A SPOONFUL OF SKYPE HELPS THE MEDICINE GO DOWN:

THE POTENTIAL AND PITFALLS OF TELEHEALTH IN THE UNITED STATES

by
Erin Mahn

A thesis submitted to Johns Hopkins University in conformity with the requirements for the degree of Master of Arts in Government

Baltimore, Maryland
December 2014

Abstract

Telehealth could fundamentally change health care in the United States by delivering treatments via telecommunications across space and time.

This thesis is built around three key questions for telehealth: Is telehealth an effective way to deliver care, especially in rural America? Why has the spread of telehealth been restrained? What proposals are being considered at the federal level to further the use of telehealth?

First, I examine if telehealth is clinically effective and could successfully expand access to care in rural America. The existing medical literature is reviewed to find telehealth to be effective and shows that telehealth could alleviate the shortage of doctors in rural America. This chapter's original contribution is quantifying the supply and demand of doctors for all 50 states and showing that telehealth can close the gap between demand and supply in most states with a physician shortage.

Second, the public policies that have limited the spread of telehealth are examined both at the state and federal level The paper makes an original argument that three key policy barriers to telehealth are licensure, scope-of-practice rules and reimbursement and that these barriers fundamentally are a result of U.S. federalism. A case study of Oregon shows how states act as "laboratories of democracy" in the absence of coordinated national policy and are furthering access to care.

Third, I analyze the telehealth legislative proposals that are currently pending before Congress to determine if they would help increase access to health care, if they would overcome the current policy barriers to telehealth and if they are politically viable. I review the existing literature showing why health care bills are difficult to pass. These insights are applied to the telehealth proposals to assess their political feasibility.

Finally, I recommend public policy that would tie together the insights of the paper's findings. This proposed telehealth framework would overcome the geographic barriers to providing care and reduce the policy barriers that result from federalism while remaining politically viable.

Thesis Readers:

Dr. Dorothea Wolfson, Paul Weinstein

Acknowledgements

I would like to express my sincere gratitude to my advisor, Dr. Wolfson, and my professors at The Johns Hopkins University for their knowledge and support. I would like to thank my Research and Thesis professors Dr. Harris, Dr. Masugi and Dr. Ginsberg for their encouragement and insightful comments during the thesis process.

I would also like to thank my family and friends for their love and encouragement. Last but not least, I would like to thank my fiancé, Josh Zumbrun, for his patience, love and support.

TABLE OF CONTENTS

Illustrations

Tables

Figures

Abbreviations

AAMC ..... Association of American Medical Colleges

ACA ..... Affordable Care Act

AMA ..... American Medical Association

ATA ..... American Telemedicine Association

BBA ..... Balanced Budget Act of 1997

BIPA ..... Medicare, Medicaid and State Children's Health Insurance Program Benefits Improvement and Protection Act of 2000

CBO ..... Congressional Budget Office

CMS ..... Centers for Medicare & Medicaid Services

DO ..... Doctor of Osteopathic Medicine

EHRs ..... Electronic Health Records

EMS ..... Emergency Medical Services

FSMB ..... Federation of State Medical Boards

GAO ..... Government Accountability Office

HHS ..... U.S. Department of Health and Human Services

HPSA ..... Health Professional Shortage Areas

HIT ..... Health Information Technology

HRSA ..... Health Resources and Services Administration

IOM ..... Institutes of Medicine

MD ..... Doctor of Medicine

MEDPAC ..... Medicare Payment Advisory Commission

MSA ..... Metropolitan Statistical Area

NASA ..... National Aeronautics and Space Administration

NCSBN ..... National Council of State Boards of Nursing

NRHA ..... National Rural Health Association

OAT ..... Office for the Advancement of Telehealth

OHSU ..... Oregon Health & Science University

ONC ..... Office of the National Coordinator for Health Information Technology

ORHP ..... Office of Rural Health Policy

USDA ..... U.S. Department of Agriculture

VA ..... U.S. Department of Veterans Affairs

WHO ..... World Health Organization

Introduction

Many regions of the United States face physician shortages. One simple way to address these shortages is to connect patients with physicians via telecommunications. Technology is now making that possible. Telehealth, the use of telecommunications in a health care setting, can overcome geographic barriers and access barriers to delivering health care. Patients now have the opportunity, in some cases, to stay in the comfort of their homes, and monitor their vital signs remotely. Specialists can consult with physicians or diagnose patients using the internet, store-and-forward imaging, streaming media and wireless communications.

Modern technology, from computers to the Internet to remote-controlled robots, is revolutionizing communications and exchanges of information and is addressing the health care challenges of access, quality and cost-effectiveness. Telehealth, in its earliest version, was simply the practice of health care providers calling other providers to consult or ask advice about patients via telephone, allowing them to learn from doctors with different areas of expertise or different experiences, as well as to remain informed about the evolution of best practices in their field. Yet the technology has grown rapidly in the past 50 years. What began as telephone conversations progressed to closed-circuit television links and transfers of basic medical imagery, and now includes high-resolution still-frame and motion cameras which take images more precise than the human eye, interactive video systems, portable electrocardiogram machines and even remote-controlled systems that use the above technologies along with robotics to allow some surgeries to be performed remotely.

This thesis will show how telehealth can alter the health care landscape by lessening access disparities across the United States, particularly in rural America. Patients facing a trauma or requiring specialty care once had no choice but to travel to the appropriate specialist's office, even in an emergency. Those trips could consist of hours and hundreds of miles for people in the most rural areas. Now, telehealth technology has the potential to bridge this distance. In fact, the results of my analysis will suggest that the physician shortage gaps in the United States could be eliminated in some states or substantially reduced.

But restraining the expansion of telehealth are three policy barriers: licensure, scope of practice and reimbursement. Licensure is the system by which doctors are authorized to practice medicine, but because every state sets its own licensing rules, doctors can only practice telehealth if they obtain multiple licenses – an expensive, difficult and time-consuming process. Scope-of-practice rules define what tasks medical providers can perform – even under the tutelage of a remote specialist, physicians cannot perform certain procedures. Reimbursement refers to the system of paying for health care in the U.S. – currently dominated by Medicare, which has limited reimbursement for telehealth; Medicaid, which uses federal funds but is administered by the states; and private insurers which also set different policies in different states.

Easing the burden of these barriers for health care facilities and their providers would create a friendly environment for telehealth to thrive, and in return help alleviate the barriers of access to care.

Even in the absence of nationally coordinated policy, however, some states are experimenting with telehealth policies that are expanding its use. A case study of

telestroke in Oregon will show how policy changes at the state level can facilitate successful adoption of telehealth.

This paper will show that the barriers to telehealth, and the state-level experimentation of telehealth did not happen by chance: they are a direct result of federalism in the U.S. and the fact that responsibilities for health care are not clearly delineated in the constitution. This has been a long-standing complication in the U.S. health care system, and telehealth is no exception.

Finally, this paper will look at the current proposals before Congress to reform the regulations that govern telehealth. In the current Congress, 56 bills with references to telehealth have been introduced. Many of these bills reference telehealth only in passing (and bills that are simply appropriations are included from this tally) but 4 of those 56 bills are concerned almost entirely with telehealth.

Those four bills – the Telehealth Enhancement Act, the Telehealth Modernization Act, the Medicare Telehealth Parity Act and the TELE-MED Act – are analyzed along three key dimensions. First, would these bills help expand the use of telehealth and further the provision of health care to rural America? Second, do these bills help to remove the policy barriers that have restrained the growth of telehealth? Third, are these bills politically feasible?

To assess the political viability of the different proposals, this thesis will review the existing literature on the political science of health care reform, with a focus on what kind of health care policy changes can be successful in Congress. This literature suggests two policy ideas in particular: controlling health care costs and reducing the geographical disparities that face residents of different regions are powerful motivators for change.

The analysis in this chapter concludes that the existing proposals check some of the boxes – some of the bills would make improvements to the geographical footprint of telehealth; others would reduce or remove some of the key telehealth barriers, and some of the bills have features that make them politically appealing. But none of the bills were designed to pass all three tests, and thus this thesis will propose a policy that would build on the existing proposals, with a focus on improving telehealth's ability to deliver care while remaining politically plausible.

Because telehealth has the opportunity to transform and revolutionize the delivery of health care in the United States, its potential and pitfalls are an important area for a wide range of research. It is important to examine whether patients that are geographically isolated or face provider shortages could have their access to health care improved. A scholarly investigation into the barriers of access and the barriers of telehealth can help provide a base of evidence on whether and how to remove the hurdles that currently prevent more widespread use of the technology.

The existing literature on telehealth can be divided into three broad categories. Medical journals have primarily examined the clinical effectiveness of various telehealth procedures. A second body of literature looks at the technological challenges of telehealth and the progress of hospitals toward adopting Health Information Technology (HIT). The third category is articles covering the public policy issues facing telehealth, which will be further analyzed in chapters two and three of the thesis.

This thesis reviews the medical literature which generally concludes that telehealth holds great promise, and finds many procedures to be effective, with others

needing further research. The technology literature finds that telehealth presents a number of technological challenges, but generally believes they will be surmountable.

This thesis, however, is primarily concerned with the public policy of telehealth. This thesis fits squarely within the mainstream of health care policy researchers that believe many applications of telehealth hold a great deal of promise. This thesis adds to that body of research by providing an original quantitative analysis of the physician shortages in the United States, and quantifies how telehealth can alleviate the access to care problems in states that face a shortage of physicians.

This research also synthesizes the existing policy research on telehealth barriers with the existing political science research on how federalism has complicated the U.S. health care system. Finally, this research builds upon scholarly work showing that although health care proposals face a difficult path in Congress, incremental changes occur with regularity and certain aspects of proposals can make some more viable than others. This paper provides an original analysis of the policy barriers to telehealth and the current political proposals to expand telehealth with a deep grounding in the political science research of health care.

Chapter 1: Telehealth's Impact on Rural America

I. Introduction

In June 2011, 7-month-old MaLea Fox visited a 25-bed hospital in a remote coastal area of Oregon, where doctors were unable to diagnose the cause of a 102.4-degree fever. The doctors at Columbia Memorial Hospital in Astoria arranged a telehealth consultation with a specialist 100 miles away at the Oregon Health & Science University in Portland. Using a two-way communication system and a robot-like device, the pediatric intensivist in Portland was able to check Fox's vital signs and diagnose her with memingococcemia, a life-threatening disease requiring intensive care. They instructed the rural doctors to install a breathing tube before transferring her to Portland. Bad weather delayed her helicopter's arrival to the intensive care hospital, and doctors believe the breathing tube, identified as critical by the telemedicine consultation, was what kept her alive.[1]

Telehealth has already helped improve health outcomes and has tremendous promise for the future as technology advances. Prior to today's technology, Fox would have had to travel 100 miles to Portland to see the specialist who diagnosed her condition, and it may have been impossible for her to arrive in time. What was once only plausible by having an in-patient consultation is now available with the help of modern technology, illustrating how telehealth is poised to fundamentally alter the health care landscape.

The challenges that telehealth can overcome are even more evident as areas become more and more remote from urban centers. Samuel C. Johnson, the executive

[1] Elizabeth Hayes, "How OHSU Used Telemedicine to Save a Baby's Life," *Portland Business Journal*, November 12, 2013, accessed April 10, 2014, http://www.bizjournals.com/portland/blog/health-care-inc/2013/11/how-ohsu-used-telemedicine-to-save-a.html?page=all.

director of the Alaska Federal Health Care Partnership, explained that a large number of patients live,

> In the bush, where there is no road system … Some of these villages when you are sick the weather can be bad and you literally cannot get out so you need some way to connect with the patient ... So how do you provide health care to people as close to home as possible? The only way we think we can do it is through technology.[2]

Telehealth is transformative because it has changed the speed, the geography and nature of health care delivery. This shift will alter regular checkups and emergency care and save lives. No longer will people have to drive for so many miles or wait for so many hours to see their providers or specialists, if the technology reaches its full potential.

Whether telehealth can be effective is of critical importance for Washington policy makers. Many of the federal government programs aimed at addressing the health care challenges of rural America have faced ongoing budget cuts in recent years. If telehealth can significantly reduce these challenges then Congress and the administration could fruitfully pursue policies to increase the adoption of telehealth.

This chapter will examine the relationship of telehealth and the delivery of health care to rural America. The rural regions of the United States face a persistent shortage of physicians and medical providers willing to practice in remote areas of the country, and this chapter will evaluate if telehealth can resolve the shortage of doctors in rural America. It is important to ask, how can the rise of telehealth affect the delivery of health care to rural Americans? What barriers do rural Americans face with access to health care and what role can telehealth play in breaking down those barriers?

---

[2] Samuel C. Johnson, "Louis Gorin and Outstanding Rural Health Program Awards" (video, Annual Conference 2014, National Rural Health Association, April 28, 2014), accessed April 28, 2014.

The literature review will begin with a definition of telehealth and a brief history of how it evolved into modern practice. Then it will provide an overview of the literature on telehealth's effectiveness and challenges. Finally, it will examine the role telehealth could play in removing two key barriers of access to rural health care: geography and workforce shortages.

Proponents believe that telehealth can provide some health care services across geographic barriers and reduce the demand of physicians in these rural areas. Opponents believe that the status quo of health care delivery is sufficient and that telehealth would introduce more problems than it solves. This paper's original contribution to the literature will include an analysis of these competing views, as well as a quantitative analysis that will test the thesis that telehealth can help overcome the geographic and workforce shortage barriers. Data from the Department of Health and Human Services (HHS), physicians groups and scholars will be examined to quantify the shortage of doctors, show how the demand for doctors could change, and determine how much telehealth can do to fill the gaps and break down barriers on a state-by-state level. The chapter will conclude with a discussion of the results.

These results will show that telehealth could help substantially reduce the physician shortage in rural America. Under most scenarios that will be studied in this thesis, telehealth would reduce the number of states with a physician shortage. However, this analysis will conclude that telehealth, by itself, cannot solve the workforce shortage. Even in the best-case scenario studied in this paper, not all states can have a sufficient supply of physicians to meet patient demand.

II. Literature Review

Definitions

Telehealth and telemedicine are growing areas of academic and medical research, expanding as advances in telecommunications technology allow for the creation of new and better medical techniques.

The terms telehealth and telemedicine do not have consistent definitions across the academic literature. In general, all researchers use the terms to refer to health care procedures that utilize telecommunications, but many favor even narrower definitions of the terms. Among those narrower definitions there are a range of approaches, and a 2007 study identified 104 different peer-reviewed definitions of the term telemedicine.[3]

One key area of disagreement is the distinction between telehealth and telemedicine. Telemedicine is sometimes defined as only those services that are provided by physicians, and health care services such as those provided by nurses, pharmacists and other health professionals are excluded. The broader set of services provided via telecommunications is telehealth.

Many health care providers, advocates, and analysts use telemedicine and telehealth interchangeably, to refer broadly to the "use of electronic communication and information technologies to provide or support clinical care at a distance."[4]

Three definitions from authoritative bodies are those of the Institute of Medicine (IOM), the World Health Organization (WHO), and the U.S. government's Health

---

[3] Sanjay Sood et al., "What Is Telemedicine? A Collection of 104 Peer-Reviewed Perspectives and Theoretical Underpinnings," *Telemedicine and e-Health* 13, no. 5 (October 2007): 573, accessed April 4, 2014, doi:10.1089/tmj.2006.0073.

[4] Susan E. Volkert, "Telemedicine: Rx for the Future of Health Care," *Michigan Telecommunications and Technology Law Review* 6 (2000): 151, accessed April 4, 2014, http://www.mttlr.org/volsix/VolkertTYPE.pdf.

Resources and Services Administration (HRSA), an agency of HHS. IOM defines telehealth as: "the use of electronic information and communications technologies to provide and support health care when distance separates participants."[5]

In reports from WHO the terms telehealth and telemedicine also are "synonymous and used interchangeably."[6] WHO defines telehealth as the following:

> The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities.[7]

HRSA uses the term telehealth and favors a broad definition. HRSA focused on improving access to health care services, defines telehealth as:

> The use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration. Technologies include videoconferencing, the internet, store-and-forward imaging, streaming media, and terrestrial and wireless communications.[8]

For the purposes of this paper, I will follow HRSA's convention of using the term telehealth to refer broadly to health care services that are delivered across distances via telecommunications technology. I favor this broad definition because my interest is whether the use of telecommunications can expand access to health care and thus I am interested in the full range of options included under an encompassing definition of

---

[5] Institute of Medicine, *Telemedicine: A Guide to Assessing Telecommunications for Health Care* (Washington, DC: The National Academies Press, 1996), 1.
[6] Misha Kay, Jonathan Santos, and Marina Takane, *Telemedicine: Opportunities and Developments in Member States* (Geneva: World Health Organization, 2010), 9, accessed April 9, 2014, http://www.who.int/goe/publications/goe_telemedicine_2010.pdf.
[7] Ibid.
[8] "Telehealth," Health Resources and Services Administration, accessed April 16, 2014, http://www.hrsa.gov/ruralhealth/about/telehealth/.

telehealth. Because this definition is used by the federal government, it is also the most relevant definition for discussing U.S. telehealth policies.

Although telehealth has an expansive definition, the most common forms of telehealth in the United States, for now, are fairly simple patient-to-general practitioner or general practitioner-to-specialist interactions via two-way video and audio communications. The potential exists to one-day use telecommunications technology for very complicated interactions, such as robotic surgeries, and doing so could eventually help further lessen the barriers to telehealth. But these technologies remain experimental and for now the vast majority of telehealth interactions remain simple in nature.

Brief History of Telehealth

Some rudimentary applications of telehealth began almost as soon as telephones were available to the public. In 1879 *The Lancet*, the world's leading general medical journal, had an article that discussed doctors using the telephone and in 1925 the magazine "Science and Invention" had an article on doctors using the radio.[9] More sophisticated and modern uses of telehealth stemmed from technologies developed in the 1960s primarily for use in the military and the space program.[10,11] The National Aeronautics and Space Administration (NASA) developed technologies to monitor the

[9] Institute of Medicine, *The Role of Telehealth in an Evolving Health Care Environment: Workshop Summary* (Washington, DC: The National Academies Press, 2012), 11-12.
[10] John Craig and Victor Patterson, "Introduction to the Practice of Telemedicine," *Journal of Telemedicine and Telecare* 11, no. 1 (January 2005): 5, accessed April 1, 2014, http://search.proquest.com.proxy3.library.jhu.edu/docview/210708401?accountid=11752.
[11] Rosemary Currell et al., "Telemedicine Versus Face to Face Patient Care: Effects on Professional Practice and Health Care Outcomes," *Cochrane Database of Systematic Reviews* 2, no. 2 (January 2000): 2-3, accessed March 20, 2014, doi: 10.1002/14651858.CD002098.

vital signs of astronauts from a distance as part of the Mercury space program.[12] A psychiatric institute was among the first to use videoconferencing technologies to connect specialists at the institute with non-specialized staff at a mental hospital.[13,14]

Telehealth services are sometimes classified into two groupings: real-time and asynchronous. Real-time services are those interactions that occur via telecommunications and involve direct interaction between two parties. Asynchronous services are those that unfold over time, such as when medical imagery is sent away for analysis. Another division is between telehealth that occurs between patients and doctors versus telehealth between general practitioners and specialists.

Telehealth now has applications in a wide-range of general uses – from videoconferencing with remote doctors, monitoring vital signs remotely, or sharing medical records – and in a wide range of highly specialized uses.

For example, teleradiology allows medical images such as x-rays and CAT scans, to be digitized and transmitted to specialized facilities in the United States or internationally. Telepathology allows the full scope of pathology slides and information to be transmitted to specialists with expertise in a particular disease. Telepharmacology allows physicians to enter prescriptions via computer rather than scrawled hand-written notes.[15]

The Medicare Payment Advisory Commission (MEDPAC) estimated in 2009 that telehealth was most commonly used for mental health services, including pharmacological management, and that this comprised about 62 percent of telehealth

[12] Institute of Medicine, *The Role of Telehealth in an Evolving Health Care Environment,* 11-12.
[13] Kay, Santos, and Takane, *Telemedicine*, 9.
[14] Reba Ann Benschoter, Merril T. Eaton, and Pringle Smith, "Use of Videotape to Provide Individual Instruction in Techniques of Psychotherapy," *Academic Medicine* 40, no. 12 (December 1965): 1159-61.
[15] Institute of Medicine, *The Role of Telehealth in an Evolving Health Care Environment,* 14.

services provided to Medicare beneficiaries. About 31 percent of telehealth services were office and other outpatient visits and 5 percent were end-stage renal disease services.[16]

The existing literature on telehealth can be divided into three broad categories. The first category examines the growing array of telehealth services that are being provided and evaluates their clinical effectiveness. This is the primary focus of medical journal articles covering telehealth. A second category is articles on the technological challenges of telehealth and the progress of hospitals in implementing Health Information Technology (HIT) and promoting its adoption. The third category is articles covering the public policy issues facing telehealth, which will be further analyzed in chapters two and three of the thesis.

The Effectiveness of Telehealth

When medical journals examine telehealth, they are concerned primarily with the effectiveness of specific treatments. Journals will study one particular procedure and compare the procedure using telehealth to the in-person procedure and gauge whether or not they had similar outcomes.[17,18]

The purpose of these studies is to evaluate the clinical effectiveness of telehealth and justify its ongoing use. Because telehealth is a relatively new field, researchers do not

---

[16] Medicare Payment Advisory Commission, *Report to the Congress: Medicare and the Health Care Delivery System* (Washington, DC: Medicare Payment Advisory Commission, 2012), 142-143, accessed April 18, 2014, http://www.medpac.gov/documents/Jun12_EntireReport.pdf.
[17] Anne G. Ekeland, Alison Bowes, and Signe Flottorp, "Methodologies for Assessing Telemedicine: A Systematic Review of Reviews," *International Journal of Medical Informatics* 81, no. 1 (January 2012): 5, accessed June 15, 2014, doi:10.1016/j.ijmedinf.2011.10.009.
[18] Richard Wootton, "Twenty Years of Telemedicine in Chronic Disease Management - an Evidence Synthesis," *Journal of Telemedicine and Telecare* 18, no. 4 (June 2012): 212, accessed April 5, 2014, doi: 10.1258/jtt.2012.120219.

always have consistent methodologies to study different procedures. Analysis in the field measures the effectiveness in vastly different ways.

For example, a study of 47 cancer patients found that they saved 27,000 miles of travel through the use of telepharmacy to fill their medication.[19] Another analysis of telepharmacy at rural hospitals discovered that about one-fifth of patients had errors in their medications that were detected by sending the prescriptions to pharmacists in other locations.[20,21] Research into telepathology determined that 74 percent of cases were more precisely diagnosed by a remote specialist than an on-site general pathologist.[22,23] A program to contact heart failure patients daily by phone led to savings of $3 million, 54 percent less inpatient visits, and 13 percent less outpatient visits.[24]

While reducing costs, errors, travel times, and misdiagnoses are important objectives for telehealth, the scattered conclusions of these articles underscore a key challenge for the medical research behind telehealth: researchers focus on wildly inconsistent metrics to measure success.[25,26]

Several authors have summarized the existing medical literature on telehealth. Hersh et al. (2006) studied papers on the use of telehealth among Medicare beneficiaries and determined telehealth was most effective with services that primarily used verbal

---

[19] H.L. Gordon, M. Hoeber, and A. Schneider, "Telepharmacy in a Rural Alberta Community Cancer Network," *Journal of Oncology Pharmacy Practice* 18, no. 3 (February 2012): 366, accessed April 15, 2014, doi: 10.1177/1078155211431858.
[20] Institute of Medicine, *The Role of Telehealth in an Evolving Health Care Environment,* 14.
[21] Stacey L. Cole et al., "Rural Inpatient Telepharmacy Consultation Demonstration for After-Hours Medication Review," *Telemedicine Journal and E-Health* 18, no. 7 (September 2012): 530, accessed March 30, 2014, doi: 10.1089/tmj.2011.0222.
[22] Institute of Medicine, *The Role of Telehealth in an Evolving Health Care Environment,* 14.
[23] Wen-Yih Liang et al., "Low-cost Telepathology System for Intraoperative Frozen-section Consultation: Our Experience and Review of the Literature," *Human Pathology* 39, no. 1 (January 2008): 56, accessed April 2, 2014, doi:10.1016/j.humpath.2007.04.023.
[24] Institute of Medicine, *The Role of Telehealth in an Evolving Health Care Environment,* 44.
[25] Ekeland, Bowes, and Flottorp, "Methodologies for Assessing Telemedicine," 8.
[26] Wootton, "Twenty Years of Telemedicine in Chronic Disease Management," 212.

communication such as mental health services, and not necessarily as effective for services that typically require physical contact.[27]

Wootton (2012) reviewed 141 randomized control trials in which 148 telemedicine procedures were practiced on 37,695 patients with five common diseases: asthma, diabetes, heart failure, hypertension and chronic obstructive pulmonary disease. Although the vast majority of these studies, 108 of them, reported positive results and only two claimed negative effects, Wootton criticized many studies for focusing on too-short a time period and using inconsistent methodologies. He concluded that "the evidence base for the value of telemedicine in managing chronic diseases is on the whole weak and contradictory."[28]

In addition to concerns about the medical research behind telehealth, scholars have identified other potential practical drawbacks. These include potential bureaucratic difficulties for coordinating care across multiple sites, and a potential breakdown in relationships between patients and physicians, or between health care providers and their colleagues.[29]

Ekeland, et al. (2012) examined 50 different reviews and concluded that studies generally need larger and more standardized populations and more consistent methodologies to allow comparisons of procedures. They concluded that "larger and

---

[27] W.R. Hersh et al., "Telemedicine for the Medicare Population: Update," *Evidence Report/Technology Assessment* 131 (February 2006): 6.
[28] Wootton, "Twenty Years of Telemedicine in Chronic Disease Management," 219.
[29] N.M. Hjelm, "Benefits and Drawbacks of Telemedicine," *Journal of Telemedicine and Telecare* 11, no. 2 (2005): 66-67, accessed October 5, 2014, http://search.proquest.com/docview/210708914?accountid=11752.

more rigorous studies are crucial for the production of evidence of effectiveness of unambiguous telemedicine services for pre-defined outcome measures."[30]

While an increasing array of telehealth services has been found to be effective, there will likely remain many procedures for which telehealth is not as effective. Procedures that require physical inspection or other direct contact with a physician, for example, are unlikely to be developed as quickly as procedures for telemental health. Even in-person a physician would rarely touch the patient during a psychological evaluation.

