionally, an MnTS physician must connect with the provider requesting assistance through encrypted, HIPAA compliant communication system.

Field Demonstration

Three commercially available MnTS field kits and several peripheral medical devices, shown in the picture below, were tested and demonstrated during a field exercise in L'viv, Ukraine in September of 2015. This field exercise was organized by the Euro-Atlantic Disaster Response Coordination Centre and Ukraine's state-run emergency services.³² The exercise included an urban search and rescue team that connected to an advanced medical teams in three separate locations across a rural, eight square-mile region.

³⁰Doarn, Charles, et al. *Multinational Telemedicine Systems for Disaster Response: Opportunities and Challenges*. Amsterdam, Netherlands: IOS Press, 2017.

³¹Ibid.

³²Doarn, Charles, et al. "Development and Validation of Telemedicine for Disaster Response: The North Atlantic Treaty Organization Multinational System." *Telemedicine and E-Health* 24, no. 9 (September 2018): 657-68. doi:10.1089/tmj.2017.0237.

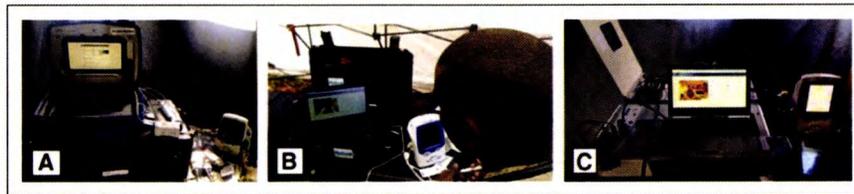


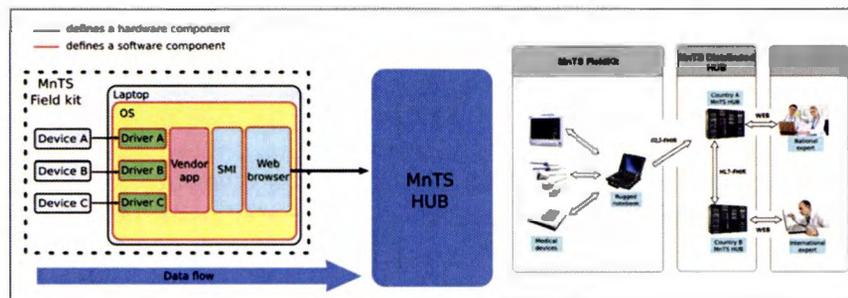
Fig. 4. Commercial deployable telemedicine systems utilized in the disaster response exercise: (A) AMD Global Telemedicine—North Chelmsford, MA; (B) MedWeb—San Francisco, CA; and (C) GlobalMed—Scottsdale, AZ.

The equipment used in the demonstration included live audio and video feed in addition to store-and-forward data communications. The equipment was connected via satellite and powered with a Peppermint solar panel system. Using this satellite link, the TM system was also able to connect to consulting physicians in Romania and Finland. Additionally, the TM equipment was successfully connected and fully functioning within 20 minutes after the initial request by the on-site responders.³⁴ This proof-of-concept exercise demonstrated that TM technology could be used in a multinational disaster response environment if the right operational model is applied to the technology.

Experiential Data

South Dakota Meeting and Technology Development

I had the amazing opportunity to participate in this TM research through an internship with the NATO MnTS Project. As an intern for this project, I assisted in coordinating several international meetings. For the first meeting in South Dakota in June of 2015, I developed a daily task list for meeting preparation, presented my personal findings at the end of each day, and coordinated activities and travel schedules for more than 20 international dignitaries. This NATO visit only lasted for approximately a week, and as such the team was forced to fit as much TM technology education and research in as possible. Through this visit and the study of Avera eCare, the NATO MnTS Project established relationships with three medical technology companies and developed the field kit models shown below.