As Dr. Miles E. Drake, M.D., a professor emeritus of psychology and neurology at The Ohio State University, explains, while telehealth is promising for some areas of medicine and consultation, there are some limits to it as well. "It would be very hard to [feel] someone's liver, palpate lymph nodes, or to do examinations used in gynecology at a distance. It need not be used for those purposes. It is promising way of expanding certain kinds of healthcare services, when distance and population are an issue."[31]

The absence of an in-person consultation will remain a challenge for some procedures and as the field of telehealth grows, medical researchers will continue to determine the settings in which telehealth works and when it doesn't. Even as the technology develops, it is highly unlikely to be appropriate for all procedures.

In many applications, telehealth is a physician extender. The patient is with a licensed provider, such as a physician, physician's assistant or nurse practitioner, who is

[30] Ekeland, Bowes, and Flottorp, "Methodologies for Assessing Telemedicine," 2.
[31] Gabriel Perna, "Neurology: The Next Frontier in Telehealth?," *Healthcare Informatics*, August 28, 2014, accessed December 3, 2014, http://www.healthcare-informatics.com/article/neurology-next-frontier-telehealth.

trained in coordinating care. For procedures that require physical contact, the on-site health care professional will sometimes be able to handle that aspect of the treatment.

Significant challenges remain for medical researchers in standardizing their research and providing the underpinning for which telehealth interventions are the most effective. Yet these obstacles for medical researchers should not postpone the advancement of telehealth in the United States. Despite the use of varying methodologies and approaches, the research "clearly demonstrates that technology-enabled health care is not only feasible but in some cases can be equal to or better than in-person care."[32] MEDPAC has concluded that for some specialties "services provided via telehealth can probably achieve results comparable to in-person care."[33]

Telehealth has been found to provide benefits in most areas of study, even though researchers have focused on differing metrics such as cost savings, access to services, time to treatment and clinical outcomes.[34] While challenges remain for researchers, the medical case to press forward with implementing telehealth is strong.

Access to Care in Rural America

A second, and somewhat separate, body of research exists analyzing the challenges of access to care in rural America. Three main barriers exist: rural America is socioeconomically disadvantaged, its residents must overcome geographical distance to obtain care, and the region faces a shortage of health care providers, relative to the size of its population.

---

[32] Elizabeth A. Krupinski and Jordana Bernard, "Standards and Guidelines in Telemedicine and Telehealth," *Healthcare* 2, no. 1 (February 2014): 79, accessed June 20, 2014, doi:10.3390/healthcare2010074.
[33] Medicare Payment Advisory Commission, *Report to the Congress,* 142-143.
[34] Krupinski and Bernard, "Standards and Guidelines in Telemedicine and Telehealth," 75.

The research shows that compared to urban Americans, people in rural America tend to be older and have less financial resources. Residents in rural counties are more likely to report poor health status than those in urban counties, by a measure of 19.5 percent to 15.6 percent.[35]

These barriers will be analyzed further in the next section, and will be followed by a data analysis of whether telehealth can make a significant contribution to overcoming the barriers. Preliminary data from existing research on small telehealth initiatives has produced preliminary but "promising results" about the potential for telehealth to alleviate challenges in rural America by provided care "with little regard for geography."[36]

Another issue that can be addressed through telehealth is the need for patients to be transferred between hospitals, common in rural America, when the initial hospital may lack the expertise to treat the patient.[37] Nearly one-third of rural residents who require hospitalization ultimately receive treatment in urban hospitals.[38] Every year, more than 2 million patients are transported between emergency facilities, and telehealth's reduction of these transfers would be a significant benefit to rural America.[39] One study estimated

---

[35] Kevin J. Bennett, Bankole Olatosi, and Janice C. Probst, *Health Disparities: A Rural-Urban Chartbook* (Columbia: South Carolina Rural Health Research Center, 2008), i, accessed April 10, 2014, http://rhr.sph.sc.edu/report/(7-3)%20Health%20Disparities%20A%20Rural%20Urban%20Chartbook%20-%20Distribution%20Copy.pdf.

[36] Alexander H. Vo, *The Telehealth Promise: Better Health Care and Cost Savings for the 21st Century* (Galveston: University of Texas Medical Branch, 2008), 1, accessed April 19, 2014, http://telehealth.utmb.edu/presentations/The%20Telehealth%20Promise-Better%20Health%20Care%20and%20Cost%20Savings%20for%20the%2021st%20Century.pdf.

[37] Ibid., 9.

[38] Margaret Jean Hall, Jill Marsteller, and Maria Owings, *Factors Influencing Rural Residents' Utilization of Urban Hospitals* (Hyattsville, MD: National Center for Health Statistics, 2010), 1, accessed April 1, 2014, http://www.cdc.gov/nchs/data/nhsr/nhsr031.pdf.

[39] Vo, *The Telehealth Promise,* 9.

that telehealth could save $4.3 billion in health care spending in the United States just from reducing transfers, a problem that's particularly acute for rural.[40]

III. Rural America and Telehealth

Telehealth holds promise for rural America by helping residents access their providers. These services can be cost effective, a necessity given rural Americas socio-economic disadvantages, and attainable across great distances thus lessening the need for transportation.[41,42]

The original contribution that this paper seeks to make to the existing body of research is to show whether telehealth could be sufficiently effective to help alleviate the barriers to health care in rural America, especially the shortage of physicians.

Geographic Barriers

While only 20 percent of the U.S. population lives in rural areas, these regions comprise over 90 percent of the country's landmass.[43] The cost and difficulty of travel for rural Americans to receive medical or dental care is higher than their urban counterparts and serves as a key barrier for rural populations. A study by the South Carolina Rural Health Research Center in 2006 showed that the average rural patient has to travel 17.5

---

[40] Ibid., 1.
[41] Mandy Bell et al., *Geographic Restrictions for Medicare Telehealth Reimbursement* (Washington, DC: National Rural Health Association, 2011), 1, accessed April 18, 2014, http://www.ruralhealthweb.org/index.cfm?objectid=80E523E9-3048-651A-FE53EF1E8BB0DDAB.
[42] T.L. Young and C. Ireson, "Effectiveness of School-based Telehealth Care in Urban and Rural Elementary Schools," *Pediatrics* 112, no. 5 (2003): 1088, accessed April 18, 2014, http://www.ncbi.nlm.nih.gov/pubmed/14595051.
[43] A resolution recognizing that access to hospitals and other health care providers for patients in rural areas of the United States is essential to the survival and success of communities in the United States, S. Res. 26, 113th Cong., 1st sess., *Congressional Record* (February 2013).

miles, compared to 8.3 miles for urban residents, to receive medical and dental care. The average trip for rural Americans is 27.2 minutes, versus the 20.7 minutes for their urban counterparts.[44]

In rural America, around a quarter of patients face difficulty when traveling to receive health care due to the price of gasoline, the poor condition of roads, or congestion on roadways.[45]

Rural residents are most likely to face an extreme travel burden, defined as "trips that were over 30 miles in distance or greater than 30 minutes in time required." Around 21 percent of rural residents, compared to less than 5 percent of urban residents, face such long travel times in order to receive in-person health care.[46]

For routine check-ups this can be considered an inconvenience, but for emergency care the geographic barriers to health care can be a matter of life or death. Nearly 85 percent of overall U.S. residents can reach emergency care, provided by Level I or Level II trauma centers, within an hour. This group includes nearly everyone who lives within, or in the surrounding suburbs, of most major U.S. cities. By contrast, only 24 percent of rural residents can reach a trauma center in the same timeframe. The geographic barrier to accessing health care contributes directly to the fact that 60 percent of all trauma deaths happen in rural America.[47]

Accidents in rural America are significantly more likely to result in death or serious injury, in part because of the delays that can occur between the emergency call

---

[44] Janice C. Probst et al., *Mode of Travel and Actual Distance Traveled for Medical or Dental Care by Rural and Urban Residents* (Columbia: South Carolina Rural Health Research Center, 2006), 4, accessed April 15, 2014, http://rhr.sph.sc.edu/report/SCRHRC_ModeofTravel_Exec_Sum.pdf.
[45] Ibid., 3.
[46] Ibid., 4.
[47] "About Rural Health in America," National Organization of State Offices of Rural Health, last modified 2014, accessed April 15, 2014, http://celebratepowerofrural.org/?page_id=30.

and the arrival of an Emergency Medical Services (EMS) provider across greater travel distances. For example, national average response times from motor vehicle accidents to EMS arrival in rural areas were 18 minutes, or eight minutes greater than in urban areas.[48] Attending physicians are not always on site and sometimes have to travel to the hospital after the patient arrives, further delaying care.[49]

Many of the geographic barriers that create challenges for rural Americans to receive health care can be directly addressed by telehealth. Telehealth can reduce transportation costs for patients and providers, it can allow consultations to take place via telecommunications, and it lets general practitioners discuss a patient with remote specialists thus shrinking the amount of time before the appropriate care can be provided.

Workforce Shortage in Rural America

The health care system faces a general shortage in its health workforce, and this is particularly pronounced in rural America. One-fifth of Americans live in rural areas (20 percent), yet less than one-tenth of physicians serve that population (9 percent).[50]

Of the 2,050 rural counties in the United States, 77 percent are designated as primary care Health Professional Shortage Areas (HPSAs), defined as areas with half as many primary care physicians as urban areas.[51] Rural residents are somewhat less likely to report having a personal health care provider than urban residents (79.4 percent to 81

---

[48] Larry Gamm et al., eds., *Rural Healthy People 2010: A Companion Document to Healthy People 2010* (College Station: The Texas A&M University System Health Science Center, 2003), 40, accessed April 18, 2014, http://sph.tamhsc.edu/centers/rhp2010/Volume2.pdf.
[49] Medicare Payment Advisory Commission, *Report to the Congress,* 148.
[50] Council on Graduate Medical Education, *Advancing Primary Care*, 20th ed. (Bethesda, MD: The Health Resources and Services Administration, 2010), 14, accessed April 21, 2014, http://www.hrsa.gov/advisorycommittees/bhpradvisory/cogme/Reports/twentiethreport.pdf.
[51] S.Res. 26, A resolution recognizing that access to hospitals and other health care providers for patients in rural areas of the United States is essential to the survival and success of communities in the United States.

percent). Residents in the most remote rural counties were even less likely to have a physician (78.7 percent).[52]

A number of federal government programs exist to address this shortage. These include the National Health Service Corps which aims to bring doctors into areas with the most acute needs, the Loan Repayment Program which help ease the burden of medical school debt for doctors in shortage areas, and Title VII funding for a range of HHS programs aimed at closing specific shortages. Shortages persist despite these programs, many of which have seen their budgets reduced in recent years.

Estimates from HRSA say there will be a nationwide shortage of between 85,000 to 95,000 doctors in 2020.[53] The shortage is likely to be even worse in rural regions because new doctors are more likely to practice in urban and suburban areas as is, and this will magnify the problem, worsening "already existing access problems" and will "drain resources away from underserved areas."[54]

In 2010 only 32 percent of physicians were primary care providers.[55] The need for primary care doctors that are capable of providing care for adults with chronic diseases is especially elevated. There are also shortages in general surgery and some key pediatric and internal medicine specialties.[56] In rural America, shortages for radiologists,

---

[52] Bennett, Olatosi, and Probst, *Health Disparities*, ii.
[53] Council on Graduate Medical Education, *Physician Workforce Policy Guidelines for the United States, 2000-2020*, 16th ed. (Bethesda, MD: The Health Resources and Services Administration, 2005), xvi, accessed April 21, 2014, http://www.hrsa.gov/advisorycommittees/bhpradvisory/cogme/Reports/sixteenthreport.pdf.
[54] Council on Graduate Medical Education, *New Paradigms for Physician Training for Improving Access to Health Care*, 18th ed. (Bethesda, MD: The Health Resources and Services Administration, 2007), 5, accessed April 21, 2014, http://www.hrsa.gov/advisorycommittees/bhpradvisory/cogme/Reports/eighteenthrpt.pdf.
[55] Council on Graduate Medical Education, *Advancing Primary Care*, 3.
[56] Ibid.

neurologists, psychologies and psychiatrists are especially acute, yet these services could be delivered via telehealth.[57]

Retention and recruitment for rural primary care providers is challenging because of the lower compensation rates for rural doctors, insufficient reimbursement for procedures from Medicare, high workload environments due to the shortage, and medical schools that are primarily outside of rural areas. Here too, telehealth may be helpful in increasing retention by allowing rural providers to remain in communication with colleagues in other areas.[58]

The shortage of physicians in the United States, especially acute in rural America, is likely to intensify. The expansion of health insurance under the Affordable Care Act (ACA[59]) is projected to increase the need for primary care physicians even further.[60] The Congressional Budget Office (CBO) estimates that the ACA will add 37 million Americans to health insurance rolls, 24 million of these through health insurance exchanges and 13 million through Medicaid.[61]

Limitations of Telehealth

Telehealth faces significant limitations in achieving its full potential. One limit is the cost of installing the technological infrastructure across the country, which is still being developed. Rural hospitals are four times as likely as urban hospitals to refrain

[57] Janice C. Probst, interview by author, Las Vegas, April 22, 2014.
[58] David Schmitz, interview by author, Las Vegas, April 22, 2014.
[59] The Patient Protection and Affordable Care Act, Public Law 148, 111th Cong., 2d sess. (March 23, 2010).
[60] Council on Graduate Medical Education, *Advancing Primary Care*, 3.
[61] "CBO'S Estimate of the Net Budgetary Impact of the Affordable Care Act's Health Insurance Coverage Provisions Has Not Changed Much Over Time," Congressional Budget Office, accessed April 18, 2014, http://www.cbo.gov/publication/44176.

from undertaking HIT investments due to cost concerns.[62] Even maintaining basic technologies such as Electronic Health Records (EHRs) over time can be a significant cost burden for a small rural hospital or medical practice. HHS has estimated that compliance with the technical specifications for EHRs could cost $50,000 to $138,000 per upgrade, even for institutions that had previously been through the compliance process.[63]

In order for telehealth and HIT systems to be most effective, both health care administrators and physicians need to be trained, engaged and comfortable with the capabilities of the technology.[64] Patients will also need to be familiarized with telehealth procedures. Key interest groups, including physician and hospital interest groups will also need to support telehealth.

Telehealth creates some new technological challenges, such as the risk of losing a telecommunications connection in the middle of a procedure. Loss of connection, if it resulted in a medical accident, could be the basis for a malpractice lawsuit.[65] Hospitals adopting telehealth will thus need to have access to stable internet connections and stable platforms. Test runs and backup options will be a vital part of the telehealth process.[66]

Another limitation to telehealth is the lack of broadband in rural America.[67] While the Federal Communications Commission's "Eighth Broadband Progress Report" shows

---

[62] National Organization of State Offices of Rural Health, "About Rural Health in America."
[63] "Electronic Health Record Standards," Health Policy Briefs, last modified September 28, 2010, accessed April 19, 2014, http://www.healthaffairs.org/healthpolicybriefs/brief.php?brief_id=26.
[64] Kathleen Roney, "Overcoming 4 Challenges in Implementing Telemedicine, Healthcare's Next Frontier," *Becker's Hospital Review*, February 13, 2012, accessed April 20, 2014, http://www.beckershospitalreview.com/healthcare-information-technology/overcoming-4-challenges-in-implementing-telemedicine-healthcares-next-frontier.html.
[65] Ibid.
[66] Ibid.
[67] National Telecommunications and Information Administration, *Broadband Statistics Report: Broadband Availability in Urban Vs. Rural Areas* (Washington, DC: National Telecommunications and Information

significant progress has been made to expand access to high-speed Internet by the communications industry investing billions in broadband development, there are still rural areas – nearly one-fourth – that lack access to broadband.[68]

Many rural areas continue to struggle to bring this technology to their communities. For example, 91 percent of urban residents in the U.S. have access to internet download speeds of 50 megabits per second, compared to only 47 percent of rural residents.[69] Broadband enables "instant remote access over high-speed networks to medical specialists, health care records and training."[70]

Even at some rural hospitals, access to quality internet remains a challenge. A 2013 survey found that 11 percent of Critical Access Hospitals – facilities located in remote rural areas – had "significant challenges" obtaining broadband availability and adequacy. A substantial majority of 83 percent of these hospitals report "adequate internet upload speeds."[71]

Jesse Ward, the Industry & Policy Manager at NTCA – The Rural Broadband Association explained that:

Administration, 2014), accessed April 20, 2014, http://www.broadbandmap.gov/download/Broadband%20Availability%20in%20Rural%20vs%20Urban%20Areas.pdf.

[68] "FCC Broadband Report Finds Significant Progress in Broadband Deployment, But Important Gaps Remain," Federal Communications Commission, last modified August 21, 2012, accessed December 4, 2014, http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-315866A1.doc.

[69] National Telecommunications and Information Administration, *Broadband Statistics Report: Broadband Availability in Urban Vs. Rural Areas*, 7.

[70] Federal Communications Commission, *New Healthcare Connect Fund Expands Access to Broadband for Healthcare* (Washington, DC: Federal Communications Commission, December 12, 2012), accessed April 1, 2014, http://www.fcc.gov/document/new-healthcare-connect-fund-expands-access-broadband-healthcare.

[71] Meghan Hufstader Gabriel et al., *Progress and Challenges with the Implementation and Use of Electronic Health Records among Critical Access Hospitals* (Washington, DC: Office of the National Coordinator for Health Information Technology, 2013), 8, accessed December 3, 2014, http://www.healthit.gov/sites/default/files/cahdata_brief12.pdf.

> The areas that are traditionally probably underserved by some larger carriers, they're high cost. It's the distance from the facility the telecommunications providers maintain to a customer's home or anchor institution are very far. And you have a lot fewer customers to spread the cost of creating and maintaining and evolving that network. And that's why it's really difficult to maintain a network or operate a network without support from Universal Service Funds. I have to say geography is a problem, and topography, and then distance.[72]

While providing high-speed broadband internet to remote areas will remain a challenge for telecommunications policy makers and economic development officials, the government has several programs in place to expand and modernize broadband services, especially to health care providers. Two examples are the Federal Communications Commission's creation of the Healthcare Connect Fund in 2012 and the Rural Health Care Pilot Program in 2006.[73]

Both regulatory and political barriers remain, as further analyzed in the second and third chapters. Some physician groups and state medical boards fear that telehealth could erode their influence over health care within their state borders. Some physician groups worry that telehealth could create a "race to the bottom" in which physicians in states with the lowest standards could provide low quality health care services.

According to Tom Morris, the Associate Administrator for Rural Health Policy at the Office of Rural Health Policy (ORHP) at HHS, it is important for telehealth to remain just one component of care, and not to become a standalone service disconnected from the rest of the health care system:

> Telehealth as part of a system of care makes a lot of sense. Telehealth where you can walk down any corner and run your credit card through a system and immediately link to a specialist you have no relationship to, and he has no relationship to your primary care provider. I do worry about that. It doesn't think

[72] Jesse Ward, interview by author, Washington, DC, December 4, 2014.
[73] Ibid.

> about outcomes, it only thinks about procedures. It may be great for the consumer who has an immediate need but I worry about it driving up utilization without showing value.[74]

In addition, physicians, patients and health care administrators must become more comfortable with new and unfamiliar technologies in order for telehealth to spread. Reimbursement and the cost of telehealth also has limited the extent of telehealth implementation throughout the United States.

IV. Data Analysis of Telehealth in Rural America

Methodology and Data

To determine whether telehealth can play a substantive role in closing the physician workforce shortage in rural America, this paper analyzes different estimates of the demand and supply for physicians, and the role that telehealth could play in closing those gaps on a state-by-state basis.

HRSA has developed a range of methods to evaluate how many physicians the United States needs. These estimates will establish a range for that demand. The Association of American Medical Colleges (AAMC) maintains a census of how many active physicians are practicing in each state. These statistics establish the supply of physicians in each state, and whether they can meet the demand. Finally, researchers have established a range of estimates for how much telehealth can reduce the demand for physicians.

I will calculate the physician shortage in each state by comparing the supply of physicians to HRSA's estimates of the demand for physicians. HRSA has different

[74] Tom Morris, interview by author, Washington, DC, November 7, 2014.

scenarios for demand and calculating the shortage under each scenario will create a range of estimates for each state's demand for physicians. Then, with these ranges established, I will calculate how much telehealth could further reduce the demand, and thereby determine whether telehealth is sufficient to eliminate the workforce shortage.

Demand for Doctors

Under HRSA's baseline assumption, the United States needs 298 physicians for every 100,000 people in the population. This estimate is derived from studying the demographic characteristics of the U.S. population and evaluating how often these groups need access to health care.

For example, children under age 5 visit physicians an average of four times a year. This drops to about two visits per year for people age 15-24 and begins to grow as people become older. At age 75-84, people visit the doctor an average of six times per year. In addition to age, these projections study the gender, insurance status and other characteristics of the population and make assumptions about their future behavior, in order to derive the baseline estimate, or likeliest outcome for doctor demand.[75]

Table 1.1. Physician demand per 100,000 people in 2015, under various demand scenarios	
Baseline Scenario	298
Assuming demand grows faster along with the economy	327
Assuming differences grow in how often different ages visit doctors	322
Assuming unnecessary visits and services are reduced	219
Assuming economic growth and control of unnecessary services	240

[75] Council on Graduate Medical Education, *Physician Workforce Policy Guidelines for the United States, 2000-2020*, 15.

Changes to these assumptions, however, could cause the baseline estimate of demand to be either too high or too low. Thus HRSA has calculated alternative scenarios (Table 1.1). The baseline scenario assumes that demand will rise along with population, but the first alternative scenario assumes that medical demand will also rise with economic growth. Thus if per capita economic growth is positive this will result in an uptick in physician demand, even beyond the population growth. This reflects that the use of medical services rises along with wealth in a society. This scenario leads to a need for 327 physicians for every 100,000 people in the population by 2015.[76]

The second alternative scenario analyzes how the utilization of medical services is changing within age groups. For example, over the past 30 years, people age 15-44 have used slightly less medical services and those aged 45-84 have used more. The second scenario assumes that young populations will see further declines in their usage and older populations will continue to increase their utilization of medicine. This scenario also leads to an increase in demand to 322 physicians for every 100,000 people.[77]

The third alternative scenario considers whether all the services being provided by physicians are truly necessary. Most observers of the U.S. health care system agree that doctors tend to order too many tests and perform procedures that are not medically necessary, thereby increasing the demand for physicians beyond what is needed to provide quality care. If doctors were able to better discriminate between necessary and unnecessary procedures, the demand for medical services would decrease, with every 100,000 people requiring only 219 physicians. The fourth alternative scenario combines

[76] Ibid., 17.
[77] Ibid., 28.

the alternative assumptions to produce an estimate of 240 physicians for every 100,000 people.[78]

The following analysis looks at the baseline and all four HRSA alternatives because it cannot be known which scenarios offer the most plausible assumptions for the future. The utilization of health care by people at different age groups will not necessarily continue with its most recent trends, and economic growth will not necessarily increase the demand for services even faster than population growth. While it is likely that many unnecessary medical procedures are performed, it may be challenging for physicians and patients to reduce the occurrence of unnecessary procedures.

Supply of Physicians

These ratios are then compared to the actual physician-to-population ratio in each of the 50 states (Table 1.7, Appendix A). This data, from the AAMC, includes all physicians who work in administration, direct patient care, medical research and medical teaching. The measure excludes doctors who are retired, semi-retired, or temporarily not in practice. The data covers all 50 states, Washington, D.C. and Puerto Rico and includes doctors who

Table 1.2. Minimum and maximum physician shortages under different demand assumptions

State	Minimum	Maximum
Indiana	22	7082
South Carolina	95	5197
Wyoming	160	783
Kansas	169	3286
Iowa	318	3639
Georgia	425	11138
Utah	452	3536
Idaho	557	2280
Nevada	681	3661
Oklahoma	802	4922
Arkansas	830	4015
Alabama	879	6087
Mississippi	1141	4365
Texas	2903	31047

[78] Ibid., 24.

attended medical school (MDs) or osteopathic school (DOs).[79]

The AAMC data provides a state-by-state supply tally of doctors that can then be compared against the different estimates for the appropriate physician-to-population ratio. The scenarios produce different estimates of the severity of the shortage in the different states. Yet no matter which scenario for demand is used, I calculate that there is a shortage in at least 14 states (Table 1.2). Only six states have no shortage under any method: Massachusetts (which has the highest per capita number of doctors of any state), Maryland, New York, Rhode Island, Vermont and Connecticut. An estimate of the shortages produced in each state, under the different demand scenario is provided in Table 1.8 in Appendix C.