³³Doam, Charles, et al. "Development and Validation of Telemedicine for Disaster Response: The North Atlantic Treaty Organization Multinational System." *Telemedicine and E-Health* 24, no. 9 (September 2018): 657-68. doi:10.1089/tmj.2017.0237.

³⁴Ibid.

³⁵"At a Glance." The International Red Cross and Red Crescent Movement, 2019. https://www.ifrc.org/Global/Publications/general/at_a_glance-en.pdf.

MnTS Project Final Demonstration

After participating in the TM system research for two years and helping to gather the information contained in this paper, the MnTS Project concluded with a research presentation and technology demonstration at NATO Headquarters in Brussels, Belgium. While attending these final meetings in Belgium, I was able to take part in the technology demonstration in front of NATO leaders and ambassadors from all major NATO member countries. This demonstration was the culmination over almost five years of research, and there was a great deal of pressure on the team to perform well. The future of the project heavily depended on the outcome of the presentation and how the NATO leaders and ambassadors perceived the project. It was an intense and nerve-wracking experience, especially as I was the “patient” on which the technology was being tested, as shown in the images below. The demonstration went well, and since the project research has been published, the project has been approved to move forward with further research and development.



36

Lessons Learned

This internship not only introduced me to the complexity of the medical field, but it also helped me to understand the disparate nature of the approaches to international humanitarian aid. My research with the MnTS Project helped me to develop skills in cultural awareness, problem solving, and international project coordination. There are two major lessons that I learned while working on the MnTS Project.

Firstly, the technological ability to create an MnTS already exists. I quickly realized this fact during the 2015 South Dakota meeting. The technological proof of an MnTS was further proven through my participation in the research and development process of the NATO project, especially in the Ukraine field demonstration. Despite the technology existing, international barriers and laws severely complicate the ability to operate the MnTS across borders. This was shocking to me throughout my two-year internship experience. Before working on an international project, I would have assumed that the technology development would be the most

³⁶Accessed December 3, 2019. https://www.nato.int/cps/en/natohq/photos_141827.htm.

difficult and require the most in-depth discussion. While this is true to an extent, the majority of the project members had to repeatedly discuss legal and regulatory complications. Solving these regulatory difficulties will likely be the most pressing concern for the MnTS Project moving forward.

Secondly, there must be an organization of TM infrastructure at the international level. Working on an international level introduces great complexity to a project. In addition to intense language and timezone barriers, cultural myopia — the belief that one's own culture is superior or relevant to all other cultures — often takes hold. These challenges were difficult to overcome throughout the MnTS project even though team members were on good terms with each other. Working across countries that might have historical or current grievances with each other would only exacerbate this situation. Therefore, a permanent organization needs to be established with the authority and resources necessary to develop, promote, and operate the MnTS. Additionally, having a fully developed organization with clear standards, rules of operation, and methodology will help to make the system more effective in times of disaster. Building this organization will obviously take a great deal of time and coordination between nations, NGOs, and private industry. However, through working on the project for two years, I have come to believe that the MnTS will require its own independent, international organization.

The Future of the MnTS Project

While NATO's SPS Program only funded the MnTS Project from 2013 to 2017, several nations are still working together to further develop and prove the concept of an MnTS. However, transitioning MnTS research into an operational system has not been accomplished, as the path forward remains obstructed with legal, political, and technological barriers. Additionally, NATO is primarily a military alliance. While the organization contributes to the science community through the SPS Program, it is unlikely that NATO itself would be able to implement a neutral TM system, as many non-NATO nations would likely have a difficult time separating the MnTS from NATO's military orientation. As a result, considering how NATO currently operates its suborganizations is not particularly helpful for defining a path forward for the MnTS.

To overcome this reputational challenge, other potential models with primarily humanitarian missions were considered, specifically the International Federation of the Red Cross and Red Crescent (IFRC) within the International Red Cross and Red Crescent Movement (IRCM). The IRCM is the world's largest humanitarian network and is a neutral organization that provides protection and assistance to people affected by disasters and conflicts.³⁷ The analysis of the IFRC includes a discussion of the organization's current operational model and ways this model could be applied to the NATO MnTS project moving forward.