The number of physicians needed to close the gap is the largest in Texas, but this is due to the state's large population. In terms of the physician-to-population ratio, the state with the

Table 1.3. States with most severe doctor shortages, and percent of those states that are rural

Rank	State	% rural by population	% rural by area
1	Mississippi	50.7	97.6
2	Idaho	29.4	99.4
3	Arkansas	43.8	97.9
4	Wyoming	35.2	99.8
5	Nevada	5.8	99.3
6	Oklahoma	33.8	98.1
7	Alabama	41.0	95.6
8	Utah	9.4	98.9
9	Texas	15.3	96.7
10	Iowa	36.0	98.3
11	Kansas	25.8	98.8
12	Georgia	24.9	91.7
13	South Carolina	33.7	92.1
14	Indiana	27.6	93.0
15	Nebraska	26.9	99.3
16	Kentucky	41.6	96.4
17	South Dakota	43.4	99.7
18	Montana	44.1	99.8
19	Arizona	10.2	98.1
20	New Mexico	22.6	99.3

[79] Association of American Medical Colleges, *2013 State Physician Workforce Data Book* (Washington, DC: Association of American Medical Colleges, 2013), 19, accessed April 4, 2014, https://www.aamc.org/download/362168/data/2013statephysicianworkforcedatabook.pdf.

worst shortage is Mississippi, followed by Idaho, Arkansas and Wyoming.

Data from the U.S. Census Bureau show that the states with the most severe shortage of physicians are, in general, highly rural (Table 1.3).[80] This demonstrates that the shortages identified by my calculations show that the physician shortage is most acute in rural America.

Only 20 percent of the overall U.S. population lives in rural areas, but many of the states with the most severe physician shortage have significantly larger shares of their population in rural areas. This means that in addition to having a low physician-to-population ratio, many of the residents of these states may face the additional geographic challenges of reaching the relatively-few medical providers in their state.

Proponents of telehealth believe that the technology could play a role in alleviating the national shortage of doctors, especially in rural areas. In order to test this hypothesis, estimates of the potential benefits of telehealth can be applied to my estimates of state-level shortages, in order to see if telehealth is sufficient to close the gaps.

Closing Gaps

The ability of telehealth to reduce the demand for physicians depends

Table 1.4. Estimates of how much telehealth can reduce the demand for physicians

	30 % use of HIT	70% use of HIT
Remote care	2-5%	4-11%
Remote and asynchronous care	4-7%	8-15%

[80] "2010 Census Urban and Rural Classification and Urban Area Criteria," U.S. Census Bureau, accessed April 4, 2014, http://www.census.gov/geo/reference/ua/urban-rural-2010.html.

critically on how widely medical institutions, from hospitals to clinics to individual practices, begin using HIT (Table 1.4).[81]

In an optimistic scenario where 70 percent of medical providers begin using the necessary HIT systems, telehealth could reduce the demand for doctors by 4 to 11 percent through the use of remote care and by 8 to 15 percent if the practices use both remote care and asynchronous care. Even in a less optimistic scenario where the technology only has 30 percent uptake, the demand could be reduced by 2 to 5 percent through remote care and by 4 to 7 percent if both remote and asynchronous telehealth care is used.[82]

The assumptions from Weiner et al. (2014) above were derived from an analysis of how different types of telehealth can help reduce the demand for physicians. Their study considered four main types of telehealth: increased consumer use of digital health tools, digital communications between patients and providers, remotely provided telehealth services and improvements in the clinical workflow. Workflow improvements include the use of electronic health records and technology that helps support clinical decision making.

Weiner et al. summarize the evidence as providing "modest evidence" for the effectiveness of consumer's using digital health tools, "substantial evidence" that digital communications between patients and providers can reduce health demand, "substantial evidence" that remote care can reduce the number of visits and allows nurses, rather than physicians, or general practitioners rather than specialists, to provide a greater amount of health care. Finally, the evidence suggests that within medical practices, the adoption of

[81] Jonathan P. Weiner, Susan Yeh, and David Blumenthal, "The Impact of Health Information Technology and E-Health On the Future Demand for Physician Services," *Health Affairs* 32, no. 11 (November 2013): 2001, accessed April 1, 2014, http://dx.doi.org/ 10.1377/hlthaff.2013.0680.
[82] Ibid.

clinical workflow technologies initially reduces productivity as the systems are learned. Over time, these systems lead to more efficient workflows.

Combining all these changes – less face-to-face visits, nurses performing the duties of doctors, generalists performing the duties of specialists, and increased productivity – shows that the adoption of telehealth can make meaningful reductions in the demand for physicians.

While these estimates suggest that telehealth can reduce the overall demand for physicians in the United States, they do not directly address whether or not the regional shortages can be resolved via telehealth. The original analysis in this thesis thus goes one step further than previous analyses by applying the five different scenarios of demand to each of the 50 states and comparing it to their supply of doctors. It then measures how this demand outlook could be offset by 30 percent and 70 percent adoption of technology and by the use of remote care and the use of both remote and asynchronous care.

To be clear, this analysis only shows whether states would have a sufficient number of physicians to meet the demand from patients. Even in these states, however, shortages could arise in other ways. Many procedures may remain difficult or impossible to conduct via telehealth, and therefore telehealth could not alleviate a shortage in providing these types of care. A sufficient number of physicians does not ensure a sufficient number of specialists. Despite these limitations, this analysis provides an illustrative examination of how and where telehealth barriers could be reduced.

V. Discussion of Results

The state of Iowa serves as an example (Table 1.5) of the results from the calculations used to demonstrate whether or not telehealth can close the physician shortage gaps. Iowa has a population of 3.07 million and has 6,414 physicians, or a ratio of 208.6 physicians per every 100,000 people. This is the 10th worst ratio of any of the states, and Iowa is one of the 14 states that has a doctor shortage no matter which HRSA assumptions are used. Iowa's shortage ranges in size from 328 doctors, in a scenario where unnecessary procedures are reduced, to 3,640 doctors in the scenario where economic growth drives additional demand for doctors.

Table 1.5. Number of physicians needed to close shortage in Iowa, under different supply and demand scenarios

	Baseline	Economic growth scenario	Age utilization scenario	Unnecessary procedures eliminated scenario	Economic growth and unnecessary procedures
No Change	2,748	3,640	3,486	320	965
30% HIT & remote services	2,565	3,439	3,288	185	818
30% HIT & remote and asynchronous services	2,382	3,238	3,090	50	670
70% HIT & remote services	1,741	2,534	2,397	No shortage	154
70% HIT & remote and asynchronous services	No shortage	2,132	2,001	No shortage	No shortage

In the baseline scenario, Iowa has a gap of 2,748 doctors. In the scenario where age utilization shifts, Iowa has a shortage of 3,486 doctors. In the scenario where economic growth and unnecessary services are combined, Iowa needs 965 doctors to meet its projected demand.

The analysis then considers whether 30 percent or 70 percent adoption of telehealth, and its use in remote care, or both remote and asynchronous care, can reduce demand sufficiently that the state of Iowa has enough doctors.

The first scenario of 30 percent technology use and remote care shrinks the need for physicians by as little as 2 percent. For Iowa, this means that 185 doctors are still needed to close the gap even in the scenario in which demand grows most slowly, and 3,439 doctors in the scenario in which demand grows most quickly.

If both remote and asynchronous services are used, an additional reduction in demand means that Iowa needs as few as 50 doctors in the favorable low-demand assumption, yet still needs 3,238 doctors with the unfavorable assumptions for high demand.

Increasing technology use of 70 percent for remote care finally produces scenarios in which Iowa's gap could be eliminated by telehealth. In this scenario with reduced unnecessary procedures, Iowa actually has 421 doctors more than it needs to meet demand. Yet in the other four scenarios, a shortfall remains. Iowa needs 2,534 doctors if demand rises with economic growth and 2,397 if age utilization rates continue to shift. In the baseline scenario, Iowa still needs 1,741 doctors and in the scenario with both growth and a reduction in unnecessary procedures, Iowa has a shortage of 154 doctors.

Finally, the most aggressive adoption of technology for both remote and asynchronous care closes the gaps entirely for the baseline scenario and both scenarios with a reduction in unnecessary services. Yet even the reduction in demand from telehealth is not enough to offset the amount of physicians that Iowa would need if medical utilization continues to increase as the population ages and if demand for physicians rises with economic growth.

The methodology described for Iowa to produce 25 scenarios was applied to all 50 states, to analyze whether or not the shortage of physicians can be resolved through telehealth. Table 1.6 shows the number of states in which gaps were completely eliminated for each of the 25 scenarios studied.

Table 1.6. Number of states with doctor shortages, under different supply and demand scenarios

	Baseline	Economic Growth Scenario	Age Utilization scenario	Unnecessary Procedures Eliminated Scenario	Economic Growth and Unnecessary Procedures
No Change	42	45	45	14	23
30% HIT & remote services	42	45	45	11	20
30% HIT & remote and asynchronous services	40	45	45	10	18
70% HIT & remote services	33	42	40	5	11
70% HIT & remote and asynchronous services	28	39	38	2	8

This analysis shows that in a worst-case scenario where demand proves higher than the HRSA baseline scenario and if the gains from telehealth are modest, then 45 states could still face a doctor shortage that telehealth is insufficient to resolve. If the baseline scenario is correct, however, then an aggressive expansion of telehealth could reduce the number of states with a physician shortage from 42 states to 28 states. In an absolute best-case scenario where telehealth adoption is widespread and where demand proves lower than the baseline, and in which unnecessary procedures are reduced, then telehealth could reduce the number of states with a physician shortage to only two states: Mississippi and Idaho. A table displaying the calculations for the remaining shortages in the best-case scenario, applied to all 50 states, is available in Table 1.9 in Appendix D.

VI. Conclusion

Telehealth holds great promise for improving the delivery of health care and overcoming the access barriers that plague rural America. Rural Americans are typically older, poorer and sicker than their urban counterparts and have to travel further distances to access health care. Telehealth can serve as a tool to reduce transport costs and time, improve care quality and patient outcomes, increase the efficiency of the health care workforce, and broaden the distribution of specialists. While many of the techniques are still being developed and studied, the evidence thus far suggests that telehealth can be clinically-effective in providing a range of health care services.

Rural Americans face challenges in receiving health care that are particularly well-suited to being addressed through telehealth technology. The geographic barriers of obtaining health care can be lessened when services are available through

telecommunication and the shortage of general practitioners and specialists can also be alleviated by the existing technology. The more remote an area is, the more difficult it is to access care.

The shortage of physicians can be quantified and this paper's original analysis of state-by-state data shows that telehealth can reduce the physician workforce shortage that creates one of the key barriers of access to care in rural America. However, even in an absolute best-case scenario some gaps remain. Thus telehealth is not a panacea for the well-documented shortage of physicians in the United States. The most rural states would likely require policy interventions beyond the adoption of telehealth in order to ensure that there are enough doctors to meet patient demand.

Critics of telehealth fear that many applications of telehealth technology are unproven and that widespread implementation of telehealth will lead to deteriorating quality of health care or could diminish the relationship between patients and their providers or the doctor-to-doctor relationship. These are valid concerns that need to be recognized and addressed as telehealth policy continues to develop. Still, fear that health care procedures could eventually be determined to be ineffective or could lead to worse quality are not unique to telehealth. The existing health care system in the United States has repeatedly experimented with new waves of technology and policy and over time abandoned ineffective procedures. There is little reason to believe that telehealth will lead to much more dangerous health care practices than previous rounds of medical innovation.

The reality for many rural Americans is lack of access to quality health care. In some cases, telehealth does not remove their access to in-person health care because they

have no such access. Some of these communities face the option of telehealth or no access to health care within hours of their homes. Given this reality, the case for telehealth is even stronger.

While the costs of broadband infrastructure, as well as health care laws and reimbursement policies, have limited the expansion of telehealth in rural America, the results from this study suggest that telehealth can play a significant role in reducing the number of states with a workforce shortage, reducing the gap in dozens of states and significantly shrinking it in others. Even with enough physicians other forms of health care shortages could still arise. But even if telehealth is not a cure-all for some of the health care challenges facing rural America, encouraging its widespread adoption would be a significant accomplishment for policy makers and would help address the inequality in access to health care that currently confronts many rural states.

Chapter 2: How Federalism Creates Policy Barriers for Telehealth

I. Introduction

When Dr. Ray Dorsey was the director of the Movement Disorders Division and Neurology Telemedicine at Johns Hopkins Medicine telehealth allowed him the technology to consult with patients across various distances and geographic terrains, all from his office in Baltimore – as long as they lived within five specific states: California, Delaware, Florida, Maryland, and New York.[83] But a patient in any of the other 45 states had to physically travel to his office in Baltimore for his treatment.

Even though the technologies behind telehealth allow physicians like Dr. Dorsey to consult, advise and change medications with patients with a click of the mouse and internet, the state-by-state system for health care regulation creates strict borders beyond which providers cannot deliver remote services – state lines.

Three key health care policies are restraining the growth and implementation of telehealth, even when medical researchers have concluded that the telehealth procedures are medically effective. At the root of these barriers is the American federalist system. Federalism has left the regulation of health care to be divided between state governments, which regulate the procedures, and the federal government, which pays for more health care services than any other entity and thus sets guidelines and incentives for which services can be reimbursed.

Individual states have written their own complex rules for licensing medicine within their own borders. When a physician is licensed within a state, he can practice

[83] Nancy Shute, "Can Free Video Consults Make Parkinson's Care Better?" *NPR*, March 13, 2013, accessed June 10, 2014, http://www.npr.org/2011/06/27/137089619/the-parkinsons-doctor-will-video-chat-with-you-now.

medicine from one border to another. But the moment the physician or patient crosses state lines, new rules apply. Dr. Dorsey is allowed to practice medicine on patients in four states other than Maryland because he is among the small fraction of doctors – less than 6 percent in the United States – who hold licenses to practice medicine in more than two states.[84]

This chapter will explore three public policies – licensure, scope-of-practice rules, and reimbursement policies – and show how they have restrained the spread of telehealth. This thesis will argue that these problems evolved from federalism, which divided U.S. health care regulation and payment policies between the states and federal government respectively. I will also show that federalism has not entirely hindered the development of telehealth, as the state-by-state regulation of health care has allowed some states to develop very expansive telehealth programs within their own borders, which can serve as a demonstration and test of whether the technologies are effective. Because different states have different health care policies, an environment developed in which the nascent technologies of telehealth have an opportunity to prove themselves, as I will demonstrate with a case study of telestroke programs in Oregon.

II. Literature Review

Telehealth, as explained in the first chapter, is a growing area of academic and medical research that holds considerable promise for improving certain health care procedures and with particular potential to address the health care shortages in rural

[84] Aaron Young et al., "A Census of Actively Licensed Physicians in the United States, 2010," *Journal of Medical Regulation* 96, no. 4 (2011): 12, accessed August 16, 2014, http://www.nationalahec.org/pdfs/fsmbphysiciancensus.pdf.

America. The terms telehealth and telemedicine do not have consistent definitions across the academic literature -- a 2007 study identified 104 different peer-reviewed definitions of the term telemedicine.[85] Many health care providers, advocates, and analysts use telemedicine and telehealth interchangeably, to refer broadly to the "use of electronic communication and information technologies to provide or support clinical care at a distance."[86] This paper favors the term "telehealth," following the practice of the federal government.

Medical researchers have studied many applications of telehealth. According to Wootton (2012), the majority of research reports positive results for the procedures studied.[87] While Ekeland et al. (2012) argued the methodologies for assessing telemedicine are not perfect,[88] the existing research "clearly demonstrates that technology-enabled health care is not only feasible but in some cases can be equal to or better than in-person care" according to Krupinski and Bernard (2014).[89]

Yet despite the medical promise of these new technologies and procedures, health care policy and regulation in the United States impose considerable impediments to the widespread adoption of telehealth.

[85] Sood, "What is Telemedicine?" 573.
[86] Volkert, "Telemedicine," 151.
[87] Wootton, "Twenty Years of Telemedicine in Chronic Disease Management," 214.
[88] Ekeland, Bowes, and Flottorp, "Methodologies for Assessing Telemedicine," 2.
[89] Krupinski and Bernard, "Standards and Guidelines in Telemedicine and Telehealth," 79.

U.S. Health Care Policy

Congress and the administration have demonstrated the importance and effectiveness of telehealth by including it in appropriations and in the language of the ACA. The ACA included many programs to continue the advancement of telehealth.[90]

One key reason that telehealth could be effective, especially at lessening the health care shortages in rural America, is that providers can deliver health care across great distances or geographic barriers.[91] Research documenting how telehealth could "help overcome disadvantages faced by rural hospitals are standard in telemedicine literature," according to Emery (1998). Key benefits include the ability to reduce the isolation physicians feel in rural areas and to increase the availability of specialists in rural America.[92]

The technology has made it feasible for physicians in a major medical center in Portland, Oregon to perform health care procedures on a patient in rural Washington, for example. Yet even though the technology is ready, such procedures delivered across state lines often violate existing health care policy. At the root of the barriers to telehealth is the patchwork of state and federal regulations that result from the uniquely American system of governance and the ambiguity of health care policy in the Constitution.

As Holloway (2005) has noted, the U.S. Constitution does not explicitly place health care policy in the domain of the states or in the domain of the federal

---

[90] "Telemedicine in the Patient Protection and Affordable Care Act (2010)," American Telemedicine Association, last modified 2010, accessed June 15, 2014, http://www.americantelemed.org/docs/default-source/policy/telehealth-provisions-within-the-patient-protection-and-affordable-care-act.pdf?sfvrsn=14.
[91] Sherry Emery, *Telemedicine in Hospitals: Issues in Implementation* (New York: Garland Publishing, 1998), 11-12.
[92] Ibid., 13.

government.[93] The Constitution's 10th Amendment states that powers not granted to the central government fall to the states or the people. Yet the Constitution also says that the federal government has some authority to regulate commerce across the states, and health care is a form of commerce.[94]

A further complication to the status of health care under the U.S. federal system is that the Constitution does not explicitly make health a right of the people or a goal of the federal government, but a number of state constitutions establish obligations to provide health care to their citizenry.[95]

The U.S. system has created both benefits and challenges, and the debate over whether state or federal government should have more power is "older than the nation itself."[96] One benefit of the divide between the federal and state governments, according to Laguarda (1993), is that states have considerable ability to experiment with their health care policies. This allows for large-scale tests of different policies that, if found to be successful, can be implemented by other states or even nationwide. The existing system also allows the residents of states to choose the policies they believe to be appropriate. Residents of different states may have widely varying views about the ethicality of certain procedures, and so many states would be reluctant to surrender their authority to

[93] James E. Holloway, "Revisiting Cooperative Federalism in Mandated Employer-Sponsored Health Care Programs under the ERISA Preemption Provision," *Quinnipiac Health Law Journal* 8 (2005): 239, accessed June 17, 2014, http://www.quinnipiac.edu/prebuilt/pdf/SchoolLaw/HealthLawJournalLibrary/12_8QuinnipiacHealthLJ239(2004-2005).pdf.
[94] Ibid., 244.
[95] Ibid., 244-45.
[96] Randall R. Bovbjerg, Joshua M. Wiener, and Michael Housman, "State and Federal Roles in Health Care: Rationales for Allocating Responsibilities," in *Federalism and Health Policy,* eds. John Holahan, Alan Weil, and Joshua M. Wiener (Washington, DC: Urban Institute Press, 2003), 33.

establish health care regulations at the state level.[97] Leonard (2010) argued that by allowing states to set their own policies or even disagree with federal policies, the entire U.S. health care system may benefit over time, because the debate helps educate the public on issues and to give voice to minority views that may be stronger in one state, than nationally.[98]

State-by-state systems may also ensure that more rural states can adopt the policies most appropriate for their populations. One argument is that rural communities cannot aim to have the same health care services as their urban counterparts because the differences in their populations mean the same treatments wouldn't always achieve the same results. Therefore, Denis (2008) argues that the better goal of public policy makers is to use communications and technologies such as telehealth, where appropriate, for the populations that need it.[99]

In the words of the late Supreme Court Justice Louis Brandeis, the states can serve as "laboratories" in which different approaches to policy and regulation are trialed and, if successful, implemented more widely across the nation. Nathan (2005) has argued that this idea is applicable for health care polices. New policy approaches are practiced at the state level during times of conservative approaches to policy and the successful initiatives are adopted nationally during more liberal periods.[100]

---

[97] Fernando R. Laguarda, "Federalism Myth: States as Laboratories of Health Care Reform," *Georgetown Law Journal* 82 (1993): 159.
[98] Elizabeth Weeks Leonard, "Rhetorical Federalism: The Value of State-Based Dissent to Federal Health Reform," *Hofstra Law Review* 39 (October 2010): 162-163, accessed June 18, 2014, http://digitalcommons.law.uga.edu/fac_artchop/769.
[99] Marion Denis, "The Ethics of Allocating Resources toward Rural Health and Health Care," in *Ethical Issues in Rural Health Care*, eds. Craig M. Klugman and Pamela M. Dalinis (Baltimore: The Johns Hopkins University Press, 2008), 89-90.
[100] Richard P. Nathan, "Federalism and Health Policy," *Health Affairs* 24, no. 6 (November 2005): 1459-60, accessed July 1, 2014, doi:10.1377/hlthaff.24.6.1458.

The challenges of the federal health care system, however, are considerable and the notion that states can easily experiment or that such policies will easily spread may be too optimistic. Weil (2008) notes that state health care policy makers are limited in what they can accomplish because existing federal laws have proscribed their ability to experiment.[101]

Technological changes in the medical field, however, have a history of upending the existing system in the United States and forcing resolution to conflicts between state and federal government.[102] Factors that historically influence whether technologies enter widespread medical use have always included the influence of medical schools, the market structure and the effects of government funding and state regulations.[103]

This chapter seeks to expand upon the existing literature by exploring what the policy barriers are to telehealth and showing how they arise from federalism. This paper will show that the principal barriers to telehealth were not deliberately created in order to stop telehealth. The key debate over telehealth is not whether to allow it, but how it should be regulated and by whom, with interest groups battling over retaining primary control at the state level versus a system of greater federal control.

III. History of Federal and State Legislation Relevant for Telehealth

The system of laws that now govern health care in the United States began to develop after the Civil War. The state-by-state system of licensure laws arose in the

[101] Alan Weil, "How Far Can States Take Health Reform?" *Health Affairs* 27, no. 3 (2008): 740-741, accessed July 1, 2014, doi:10.1377/hlthaff.27.3.736.
[102] Louise B. Russell, *Technology in Hospitals: Medical Advances and Their Diffusion* (Washington, DC: The Brookings Institution, 1979), 132-133.
[103] Ibid., 40.

1870s. At that time, medicine was almost completely unregulated and anyone could enter into practice.[104] As medical science advanced, physicians obtained a better understanding of what treatments were effective and which were snake oil. The early licensure laws arose largely to combat "quackery," or the promotion of unproven and fraudulent medical practices. At the time, this role naturally fell to the individual states as the predecessor to HHS was not established until 1953.

The system did not develop in a unified way, as different states took different approaches to licensure – in the late 1800s some of the biggest differences between states included how to verify the quality of medical schools and whether to allow homeopathic medicine.[105]

The licensure system continued to spread state-by-state through the end of the 1800s. The licensure laws expanded and restricted who could practice medicine: licensure limited competition for physicians however it also protected consumers from some types of incompetent medicine. Since physicians have long been influential and wealthy members of society, the physician boards became politically powerful institutions long before the technologies that enabled telehealth were developed.[106]

While the state-by-state system of licensure and regulation became entrenched, the federal government had scattered health care initiatives, dating as far back as 1798's Marine Hospital Service, for disabled seamen. In the 1870s, the Office of the Surgeon General was created and a Federal Quarantine Act was passed to help prevent the spread

---

[104] Samuel L. Baker, "Physician Licensure Laws in the United States, 1865-1915," *Journal of the History of Medicine and Allied Sciences* 39, no. 2 (1984): 174, accessed August 14, 2014, doi:10.1093/jhmas/39.2.173.
[105] Ibid., 182-183.
[106] Ibid., 193.

of infectious diseases. The Social Security Act of 1935 created federal funding for health care grants to the states. In 1953, President Dwight Eisenhower consolidated the various federal health care efforts into the Department of Health, Education and Welfare, which became the modern HHS after the Department of Education was separated from it in 1979.[107]

While regulating physicians remained within the domain of the states, the federal government's health care programs arose to fill a different need: paying for health care. In 1965, President Lyndon Johnson signed Medicare and Medicaid into existence, in Title XVIII of the Social Security Act. Medicare is a social insurance program aimed at providing health and financial security for people 65 and older and for younger people with permanent disabilities and Medicaid is aimed at providing funding for state programs to help the poor obtain medical care.[108]

Medicare was established because, in the years prior to its passage, half of all seniors had inadequate medical insurance, or no insurance whatsoever. Even as medical standards were rising and the practice of medicine improving, many Americans found themselves unable to pay for health care. As of 2011, the program provided coverage for 48.7 million people, 40.4 million of whom are 65 and older, and 8.3 million of whom are disabled.[109]

Medicare helps pay for health care services, primarily hospitalization, physician services and prescription drugs. Funding for Medicare has several sources. In 2011,

---

[107] "Legislative Chronology," Office of History, National Institutes of Health, last modified June 16, 2009, accessed August 15, 2014, http://history.nih.gov/research/sources_legislative_chronology.html.
[108] Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds, *2012 Annual Report of the Boards of Trustees* (Washington, DC: Centers for Medicare and Medicaid Services, 2012), 1-2, accessed August 12, 2014, http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/ReportsTrustFunds/downloads/tr2012.pdf.
[109] Ibid., 6.

general fund revenue provided 42 percent of Medicare's revenue, payroll taxes covered 37 percent, and premiums paid 13 percent. The remaining 8 percent has a variety of sources including other taxes and state contributions.[110]

Around the same time that Medicare was coming into use, the technology to diagnose and treat patients via telehealth developed in the 1960s and the 1970s.[111] While providers have been keen to experiment with this cutting edge technology, it has taken Congress longer to adopt and create some of the key pieces of a legal framework that would allow widespread use of telehealth.

Various agencies, including the U.S. Department of Agriculture (USDA), the National Library of Medicine, NASA, the Veterans Administration (VA), and the U.S. Army's Telemedicine and Advanced Technology Research Center have also all taken steps that developed or utilized telehealth technologies.[112]

Thus regulating physicians, reimbursing health care, and the technologies behind telehealth all developed from different sources and with different motivations. In the mid-1990s, HHS established the Office for the Advancement of Telehealth (OAT) to serve as the lead federal agency on telehealth policies, to coordinate policy efforts across the various agencies.[113]

Medicare became one of the key vehicles for federal policy makers to influence national health policy. Because Medicare is the largest payer for health care services in the United States, its practices and policies have influence across the health care system.

---

[110] Ibid., 24.
[111] Institute of Medicine, *The Role of Telehealth in an Evolving Health Care Environment*, 11-12.
[112] Charles R. Doarn et al., "Federal Efforts to Define and Advance Telehealth – a Work in Progress," *Telemedicine and e-Health* 20, no. 5 (May 2014): 410-411, accessed August 15, 2014, doi:10.1089/tmj/2013.0336.
[113] Ibid., 410.

Yet the federal government's attempts to establish national policy in this area have created their own barriers to telehealth, as a brief review of federal telehealth legislation shows.

The first major legislative foray into federal telehealth policy came with the Balanced Budget Act of 1997 (BBA) which established some basic procedures for Medicare reimbursement for telehealth.[114] The Act provided "payment for consultation services delivered via a telecommunications system to Medicare beneficiaries residing in HPSAs as defined by the Public Health Service Act."[115]

This legislation established that the federal government would reimburse for some telehealth policies, thus creating some standardization nationwide for telehealth. But the legislation also imposed a number of limitations. First, by defining the situations in which Medicare would reimburse telehealth, the legislation excluded other uses of telehealth from reimbursement. For example, the act required that a Medicare practitioner accompanied the patient during the consultation, and that the two sites -- where the patient was located (known as the originating or spoke site) and the site where the remote provider is located (the distant or hub site) – must share the reimbursement.[116] The payment was based solely on the heath care being provided. Any additional technology costs, including the communication lines or any of the equipment used in the telehealth consultation, were not eligible for reimbursement.[117]

---

[114] The Balanced Budget Act of 1997, Public Law 105-33, 105th Cong., 1st sess. (August 5, 1997).
[115] Centers for Medicare and Medicaid Services, "Medicare Program; Payment Policies Under the Physician Fee Schedule and Other Revisions to Part B for CY 2012," *Federal Register* 76, no. 138 (July 19, 2011).
[116] Ibid.
[117] Ibid.

Congress revisited telehealth legislation with the Medicare, Medicaid, and State Children's Health Insurance Program Benefits Improvement and Protection Act of 2000 (known as BIPA).[118] One of the key provisions from this legislation allowed the Secretary of HHS to create a system that would review new telehealth procedures and expand coverage if HHS deems the services effective.[119]

The Centers for Medicare & Medicaid Services (CMS) established this system through a federal regulatory rule-making in 2002.[120] Their rule created two categories of services and outlined the procedure for expanding telehealth coverage. The exact language of that rule is included as Appendix I.[121]

In short, services are divided into two categories, based off whether they are similar or different from existing procedures. If they are slightly modified versions of existing procedures, then a simple review process follows. But for services that are different from existing telehealth procedures, CMS would undertake an elaborate review to determine if telehealth is as effective as the in-person treatment.

While this system allows for the addition of telehealth services over time, it is still a complicated and slow process. By contrast, the rules have a much simpler standard for deleting services, that simply states services can be removed: "If, upon review of the

---

[118] Medicare, Medicaid, and State Children's Health Insurance Program Benefits Improvement and Protection Act of 2000, Public Law 106-554, 106th Cong., 2nd sess. (December 21, 2000).
[119] Centers for Medicare and Medicaid Services, "Payment Policies Under the Physician Fee Schedule and Other Revisions to Part B for CY 2012."
[120] Centers for Medicare and Medicaid Services, "Revisions to Payment Policies Under the Physician Fee Schedule for Calendar Year 2003," *Federal Register* 67, no. 125 (June 28, 2002).
[121] "Six Fixes: How the Obama Administration Can Improve Healthcare Delivery Using Telemedicine," American Telemedicine Association, last modified 2011, accessed July 7, 2014, http://www.americantelemed.org/docs/default-source/policy/six-immediate-actions-for-president-obamas-administration-for-telehealth.pdf?sfvrsn=16.

available evidence, we determine that a telemedicine service is not safe, effective, or medically beneficial when performed as a telemedicine service."[122]

Under the existing system, telehealth services must also meet another standard. They must use an "interactive telecommunications system" defined in the rule as "multimedia communications equipment that includes, at a minimum, audio and video equipment permitting two-way real time interactive communication between the patient and the practitioner at the distant site."[123]

One limitation created by this rule, however, is that asynchronous telehealth services are not covered. Asynchronous services are those where the patient and physician do not interact in real time. As shown in the previous chapter, these procedures can play an important role in improving access to health care and in alleviating workforce shortages. Yet under the current definition, the use of telephones, fax machines and even e-mail to exchange information for subsequent feedback from the physician do not necessarily meet the standards of the rule.[124]

The federal government has used its clout with the reimbursement process to attempt to influence telehealth policy. Yet these efforts are limited because they take an incremental approach to expanding telehealth, because they do not necessarily set the policies for Medicaid (which grants its money to the states to use with their discretion) and because the federal government does not control the state licensing boards.

---

[122] Ibid.

[123] Centers for Medicare and Medicaid Services, "Payment Policies Under the Physician Fee Schedule and Other Revisions to Part B for CY 2012."

[124] A key exception is that telehealth services may be reimbursed if they are not necessarily performed face-to-face to begin with. For example, x-ray readings and pacemaker analysis, which are eligible for Medicare benefit, remain eligible if transmitted via e-mail or another telehealth system; Ibid.

IV. Telehealth Policy Barriers

Today, health care policies have slowed the adoption of telehealth. Even once the technology is sufficient, financial and legal barriers remain.[125] The aspects of health care that are regulated state-by-state pose a number of hurdles. Researchers have pointed to three main areas that pose barriers to telehealth: licensure, scope-of-practice laws and reimbursement policies.

Licensure

Licensure is the system by which health care professionals are granted the legal authority to practice medicine. State legislatures enact laws that govern health care providers in their state, and much of the implementation of these laws falls to state licensing boards. There are 70 licensing boards in the United States because some states have separate medical and osteopathic boards. Without an active license, a physician cannot legally practice medicine, and licenses are only valid for the state in which they are issued.[126] Physicians who practice medicine across state lines without the proper licenses can be subject to fines and even imprisonment. For example, the state of North Carolina recently fined physicians in Texas who prescribed medicine via telehealth without following the proper guidelines.[127]

The legislatures task state boards with ensuring that appropriate medical procedures are used, that providers are qualified to perform the tasks and that the public

---

[125] Cynthia LeRouge and Monica J. Garfield, "Crossing the Telemedicine Chasm: Have the U.S. Barriers to Widespread Adoption of Telemedicine Been Significantly Reduced?" *International Journal of Environmental Research and Public Health* 10, no. 12 (November 2013): 6480, accessed June 20, 2014, doi:10.3390/ijerph10126472.
[126] Young et al., "A Census of Actively Licensed Physicians in the United States, 2010," 10.
[127] David Pittman, "Medical Boards Engage in Telemedicine Reform," *Politico Pro*, August 25, 2014.

is protected from "incompetent or impaired practitioners."[128] A certificate of licensure is required to practice medicine in any given state, and such rules also apply to nurses, pharmacists and other medical professionals.

This system poses a significant barrier to telehealth. One of the key challenges arises because each of the 50 states handles its own medical licensure, and medical licenses apply only to procedures within a certain state. This means, for example, that a doctor licensed to practice medicine in Illinois cannot provide health care services to a patient in Iowa, unless the doctor also has a license to practice medicine in Iowa. As noted by Cwiek et al. (2007) "this approach is deficient when applied to telemedicine because, with the advent of the Internet and modern technological advances, differences in space and time are rendered nearly meaningless."[129]

Andrew Mekelburg, the Vice President of Federal Government Relations for Verizon Communications, argued that state-by-state licensing is an outdated system:

> I guess [state-by-state licensure] still made sense when doctors still made house calls or before patients got cars. What happens if you are a doctor in the same state that the patient is in and the patient travels? Why shouldn't you be able to take care of that person? What if the doctor travels? The technology has rendered that argument off a little bit.

In many fields, state licensing boards have reciprocity agreements. For example, lawyers who pass the bar in one state can generally practice law in other states, and one state's driver's license allows someone to drive anywhere in the country. This is not the

---

[128] "Licensure and Scope of Practice," Telehealth Resource Centers, accessed June 10, 2014, http://www.telehealthresourcecenter.org/toolbox-module/licensure-and-scope-practice#3.
[129] Mark A. Cwiek et al., "Telemedicine Licensure in the United States: the Need for a Cooperative Regional Approach," *Telemedicine and e-Health* 13, no. 2 (April 2007): 141, accessed June 14, 2014, doi:10.1089/tmj.2006.0029.

case with medical licenses. There are no reciprocity agreements for physicians practicing medicine.[130]

Some state nursing boards, however, have adopted a reciprocity agreement. A Nurse Licensure Compact was launched in 2000 when Maryland, Texas, Utah and Wisconsin agreed to allow nurses to practice across state lines.[131] As of June 2011, a total of 24 states had entered the agreement, but the remaining states have no reciprocity for nursing either.[132,133]

The Federation of State Medical Boards (FSMB) issued a draft proposal in July 2014 that would simplify the process for physicians seeking to practice in multiple states. If one day finalized, this interstate compact would eventually create a streamlined process for obtaining multiple licenses in states that adopt the compact. For now, however, licensure issues can be a significant barrier for physicians who wish to practice telehealth with patients in other states.[134]

---

[130] American Telemedicine Association, *Medical Licensure and Practice Requirements* (Washington, DC: American Telemedicine Association, 2011), 1, accessed August 14, 2014, http://www.americantelemed.org/docs/default-source/policy/ata-policy-on-state-medical-licensure-and-practice-requirements.pdf.

[131] Health Resources and Services Administration, *Telehealth Licensure Report,* Mary K. Wakefield, 111th Cong., Senate (2010), 2, accessed August 14, 2014, http://www.hrsa.gov/healthit/telehealth/licenserpt10.pdf.

[132] American Telemedicine Association, *Medical Licensure and Practice Requirements*, 4.

[133] "Nurse Licensure Compact," National Council of State Boards of Nursing, last modified 2014, accessed August 15, 2014, https://www.ncsbn.org/nlc.htm; The 24 states that are part of the Compact are Arizona, Arkansas, Colorado, Delaware, Idaho, Iowa, Kentucky, Maine, Maryland, Mississippi, Missouri, Nebraska, New Hampshire, New Mexico, North Carolina, North Dakota, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, and Wisconsin.

[134] "FSMB: Draft Interstate Compact for Physician Licensure Nears Completion," Federation of State Medical Boards, last modified July 25, 2014, accessed August 20, 2014, http://www.fsmb.org/Media/Default/PDF/Publications/07%2025%202014%20FSMB%20statement%20on%20draft%20compact_FINAL.pdf.

Scope of Practice

Scope of practice refers to those rules that state medical boards implement to determine what roles medical professionals may perform. For example, nurses have licenses to practice medicine, but due to scope-of-practice laws they are confined to performing activities defined as nursing and may not perform surgery.[135]

Different academic degrees are required to perform certain procedures and as with licensure rules, these guidelines are determined at the state level. State medical boards are charged with writing the precise guidelines. These rules apply to all providers performing medical procedures under the licensure system and again each of the 50 states determines their own system.

As with licensure rules, states created the scope-of-practice rules before the rise of telehealth and historically designed the rules around a system in which doctors provided health care to patients in-person and in the same geographical location.

These scope-of-practice considerations are especially important for nurses and rural physicians. For nurses, scope-of-practice rules have not always made clear whether talking to patients via telecommunication is classified as nursing because it is not "hands on."[136] For rural physicians, scope-of-practice laws may limit the range of practices they are able to perform. Because of rural America's low population density, many regions simply lack the presence of certain specialists.[137] While telehealth may allow a rural

---

[135] Carolyn M. Hutcherson, "Legal Considerations for Nurses Practicing in a Telehealth Setting," *Online Journal of Issues in Nursing* 6, no. 3 (September 30, 2001): 1, accessed August 19, 2014, www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Volume62001/No3Sept01/LegalConsiderations.aspx.
[136] Ibid.
[137] Denise Niemira, "Ethical Dimensions of the Quality of Rural Health Care," in *Ethical Issues in Rural Health Care*, eds. Craig M. Klugman and Pamela M. Dalinis (Baltimore: The Johns Hopkins University Press, 2008), 121-122.

physician to consult with a remote specialist, scope-of-practice laws could prevent the rural physician from performing certain procedures, despite the telepresence of the specialist.

State medical boards also perform other key tasks that can complicate the delivery of telehealth, such as determining the rules that govern precisely when physician-patient relationships are established, that guarantee the privacy of medical information and data, and that ensure that medical procedures and drug prescriptions are appropriate.[138]

Reimbursement

The third key policy challenge to widespread adoption of telehealth is differing rules for reimbursing telehealth procedures. Reimbursement is simply the system that determines who is responsible for paying for health care procedures – the federal government through Medicare, states through Medicaid (with assistance from federal grants), private insurance or patients who pay out of pocket.

Reimbursement policies are always complicated in the U.S. health care system, especially with new procedures. According to the Center for Telehealth and eHealth Law, which studies the policies and rules of telehealth, "the absence of consistent, comprehensive reimbursement policies is often cited as one of the most serious obstacles to total integration of telehealth into health care practice."[139]

---

[138] Federation of State Medical Boards, *Model Policy for the Appropriate Use of Telemedicine Technologies in the Practice of Medicine: Report of the State Medical Boards' Appropriate Regulation of Telemedicine Workgroup* (Washington, DC: Federation of State Medical Boards, 2014), 2, accessed June 20, 2014, http://library.fsmb.org/pdf/FSMB_Telemedicine_Policy.pdf.

[139] "Reimbursement Overview," Center for Telehealth and e-Health Law, last modified 2011, accessed June 21, 2014, http://ctel.org/expertise/reimbursement/reimbursement-overview/#.

Medicare reimbursement is set at the federal level and reimburses some telehealth services. States set Medicaid policies, and at least 39 states offer some reimbursement for telehealth procedures. Fifteen states have gone so far as to require reimbursement of any services that would be covered if provided in person.[140] An additional challenge of reimbursement policy, which will be explored further in this chapter, is the challenge of how reimbursement is divided among two different sites.

Medicare legislation has subdued the growth of telehealth in two key ways. Medicare will only reimburse a small number of telehealth procedures and only allows hospitals in certain geographical areas to qualify for reimbursement. In 2012, the Medicare system paid for $573 billion of health care, a sum that represents 20 percent of all spending on health care in the United States. The Medicaid system spent $421 billion that year.[141]

Medicare alone comprises one-fifth of U.S. health care spending. Medicaid and Medicare together account for more than one-third of spending from just these two programs. And for many of the rural hospitals where scholars believe telehealth could have the greatest benefits, even more patients may rely on those two programs. As Tim Wolters, the director of reimbursement at Citizens Memorial Hospital, a 74-bed hospital, in Bolivar, Missouri explained:

> Especially in rural areas, at the hospital, over half of our patients are Medicare patients. In the rural health clinics, it is virtually the same in most cases. We are dealing with a very rural population. Elderly patients are in some cases limited in their ability to travel so that is why telehealth can be so valuable to them … Both Medicare and Medicaid combined is over 70 percent of our population. Add the

[140] Ibid.
[141] "National Health Expenditures 2012 Highlights," Center for Medicare and Medicaid Services, accessed August 15, 2014, http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/downloads/highlights.pdf.

> uninsured and that's over 75 percent of the population that falls into the three categories: Medicare, Medicaid and Uninsured. We are heavily dependent on the federal and state Medicare and Medicaid funding to try to keep doors open and provide services to as many people as you can.[142]

The lack of telehealth reimbursement can therefore constitute a make or break issue for whether a hospital can offer telehealth services. A hospital reliant on Medicare for a majority of its payments is unlikely to establish a telehealth program that will be ineligible for reimbursement. Receiving payment for telehealth can be especially important given the costs of establishing the systems, which can easily cost thousands of dollars.

Key Stakeholders

The most up-to-date information on the current status of telehealth policy often comes from organizations that are key stakeholders in the policies being considered. A wide range of health care professionals, companies and policy makers have stakes in the telehealth system. Telehealth policies have advanced slowly in the United States because key stakeholders fundamentally disagree about how to regulate telehealth.

Within HHS, OAT seeks to coordinate and implement national telehealth policies where possible. The Agency for Healthcare Research and Quality, HRSA and the Office of the National Coordinator for Health Information and Technology (ONC) and CMS also work to advance and support telehealth within HHS. A handful of other U.S. federal agencies have taken ad hoc steps to develop telehealth technologies, including the USDA,

[142] Tim Wolters and Angela Davison, interview by author, Washington, DC, July 28, 2014.

NASA and the VA. These various government stakeholders are members of the task force for which OAT is the lead agency.[143]

Key interest groups actively seeking to influence the policies surrounding telehealth include the American Telemedicine Association (ATA), the American Medical Association (AMA), and the FSMB.

The ATA seeks widespread changes to accelerate the adoption of telehealth, including the creation of a national licensure system that would allow telehealth to be practiced across states. This organization is the most outrightly pro-telehealth and the organization most strongly favoring a federal government-led approach.

The ATA represents those institutions that want to aggressively expand the use of telehealth and pushes for policy changes that would allow telehealth to spread the most quickly. The ATA, for example, led a recent campaign to press the Medicare system to reimburse more telehealth procedures. The ATA formed a coalition of private companies for its campaign, including insurers such as WellPoint, telecommunications companies such as Verizon and pharmacies such as CVS Caremark and Walgreens, medical equipment manufacturers such as Welch Allyn, and other medical associations including the American Academy of Physician Assistants and American Heart Association.[144]

The National Rural Health Association (NRHA) also "supports policy development and actions which will remove barriers such as public support for necessary broadband services, Federal and state licensing, credentialing and reimbursement

[143] Doarn et al., "Federal Efforts to Define and Advance Telehealth," 410-411.
[144] "Letter from Alliance for Connected Care to Sylvia Burwell," Alliance for Connected Care, last modified June 9, 2014, accessed August 19, 2014, https://www.documentcloud.org/documents/1184258-alliance-and-advisory-board-letter-to-hhs-on-acos.html.

restrictions that impede increasing use of telemedicine, telehealth and distance learning services."[145,146]

The AMA has a role both representing physicians in Washington and overseeing the system for identifying physician practices. In June 2014 the AMA adopted telehealth guidelines that seek to standardize reimbursement procedures and to improve access to telehealth care. The AMA, however, opposes a national licensure system and instead supports the authority of the states to regulate telehealth.[147] The AMA stance represents the middle-ground in the U.S. telehealth debate, supporting some policies that would simplify telehealth but opposing others on the grounds that it would encroach on state boards.

The FSMB is a body which collectively represents the interests of 70 different state boards and largely seeks to defend the status quo. There are more than 50 boards because some states have separate bodies for MDs and DOs. The FSMB issued new telehealth guidelines in April 2014, with a focus on clarifying when a patient-provider relationship is established and detailing issues like privacy and security.[148]

While the FSMB has said telehealth offers "potential benefits," its recommendations stop short of making any specific changes that "alter the scope of

---

[145] National Rural Health Association, *2014 Legislative and Regulatory Agenda* (Washington, DC: National Rural Health Association, 2014), 1.
[146] The author of this thesis is employed at the National Rural Health Association.
[147] Jennifer Bresnick, "AMA adopts new telemedicine reimbursement policy," *EHRintelligence.com*, June 12, 2014, accessed June 12, 2014, http://ehrintelligence.com/2014/06/12/ama-adopts-new-telemedicine-reimbursement-policy/.
[148] Kate Stewart, "Federation of State Medical Boards Passes Model Telemedicine Policy," *Health Law & Policy Matters*, April 30, 2014, accessed June 12, 2014, http://www.healthlawpolicymatters.com/2014/04/30/federation-of-state-medical-boards-passes-model-telemedicine-policy/.

practice of any health care provider" and its changes do not "authorize the delivery of health care services in a setting, or in a manner, not otherwise authorized by law."[149]

The FSMB opposes national licensure for telehealth because this would reduce the authority of state medical boards to set their own guidelines for patient safety and protection. The FSMB does not oppose states adopting policies to promote telehealth within their own borders. But some advocates of telehealth argue that the FSMB stance constitutes opposition to telehealth by making it cumbersome for physicians to use telehealth across state lines.[150]

A related body to the FSMB is the National Council of State Boards of Nursing (NCSBN). The NCSBN also argues for a conservative approach to changing scope-of-practice and licensure laws.[151]

Some state medical and nursing boards more strongly oppose cross-state telehealth than others. For example, the Florida Medical Association has vigorously opposed a law that would make it easier for out-of-state doctors to treat patients in Florida. The association has conducted a public opinion survey that showed Florida residents opposed allowing physicians not licensed in the state of Florida to practice

[149] Federation of State Medical Boards, *Model Policy for the Appropriate Use of Telemedicine Technologies in the Practice of Medicine*, 2.
[150] Lisa Gillespie, "Telemedicine Policy Draws Opposition from Patient Advocates, Health Care Providers," *Kaiser Health News*, May 2, 2014, accessed August 19, 2014, http://www.kaiserhealthnews.org/stories/2014/may/02/telemedicine-policy-draws-opposition-from-patient-advocates.aspx.
[151] National Council of State Boards of Nursing, *Changes in Healthcare Professions' Scope of Practice: Legislative Considerations* (Chicago: National Council of State Boards of Nursing, 2009), 3, accessed June 20, 2014, https://www.ncsbn.org/ScopeofPractice_09.pdf.

medicine via telehealth.[152] The association argues that the legislation would create inadequate safeguards for patient safety.[153]

As discussed previously in chapter one, although medical research supports the effectiveness of many uses of telehealth, some researchers argue that some clinical trials have not been sufficiently rigorous and some procedures are unproven or too expensive to be justified.[154]

Additional arguments against telehealth include concerns from physician groups that telehealth could lower the quality of care that patients receive, that the technology is too complicated, or that it would be difficult to monitor across state lines for unethical billing practices.[155] Some physician groups also oppose telehealth for the reason that it is more difficult to receive reimbursement for the procedures and their opposition has often slowed the implementation of telehealth.[156]

For example, if a doctor licensed in any state could practice telehealth, then the worst doctors may flock to the states with the least regulation or the most lax malpractice laws.[157] This could lead to a proliferation of low-cost but low-quality health care

---

[152] "Patients Oppose Unlicensed, Out of State Physicians Practicing Telemedicine and Prescribing Drugs, Controlled Substances in Florida," Florida Medical Association, last modified February 19, 2014, accessed August 14, 2014, www.flmedical.org/pr_telemedicine.aspx.

[153] Andis Robeznieks, "Florida docs gear up for fight against telemedicine bill," *Modern Healthcare*, February 20, 2014, accessed August 14, 2014, http://www.modernhealthcare.com/article/20140220/NEWS/302209940.

[154] Linda Prinz, Mary Cramer, and Andrea Englund, "Telehealth: A Policy Analysis for Quality, Impact on Patient Outcomes, and Political Feasibility," *Nursing Outlook* 56, no. 4 (July-August 2008): 155, accessed August 19, 2014, doi: 10.1016/j.outlook.2008.02.005.

[155] Ibid., 155-156.

[156] Mary Schmeida, Ramona McNeal, and Karen Mossberger, "Policy Determinants Affect Telehealth Implementation," *Telemedicine and e-Health* 13, no. 2 (May 2007): 105, accessed August 19, 2014, doi:10.1089/tmj.2006.0017.

[157] Tara Kepler and Charlene L. McGinty, *Telemedicine: How to Assess Your Risks and Develop a Program That Works* (Washington, DC: American Health Lawyers Association, 2009), 13, accessed August 14, 2014, http://www.healthlawyers.org/Events/Programs/Materials/Documents/HHS09/kepler_mcginty.pdf.

providers in one state giving bad medical advice or prescriptions to patients in other states. The states with the patients would then have little recourse against providers in other states.[158]

Medical malpractice laws also complicate the adoption of telehealth because it is unclear which state has jurisdiction. If a doctor in Florida mistreats a Florida patient, then it's straightforward to establish which laws apply and which courts have jurisdiction. The American Health Lawyers Association says that telehealth case law is "embryonic" and that "the inability to predict how courts will allocate loss related to a given telemedicine encounter is a formidable barrier to multi-state telemedicine programs."[159]

A final group of telehealth stakeholders, in addition to the traditional hospitals, physicians, nurses and their associated trade groups, are a new breed of technology start-up companies that seek to deploy telehealth. According to the Wall Street Journal, telehealth start-ups have raised $272 million in venture capital funding since 2010.[160] While such firms are growing, they remain for now a very small part of the $2.8 trillion in annual health care spending in the United States.[161] The emergence of these non-traditional health care technology companies that seek to deploy telehealth has raised concerns among traditional providers that quality of care could decline or that medications could be dispensed too easily. This has caused caution in expanding telehealth laws.[162]

---

[158] Melinda Beck, "Where Does It Hurt? Log On. The Doctor Is In: Telemedicine Sector Attracts Funding, But Some Physician Groups Worry About Quality of Care," *Wall Street Journal*, May 8, 2014, accessed August 8, 2014, http://online.wsj.com/news/articles/SB10001424052702303678404579536284129494564.
[159] Kepler and McGinty, *Telemedicine,* 17.
[160] Beck, "Where Does It Hurt? Log On. The Doctor Is In."
[161] Center for Medicare and Medicaid Services, "National Health Expenditures 2012 Highlights."
[162] Beck, "Where Does It Hurt? Log On. The Doctor Is In."