³⁷"At a Glance." The International Red Cross and Red Crescent Movement, 2019. https://www.ifrc.org/Global/Publications/general/at_a_glance-en.pdf.

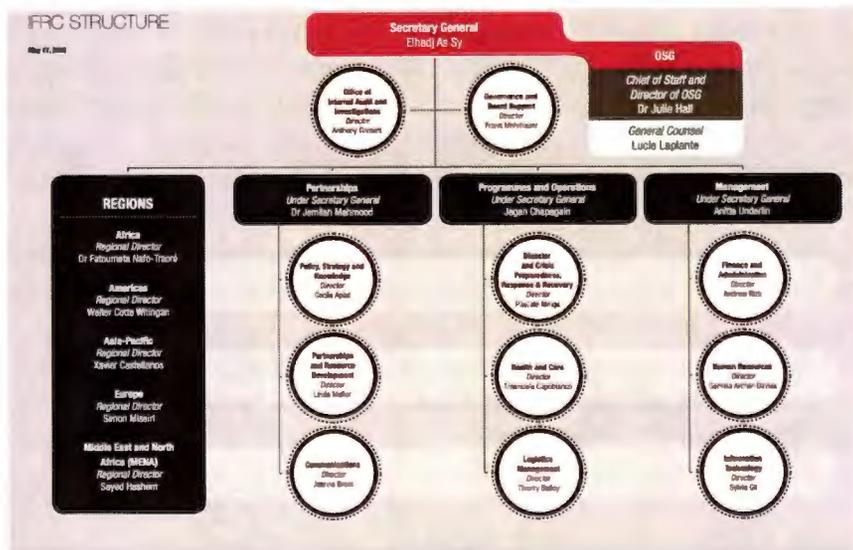
The Red Cross Model

The International Red Cross and Red Crescent Movement

The IRCM is a global humanitarian network of over 80 million people with three main components: the International Committee of the Red Cross (ICRC), the IFRC, and 191 National Red Cross and Red Crescent Societies.³⁸ The IRCM is a neutral organization that cooperates with governments, donors, and other aid organizations to provide humanitarian assistance. The ICRC, IFRC, and the National Societies are independent organizations within the IRCM and exercise no authority over each other.

The International Federation of Red Cross and Red Crescent Societies

The second component of the IRCM — the IFRC — is likely the most applicable to the NATO MnTS Project because it focuses specifically on international assistance following natural and man-made disasters in non-conflict situations. As the MnTS is not intended to be used for military purposes, the IFRC appears to be a better fit than the ICRC, which provides humanitarian aid to victims of war and armed violence. The IFRC was founded in 1919 by France, Great Britain, Italy, Japan, and the U.S. and coordinates international assistance following natural and man-made disasters in non-conflict situations.³⁹ The organization works with the 191 IRCM National Societies, a secretariat in Geneva, and more than 60 local delegations to respond to catastrophes around the world. Its relief operations are usually combined with development work. While the secretariat in Geneva is responsible for the day-to-day administrative operations of the IFRC, the decisions on the organization's policies and direction are made by its internal governing bodies.⁴⁰



³⁸"At a Glance." The International Red Cross and Red Crescent Movement, 2019. https://www.ifrc.org/Global/Publications/general/at_a_glance-en.pdf.

³⁹"Our Vision and Mission." IFRC. Accessed December 2, 2019. <https://www.ifrc.org/en/who-we-are/vision-and-mission/>.

⁴⁰"Governance." International Federation of Red Cross and Red Crescent Societies. Accessed December 3, 2019. <https://media.ifrc.org/ifrc/governance/>.

National Society Model

The IFRC's greatest strength is its ability to access the network of National Societies. Each National Society is made up of volunteers and staff and supports local government authorities as independent humanitarian assistants. This network covers almost every country in the world and gives the IFRC greater potential to develop aid capacities, as it helps to ensure that care is thorough and carried out effectively.⁴¹ The IFRC is also able to reach individual communities through field delegations, which assist with and advise on the National Societies' relief operations. As a result, local expertise, access to communities, and infrastructure enable the IRCM to more effectively provide protection and assistance.⁴² The IFRC also promotes cooperation between National Societies to strengthen their capacity to carry out effective disaster response.⁴³ This localized approach combined with the IRCM's resources and expertise often give the IFRC a distinct advantage in the humanitarian field, and advantage that could be used as a guide for the future of the NATO MnTS Project.⁴⁴

Strategic Recommendations

Addressing Legal Challenges

The medical licensure component of the MnTS could be addressed by establishing an MnTS Medical Review Committee to ensure that MnTS member physicians have met the established education, training, certification, and experience standards.⁴⁵ For example, the IFRC requires that volunteers taking part in medical activities go through established additional screening processes in addition to minimum qualifications and/or certification verification.⁴⁶ Proxy credentialing, the process of allowing a non-primary hospital wishing to credential a physician to rely on that physician's primary hospital's credentialing process, could be used to create a global MnTS physician pool.

To handle malpractice and jurisdictional issues, the MnTS should develop its own malpractice governance process and insurance with a specially designated NATO court. In order to clarify the physician-patient relationship in a TM environment, the MnTS should focus only on TM consults to support the on-site provider while maintaining that provider's medical responsibility for the patient. Data security and privacy should be addressed by the MnTS to following the regulations of the strictest country to raise the security of health data to the highest level possible. The IFRC uses secure systems and implements appropriate technical and organizational measures to safeguard data. Additionally, if personal information is shared with

⁴¹"Our Vision and Mission." IFRC. Accessed December 2, 2019. <https://www.ifrc.org/en/who-we-are/vision-and-mission/>.

⁴²"At a Glance." The International Red Cross and Red Crescent Movement, 2019.

https://www.ifrc.org/Global/Publications/general/at_a_glance-en.pdf.

⁴³"Components and Bodies of the International Movement of the Red Cross and Red Crescent." ICRC, August 24, 2013.

<https://www.icrc.org/en/doc/resources/documents/misc/components-movement.htm#gs.kdseyo>.

⁴⁴"At a Glance." The International Red Cross and Red Crescent Movement, 2019.

https://www.ifrc.org/Global/Publications/general/at_a_glance-en.pdf.

⁴⁵Doorn, Charles, et al. *Multinational Telemedicine Systems for Disaster Response: Opportunities and Challenges*. Amsterdam, Netherlands: IOS Press, 2017.

⁴⁶"Our Vision and Mission." IFRC. Accessed December 2, 2019. <https://www.ifrc.org/en/who-we-are/vision-and-mission/>.

third parties of the IFRC, the organization usually requires those companies to maintain equally strict security measures.⁴⁷ Any country wishing to connect its system to the MnTS would need to prove the security of its platform reaches these strict standards.

Addressing Operational Challenges

Firstly, the MnTS should operate with the principles of impartiality and neutrality. The goal of the system is to provide people in disaster situations with quicker and better access to healthcare. The needs of citizens should be the primary concern of the MnTS, thus freeing the application of TM from any discrimination based on nationality, race, religion, economic class, or political ideology. Upholding the principle of neutrality is one of the IFRC's primary operating concerns. The IFRC focuses on neutrality to maintain the confidence of all parties in the IFRC's activities in a particular location. To the IFRC, neutrality is a necessary condition for operational efficiency.⁴⁸ The IFRC's principle of neutrality prohibits National Societies from taking part in hostilities; engaging in controversies; and/or expresses sympathy for a movement, cause, or political figure. The role of National Societies as a support system to public authorities in the administration of aid is not considered to be a violation of the principle of neutrality.⁴⁹ The MnTS should work follow this model of neutrality to establish confidence in the system and to expand the system's reach to contentious nations.