While proponents of telehealth see the technology as limitless, there will always be some limitations because some procedures, from as basic as administering shots to complex surgeries, will likely always require onsite health practitioners.[163]

Geographic Limitations

The approach created by federal legislation and rulemaking also established several geography-based limitations that prevent telehealth from being implemented as broadly as possible. The existing rule creates limits to the types of sites that may originate telehealth services.[164] The original BBA stated that the originating site must be a practitioner's office, a rural health clinic or a handful of sites established by limited federal programs. This was later expanded by BIPA to include some other types of sites, including certain mental health centers and skilled nursing facilities.[165]

The geographical location of the facility within the country also posed a barrier. Under the original BBA, the patient had to live in a HPSA in order for their telehealth services to be eligible for reimbursement. HPSAs are regions in which too few physicians live, according to government guidelines. This rule for reimbursement sought to allow telehealth to develop only in areas where there was a critical shortage of physicians.

This was expanded in the Medicare Improvements for Patients and Providers Act of 2008 to also include those living in non-Metropolitan Statistical Areas (MSA) and to people participating in demonstration projects officially established by the CMS.[166]

---

[163] Andrew Mekelburg, interview by author, Washington, DC, August 1, 2014.
[164] Centers for Medicare and Medicaid Services, "Revisions to Payment Policies under the Physician Fee Schedule for Calendar Year 2003."
[165] Ibid.
[166] Ibid.

While the new law makes many more rural residents eligible for services, official MSAs can encompass regions that are very remote. Especially in the western United States, where counties can be much larger, some patients who technically reside within the limits of an MSA can live in a highly rural area. Furthermore, the current law would prevent reimbursement for many sorts of telehealth services that may be useful to urban residents who are seeking specialized care not easily obtainable in their immediate area.

The fact that telehealth procedures occur across two sites poses an additional complication for reimbursement. With a traditional medical service, one administrative unit, such as a physician or hospital, is eligible for reimbursement. But telehealth creates a new challenge because, in some cases, two medical facilities carry out the service: the site with the patient and the site with the physician.

In the original BBA, a telehealth service received the same reimbursement as a standard in-person service, but the site with the patient (spoke site) and the site with the provider (hub site) were required to split the payment. This created little incentive for a busy physician to help patients via telehealth. If a patient visits in person, this physician receives full reimbursement for his or her time, but if a patient visits via telehealth, the physician receives half as much reimbursement.[167]

This too was modified by the BIPA which instead paid the spoke site a set facility fee and the physician received the full reimbursement as if the procedure had been performed in person. While this removes the disincentive for the sites with the physician, it worsens the financial strains on the locations that house the patient, and often times, these are the rural facilities that have the most strained finances to begin with.

[167] Ibid.

These payments are often inadequate to cover the cost of housing a facility with telehealth capabilities. The current originating fee for a site is a mere $24. This fee can be insufficient for covering the expenses of both the support staff and technology required to operate a site.[168] Some of the equipment necessary to carry out telehealth procedures may cost thousands or tens of thousands of dollar. A telehealth facility with a piece of equipment that cost $10,000 would need to receive more than 400 payments of $24 a visit before covering the cost. After paying for the staff to service the equipment, the $24 fee may never be sufficient to cover the procedures.

According to ORHP Associate Administrator Morris, "some rural providers say it's too much of a burden because you only get to bill for a facility fee of $25 under Medicare. Some don't even bill for it, though they do provide services, because it's more burden than benefit. So that's a bit of a challenge."[169]

The added complications and shifting rules for telehealth procedures may add to the reluctance of physicians to partner with remote sites in the rural United States. Since many physicians already have long wait times for in-person visits, they may have little incentive to undertake the extra administrative work and complications of seeing patients via telehealth.

State Landscapes

While federal policy has imposed limitations on telehealth, the 50 different states have imposed an incredibly complex matrix of policies, pertaining to licensure, scope of

[168] Mary Hughes et al., *Telemedicine Reimbursement* (Washington, DC: National Rural Health Association, 2010), 4.
[169] Morris, interview by author.

practice and reimbursement. The ATA and the Center for Connected Health Policy, both track the status of different policy initiatives across the United States. Looking at the telehealth policies of each of the states shows how complicated the state-by-state landscapes have become and why the complication itself can serve as a barrier to telehealth reaching its full potential.

While the federal government establishes the policies for government reimbursement through Medicare, each state has the authority to set its own policies for Medicaid reimbursement. In total, 46 states have some form of reimbursement for telehealth included in their Medicaid programs. Only four states, Iowa, Massachusetts, New Hampshire and Rhode Island have no definitive reimbursement policies for telehealth.[170]

However, the 46 states with Medicaid policies have different approaches to what they will reimburse. Even when it comes to the most basic telehealth services consisting of a video-and-audio link with a remote doctor, some states like Idaho only reimburse for limited mental health services.[171] Yet even among states that reimburse for telehealth, not all reimburse for mental health – only 40 states provide coverage for telemental health.[172]

As a further complication, some states have medical boards that have created guidelines for telehealth even though the state legislature has not explicitly written laws

---

[170] "Center for Connected Health Policy, *State Telehealth Laws and Reimbursement Policies* (Sacramento: Center for Connected Health Policy, 2014), accessed July 10, 2014, http://telehealthpolicy.us/sites/telehealthpolicy.us/files/uploader/50-State%20February%202014%20-%20Correct%20Grant%20Numbers.pdf.

[171] Ibid.

[172] "State Policy Toolkit," American Telemedicine Association, last modified 2014, accessed July 13, 2014, http://www.americantelemed.org/docs/default-source/policy/ata-state-policy-toolkit.pdf?sfvrsn=34.

pertaining to telehealth. In other words, these states have telehealth rules created administratively, but not legislatively.[173]

Most states follow the federal reimbursement standard and only reimburse services that are performed in real time. Asynchronous telehealth services, also known as store-and-forward services (because they often consist of obtaining medical imagery and sharing it with a remote facility for later review) are only reimbursed by Medicaid in nine different states. Even among those states, the services eligible for reimbursement can be extremely limited, such as in California, where the state will only reimburse for sharing of imagery for dermatologists.[174]

Another set of telehealth services with limited reimbursement are remote patient monitoring services in which patients have monitoring devices that share information with their physician. Only 11 states reimburse for such services, and again, the reimbursement can be quite limited, for example, Minnesota only reimburses remote patient monitoring under a geriatric nursing program.[175]

States also have the authority to determine which policies private insurers can cover and which services they must cover. Currently, 22 states require private insurers to reimburse some telehealth procedures.[176]

States could opt to simplify their licensing rules to allow physicians from other states to provide telehealth services or the states could create special licenses or certificates for telehealth, in order to expand the physicians who could care for patients in

---

[173] "State Telemedicine Legislation Tracking," American Telemedicine Association, last modified July 3, 2014, accessed July 13, 2014, http://www.americantelemed.org/docs/default-source/policy/state-telemedicine-policy-matrix.pdf?sfvrsn=44.
[174] Center for Connected Health Policy, *State Telehealth Laws and Reimbursement Policies*.
[175] Ibid.
[176] American Telemedicine Association, "State Telemedicine Legislation Tracking."

their states. Most states, however, have opted away from this approach. Only ten states have created any sort of special telehealth license.[177]

The topics discussed above cover some of the most basic issues in telehealth – whether to cover telehealth in Medicaid, whether to allow private insurance plans to cover telehealth, whether to create special telehealth licenses and whether to cover procedures like store-and-forward services, remote patient monitoring and telemental health. Still, states have adopted widely varying approaches. The state-by-state differences on these key policy issues are summarized in Table 2.1 in Appendix J.

All of the 50 states and the District of Columbia have some coverage for telehealth or at least proposed legislation for such. No states are completely shying away from telemedicine. Yet remarkably none of the states have implemented all of the six policies tracked in Table 2.1. For those seeking to coordinate and expand telehealth coverage on a nationwide basis, even tracking what telehealth is permissible and reimbursable in each state is an incredibly complex task.

Options to Overcome Policy Barriers

The existing literature on telehealth has outlined a handful of options that could lead to more rapid adoption of the procedures.

In the simplest option, the status quo would be preserved and the onus would fall on doctors to obtain the necessary licenses to perform procedures across state lines and to figure out how to operate within each state's scope-of-practice rules. To do so, a physician must obtain multiple state licenses, and must understand "a patchwork of

[177] Center for Connected Health Policy, *State Telehealth Laws and Reimbursement Policies*.

medical record, patient confidentiality, continuing medical education, and mandatory reporting laws, along with differing medical practice acts."[178] A drawback of this approach is that many practitioners would likely find it challenging due to both the range of knowledge necessary and due to the expense of obtaining multiple licenses.[179] Under the status quo, states take a piecemeal approach to changing their telehealth guidelines and the system remains complex.

Supporters of state licensure believe that the system may help prevent a "race to the bottom" in which doctors could flock to the state with the lowest standards or most permissive malpractice laws.[180] Without any control over the licensing of an out-of-state physician, a state could find itself in the position of being unable to protect its citizens from receiving low-quality care.[181]

By departing from the status quo, HRSA believes questions would be raised about legal authorities, logistics of data collection, enforcement of licensure, and state revenue loss. While these are not insurmountable issues, HRSA believes they would need to be thoughtfully addressed in a switch away from the state licensure system.[182]

A second and more radical option to make telehealth more easily deliverable across state lines would be a federal licensure system for telehealth with standardized scope-of-practice rules. This has the advantage of allowing procedures across all 50 states through a single system, but it would represent a considerable loss of power to the states.

---

[178] Diane Hoffmann and Virginia Rowthorn, "Legal Impediments to the Diffusion of Telemedicine," *Journal of Health Care Law Policy* 14, no. 1 (2011): 10, accessed June 14, 2014, http://digitalcommons.law.umaryland.edu/jhclp/vol14/iss1/2.
[179] Ibid.
[180] Kepler and McGinty, *Telemedicine,* 13.
[181] Beck, "Where Does It Hurt? Log On. The Doctor Is In."
[182] Health Resources and Services Administration, *Telehealth Licensure Report*, 11.

The constitutional basis for such a system is unclear and the political opposition would likely be considerable.[183]

Proponents of a national licensure system argue that the state-by-state system was devised based off medical practice more than 100 years ago when the statutes were first enacted. A national system, proponents argue, would be the most efficient way to update this system.[184] One concern with such a system is that it could make a national board based in Washington, D.C. too powerful, too unresponsive to the needs of individual states, or perhaps too focused on cost-cutting. Other national boards or agreements, however, have not prompted such problems so far. Two examples of such agreements are the Nurse Licensure Compact, which allows nurses to more easily practice in different states, and the Emergency Management Assistance Compact, which allows states to receive assistance from out-of-state health care providers in emergencies, have provided templates for long-standing and well-managed interstate licensing agreements.

A national licensure system would have to create clear standards for enforcement and data collection. Due to these difficulties, one possible arrangement would be for states to retain a role in implementing the system. That would help prevent federal licensure from leading to a deterioration of quality from local actors losing all involvement.[185]

If concerns about a national system are too great, then a third option for telehealth licensing would be for regional associations of states such as the Southern Governors'

---

[183] Cwiek et al., "Telemedicine Licensure in the United States," 143-144.
[184] Peter D. Jacobson and Elizabeth Selvin, "Licensing Telemedicine: The Need for a National System," *Telemedicine Journal and e-Health* 6, no. 4 (December 2000): 429-439, accessed June 14, 2014, doi:10.1089/15305620050503915.
[185] Health Resources and Services Administration, *Telehealth Licensure* Report, 11.

Association or the Western Governor's Associations to voluntarily adopt licensure systems or compacts that apply across their territories. This is similar to the compact that state nursing associations have reached, in which states could opt in or opt out. Thus if the Southern states reached a compact then a doctor in Seattle might not be able to see patients in rural Mississippi, but a doctor in Atlanta could provide services to rural Mississippi. If Georgia became concerned that low-quality doctors in, for example, Tennessee were providing low-quality care, then the state of Georgia could leave the compact with Tennessee and seek to join a different compact.[186]

When states enter a compact, they decide if the compact's standards meet their minimum standards. Such a compact would not take away judicial responsibility from the state boards. The state boards would still legally determine who can practice and would control their states ethics rules.

One argument in favor of greater regionalization is that appropriate health care does not substantially differ due to a patient's state of residence. The human body is the same no matter what state he or she resides in. A cardiologist in Oregon is very likely to practice the same procedures as another cardiologist in Maryland. Thus health care could be regionalized more easily than many types of regulations.

Efforts to simplify reimbursement policy would depend, in part, on how standardized the licensure and scope-of-practice rules become. The third chapter of this thesis will further probe these concerns and provide an analysis of which policies would most effectively improve health care without giving rise to lower quality care.

[186] Cwiek et al., "Telemedicine Licensure in the United States," 144-145.

V. States as Laboratories of Democracy: The Case Study of Telestroke in Oregon

82-year-old Emil Evans was standing in the kitchen of his McMinnville, Oregon home when he felt dizzy. Paramedics rushed Evans to the nearby Willamette Valley Medical Center, a small 80-bed hospital near his home.

The emergency room physician on duty suspected Evans had suffered a stroke and sought further consultation with a stroke neurologist at the Oregon Health and Science University (OHSU). There is little room for error with stroke treatment and the right medicine delivered quickly can be the difference between life and death.

Via a telehealth cart with two-way audio-video equipment, basically a robotic pair of eyes and ears, the stroke neurologist was able to examine and interview Evans and his family, and direct the physician. The specialist diagnosed Evans as having suffered an ischemic stroke, one that would respond to a clot-busting medicine called t-PA. With the proper diagnosis and medicine, the doctors stabilized Evans' condition and within three days he had made a complete recovery.[187]

Evans' story underscores the potential for telehealth to dramatically improve health outcomes for millions of Americans. Physicians, although qualified for primary care, do not have the same expertise as a specialist. And in much of rural America, the time it takes to reach even an emergency room physician could be too long.[188]

---

[187] Hormozd Borzorgchami, "Telemedicine Brings Stroke Expertise Bedside," *Oregon Health and Science University Blog*, May 17, 2013, accessed July 6, 2014, http://www.ohsu.edu/blogs/96kmiles/2013/05/17/telemedicine-brings-stroke-expertise-bedside.
[188] Probst et al., *Mode of Travel and Actual Distance Traveled for Medical or Dental Care by Rural and Urban Residents*, 4.

The telestroke program at OHSU has allowed stroke neurologists to treat over 250 patients at Oregon community hospitals since the program began in April 2010.[189] Yet, on average, across the United States, stories like Evans remain rare. Even though the technology used to diagnose his condition could be available nationwide, as this paper has documented and this case study will further illustrate, health care policy in the United States often prohibits the implementation of telehealth.

States have a history of experimentation and serving as a blueprint for national policy and legislation, in recent years leading the implementation of the ACA, passing immigration bills, and advancing gay rights legislation. States have often taken the lead on politically-complicated issues because of the ability to move legislation quickly and effectively at the state level compared to Congress. States often create their own laws when they resist national efforts or when they feel the federal government has stalled.

States taking legislative matters into their own hands could be a type of "anti-federalism." Or those states could be performing an important function of the federalist system. As Justice Brandeis said, when states take matters into their own hands, they can serve as "laboratories of democracy," testing policies and procedures and, if they work, providing a template for expansion at the national level.[190]

Oregon serves as a case study to examine the interplay between federal telehealth policy and how states are embracing telehealth. The experience of doctors trying to practice telemedicine in Oregon shows the barriers that the current system creates. Oregon has been a very progressive state when it comes to implementing telehealth

[189] "Stopping the Clock on Stroke Damage," OHSU Extra, last modified Spring 2013, accessed July 3, 2014, http://www.ohsu.edu/xd/about/foundation/about/ohsu-extra/stroke.cfm.
[190] Nathan, "Federalism and Health Policy," 1458.

policies and if its programs prove to be successful over time, they may encourage other states or the federal government, to take more steps to expand telehealth.

Oregon's telestroke program is a case in point. Only heart disease and cancer kill more people in the United States than strokes.[191] About 795,000 people have a stroke each year, and around 130,000 people will die from it.[192]

Researchers at the American Heart Association and American Stroke Association have concluded that the use of telehealth to help treat strokes can play an important role in getting patients the proper medicine and treatment quickly enough for it to still be effective.[193]

Yet as recently as 2012, a study of telestroke programs, identified only 38 programs across 27 states.[194,195] Many of the states lacking an identified telestroke program are rural and would perhaps have the most to benefit. The telehealth sites surveyed saw significant barriers to creating telehealth programs. The key barriers: 28 percent of telehealth facilities said the inability to obtain the right physician, another 28 percent cited a lack of funds and 19 percent cited a lack of reimbursement.[196] Of the

---

[191] National Institute of Neurological Disorders and Stroke and National Institutes of Health, *Stroke: Challenges, Progress, and Promise* (Bethesda, MD: NIH Publication, 2009), 1, accessed August 20, 2014, http://stroke.nih.gov/documents/NINDS_StrokeChallenge_Brochure.pdf.
[192] "Stroke Fact Sheet," Centers for Disease Control and Prevention, last modified August 20, 2014, accessed August 20, 2014, http://www.cdc.gov/dhdsp/data_statistics/fact_sheets/fs_stroke.htm.
[193] Lee H. Schwamm et al., "A Review of the Evidence for the Use of Telemedicine Within Stroke Systems of Care: A Scientific Statement from the American Heart Association/American Stroke Association," *Stroke* 40, no. 7 (2009): 2622, accessed August 14, 2014, doi: 10.1161/STROKEAHA.109.192360.
[194] Gisele S. Silva et al., "The Status of Telestroke in the United States, A Survey of Currently Active Stroke Telemedicine Programs," *Stroke* 43, no. 8 (2012): 2078, accessed August 10, 2014, doi: 10.1161/ STROKEAHA.111.645861.
[195] The states with no telestroke program identified for the survey were Alabama, Colorado, DC, Delaware, Idaho, Indiana, Iowa, Kansas, Kentucky, Maryland, Mississippi, Missouri, Nevada, New Hampshire, New Jersey, New Mexico, North Dakota, Ohio, Rhode Island, South Dakota, Utah, Vermont, West Virginia, and Wyoming.
[196] Silva et al., "The Status of Telestroke in the United States, A Survey of Currently Active Stroke Telemedicine Programs," 2078.

surveyed programs using telestroke, 43 percent are unable to receive reimbursement from Medicare, Medicaid or from private insurance.[197]

First, telehealth faces the geographic barriers and the issues of licensure. McMinnville, where Evans had his stroke, is only about an hour south of Portland. One hour north, across the border in Washington State, Evans' story may be impossible. Health care licenses are state issued and so an Oregon-based doctor would not be able to treat a patient in Washington unless he'd gone to the trouble of receiving licenses in both states. The vast majority of physicians in the United States., 77.3 percent, only obtain one medical license. Just 5.9 percent of physicians hold three or more licenses and only 16.8 percent hold two licenses.[198]

The success of Oregon's program shows that telehealth can be successful under the existing state licensing system, but the fact that so many other states have yet to adopt it shows the impact of the licensure limitation. As shown in Table 2.1, Oregon has adopted a significant set of telehealth policies, including mandated private insurance coverage, legislated Medicaid coverage, special telehealth licensure rules and expanded telemental health coverage.

Other states could attempt to mimic Oregon's system, establishing a knowledge base of telestroke doctors in a major city and building a network across their region, but most states have yet to do so. Under the existing state licensing system, patients in other states cannot receive care from Oregon's successful program. Even if states did establish their own programs, it may take time for them to develop the same level of expertise.

---

[197] Ibid., 2082.

[198] Young et al., "A Census of Actively Licensed Physicians in the United States, 2010," 12.

Crossing state borders allows patients to reach the best providers and to obtain access to "centers of excellence," where a cluster of physicians and researchers specialize in certain types of health care. For general practice, every state will have qualified and licensed doctors, but when it comes to increasingly specialized care it becomes unlikely that each state could develop a high-quality program for all the medical problems that could arise for its residents. While most states do have at least one large city with a major medical center, the level of specialization in the most rural states like Idaho or North Dakota will never match the range of services available in California or Massachusetts.

Evans benefited because his physician was affiliated with OHSU, which operates Oregon's oldest telehealth program, with services including pediatric care, neonatal care, telestroke and trauma.[199] Because OHSU's program has become well-known in the state, the Oregon legislature has enacted changes to its medical credentialing laws that make it easier for doctors to practice telemedicine. This came about due to serendipity – the director of OHSU's telemedicine program happened to be on a flight next to an influential state senator in Oregon who asked what the biggest barrier to advancing his telemedicine program was – and the exchange inspired her to push for streamlined laws.[200] OHSU attributed this simplification of the credentialing process to its ability to expand its telemedicine program.[201]

Second, the scope-of-practice rules were valid for the care that Evans needed. Evans was able to receive treatment via telehealth because he was in the care of an

---

[199] "OHSU Telemedicine Network Connects Oregonians to Lifesaving Health Care," Oregon Health and Science University, accessed August 19, 2014, http://www.ortelehealth.org/content/credentialing-and-privileging.
[200] Catherine Britain, "Oregon Searches for Solutions to Credentialing of Physicians Providing Telemedicine Services," *Oregon Rural Health News,* August 21, 2013, accessed August 15, 2014, http://www.ohsu.edu/xd/outreach/oregon-rural-health/about/news/credentialing-telemed-services.cfm.
[201] Ibid.

emergency room physician. Despite working under the tutelage of the same stroke neurologist, a skilled nurse would not necessarily be able to coordinate Evans' care because state scope-of-practice laws limit the procedures different medical providers can perform. Had the doctor been out, Evans may have died. Similarly, changing scope-of-practice rules to make it easier for rural general practitioners or nurses could expand the range of sites available for a telestroke program.

When it comes to paying for the medical procedures, Oregon is subject to the same Medicare reimbursement policies as the other states. While Evans is 82 and is eligible for Medicare, telestroke is not a type of treatment that Medicare will reimburse.[202] But when it comes to other payment sources, including Medicaid and private insurance, Oregon has taken special steps to ensure reimbursement for telehealth procedures. Oregon has enacted legislation that provides for reimbursement of telehealth services from the state's Medicaid funds. The state has also enacted legislation that requires private insurers to pay for medical services provided via telehealth if the insurer would also cover the in-person treatment.[203,204]

This ability for health care providers to receive reimbursement for procedures has led to a more robust telehealth network across the state. The availability of funding sources in Oregon is better than that faced by many telehealth programs. Nationwide, more than 40 percent of sites have no source for reimbursement.[205]

---

[202] "Telehealth Fact Sheet," Centers for Medicare and Medicaid Services, last modified April 2014, accessed August 15, 2014, http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/telehealthsrvcsfctsht.pdf.
[203] "Oregon Medicaid Reimbursement," Telehealth Alliance of Oregon, accessed August 15, 2014, http://www.ortelehealth.org/content/oregon-medicaid-reimbursement.
[204] "Oregon Private Payer Reimbursement," Telehealth Alliance of Oregon, accessed August 15, 2014, http://www.ortelehealth.org/content/oregon-private-payer-reimbursement.
[205] Silva et al., "The Status of Telestroke in the United States," 2078.

VI. Conclusion

The example of OHSU's telestroke program shows the stakes for telehealth and illustrates the concepts documented throughout this chapter.

The program has been able to thrive because the state of Oregon has taken extraordinary steps to ease the burdens of licensing for physicians and because the state has passed special laws to increase the amount of reimbursement sources. The telestroke program has enjoyed the support of a major public research university housed in a major metropolitan area, with access to resources that many hospitals in the United States would lack.

Still, OHSU's telestroke program remains restrained by the three key policy barriers of licensure, scope-of-practice rules and reimbursement policies. Despite extended experience treating stroke patients via telecommunications systems, the stroke neurologists at OHSU cannot work across state lines without obtaining a new license in each and every state.

If the OHSU doctors obtained the license, they would still need to partner with originating sites where the medical staff met the needed scope-of-practice rules. While the state of Oregon has extra funding sources, the partner sites in other states might not, requiring the hub-and-spoke sites to coordinate the limited payments.

These barriers exist not just for telestroke, but for telehealth programs in general. Telestroke is but one example of a treatment that medical researchers have resoundingly concluded is medically effective, yet it remains restrained by policy barriers. A similar case study for other medically effective telehealth treatments would show that these

barriers prevent a wide array of medical treatments from deployment, especially across state lines.

This chapter has shown that the barriers to telehealth have arisen primarily because of the U.S. federalist system. The constitution did not clearly place health care in the domain of the states or in the domain of the federal government. As a result, more than 70 bodies across the United States write their own licensure and scope-of-practice rules, and delivering health care across state lines is difficult to impossible.

Some researchers and physician groups have reservations about telehealth, arguing that some procedures have not been sufficiently studied and fearing that allowing physicians from out-of-state to practice medicine could lead to a deterioration of care. A small community of telehealth startups has developed in the United States, but this remains a small part of the industry.

The key reason that telehealth barriers remain is that different interest groups have different ideas about *who* should regulate telehealth. Not because there is substantial debate about *whether* telehealth should be allowed.

Finally, the example of telestroke care in Oregon provides some reason for optimism. This case study shows that telehealth can gain some traction even without a national licensing program, but also shows why changes to licensing could be beneficial. By making careful legal changes to licensure and reimbursement rules, Oregon has demonstrated that telestroke can be a successful program. Thus, Oregon serves as a "laboratory of democracy," providing a state-level example of how policy makers could overcome the national barriers to telehealth.

Chapter 3: Policy Analysis and Recommendations for Telehealth

I. Introduction

On July 18, 2002, Senator Mike Crapo, a Republican from Idaho and Senator Kent Conrad, a Democrat from North Dakota took the senate floor to speak about the Medicare Telehealth Validation Act of 2002.

"Telehealth is the future of rural health care," said Crapo. "Access to quality health care in rural areas is at a critical stage. Today, many ill and disabled people must drive hundreds of miles, often in bad weather on dangerous roads, just to receive the most basic of health care."[206]

The legislation that the bipartisan group of senators put forward made a few modest changes to the way Medicare would reimburse telehealth. More than a decade ago, senators like Crapo and Conrad believed telehealth could play a role in addressing the health care gaps in rural America that were worsening.

"Technology in America is booming. We must embrace this technology as a cost-effective way to improve health care in rural and underserved areas," Crapo said.[207]

The bill would have expanded telehealth services by increasing the number of eligible spoke sites and by encouraging states to create systems that would allow doctors to more easily cross state lines. The legislation, however, died in the Senate Finance Committee.[208]

More than a decade later, Congress still has taken few major steps to help encourage the spread of telehealth. Even as medical researchers and physicians have

---

[206] Statements on Introduced Bills and Joint Resolutions, S. Res. 2750, 107th Cong., 2nd sess., *Congressional Record*, vol. 148, daily ed. (July 18, 2002): S7035.
[207] Ibid.
[208] "Bill Summary & Status, S. 2750," Library of Congress, last modified October 3, 2002, accessed October 18, 2014. http://thomas.loc.gov/cgi-bin/bdquery/z?d107:SN02750:@@@L&summ2=m&

increasingly found telehealth to be medically effective, and even as the ability of rural Americans to access health care has worsened, legislators have made little progress.

At Citizens Memorial Hospital in Bolivar, Missouri, the hospital's administrators and patients would like to expand their use of telehealth, but the policy barriers to telehealth prevent many of the applications that the hospital believes would be effective.

"If we could get Congress to actually do something to ease up on the wording just a little bit that would probably open up the window to more patients being able to access telehealth," said Wolters, director of reimbursement at Citizens Memorial Hospital. He continued:

> It would be a relatively small and simple legislative fix that, again, I don't think would have significant costs because we are talking about primary care getting patients access to care at the right time in a more convenient location. That would be the idea being we can treat them at the primary care level. That prevents the situations from getting worse and resulting in emergency visits and/or worse as far as hospitalization.[209]

The technology for telehealth is available, and as demonstrated in the first chapter, can greatly improve disparities in health care access. So why has Congress moved so slowly? Because Congress not keeping up with the times of technology is not a new phenomenon.

History has shown that even in the early days of the railroad, Congress was slow to adopt to new technologies, unable to address topics ranging "from property rights over track and eminent domain to liability for damages to employees, passengers, stock, and land."[210] Scholars argue that the law cannot, or does not, advance as quickly as

---

[209] Wolters, interview by author.
[210] Lyria Bennett Moses, "Recurring Dilemmas: The Law's Race to Keep Up with Technological Change," *Journal of Law, Technology & Policy* 2007, no. 2 (Fall 2007): 239, accessed October 18, 2014, http://jltp.uiuc.edu/archives/moses.pdf.

technology changes, creating a gap between technological possibility and legal guidance. This phenomenon leaves lawyers, lawmakers and scholars wrestling with the implications of this void, in fields far beyond that of health care.[211]

This chapter will first provide an overview of the existing state of telehealth policy in the United States and, building off the analysis in the first and second chapters of the thesis, show where it would be most beneficial for the existing policy to change.

Then, the existing political science literature on the congressional environment will be reviewed. While all proposed bills face a challenging road in becoming law, this is especially the case for health care legislation, which becomes law less than half as often as most bills. This literature review will examine why health care legislation is difficult to pass and consider the conditions under which passage has proven possible. It will also discuss a framework in which three different types of policy change have led to incremental health care reform.

Having established the state of existing telehealth policy and the Congressional environment for health care changes, this chapter will then examine current legislative proposals related to telehealth. All active Congressional proposals pertaining to telehealth will be summarized, and an in-depth analysis of the four bills, currently before Congress, that are focused primarily on telehealth reforms will be provided.

These bills will be analyzed on the basis of whether they would help address the geographic and workforce shortage barriers identified in the first chapter; on whether they help to overcome the policy barriers identified in the second chapter; and where they fit into the scheme of incremental health care changes identified by scholars and how

[211] Ibid.

viable the proposals would be. This chapter will then conclude with a set of recommendations for the next steps for telehealth policy in the United States.

This analysis will show that all four of the bills under consideration have strengths and weaknesses, both regarding whether they would improve telehealth policy and in terms of their political feasibility. The environment for passing health care laws is likely to remain difficult for some time, but there is potential for telehealth policy proposals that would improve telehealth and do a better job overcoming the political objections.

II. Current U.S. Telehealth Policy

The United States does not have an official and over-arching national telehealth policy. Rather, U.S. telehealth policy is governed by a patchwork of state laws that creates rules and guidelines for health care providers within their own borders, and federal reimbursement rules that exert enormous influence over this system by determining which services will be paid for by Medicare, the single largest payer of health care services. Even within the federal government there are seven different definitions of telehealth that have been adopted. This reflects both the different functions of the government bodies involved with telehealth and the lack of coordination or official national policy.[212]

In the absence of an official policy, the federal government has a patchwork of key rules that influence how telehealth can be provided and how the procedures can receive reimbursement. First, in order to receive payment, procedures must be approved

[212] Doarn et al., "Federal Efforts to Define and Advance Telehealth," 410- 411.

by CMS. If approved, Medicare will reimburse providers who deliver the services. But, in order to be eligible to provide services, physicians and other health care professionals must be duly licensed within their state. This licensing process falls to state governments which also are responsible for scope-of-practice rules that determine what roles health care providers can perform.

As explained in the second chapter, the existing ad hoc patchwork of policies has created barriers to implementing telehealth. Through licensure and scope of practice, the states are in charge of setting boundaries in terms of where services can be provided by physicians. Through this system, states also play a role in regulating whether or not telehealth procedures are valid. While there are a wide range of steps states could individually take to alter their telehealth systems, the focus of this chapter will be federal policy proposals.

Once it is determined that a physician is allowed to provide a telehealth service to the patient, there remains the practical concern of how the service will be paid for. Currently, reimbursement for telehealth is inconsistent and incomplete. In general, health care services are paid by Medicare, Medicaid, private insurance, or by patients themselves. Under current law, Medicare only pays for a limited range of telehealth procedures, while Medicaid policies and private insurance rules are inconsistent and vary state-by-state.

In 2012, Medicare accounted for 20 percent of all U.S. health care spending, including 27 percent of hospital care spending and 23 percent of the spending on

physician services.[213] Because Medicare provides such a large amount of funding for health care in the United States, federal policy makers use Medicare reimbursement to set de facto guidelines for how procedures should work. If a procedure is approved by Medicare, then performing the procedure along those guidelines ensures an easier reimbursement process.[214]

Congress has also introduced or passed bills with some telehealth provisions as documented in the second chapter, and CMS has been an active agency in passing regulation to further promote telehealth. An array of Federal agencies, including the OAT, USDA, the National Library of Medicine, NASA, the VA, and the U.S. Army's Telemedicine and Advanced Technology Research Center also have involvement in developing or promoting telehealth.[215]

Reasons for Initiating Changes

The review of existing telehealth policy in the United States and the review of policy barriers in the second chapter suggests a number of reasons to consider new telehealth policies at the federal level that would advance the ability of health care providers to deliver effective medical procedures through telehealth technologies. There are still outstanding policy issues facing telehealth. These include policies that would increase the penetration of telecommunications technologies to poorer and more remote

[213] "The Facts on Medicare Spending and Financing," Kaiser Family Foundation, last modified July 28, 2014, accessed October 18, 2014, http://kff.org/medicare/fact-sheet/medicare-spending-and-financing-fact-sheet.
[214] "Telehealth and Medicare," Center for Connected Health Policy, accessed October 5, 2014, http://cchpca.org/telehealth-and-medicare.
[215] Doarn et al., "Federal Efforts to Define and Advance Telehealth," 410-411.

areas,[216] policies pertaining to investments in telehealth technologies,[217] policies pertaining to privacy and confidentiality,[218] and policies that would provide for testing new procedures.[219]

First, the United States does not have an explicit national telehealth policy and even has inconsistent definitions of telehealth across departments. More standardization of terminology would help streamline debate over telehealth by clarifying the policies in question. And adoption of a national policy could clarify the government's goals and reduce the ad hoc nature of the current policy approach. An ad hoc approach can be bad for both telehealth opponents and proponents: while there are inadvertent policy barriers created by this approach, there is also no clear system to safeguard against potential abuses or misuses of telehealth.

Second, the state-by-state system of telehealth regulation was developed shortly after the Civil War and has been updated via a piecemeal approach at the state level. The system developed at a time when technologies that would allow the provision of health care across space and time were inconceivable. While individual states have taken steps to take this system into the 21st century, an opportunity exists to modernize and update these systems.

Third, telehealth receives different treatment from Medicare, Medicaid and private insurers. This disparate treatment has created a significant bureaucratic barrier to telehealth that could be reduced or eliminated.

---

[216] Shariq Khoja et al., "Scope of Policy Issues in eHealth: Results from a Structured Literature Review," *Journal of Medical Internet Research* 14, no. 1 (February 2012): e34, accessed September 20, 2014, http://dx.doi.org/10.2196/jmir.1633.
[217] Ibid., 8.
[218] Ibid., 5.
[219] Ibid., 7.

Fourth, rural America faces a critical shortage of primary care physicians and specialists that is only likely to worsen. Telehealth is one of the simplest options for providing health care to this segment of the population and, as shown by the first chapter, could be the key part of a strategy to help ameliorate the shortage faced by much of the United States.

In short, current telehealth policy is ad hoc and has created a number of largely unintentional barriers to a form of treatment that could greatly improve the health outcomes of a large part of the population. There is thus a compelling case for legislation that would further the advancement of telehealth in the United States.

III. Political Theories of Health Care Reform

Before considering the merits and weaknesses of the key Congressional proposals on telehealth, it is worth considering the overall political climate into which these proposals are entering, and look at the existing political science literature of health care reform proposals.

The first salient fact is that health care faces an unusually polarized environment in Congress and health care proposals are especially likely to succumb to political gridlock. As Ibrahim (2012) put it, "politics in health care has reached a new level of intensity and urgency in this age of in-your-face discourse."[220]

This is more than just an anecdotal impression. Health care legislation has long been more difficult to pass than most types of legislation, according to a detailed legislative review by Volden and Wiseman (2011). They found that, from 1973 to 2002,

[220] Said A. Ibrahim, "Health in the Age of Politics," *American Journal of Public Health* 102, no. 12 (December 2012): 2200, accessed October 25, 2014, doi:10.2105/AJPH.2012.301067.

Congress introduced a total of 9,740 bills that dealt mainly with issues of health.[221] Of these bills, only 154 became law, for a "conversion rate" of 1.6 percent. This compares to a 4.1 percent conversion rate for other laws, meaning that health care proposals become law at "less than half the rate for other policy areas."[222]

They find that every step of the process for health care reform bills is challenging, and that "health bills clearly die in committee and fail to achieve bicameral support at a greater level than do bills in other policy areas."[223]

Health care reforms move especially slowly.[224] In the words of Ruger (2012), "the health law system in the United States is glacial."[225] Legislators and the federal government are slow to get involved with health care. The very diffuse nature of American health, with different regulations in every state, and which many physicians still working in very small practices, "remains as a sedimentary legacy"[226] through which it is very hard to enact changes.

Telehealth is clearly no exception – though the technologies have been developed over the course of decades, this is still considered a relatively new policy area, and changes to telehealth have happened incrementally.

Health care politics are further complicated by what Grogan (2012) calls the "murky relationship between ideology and policy." One challenge is that conservatives

---

[221] Craig Volden and Alan E. Wiseman, "Breaking Gridlock: The Determinants of Health Policy Change in Congress," *Journal of Health Politics, Policy & Law* 36, no. 2 (April 2011): 236, accessed October 25, 2014, doi:10.1215/03616878-1222712.
[222] Ibid., 237.
[223] Ibid., 243.
[224] Larry Charleston and Randolph W. Evans, "Public Policy and Headache: Observations of Health Care Policy in the US Congress from a Legislative Fellow's Perspective," *Headache: The Journal of Head & Face Pain* 53, no. 5 (May 2013): 829, accessed October 25, 2014, http://dx.doi.org/10.1111/head.12098.
[225] Theodore W. Ruger, "Of Icebergs and Glaciers: The Submerged Constitution of American Healthcare," *Law and Contemporary Problems* 75, no. 3 (2012): 219-220, accessed October 18, 2014, http://scholarship.law.duke.edu/lcp/vol75/iss3/11.
[226] Ibid.

approach health care policy with an approach that traditionally "favors individualism and the market mechanism to promote competition, and therefore prefer a minimal role for the state." Liberals, by contrast, "are more likely to see the state as an appropriate antidote to market failure."[227]

Shaw and Magaldi (2010) argue that the politics of health care are further complicated by:

> The way Americans see themselves is an impediment to making significant changes in the way they administer health care. The independent, set-your-mind-to-it, can-do, pull-yourself-up-by-your-bootstraps attitude is an important component of the collective American psyche, and practically a caricature of American culture – and is completely at odds with the notion of a comprehensive government program to protect the American citizenry.[228]

The conflicting views of conservative and liberal perspectives mean that proposals which shift the balance of power between markets and government are unlikely to be popular with the side losing power. A clear and recent example is the ACA which, after its passage, continues to enrage many Republicans who see it as an overstep of governmental power. In a four-year period, House Republicans have attempted to repeal the ACA 48 times.[229]

Making matters worse, health care legislation is further complicated because "the genuine complexity of health care systems typically increases the uncertainty of the reform process," according to Béland (2010). This can lead to fear-mongering, he argues,

---

[227] C. Grogan, "The Murky Relationship Between Ideology and the Role of Government in Health Policy," *Journal of Health Politics, Policy & Law* 37, no. 3 (June 2012): 361, accessed October 25, 2014, doi:10.1215/03616878-1573058.
[228] Bill Shaw and Jessica Magaldi, "Analyzing the Politics of Health Care: Let's Buy Ourselves Some Civilization," *Journal of Business Ethics* 92, no. 1 (March 210): 36, accessed October 25, 2014, doi:10.1007/s10551-009-0137-6.
[229] Neera Tanden, "If at First You Don't Succeed: A Short History of the Republicans' 48 Attempts to Repeal Obamacare," *Politico Magazine*, January 30, 2014, accessed November 3, 2014, http://www.politico.com/magazine/story/2014/01/house-republicans-obamacare-repeal-votes-102911.html#ixzz3IJ5WUXvm.

"this complexity makes it easier for politicians and advocates who oppose specific reform proposals to frame them as `evil' or `socialistic' without providing any evidence to back up their claims."[230] Prinz et al., (2008) argue that "the sheer complexity of telehealth technology" has indeed slowed the passage of legislation in this area.[231]

Even once passed, health care bills face an additional challenge: the risk of being gradually dismantled or abruptly reversed. Pollack (2011) says that in order for policies to be durable they must "nurture the conditions for future political success."[232] This means that "sustainable public health policy requires more than the passive support or the momentary acquiescence of a political majority. One must design policies to nurture the loyalties and investments of specific interest groups and constituencies who have reason to support and defend these new policies."[233]

Interest groups also have a key influence on health care policy. There are a number of these health care groups who compete to influence the policy arena. Since 2006, a total of 133 different organizations have lobbied on issues pertaining to telehealth, a total that rises to 151 when the term telemedicine is also included.[234]

History shows that interest groups have long had the ability to significantly change public policy.[235] Interest groups like the ATA and AMA, have financial resources, as well as the ability to "mobilize constituency support or opposition; hire

---

[230] Daniel Béland, "Policy Change and Health Care Research," *Journal of Health Politics, Policy & Law* 35, no. 4 (August 2010): 631, accessed October 25, 2014, doi:10.1215/03616878-2010-019.
[231] Prinz, Cramer, and Englund, "Telehealth,"154.
[232] Harold Pollack, "Health Reform and Public Health: Will Good Policies but Bad Politics Combine to Produce Bad Policy?" *University of Pennsylvania Law Review* 159, no. 6 (June 2011): 2078, accessed October 25, 2014, http://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=1117&context=penn_law_review.
[233] Ibid., 2080.
[234] "Issue Lookup," Center for Responsive Politics, accessed November 6, 2014, https://www.opensecrets.org/lobby/lookup.php.
[235] Matt Grossman, "Interest Groups Influence on US Policy Change: An Assessment Based on Policy History," *Interest Groups & Advocacy* 1, no. 2 (2012): 88.

former members, congressional staffers, and other seasoned operatives to gain access and deploy policy expertise within their lobbying operations; and invest heavily in shaping the broader policy community."[236] Powerful lobbying groups can also "point out the consequences to lawmakers if they don't heed the groups' message."[237]

Prinz notes that telehealth legislation has not always won the support of physicians groups, who worry about the lack of funding, and about the implications of doctors being able to practice across state lines. Policy makers and payers have been slow to expand the number of telehealth procedures that are eligible for reimbursement, taking a cautious approach to telehealth. While legislators have introduced bills over the past few years, they generally have not been able to move out of the relevant committees and onward to the full chamber, meaning that no telehealth-focused bill has passed Congress.[238]

Yet despite these challenges of health care politics – the extra gridlock that faces health care, the political polarization in acceptable approaches, the genuine complexity of the policies, and the risks of the policy being undone – many reforms are nonetheless able to advance and remain in effect. Here, too, political science scholars have examined the conditions for success and the mechanisms through which some bills survive.

First, bills that pass are often animated by a politically-popular idea. For example, the U.S. population is deeply resistant to changing its major health care programs. Medicare beneficiaries, for example, are often reflexively opposed to legislation that could be construed as jeopardizing their benefits. Historically, one of the only ways to

---

[236] Thomas E. Mann and Norman J. Ornstein, *It's Even Worse Than It Looks: How the American Constitutional System Collided With the New Politics of Extremism* (New York: Basic Books, 2012), 128.
[237] Ibid., 129.
[238] Prinz, Cramer and Englund, "Telehealth," 155-56.

discuss changes to Medicare is to focus on the program's burgeoning costs.[239] Another politically popular idea is "reducing variation" – the notion that residents of Massachusetts receive significantly better health care than residents of Mississippi. This is another example of a policy, which I will argue is relevant to telehealth, which has broad appeal. "Reducing variation also appeals across the ideological spectrum,"[240] according to Tanenbaum (2013). And "it is now conventional wisdom that we must reduce variation in health care."[241]

This policy analysis will examine whether the politics of the telehealth proposals are feasible and also consider the type of change being proposed. A number of scholars, such as Béland (2010) and Hacker (2004) have proposed a framework for thinking of three different ways that health care policies change incrementally in the United State. They term these three methods layering, conversion and policy drift.[242, 243] This is particularly relevant for my review of telehealth policies because the proposals that will be analyzed later in this chapter are incremental in nature: they do not propose to revamp the health care system as ambitiously as the ACA or the original passage of Medicare.

Layering is when a program has new elements grafted onto a stable policy framework, for example when the existing Medicare program had a new program for private health accounts added to it. Conversion is when an initially modest program is expanded because its objectives have been redefined. One example from outside the

---

[239] Shaw and Magaldi, "Analyzing the Politics of Health Care: Let's Buy Ourselves Some Civilization," 41.
[240] Sandra J. Tanenbaum, "Reducing Variation in Health Care: The Rhetorical Politics of a Policy Idea," *Journal of Health Politics, Policy & Law* 38, no. 1 (2013): 19, accessed October 25, 2014, doi:10.1215/03616878-1898774.
[241] Ibid., 22.
[242] Béland, "Policy Change and Health Care Research," 620-621.
[243] Jacob S. Hacker, "Privatizing Risk without Privatizing the Welfare State: The Hidden Politics of Social Policy Retrenchment in the United States," *The American Political Science Review* 98, no. 2 (May 2004): 243-260, accessed October 25, 2014, http://www.jstor.org/stable/4145310.

health care field, but that's especially well known, is the creation of the 401k retirement plan system which was initially envisioned as a small employer benefit but became one of the primary retirement policies in the United States.[244]

Policy drift, by contrast, is when changing economic and social trends reshape a policy because society no longer reflects the environment in which it was adopted, in Béland's words, "in this context, existing health and social policies may become less and less effective in addressing the problems they were designed to solve largely because the world around them – and the nature of these problems – has changed."[245]

The first and second chapters of this thesis demonstrate that telehealth could play a key role in providing health care in rural America, and show that telehealth is being restrained by a number of policy barriers. In addition to analyzing congressional policies in light of whether they pertain to the issues in the first and second chapters, this policy analysis will also consider the politically challenging environment of health care, whether the proposals could potentially overcome those political challenges.

IV. Pending Legislation

In the 113th Congress, legislators have introduced a total of 56 bills in the House and Senate that pertain to "telehealth" or "telemedicine."[246] This does not include appropriations bills.

These bills focus on a wide range of health issues and do not necessarily focus entirely on telehealth, but this count gives a general landscape of telehealth policy, which

[244] Ibid., 247.
[245] Béland, "Policy Change and Health Care Research," 620-621.
[246] Bills introduced as of September 7, 2014.

chamber produces more telehealth related bills, and which party is most likely to move forward with legislation to promote the use of telehealth.

For example, one bill pertaining to telehealth is the SGR Repeal and Medicare Payment Provider Modernization Act. Some variation of this bill, commonly known as the "Doc Fix," is introduced in Congress every year to change the formula used to adjust Medicare rates over time. This bill is almost entirely concerned with the formula, but it includes a provision that even if Medicare does not pay for a telehealth service, other sources of payment can be used. The bill would also authorize a Comptroller General Study of Telehealth.[247]

This provision is important for telehealth – without the provision, the bill could contain ambiguity about whether certain uses of telehealth are allowed – and the study could be worthwhile. But these telehealth provisions take up only two pages of the 197 page bill, and would not represent a significant legislative change.

Of the 56 bills, 29 bills have been introduced in the House of Representatives and 27 in the Senate. House Republicans have introduced 13 bills and House Democrats have introduced 16. Senate Republicans have introduced seven bills, Senate Democrats have introduced 13 bills, and seven bills have been introduced by Vermont Senator Bernie Sanders, an Independent who caucuses with the Democrats. Of these bills, 23 have a companion measure that has been introduced in the other chamber.

In total, 27 bills were proposed by members of the Democratic Caucus and 29 by Republicans. This shows that there is bipartisan desire in both houses of Congress to do

[247] The SGR Repeal and Medicare Provider Payment Modernization Act of 2014. H. Res. 4015. 113th Cong., 2nd sess. *Congressional Record* 160, daily ed. (February 6, 2014): H1686.

more with telehealth policy, even if widespread momentum has not yet developed around the current legislation.

Four of these bills are focused entirely on telehealth policy in the United States: the Telehealth Enhancement Act, the Telehealth Modernization Act, the Medicare Telehealth Parity Act, and the TELE-MED Act. This chapter will focus on analyzing these four bills that are squarely focused on telehealth and will not analyze the bills that pertain to telehealth, but not exclusively.

Telehealth Enhancement Act

The Telehealth Enhancement Act was introduced in the House of Representatives by Mississippi Republican Gregg Harper and currently has 20 cosponsors. Of the cosponsors, six are Democrats and 14 are Republicans, indicating some bipartisan support for the legislation.[248] The legislation also has a companion bill in the Senate that has been introduced by Mississippi Republican Thad Cochran and has one other Republican co-sponsor.[249]

The House bill has been referred to the Ways and Means subcommittee on health and the Senate bill has been referred to the Committee on Finance.

This is the lengthiest of the three bills examined, and contains the following key provisions: (1) hospitals receive extra incentive payments for reducing readmissions; (2) changes to the health home system, which are not specific to telehealth; (3) allows Accountable Care Organizations, basically coalitions of doctors and other health care

[248] Telehealth Enhancement Act of 2013, H. Res. 3306, 113th Cong., 1st sess., *Congressional Record*, vol. 159, daily ed. (October 22, 2013): H6674.
[249] As of October 21, 2014; Telehealth Enhancement Act of 2014, S. Res. 2662, 113th Cong., 2nd sess., *Congressional Record*, vol. 160, daily ed. (July 24, 2014): S4903.

providers, to provide coverage for telehealth services; (4) include telehealth in an experimental payment system; (5) broadens the sites that are eligible to be "originating telehealth sites"; (6) gives states a new option for providing coverage of high risk pregnancies. This provision is also not specific to telehealth; (7) to broaden the types of sites which must receive telecommunications support; and (8) to forbid health care rules that discriminate by location.

Analysis or pros and cons

The Telehealth Enhancement Act's provision that expands the eligible originating sites is aimed at broadening the geographic footprint of telehealth. Expanding the range of sites that are eligible for telehealth would be worthwhile given the conclusions of the first chapter of this thesis, that if widely adopted, telehealth could play an important role in alleviating the physician workforce shortage in rural America. It would also help address the geographic barrier that's been created by Medicare only allowing for payment at limited types of sites.

The provision that allows Accountable Care Organizations to offer coverage for telehealth would help address, in small part, the issue that reimbursement for telehealth is often a barrier. Using telehealth in an experimental payment system could potentially be a very positive development for telehealth, especially if the experimental system proves effective.

The bill's focus on reducing hospital readmissions could also be important because, as the political science literature shows, one of the key factors that can help bring health care changes to the agenda is concern about costs. Because hospital

admissions tend to be one of the most expensive ways to provide health care, it's likely that this legislation would appeal to cost-cutters.

The provisions in the legislation that are unrelated to telehealth do not appear to be especially controversial and are unlikely to diminish or boost the bill's prospects otherwise.

The bill does not address any of the scope of practice or state licensure issues that are a significant barrier to more widespread adoption of telehealth. Further, the bill does nothing to extend the limited range of services covered by Medicare, or to expand or standardize Medicaid or private insurance coverage.