Secondly, the NATO team should consider studying and applying the IFRC's operational model to the technology expansion. The IFRC works with the 191 IRCM National Societies, a secretariat in Geneva, and more than 60 local delegations to coordinate and administer humanitarian aid during natural and manmade disasters. This model could be replicated with an MnTS by operating national telemedicine systems like independent National Societies, having an MnTS "secretariat" to link these national systems together during times of crisis, and having field kit operators function at the local level.

Finally, a permanent MnTS organization with the authority and resources necessary to develop, promote, and operate the MnTS needs to be created. This is likely the only way to truly make TM technology a priority in disaster response. Additionally, creating a developed organization with clear standards, rules of operation, and methodology will help to make the system more durable and effective in times of disaster.

MnTS Importance

Geography currently dictates the standard of care in disasters. The widespread introduction of TM to disaster response and humanitarian efforts "can improve access to health services and increase survival rates," said Dr. Raed Arafat.⁵⁰ Additionally, a system like the MnTS has the potential to reduce the number of volunteers and the quantity of resources necessary for

⁴⁷"Disclaimer." IFRC. Accessed December 13, 2019. <https://www.ifrc.org/en/disclaimer/>.

⁴⁸"Neutrality." IFRC. Accessed December 13, 2019.

<https://www.ifrc.org/en/who-we-are/vision-and-mission/the-seven-fundamental-principles/neutrality/>.

⁴⁹Ibid.

⁵⁰"NATO Working with South Dakota Telemedicine Hub." Modern Healthcare, June 23, 2015.

<https://www.modernhealthcare.com/article/20150623/NEWS/150629959/nato-working-with-south-dakota-telemedicine-hub>.

emergency response. According to Dr. Donald Kosiak Jr., "When you send a team to let's say a hurricane or a tsunami in Japan, you have to be able to feed them, and water them, and clothe them, and take care of all their needs on top of allowing them to do medical care," Kosiak said. "(With TM) you still send people, but instead of needing to send 30 people maybe you send 12." This decrease in required resources not only allows organizations to get volunteers and supplies into disaster-torn countries sooner, but it also could encourage more organizations to get involved in disaster response, as the cost of responding could decrease with the use of TM.

The medical community, policy makers, and disaster response coordinators have not utilized TM technology effectively.⁵¹ What remains now for the future of the MnTS project is the process of establishing an international operational model that allows this technology to cross borders. Many people in the world now have access to amazing inventions like the Internet, smartphones and tablets, FaceTime or Skype, facial and fingerprint-recognition, etc. Technology like this could be used to save lives every day, but instead the complexity of international law stands in the way of using technology to truly help people. Dr. Arafat, the MnTS Project leader, said "We hope certain issues will be overcome in the future ... without having these barriers between us who want to help and people who need the help."⁵²

⁵¹Doorn, Charles, et al. *Multinational Telemedicine Systems for Disaster Response: Opportunities and Challenges*. Amsterdam, Netherlands: IOS Press, 2017.

⁵²Young, S. (2015, June 22). NATO, Avera plan for global disasters. Retrieved November 29, 2019, from <https://www.argusleader.com/story/news/2015/06/22/nato-taps-averas-ecare-prowess-global-disasters/29129097/>.

Capstone Reflection

In this section, I will reflect upon the process of completing a capstone project, briefly outline some of the project's problems, challenges, and triumphs, and offer some advice to future Honors students beginning their capstones.

This project was the capstone of my undergraduate education for the following reasons: I analyzed a past project to discover and record significant international boundaries; compared those issues to other published articles; discussed benefits and complications with people currently working in an international position; and built a strategic recommendation for the NATO project from my findings. This research also added to my overall future goals because I want to work in the international field. While researching international projects, programs, and professionals, I was able to truly understand the depth of complexity involved in organizing and maintaining an international project.