Among the three types of incremental health care changes, this bill is primarily an example of conversion – taking an existing program and changing its objectives, albeit slightly. The current purpose of Medicare is to provide health care, primarily for senior citizens, but the Telehealth Enhancement Act would use Medicare to bolster telehealth and limit hospital readmissions. The focus on cost containment could help boost the political acceptability of the proposal. The bill does not significantly decrease or increase the level of regulation on the health care industry, which could also help its political viability.

The Center for Connected Health Policy, which has analyzed the bill notes that the bill creates the opportunity for different agencies and organizations to expand telehealth, but does not obligate an expansion.[250] The American Telehealth Association has come out in support of the legislation.[251]

[250] "HR 3306: Telehealth Enhancement Act Fact Sheet," Center for Connected Health Policy, last modified October 2013, accessed September 20, 2014,

Telehealth Modernization Act

The Telehealth Modernization Act was introduced in the House of Representatives by California Democrat Doris Matsui and currently has three cosponsors, two of whom are Democrats and one of whom is Republican. The bill has been referred to the Ways and Means subcommittee on health. [252]

The bill defines telehealth and states that "if a state authorizes a health care professional to deliver health care to an individual, the state should also authorize the health care professional to deliver such health care to such individual through telehealth" with caveats.

Those caveats are (1) the health care professional must have the same access to medical records as if performing a service in person; (2) the physician must attempt to identify conditions underlying symptoms, not just assess the symptoms, and must explain the diagnosis to the patient; (3) standard medical records should be generated from the encounter; (4) professional credentials must be readily provided; and (5) the health care professional must make clear that paying a fee or responding to a questionnaire will not be sufficient to receive any given item or service, including a prescription.[253]

The bill also creates a series of requirements for prescriptions that are issued via telehealth: (1) the prescription must be issued for a legitimate medical purpose; (2) the

---

http://cchpca.org/sites/default/files/resources/HR%203306%20Telehealth%20Enhancement%20Act%20of%202013.pdf.

[251] "ATA Supports Telehealth Enhancement Act to Improve Telehealth Coverage," American Telemedicine Association, last modified October 24, 2013, accessed November 2, 2014, http://www.americantelemed.org/news-landing/2013/10/23/ata-supports-telehealth-enhancement-act-to-improve-telehealth-coverage#.VFa6APl4rig.

[252] Telehealth Modernization Act of 2013, H. Res. 3750, 113th Cong., 1st sess., *Congressional Record*, vol. 159, daily ed. (December 12, 2013): H8107.

[253] Ibid.

prescription is issued by a professional who has reviewed medical history and conducted an evaluation; (3) that certain banned or controlled substances cannot be issued and (4) that the prescription is filled by an appropriately-licensed pharmacy.[254]

Analysis of Pros and Cons

The bill would create a standardized legal definition of telehealth and also seeks to expand the situations in which telehealth could be used. Under current law, a physician who is allowed to perform procedures is not necessarily authorized to perform that same procedure via telehealth. Thus the bill would expand some of the procedures that telehealth can perform.

However, this legislation would do nothing to address the barriers posed by licensure and scope-of-practice laws that prevent practitioners from performing telehealth across state lines. The legislation also does not expand the services that will be reimbursed by Medicare, nor does it address any of the other reimbursement issues that currently create a barrier to telehealth.

The bill creates a new set of rules for telehealth procedures, aimed at preventing abuse of telehealth. The legislation is especially designed to prevent telehealth operations that provide health care or medicine without proper medical consultation. These are legitimate goals for public policy; however, this function can already be performed by states or through reimbursement policies.

The bill has been analyzed by the Center for Connected Health Policy which says the legislation is ambiguous because it's not clear how these rules would apply to states

[254] Ibid.

that have an existing set of rules. The bill raises questions: "will states begin to adopt this specific list of requirements when they have not required anything like it in the past?" and "If a state does not have any laws or regulations related to the items listed in the conditions, will the Matsui bill act as the standard in that state?"[255]

This legislation could be considered an example of layering, because it takes the existing system and adds a new layer of rules and standards atop it. The program would not redirect or convert any existing program.

Even though this legislation creates some definitions and standardization for telehealth, it does not address the licensing and reimbursement issues that pose a key barrier to telehealth. Nor does the bill do anything to increase the ability of providers to deliver telehealth in rural America where it would be most beneficial. The legislation also does not create a new set of beneficiaries, or do anything for health care costs. Thus, even if the proposed guidelines for telehealth consultations are sensible, this bill does not address the key barriers of telehealth, nor does it take steps to expand its potential.

Medicare Telehealth Parity Act

The Medicare Telehealth Parity Act of 2014 was introduced in the House of Representatives by California Democrat Mike Thompson.[256] The bill has four cosponsors, of which three are Democrats and one is a Republican. The bill has been referred to the Ways and Means Subcommittee on Health.

---

[255] "HR 3750: Telehealth Modernization Act of 2013 Fact Sheet," Center for Connected Health Policy, last modified October 2013, accessed September 20, 2014, http://cchpca.org/sites/default/files/resources/D.%20Matsui%203750.pdf.

[256] Medicare Telehealth Parity Act of 2014, H. Res. 5380, 113th Cong., 2nd sess., *Congressional Record,* vol. 160, daily ed. (July 31, 2014): H7181.

The legislation has five key provisions: (1) it would expand the range of sites that can serve as originating sites for telehealth, including allowing the home as a possible originating site in some instances; (2) allows for telehealth coverage of a handful of new services including diabetes education, speech language pathologists and a few others; (3) adds Medicare coverage for so-called remote patient management services for some chronic health conditions, for example congestive heart failure, chronic obstructive pulmonary disease and diabetes; (4) authorizes a Government Accountability Office (GAO) study of the effectiveness of the remote patient monitoring and another study of the effectiveness of telehealth services for therapy and; (5) authorizes the HHS Secretary to develop a system for paying for reimbursing telehealth when it takes place outside a designated originating site.

Analysis of Pros and Cons

By seeking to expand the list of eligible sites, and by expanding the range of telehealth services that would be covered by Medicare, this act would address some of the key barriers described in the first and second chapters. By expanding the sites, the legislation would further the ability of telehealth to be used in more settings, including the home. The restriction set by Medicare that only certain sites are eligible for reimbursement prevents many potential applications of telehealth.

The legislation would also enhance coverage of telehealth by explicitly calling for reimbursement for a range of new procedures. Though limited to a specific set of procedures, allowing their reimbursement will almost certainly lead to more use of telehealth, especially for chronic diseases.

The bill includes a requirement that the GAO would study whether the telehealth procedures are effective. If the study confirms the findings of the first chapter of my thesis, then it would likely identify some cost-savings from the procedures, and would likely find them to be effective. This could bolster the political case for further telehealth reforms by elevating the cost-savings argument.

This legislation is another example of conversion, in that it takes the existing Medicare system and redirects it toward funding a somewhat new model of health care, in which many chronic conditions are treated on an ongoing basis via telehealth. It also takes the initially modest range of eligible telehealth sites and expands it.

This legislation, however, does not address the licensing issues that prevent the use of telehealth across state lines.

TELE-MED Act

The TELEmedicine for MEDicare Act of 2013, or TELE-MED Act, was introduced into the House of Representatives by California Republican Devin Nunes on September 10, 2013. The bill has 64 cosponsors, 16 of whom are Democrats and 48 of whom are Republican, also indicating some bipartisan support for the legislation. The legislation has been referred to the subcommittee on health.[257,258]

The TELE-MED Act has four main provisions. This bill allows: (1) physicians who participate in Medicare to perform services on patients in other states via telehealth that they are currently licensed to perform within state lines; (2) telehealth procedures

[257] As of November 2, 2014.
[258] TELE-MED Act of 2013, H. Res. 3077, 113th Cong., 1st sess., *Congressional Record*, vol. 159, daily ed. (September 10, 2013): H5475.

performed across state lines would be regulated and enforced by the state that authorized the physician; (3) the bill would require the HHS Secretary to define the term "telemedicine services"; (4) the bill would require the Secretary to "submit to Congress a report on the plans to develop and expand the use of current and emerging Internet and communications technologies to expand access of Medicare beneficiaries to health programs."[259]

Analysis of Pros and Cons

The TELE-MED act is the only one of the four major telehealth proposals that directly addresses the issues of licensure that prevent many practitioners from practicing across state lines. By allowing physicians who participate in Medicare to provide services across state lines, this legislation breaks down a piece of the state-licensing barrier and would open the door for many services to be delivered across state lines.

This development could be of most benefit to the states identified in the first chapter as having the most severe physician shortages. Patients in Mississippi, for example, which has the fewest physicians per capita, would be able to meet with doctors from across the country for some procedures.

The expansion of licensing under the TELE-MED act is strictly limited to Medicare patients. The legislation would not necessarily apply to state Medicaid programs or to any other non-Medicare services.[260] This legislation therefore stops short of a national medical licensing regime that some proponents of telehealth advocate.

---

[259] Ibid.

[260] "HR 3077: TELE-MED Act of 2013," Center for Connected Health Policy, last modified October 2013, accessed October 21, 2014,

The law clarifies which state is responsible for enforcing behavior of the physician that practices across state lines, potentially simplifying some of the legal and malpractice issues that could arise from trans-state telehealth.

The bill would allow for some standard definitions, but it would also create some ambiguity in the terminology. For example it calls for defining the term "telemedicine services" when most other government agencies use the term "telehealth" and so it's not clear if this is meant to create a new category of service.[261]

Finally, by requiring the HHS Secretary to submit a report on expanding telehealth, the legislation creates a framework for future changes, and for possible expansion of the services available for reimbursement via telehealth. The legislation, however, does not have the features of some of the other proposals, to expand reimbursement, or to expand the range of sites to which telehealth can be provided.

This legislation could be considered an example of layering or of conversion. It resembles layering in that it creates a new type of health care service – interstate telehealth – on top of the existing state-by-state system of health care. It also resembles conversion, however, in that it takes the existing modest telehealth programs under Medicare and greatly expands its scope.

This legislation, if passed, would quickly create a system of beneficiaries in the form of patients who develop relationships with physicians in other states. This would likely lead to the policy becoming sustainable and durable. However, because the legislation changes the licensing system, it would likely be opposed by many of the

---

http://cchpca.org/sites/default/files/resources/HR%203077%20Telemedicine%20for%20Medicare%20Act%20of%202013.pdf.

[261] Ibid.

existing state boards for potentially eroding their power. Because the state lines can only be crossed by Medicare practitioners, it may lead some to consider the legislation to be an expansion of government power at the expense of the states and at the expense of private industry.

Political Feasibility of Proposals

Each of these bills have clear positive and negative characteristics which could address the inadequacy of current telehealth policies. These policies are summarized below in Table 3.1. But the reality of the Congressional legislative process is that the bills do not pass based solely on their merits. Thus, an assessment of the best bill that does not consider the political feasibility of the proposal is incomplete.

To measure the relative political viability of the different proposals, bills will be awarded points for provisions that increase their feasibility. This is similar to the method that Prinz et al., (2008) used to analyze a telehealth proposals in 2007.[262] It is by no means guaranteed that a bill with a higher score is likely to pass, but this method produces a simple numerical score that indicates whether a bill has the characteristics that are politically favorable for health care legislation.

First, the existing literature suggests that a focus on cost control is one of the key factors that can allow health care bills to gain political support. Bills with a focus on cost-control will receive one point.

Another popular idea in health care politics is reducing the variability of care between regions. Bills that facilitate physicians delivering telehealth across state lines are

[262] Prinz, Cramer and Englund, "Telehealth," 156.

one way that a patient in Mississippi and patient in Massachusetts can receive the same care, and are thus an example of reducing variability. Another example is expanding the range of sites that are eligible to receive telehealth. Therefore increasing licensing receives one point or expanding the range of eligible sites receives one point.

If the bill has been proposed in both chambers of Congress it indicates some level of bicameral support. In order to become a law, a bill must be introduced in both chambers, and any proposal that's already done so can be considered further along the process, and thus will be awarded one point. Bills will also be awarded a point for bipartisan support.

Finally, bills will have one point deducted for layering regulations atop current health care procedures. The complexity of telehealth has already been cited as one reason that Congress has been slow to adopt telehealth legislation, and adding an additional layer of complexity thus pushes the policy further from the conditions that would allow Congressional support. These scores are tabulated in Table 3.1 below.

Table 3.1. Analysis of Pending Telehealth Legislation

Bill	**H.R. 3306, S. 2662 Telehealth Enhancement Act**	**H.R. 3750 Telehealth Modernization Act**	**H.R. 5380 Medicare Telehealth Parity Act**	**H.R. 3077 TELE-MED Act**
Sponsor	Rep. Harper (R-MS) Sen. Cochran (R-MS)	Rep. Matsui (D-CA)	Rep. Thompson (D-CA)	Rep. Nunes (R-CA)
No. of cosponsors	6 Ds; 14 Rs (+1) 1 R	2 Ds; 1 R (+1)	3 Ds; 1 R (+1)	16 Ds; 48 Rs (+1)

Bill	**H.R. 3306, S. 2662 Telehealth Enhancement Act**	**H.R. 3750 Telehealth Modernization Act**	**H.R. 5380 Medicare Telehealth Parity Act**	**H.R. 3077 TELE-MED Act**
Bill status	Referred to Sc. on Health Referred to Senate Finance Cmte.	Referred to Sc. on Health	Referred to Sc. on Health	Referred to Sc. on Health
Defines telehealth	No	Yes	No	Requires HHS to define
Expands sites eligible for reimbursement	Yes (+1)	No	Yes (+1)	No
Expands services that can be reimbursed	No	No	Yes	No
Increases reimbursement	Yes, allows ACOs and experimental program to pay for some telehealth	No	Yes	No
Allows for interstate licensing	No	No	No	Yes, allows Medicare providers to practice across state lines (+1)
Focus on reducing costs	Yes, by (+1) reducing hospital readmissions	No	Partial, studies potential cost-saving (+.5)	No
Adds complexity	No	Yes (-1)	No	No
Bill in both chambers	Yes (+1)	No	No	No
Incremental change	Conversion	Layering	Conversion	Layering and conversion
Political viability	+4	0	+2.5	+2

This analysis suggests that, of the four proposals, the Telehealth Enhancement Act has the most political viability. The bill is focused largely on cost control, the bill would help reduce regional variation in health care, and the bill has been introduced in both chambers of Congress, indicating a greater degree of bicameral momentum. The Medicare Telehealth Parity Act and the TELE-MED act also both receive positive scores for provisions that would reduce the regional variation in care. The Telehealth Modernization Act appears to be the least politically viable proposal, because many of its provisions would take an already complex policy area and add an additional layer of complexity.

Recommended Course of Action and Conclusion

None of the four proposals address all of the barriers that this thesis has identified as the key restraints to telehealth, although each bill proposes steps to change the current approach to telehealth. But this analysis of the legislative proposals suggests that there is an opportunity for lawmakers to introduce legislation that would both do more to address telehealth barriers and that would be more politically feasible.

Legislation that combines the reimbursement and cost control provisions of the Telehealth Enhancement Act with the expanded licensing provisions of the TELE-MED Act would have the following advantages: this bill would expand the range of eligible telehealth sites, thus reducing regional variation, and it would allow doctors to provide some health care services across state lines, reducing another type of regional variation. The bill's focus on cost-control would be a strong selling point in Congressional debates.

This hybrid bill would not be the comprehensive legislation that is really needed to overhaul the three main barriers of telehealth: licensing, scope of practice and reimbursement. But, this hybrid bill would build off the existing Congressional proposals, make some incremental headway against the barriers to telehealth, and would maximize the impact of the politically desirable features of reducing regional variation in health care and controlling health care costs. In the aftermath of the ACA, and the overall challenges in adopting major health care overhauls, an incremental approach is likely the best that can be expected from Congress for the time being.

Traditionally, major social policy initiatives have only been driven by the federal government during liberal periods. State governments are more likely to be the "sources of innovation and expansion in the social sector" during conservative eras.[263] Applying this insight to the new Congressional Republican majority further bolsters the case that total overhaul of the telehealth system is implausible but incremental change is still possible.

While this chapter closely examines pending legislation before Congress, the future of telehealth needs to be addressed not only by Congress but also the administration. Already, the federal government has devoted hundreds of millions of dollars to telehealth.[264] The Department of Health and Human Services should take further steps to future promote telehealth at a federal level. The Centers for Medicare & Medicaid can implement changes through regulation that will largely be beneficial to telehealth, including increasing Medicare reimbursement, the definition of HPSAs and which procedures are covered by telehealth. By expanding the two-step process explained

[263] Nathan, "Federalism and Health Policy," 1459.
[264] Doarn et al., "Federal Efforts to Define and Advance Telehealth," 409.

in the second chapter, CMS can have a large influence on the future of telehealth. Together, Congress and the administration can create a friendly environment that promotes the usage of telehealth and decreases the workforce shortages that plague rural America.

Telehealth has the potential to improve health care for millions of Americans. The existing proposals before Congress could take meaningful steps to reduce the barriers to telehealth. The building blocks for better policy have taken shape and the right Congressional strategy could lay a foundation for telehealth into the future.

Thesis Conclusion

The potential exists to use telecommunications technology to change dramatically the way that health care is delivered across the United States. This thesis provided an in-depth examination of the potential for telehealth to make this transformation and examined the reasons that it has not yet done so.

The first chapter of this thesis reviewed the existing medical literature for telehealth, which suggests that the technology has considerable promise. Though much work remains for medical research as new techniques are developed, this review finds that telehealth has been found effective for a wide range of treatments thus far, with many more under review. The expansion of telehealth is thus something that is medically justified.

Telehealth holds particular promise for improving the delivery of health care to people in underserved rural areas. Rural America faces the challenges of a generally older, poorer and sicker population and of a shortage of medical providers to deliver their care. By allowing physicians to meet with patients via telecommunications across time and space, telehealth could greatly increase rural Americans' ability to access quality health care. Just as rural patients could benefit from remote interactions with physicians, rural physicians stand to benefit from the ability to connect with remote specialists.

The original contribution of the first chapter of this thesis was a detailed state-by-state review of the physician shortage. This analysis raised the question: could the use of telehealth help ensure that each state has enough physicians to meet the demand of its population, even as the demands of the population change over time? The results of this

analysis suggested that telehealth can play a significant role in reducing the shortage of physicians that faces many states.

The second chapter of this thesis built upon the first. If telehealth has been determined to be clinically effective and if it could help bridge the geographical divide separating rural patients from superior health care, then why is it not more widespread?

The answer is that federal and state health care policies have created barriers to more widespread use of telehealth. This chapter's original analysis included a study of the legislative history that led to the current system and a dissection of the three key barriers. The first of those barriers is the state-by-state licensure system that developed after the Civil War and has yet to be fully modernized. The second is the state-by-state scope-of-practice rules that narrowly define who may perform certain health care procedures. The third barrier is the fractured system for reimbursing health care expenses in the United States: where expenses are split between the federal government's Medicare system, private insurance and Medicaid systems administered by the states.

Even policies that are designed to encourage telehealth, such as provisions allowing for Medicare reimbursement for some procedures, have sometimes created new barriers. For example, Medicare has agreed to pay for telehealth encounters in areas with a rural shortage but therefore will not pay for them in urban and suburban settings.

This chapter finds that the complex matrix of telehealth policies that exist in the United States results from federalism. The fact that states have the power to set their own regulations, and that each of the 50 states has created their own medical licensing boards, has led to a system in which health care is deeply reliant on one body to pay many of its

bills (the Medicare system) but on rules out of each state to govern how medicine can be practiced.

This analysis shows that the expansion of telehealth has been delayed, in part, by a struggle between state and federal power over who gets to set the regulations going forward. The debate is not primarily over whether telehealth should be encouraged – as the first chapter showed, telehealth can be medically effective and beneficial for patients in remote areas. Instead the debate is whether states or the federal government should control the spread of telehealth.

This chapter also discussed some of the key concerns that have been raised about telehealth: Some researchers and physician groups have reservations about telehealth, arguing that some procedures have not been sufficiently studied. They also fear that allowing physicians from out-of-state to practice medicine could lead to a deterioration of care. A small community of telehealth startups has developed in the United States, and though these remain a small part of the industry, they could one day emerge as major new players in the health care landscape. While these concerns bear watching in the future, the telehealth system is not currently heading in the direction of low-quality care. For now, the debate over telehealth is best characterized as a struggle under federalism.

This chapter concluded with a case study of telestroke in the state of Oregon, showing how a state government can successfully create an environment in which telehealth can thrive. This case study showed how states can be "laboratories for democracy" in adopting policies that are different from those of the federal government and demonstrating whether or not they work. This case study showed that with the right

support, including steps from Oregon to surmount some of the policy barriers, telehealth can be an effective part of the health care system.

The third chapter of this thesis built off the first two chapters with an original analysis of current federal policy proposals to advance telehealth. If telehealth is medically effective and could successfully overcome the geographical challenges and workforce shortages for rural patients, and if telehealth is restrained by policy barriers, are the existing policy proposals before Congress likely to be effective?

This chapter studied the existing political science literature on why health care reform proposals have faced such a challenging environment in Congress. This literature has implications for whether the current Congressional proposals to expand telehealth are likely to pass.

This chapter's analysis then looked at four Congressional bills and analyzed their provisions to determine: if they would help expand the geographical footprint of telehealth that was analyzed in the first chapter, if they would help overcome the barriers of licensure and reimbursement analyzed in the second chapter, and whether they appear to be politically viable, as analyzed in the third chapter's literature review. None of the proposed bills represent comprehensive legislation that addresses all the needs of telehealth to expand to its potential. However, each bill does propose meaningful steps to change the current approach to telehealth.

A bill that addresses licensing, scope of practice and reimbursement would maximize the potential of telehealth and create a climate in which telehealth could blossom. While the new Congress elected may be hesitant to support a health care bill, legislation that is framed around the potential to control costs and the potential to reduce

inequality in care between rural and urban communities, and between different parts of the country, could have broad appeal.

Findings

The findings of the first chapter of this thesis showed that the physician shortage is indeed more acute in rural America. The shortage of physicians can be quantified and this paper's original analysis of state-by-state data showed how telehealth can reduce the physician workforce shortage. By studying the supply and demand for physicians, this paper found that telehealth could play a significant role in increasing the access to care in rural America.

However, even in an absolute best-case scenario this analysis found that some health care gaps would remain, with the states of Mississippi and Idaho facing shortages of physicians under even the most optimistic scenarios of what telehealth could accomplish. Thus this research finds that telehealth is not a panacea for the well-documented shortage of physicians. The most rural states would likely require policy interventions beyond the adoption of telehealth in order to ensure that there are enough doctors to meet patient demand.

The second chapter found that the barriers to telehealth have arisen primarily because of the federalist system. The constitution did not clearly place health care in the domain of the states or in the domain of the federal government. As a result, more than 70 bodies across the United States write their own licensure and scope-of-practice rules, and delivering health care across state lines is difficult to impossible.

The key reason that telehealth barriers remain is that different interest groups have different ideas about *who* should regulate telehealth, not because there is substantial debate about *whether* telehealth should be allowed. Finally, the case study of telestroke care in Oregon provides some reason for optimism. By making careful legal changes to licensure and reimbursement rules, Oregon has demonstrated in the real world that telestroke can be a successful program. Thus, Oregon serves as a "laboratory of democracy," providing a state-level example of how policy makers could overcome the national barriers to telehealth.

The third chapter found that some of the pending legislation before Congress would address pieces of the key barriers to telehealth, although none of the bills address all of the barriers. This policy analysis also studied the political viability of the four key bills focused on telehealth, and found that an opportunity exists to combine some of the provisions in the various bills to create an even more politically viable policy.

In recent years, health care policy makers have been focused on the divisive debate over the ACA. Telehealth does not face, at this point, heated Congressional opposition. And the analysis finds that bipartisan support for telehealth proposals remain common. Telehealth, instead, suffers from the lack of a powerful champion to push the legislation through.

This chapter found that two of the political ideas that can motivate health care reforms are cost control and reducing the geographic variation of care. Both of these ideas are effective at attracting champions and could be particularly relevant for telehealth. Telehealth can provide care earlier, more easily and more quickly, potentially helping with costs without sacrificing quality. And it could potentially allow patients in

Mississippi, for example, to see the same specialists as patients in Massachusetts, eliminating the geographic variation of care. A legislative proposal focused at both these ideas could be politically potent.

The findings of each of these chapters build upon each other. The gaps in health care coverage are quantifiable – telehealth could help overcome them. The barriers to telehealth and their root causes have been identified – they can be removed. Policies to create a better telehealth system in the United States have been proposed – they can be improved upon until they are more politically viable.

This thesis has outlined the potential and pitfalls for telehealth and suggested a route forward: telehealth has the potential to radically reshape the delivery of health care in rural America, if only policy makers will allow it.

The Future of Telehealth

While this paper's analysis has been primarily focused on the research into telehealth thus far, the current condition of telehealth, and the prospects for current legislative proposals, I believe this research has some clear implications for what the future of telehealth is likely to hold.

First, telecommunications technology and broadband access in the United States are continuing to improve rapidly. This means that the technological capabilities are only growing, and this will likely make many procedures more feasible and less expensive. Until quite recently, setting up telehealth programs could be so expensive that the

programs often relied on government grants but, according to Tom Morris of ORHP, the technology has often become cheap enough that this support is no longer necessary.[265]

Secondly, the medical procedures are likely to be continually refined and improved, leading to the potential for better telehealth. This combination of improved technology and improved medicine is likely to increase the desire for an expansion of telehealth. While Congress and state legislatures can be slow to respond to technological change, they cannot ignore it forever.