As the world becomes increasingly interconnected through technological advancement, opportunities and complications form in almost every career field. After completing an internship with NATO and visiting many international organizations with the Huntsman Scholar Semester, I have come to realize the many challenges of working in an international position. This research project not only gave me a better understanding of the underlying issues that continuously impacted the NATO MnTS project, but it also helped to prepare me for a career working in international logistics.

I think it was very valuable to analyze all of the experiences I personally had on the project and combine them with my research to provide recommendations for the MnTS project moving forward. Going through the recommendation process helped me to expand my critical thinking skills in the context of international work, something in which I hope to participate in the future. Another advantageous part of the Honors capstone experience was getting the opportunity to work with Dr. Shannon Peterson, a very experienced professional in the international field. I have worked with Dr. Peterson on research in the past, and I was excited to have her help on this capstone project. Dr. Peterson helped give me direction on what questions I should be looking to answer with my research and how to condense my thoughts on such a broad research topic. Further developing my relationship with her solidified her as a great resource for me in future international professional and academic opportunities.

My NATO MnTS research definitely helped me to gain a deeper understanding of my major in international business. Specifically related to my international business degree, I researched international projects, programs, and professionals that helped give more meaning to the theories and methods I have learned in the classroom. This research experience demanded critical thinking about my major topics and broadened my understanding across many different aspects of the international field.

This capstone also forced me to look at disciplines outside of business. I had to gain a deep understanding of national and international healthcare practices, telemedicine, international law, humanitarian aid, and operational methods of international political organizations. While very interesting, this was definitely a challenge given my timeline the project. I only had a little over a semester to complete my research and analysis, and so trying to learn enough about all of these topics to make informed recommendations for the MnTS project was very time-consuming and difficult.

Another challenging aspect of this project was the complexity of the subject matter. Not only was the range in topics wide, the topics themselves were not easy to understand. I was very lucky to have worked on the NATO MnTS Project, so I had the resources to reach out to when I was lost. I made many phone calls and sent several emails to even just gain a foundational understanding of what the MnTS project was trying to accomplish. Having to put this level of effort into understanding each topic in my paper became very tiring and frustrating at times. However, I feel like I have really expanded my knowledge in many different international disciplines, and thus this capstone feels very successful.

If I could start my capstone process over, I would have a few words of advice for myself. Firstly, I would tell myself to make my research more specific. One of the problems I faced when writing my MnTS project analysis was trying to figure out what I should or should not include. I think if I would have had a more specific research question to answer, I would have been able to spend more time on my actual analysis and less time on determining what to analyze. Secondly, I would tell myself to just sit down and start writing. I think I spent a lot of time trying to finalize my research and just kept bringing in more and more information. Had I just started writing sooner, I would have realized that some of that effort was unnecessary to the final capstone I ended up with. Finally, I would encourage myself to reach out to both of my committee members more frequently. I had a very busy semester with classes, work, my capstone, and graduating. Therefore, the additional time it took to meet with my committee members didn't always seem worth it. However, I wish I had taken more time to discuss my research with them and to bring their expertise into my research process.

While researching these topics, I was able to engage in the global community. I had the amazing opportunity to participate in the primary telemedicine research through an internship with the NATO MnTS Project. This connected me to people from many different countries and backgrounds, and it was an incredible learning experience. I hope this capstone will also be able to influence the global community. As I stated in my analysis, geography unfortunately currently dictates the standard of care in disasters. The widespread introduction of telemedicine to disaster response and humanitarian efforts has the potential to improve access to health services and increase survival rates in these disasters. The development of an MnTS therefore could greatly impact the lives of many people if the system were to be created and maintained. This research — while a small part of what is necessary for the system to be established — can be given to my contacts at NATO, where it hopefully will play a small part in the creation of an MnTS.

Bibliography

- "2018 World Disasters Report." International Federation of Red Cross and Red Crescent Societies, 2018.
<https://media.ifrc.org/ifrc/wp-content/uploads/sites/5/2018/10/B-WDR-2018-EXECSUM-EN.pdf>.
- Accessed December 3, 2019. https://www.nato.int/cps/en/natohq/photos_141827.htm.
- "At a Glance." The International Red Cross and Red Crescent Movement, 2019.
https://www.ifrc.org/Global/Publications/general/at_a_glance-en.pdf.
- "Components and Bodies of the International Movement of the Red Cross and Red Crescent." ICRC, August 24, 2013.
<https://www.icrc.org/en/doc/resources/documents/misc/components-movement.htm#gs.kdseyo>.
- "Disclaimer." IFRC. Accessed December 13, 2019. <https://www.ifrc.org/en/disclaimer/>.
- Doarn, Charles, et al. "Development and Validation of Telemedicine for Disaster Response: The North Atlantic Treaty Organization Multinational System." *Telemedicine and E-Health* 24, no. 9 (September 2018): 657-68. doi:10.1089/tmj.2017.0237.
- Doarn, Charles, et al. *Multinational Telemedicine Systems for Disaster Response: Opportunities and Challenges*. Amsterdam, Netherlands: IOS Press, 2017.
- Eastwood, Brian. "10 Ways Telemedicine Is Changing Healthcare IT." *CIO*. CIO, November 7, 2012.
- "Governance." International Federation of Red Cross and Red Crescent Societies. Accessed December 3, 2019. <https://media.ifrc.org/ifrc/governance/>.
- "History of Telemedicine." MD Portal, September 23, 2015.
<http://mdportal.com/education/history-of-telemedicine/>.
- Marilyn J. Field, *Telemedicine: A Guide to Assessing Telecommunications in Health Care*. Washington, D.C.: National Academy, 1996.
- "NATO Working with South Dakota Telemedicine Hub." *Modern Healthcare*, June 23, 2015.
<https://www.modernhealthcare.com/article/20150623/NEWS/150629959/nato-working-with-south-dakota-telemedicine-hub>.

- "Neutrality." IFRC. Accessed December 13, 2019.
<https://www.ifrc.org/en/who-we-are/vision-and-mission/the-seven-fundamental-principles/neutralty/>.
- "Our Vision and Mission." IFRC. Accessed December 2, 2019.
<https://www.ifrc.org/en/who-we-are/vision-and-mission/>.
- Ritchie, Hannah, and Max Roser. "Natural Disasters." Our World in Data, June 3, 2014.
<https://ourworldindata.org/natural-disasters>.
- Rodgers, Lucy. "Why Did so Many People Die in Haiti's Quake?" BBC News. BBC, February 14, 2010. <http://news.bbc.co.uk/2/hi/americas/8510900.stm>.
- Saslow, Eli. "The Most Remote Emergency Room: Life and Death in Rural America." The Washington Post. WP Company, November 16, 2019.
- "Using Telehealth Technology for Care Coordination During a Disaster." mHealthIntelligence, October 25, 2019. <https://mhealthintelligence.com/features/using-telehealth-technology-for-care-coordination-during-a-disaster>.
- "What Is Telemedicine?" Chiron Health. Accessed November 9, 2019.
- "Who We Are." Avera eCARE. Accessed November 17, 2019.
<https://www.averaecare.org/ecare/who-we-are/>.
- Young, S. (2015, June 22). NATO, Avera plan for global disasters. Retrieved November 29, 2019, from <https://www.argusleader.com/story/news/2015/06/22/nato-taps-averas-ecare-prowess-global-disasters/29129097/>.

Author Biography

Abigail Kosiak is originally from South Dakota and moved to Utah in 2015 to start school at Utah State University (USU). She dual majored in International Business and Statistics with minors in Mathematics and Economics. After Abigail graduates from USU in December of 2019, she is going to work as a software consultant for Workday. After working for a few years, Abigail plans to go back to school to get a Ph.D. in Statistics. Ultimately, she hopes to use her business and statistical skills to plan hospital and first aid systems for international humanitarian organizations.