This naturally raises the question of how Congress will respond. As suggested by Nathan (2005), the federal government often leads policy experimentation during liberal periods but states do so during conservative periods.[266] With the rise of new conservative majorities in both houses of Congress, this suggests that a major policy overhaul is unlikely for the time being. But, even if comprehensive federal reform is off the table, there is still the opportunity for the states to behave as laboratories of democracy, as studied in the second chapter. And there is still scope for incremental policy changes as discussed in the third chapter of this thesis.

States' continued experimentation with telehealth is inevitable. Given the success of Oregon's telestroke program, for example, it is highly likely that other states will seek to copy this success. Other telehealth programs that prove effective are also likely to attract imitators. Because some of the incremental federal proposals studied in the third chapter have Republican sponsors and bipartisan support, they could be examples of the sort of legislation that lawmakers pass to prove they are doing something. Thus

[265] Morris, interview by author.
[266] Nathan, "Federalism and Health Policy," 1459.

legislative changes that expand the range of eligible telehealth sites or increase certain types of reimbursement are plausible, though not guaranteed, in the next few years.

States have already begun to experiment with licensure compacts in nursing, allowing a nurse licensed in one state to practice with another. Some regional groups of states may experiment with similar compacts for physicians. For the states that make such a compact, there could be significant regional increases in telehealth. If successful, these experiments could also inspire federal lawmakers to look harder at ways to allow care to be delivered across state lines.

Looking further to the future, there is likely to be some period in which Congress again coalesces around a major overhaul to the health care system. By this point, many applications of existing telehealth procedures will have proven themselves over time. The technology and medical methods of telehealth are likely to only improve. This could lead to a very strong underpinning for telehealth and other health information technology reforms to be a major component of the next major federal foray into health care policy.

Limitations of This Research

This thesis specifically looks at how telehealth can improve access to care, the barriers that are preventing widespread use of telehealth, and what public policy changes could create a friendlier climate for telehealth utilization.

Though this thesis reviewed some of the existing medical studies that have been published on telehealth, this was not a medical analysis. For the field of telehealth, much work remains to be done sorting out which procedures are the most clinically effective, which are ready to be widely deployed, and which need further work. As ORHP

Associate Administrator Morris, explained, "We don't have a lot of big studies that show that a certain telehealth application is clinically equivalent to a face-to-face interaction. So that's probably the next step now that we know it improves access."[267]

The thesis did not examine some of the privacy issues that surround the use of telecommunications in medicine. The Health Insurance Portability and Accountability Act (HIPAA) rule applies to all health care, including telehealth. Transmitting medical information over telecommunications raises concerns about hacking or accidentally leaking private information that are unique to telehealth visits and do not apply to face-to-face visits. Even though "security is not the primary focus of the telemedicine research community," one systematic review of telemedicine shows that there are concerns with authorization, authentication and accounting for medical encounters that occur via telehealth.[268] Just as online banking raised a range of new issues for the finance industry, telehealth poses new challenges for the health care industry. Future researchers must probe the relationship between privacy and telehealth. Some questions they can consider is how can patients be ensured that their information is protected, how can providers be sure that they're complying with privacy laws, and where are the key electronic vulnerabilities.

This thesis did not examine some of the technological issues that may arise. For example, what are appropriate standards for securing telecommunications connections to ensure the doctor and patient do not lose contact during a procedure? What are the appropriate technological backups? Currently telehealth often takes place between a

[267] Morris, interview by author.
[268] Vaibhav Garg and Jeffrey Brewer, "Telemedicine Security: A Systematic Review," Journal of Diabetes Science and Technology 5, no. 3 (May 2011): n.p., accessed October 30, 2014, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3192643.

specialist at a hub site and a less-specialized provider at the spoke site. While the presence of a health care professional at the spoke site is a safeguard, is it sufficient? Future scholars should further examine these technological safeguards and the progress of telehealth providers in adopting them.

Another area for further study is the usage of telehealth in urban areas. Currently Medicare only reimburses telehealth in HPSAs, areas with a provider shortage. While my policy recommendations are to expand the sites eligible for telehealth reimbursements, I don't closely analyze how telehealth expansion could benefit urban populations.

Questions that could be explored include: What are the similarities and differences between underserved urban and rural areas? When can telehealth be clinically effective for the inner-city populations? Are there best practice models that can be used in any population-based region?

Another limitation is that due to the increasing utilization of mobile phones and rising broadband availability, there will continue to be a trend toward more consumer-friendly and mobile e-health practices. This paper was primarily focused on more traditional physician interactions, but the potential for mobile e-health would also be an interest for a future research project.

Technology has profoundly changed the delivery of the health care system and how health care is accessed. These technologies move much faster than researchers can analyze them and certainly much faster than lawmakers can set policies to govern them. The intersection of telecommunications technology and health care will continue to be a rich vein for researchers deep into the foreseeable future.

Appendix A

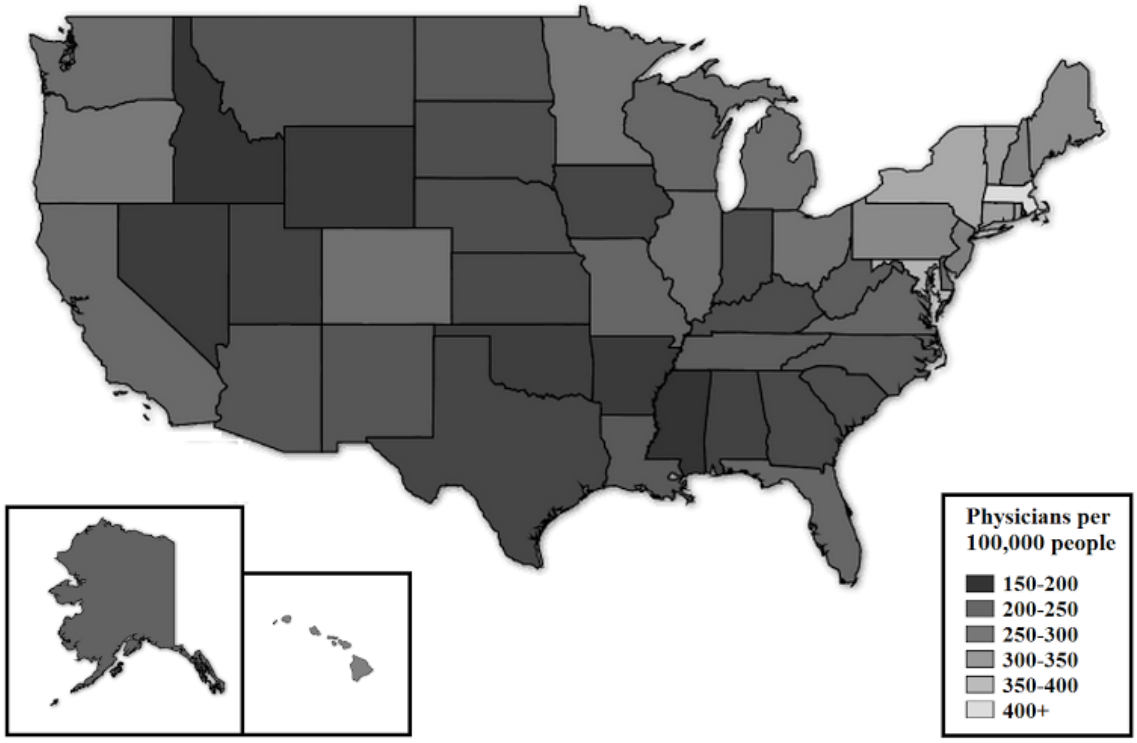
Table 1.7. Physician-to-population ratio of U.S. states, 2012

	Population	Active Physicians	Rate Per 100,000 Residents
United States	**313,914,040**	**817,850**	**260.5**
Massachusetts	6,646,144	28,016	421.5
Maryland	5,884,563	21,455	364.6
New York	19,570,261	68,273	348.9
Rhode Island	1,050,292	3,548	337.8
Vermont	626,011	2,084	332.9
Connecticut	3,590,347	11,949	332.8
Maine	1,329,192	4,084	307.3
Pennsylvania	12,763,536	38,565	302.1
New Hampshire	1,320,718	3,942	298.5
Hawaii	1,392,313	4,037	289.9
New Jersey	8,864,590	25,604	288.8
Oregon	3,899,353	10,995	282
Minnesota	5,379,139	14,814	275.4
Ohio	11,544,225	31,248	270.7
Michigan	9,883,360	26,476	267.9
Colorado	5,187,582	13,869	267.3
Washington	6,897,012	18,395	266.7
Delaware	917,092	2,439	265.9
Illinois	12,875,255	33,874	263.1
California	38,041,430	97,977	257.6
Wisconsin	5,726,398	14,578	254.6
Missouri	6,021,988	15,282	253.8
Florida	19,317,568	48,852	252.9
Virginia	8,185,867	20,647	252.2
Alaska	731,449	1,813	247.9
Tennessee	6,456,243	15,568	241.1
West Virginia	1,855,413	4,466	240.7
North Carolina	9,752,073	23,034	236.2
North Dakota	699,628	1,651	236
Louisiana	4,601,893	10,846	235.7
New Mexico	2,085,538	4,839	232
Arizona	6,553,255	15,133	230.9
Montana	1,005,141	2,297	228.5
South Dakota	833,354	1,846	221.5
Kentucky	4,380,415	9,678	220.9

Nebraska	1,855,525	4,080	219.9
Indiana	6,537,334	14,295	218.7
South Carolina	4,723,723	10,250	217
Georgia	9,919,945	21,300	214.7
Kansas	2,885,905	6,151	213.1
Iowa	3,074,186	6,414	208.6
Texas	26,059,203	54,167	207.9
Utah	2,855,287	5,801	203.2
Alabama	4,822,023	9,681	200.8
Oklahoma	3,814,820	7,552	198
Nevada	2,758,931	5,361	194.3
Wyoming	576,412	1,102	191.2
Arkansas	2,949,131	5,629	190.9
Idaho	1,595,728	2,938	184.1
Mississippi	2,984,926	5,396	180.8

Appendix B

Figure 1.1. Physician-to-population ratio in U.S., 2012



Appendix C

Table 1.8. Physician shortage per 100,000 people, under different demand scenarios (negative numbers indicate there is no physician shortage)

	Baseline scenario	Economic growth scenario	Age utilization scenario	Unnecessary procedures eliminated scenario	Growth and unnecessary procedures scenario
United States	37.5	66.5	61.5	-41.5	-20.5
Massachusetts	-123.5	-94.5	-99.5	-203	-181.5
Maryland	-66.6	-37.6	-42.6	-145.6	-124.6
New York	-50.9	-21.9	-26.9	-129.9	-108.9
Rhode Island	-39.8	-10.8	-15.8	-118.8	-97.8
Vermont	-34.9	-5.9	-10.9	-113.9	-92.9
Connecticut	-34.8	-5.8	-10.8	-113.8	-92.8
Maine	-9.3	19.7	14.7	-88.3	-67.3
Pennsylvania	-4.1	24.9	19.9	-83.1	-62.1
New Hampshire	-0.5	28.5	23.5	-79.5	-58.5
Hawaii	8.1	37.1	32.1	-70.9	-49.9
New Jersey	9.2	38.2	33.2	-69.8	-48.8
Oregon	16	45.0	40	-63	-42
Minnesota	22.6	51.6	46.6	-56.4	-35.4
Ohio	27.3	56.3	51.3	-51.7	-30.7
Michigan	30.1	59.1	54.1	-48.9	-27.9
Colorado	30.7	59.7	54.7	-48.3	-27.3
Washington	31.3	60.3	55.3	-47.7	-26.7
Delaware	32.1	61.1	56.1	-46.9	-25.9
Illinois	34.9	63.9	58.9	-44.1	-23.1
California	40.4	69.4	64.4	-38.6	-17.6
Wisconsin	43.4	72.4	67.4	-35.6	-14.6
Missouri	44.2	73.2	68.2	-34.8	-13.8
Florida	45.1	74.1	69.1	-33.9	-12.9
Virginia	45.8	74.8	69.8	-33.2	-12.2
Alaska	50.1	79.1	74.1	-28.9	-7.9
Tennessee	56.9	85.9	80.9	-22.1	-1.1
West Virginia	57.3	86.3	81.3	-21.7	-0.7
North Carolina	61.8	90.8	85.8	-17.2	3.8
North Dakota	62	91.0	86	-17	4
Louisiana	62.3	91.3	86.3	-16.7	4.3
New Mexico	66	95.0	90	-13	8
Arizona	67.1	96.1	91.1	-11.9	9.1

Montana	69.5	98.5	93.5	-9.5	11.5
South Dakota	76.5	105.5	100.5	-2.5	18.5
Kentucky	77.1	106.1	101.1	-1.9	19.1
Nebraska	78.1	107.1	102.1	-0.9	20.1
Indiana	79.3	108.3	103.3	0.3	21.3
South Carolina	81	110.0	105	2	23
Georgia	83.3	112.3	107.3	4.3	25.3
Kansas	84.9	113.9	108.9	5.9	26.9
Iowa	89.4	118.4	113.4	10.4	31.4
Texas	90.1	119.1	114.1	11.1	32.1
Utah	94.8	123.8	118.8	15.8	36.8
Alabama	97.2	126.2	121.2	18.2	39.2
Oklahoma	100	129.0	124	21	42
Nevada	103.7	132.7	127.7	24.7	45.7
Wyoming	106.8	135.8	130.8	27.8	48.8
Arkansas	107.1	136.1	131.1	28.1	49.1
Idaho	113.9	142.9	137.9	34.9	55.9
Mississippi	117.2	146.2	141.2	38.2	59.2
Number of states with shortage	**42**	**45**	**45**	**14**	**23**

Appendix D

Table 1.9. Physician shortage per 100,000 people, under different scenarios but assuming maximum use of telehealth. Negative numbers indicate there is no physician shortage.

	Baseline scenario	Economic growth scenario	Age utilization scenario	Unnecessary procedures eliminated scenario	Growth and unnecessary procedures scenario
United States	-7.2	17.45	13.2	-74.35	-56.5
Massachusetts	-168.2	-143.55	-147.8	-235.35	-217.5
Maryland	-111.3	-86.65	-90.9	-178.45	-160.6
New York	-95.6	-70.95	-75.2	-162.75	-144.9
Rhode Island	-84.5	-59.85	-64.1	-151.65	-133.8
Vermont	-79.6	-54.95	-59.2	-146.75	-128.9
Connecticut	-79.5	-54.85	-59.1	-146.65	-128.8
Maine	-54	-29.35	-33.6	-121.15	-103.3
Pennsylvania	-48.8	-24.15	-28.4	-115.95	-98.1
New Hampshire	-45.2	-20.55	-24.8	-112.35	-94.5
Hawaii	-36.6	-11.95	-16.2	-103.75	-85.9
New Jersey	-35.5	-10.85	-15.1	-102.65	-84.8
Oregon	-28.7	-4.05	-8.3	-95.85	-78
Minnesota	-22.1	2.55	-1.7	-89.25	-71.4
Ohio	-17.4	7.25	3	-84.55	-66.7
Michigan	-14.6	10.05	5.8	-81.75	-63.9
Colorado	-14	10.65	6.4	-81.15	-63.3
Washington	-13.4	11.25	7	-80.55	-62.7
Delaware	-12.6	12.05	7.8	-79.75	-61.9
Illinois	-9.8	14.85	10.6	-76.95	-59.1
California	-4.3	20.35	16.1	-71.45	-53.6
Wisconsin	-1.3	23.35	19.1	-68.45	-50.6
Missouri	-0.5	24.15	19.9	-67.65	-49.8
Florida	0.4	25.05	20.8	-66.75	-48.9
Virginia	1.1	25.75	21.5	-66.05	-48.2
Alaska	5.4	30.05	25.8	-61.75	-43.9
Tennessee	12.2	36.85	32.6	-54.95	-37.1
West Virginia	12.6	37.25	33	-54.55	-36.7
North Carolina	17.1	41.75	37.5	-50.05	-32.2
North Dakota	17.3	41.95	37.7	-49.85	-32
Louisiana	17.6	42.25	38	-49.55	-31.7
New Mexico	21.3	45.95	41.7	-45.85	-28
Arizona	22.4	47.05	42.8	-44.75	-26.9
Montana	24.8	49.45	45.2	-42.35	-24.5

South Dakota	31.8	56.45	52.2	-35.35	-17.5
Kentucky	32.4	57.05	52.8	-34.75	-16.9
Nebraska	33.4	58.05	53.8	-33.75	-15.9
Indiana	34.6	59.25	55	-32.55	-14.7
South Carolina	36.3	60.95	56.7	-30.85	-13
Georgia	38.6	63.25	59	-28.55	-10.7
Kansas	40.2	64.85	60.6	-26.95	-9.1
Iowa	44.7	69.35	65.1	-22.45	-4.6
Texas	45.4	70.05	65.8	-21.75	-3.9
Utah	50.1	74.75	70.5	-17.05	0.8
Alabama	52.5	77.15	72.9	-14.65	3.2
Oklahoma	55.3	79.95	75.7	-11.85	6
Nevada	59	83.65	79.4	-8.15	9.7
Wyoming	62.1	86.75	82.5	-5.05	12.8
Arkansas	62.4	87.05	82.8	-4.75	13.1
Idaho	69.2	93.85	89.6	2.05	19.9
Mississippi	72.5	97.15	92.9	5.35	23.2
Number of states with shortage	**28**	**39**	**38**	**2**	**8**

Appendix E

Telephone Interview by Author with Tom Morris, Associate Administrator for Rural Health Policy
U.S. Department of Health and Human Services, Office of Rural Health Policy
Interviewed from Washington, DC on November 7, 2014

Erin Mahn: What are the problems that rural health has when it comes to access to health care?

Tom Morris: Lack of providers, geographic isolation from more specialized care, those would be the main two.

Mahn: Can telehealth help with those barriers, and if so how?

Morris: Telehealth definitely has helped with it. We've been investing in telehealth at the federal level and others folks have for 25 or 30 years now. Without a doubt it improves access to care. Especially for services that aren't available locally. For mental health, for other specialty services, it's worked quite well. I think the challenge moving forward is more like: what's clinically effective and what's the value added. We don't have a lot of big studies that show that a certain telehealth application is clinically equivalent to a face-to-face interaction. So that's probably the next step now that we know it improves access.

Mahn: Where do you see telehealth holding the most potential?

Morris: Mental health obviously. If you look at the Medicare billing. There's an article that looked at Medicare billings over a multi-year period and by far mental health was the dominant specialty area in Medicare.

But I think what we're seeing now is other applications: tele-emergency care, tele-stroke, tele-dermatology, there's obviously some applications of it that work better than others. And tele-dermatology, because you can get better resolution than you can with your own eyeballs with some cameras, and there's not a lot of dermatologists in rural and underserved areas. Telestroke, the ability to coordinate and find out if somebody has a clot, and whether you can use one of those clot-bluster drugs, you can avoid all the worst impacts of a stroke, and that person can walk out of a rural hospital that day.

And tele-emergency care, just being able to handle a broad range of trauma care given the fact you don't see a lot of it. Having the backup with an emergency medicine specialist is a big plus.

Mahn: What are some ways the administration has promoted the use of telehealth in rural?

Morris: Probably mostly through federally funded grants over the years. Obviously we've been funding it through HRSA since the early 1990s, CMS before it started paying for it, back when they were the Health Care Financing Administration, they had demonstration grants in the 1990s. The Commerce Department. The NTIA, National Telecommunications Information Administration, in the 1990s they were funding telemedicine grants and then USDA still is funding telemedicine and distance learning.

That's the primary way to get networks started. In that time the cost has come down so much that you don't really need a federal grant to get a telemedicine system up and running. On the side of infrastructure, the USDA has a broadband program, then there's the Rural Health Program within the Universal Service Provision, that the Federal Communication Commission administers which is $400 million a year to support infrastructure buildout of broadband.

Mahn: Besides, the clinical studies, what do you think are the main barriers to telehealth?

Morris: Licensure is still a barrier although I think there are real ways to make it better. States are starting to look at compacts and reciprocity and model language they can use that would make it not a barrier. The primary barrier are the states that still choose to require somebody to be fully licensed in one state for telemedicine even if they're licensed in an adjoining state. There's some information on this from telehealth licensure portability grantees.

And then reimbursement. I think we have reimbursement for a lot of procedures under Medicare. The Telehealth Resource Center has published a study last year that sort of looked at how many state Medicaid programs are paying for it and quite a few were. But a lot of private payers aren't paying and so until we see broader-based reimbursement across payers that's going to be a barrier.

I mentioned tele-emergency before. One of the barriers there is, on the Medicare side, you know, you're in a rural hospital, somebody comes in with a trauma issue, you're a primary care doctor or a nurse practitioner or a PA and you're looking at the injuries. You want to get a specialist involved, you link in the specialist, he looks over your shoulder through the camera. Only one of you can go for that service under Medicare. There's a prohibition against paying twice for the same service, and so, the ability to not have to do that, to allow that remote specialist to also bill, would be a plus.

Mahn: In your experience do the rural sites tend to be eager to adopt telehealth, or are they wary of this?

Morris: I think it's all over the place. I think that some folks have really embraced it, there's an amazing network in Idaho, there's good networks in most of the regions of the country. There are other places where the telehealth equipment is installed and is only used once or twice a week. Some rural providers say it's too much of a burden because you only get to bill for a facility fee of $25 under Medicare. Some don't even bill for it,

though they do provide services, because it's more burden than benefit. So that's a bit of a challenge.

I think that to make telemedicine work it takes a fair amount of scheduling and making it fit within the practice style of both the rural providers and the specialist providers who are linking to. It's really evolved a lot, it used to be that telehealth would be like one arm of an academic health center and they'd have a couple suites where specialists would wander in and out at various times during the week and link to X number of clinics or hospitals in more remote areas. Now we're starting to see more integration of that so that it's within each academic discipline and you don't have to walk across the campus to do your telemedicine consults. You can do it from where you are in the department of dermatology.

Mahn: What do you think is likely to be the next big change in telehealth?

Morris: Probably the biggest change to come up is where it will fit in value-based payment. As we move into Accountable Care Organizations, patients have their medical home, I think there are opportunities once we get out of the fee-for-service system, where it's just seen as extra cost. It can fit well into the value focus proposition. Then I think you have a chance for people to use it more because it's a more efficient way to monitor care. You might see more applications for home-monitoring and things like that. Right now, if you do home monitoring in a fee-for-service system it's just added cost to you. You can't bill for it. Same thing in post-acute care, and recertification of patients for home health or skilled nursing episodes, you can't do that via telehealth. When you can do that via telehealth or when you can substitute telehealth visits for having a doc visit a patient in a nursing home or doing a home health visit. Because there's no distinction between whether it's in person or face-to-face, you're only focused on the outcome, you might see a lot of expansion of it.

Mahn: Why do you think private insurance hasn't picked up telehealth as quickly as people would like?

Morris: They have two reasons, probably. One is, for them it's extra cost. As long as we do fee-for-service, every time you say `I'm going to pay for telehealth' all that's going to happen is you're going to get more billing for telehealth. And that leads to the second question I think they face which is `where's the evidence-base for it?' If' I'm going to pay for tele-emergency care, if I'm Blue Cross Blue Shield and I'm going to start covering tele-emergency am I going to see the savings elsewhere in my system, and there's not enough large scale clinical studies that would answer that question.

Mahn: If telehealth is opened up more broadly, do you think there'd be a risk of a race-to-the-bottom where large corporations come in and take over telehealth?

Morris: That's a concern I have too. Telehealth as part of a system of care makes a lot of sense. Telehealth where you can walk down any corner and run your credit card through a system and immediately link to a specialist you have no relationship to, and he has no

relationship to your primary care provider. I do worry about that. It doesn't think about outcomes, it only thinks about procedures. It may be great for the consumer who has an immediate need but I worry about it driving up utilization without showing value.

Mahn: Any additional comments?

Morris: One thing I'd add is telehealth is great and Health IT and Electronic Health Records are great. I don't know how much integration there is between the two. Everybody's investing in meaningful use of EHRs. Do they operate in sync with how you do telehealth? What good is a telehealth consult if you can't, at the same time, pull up on electronic health record? I still feel like they're on parallel tracks right now.

The larger part there is what we really ought to be saying is health IT writ large, of which EHRs part of it, home monitoring is part of it, mobile health applications and telehealth. And make less distinction about individual entities. They're all tools for a clinician to use to improve outcomes. If you look at it right now they're all separate silos.

Mahn: Telehealth is widely available in rural but do you think there's a model out there that could be used in urban centers as well?

Morris: Tele-ICU actually started in urban areas and was used in, I think, Septera Health Systems down in the Tidewater area, really broad adopter of tele-ICU and it was because they had four hospitals in that region and they could use one intensivist to monitor four different ICUs. You think about inner-city areas, it's not quite as much but it definitely has significant application for under-served urban areas.

Appendix F

National Rural Health Association
Rural Health Award Recipients' video transcript
April 28, 2014
Transcribed by author

Maj. Shawn McIntosh: Hi. My name is Maj. Shawn McIntosh, along with the home telehealth monitoring team; it is my pleasure to introduce the receipt of the Louis Gorin Award for Outstanding Achievement in Rural Health Care, the executive director of the Alaska Federal Health Care Partnership, Mr. Sam Johnson.

Samuel C. Johnson III: Good afternoon. After having served in the Air Force for over 26 years and retiring as Colonel, I have received a few awards along the way. None of those awards were more meaningful to me than to have been selected by the National Rural Health Association to receive the Louis Gorin award for outstanding achievement in rural health care.

From 1986 until 1989 as an Air Force Legislative Liaison Officer I was honored and privileged to have served and traveled with Senator Ted Stevens. During that time I became infected with Senator Steven's passion to leave Alaska a better place and to serve Alaskans.

When I returned to Alaska in 1989 I began to infect as many people as I could possibly infect with that same passion to leave it a better place, to clean up the environmental hazards of the past, to protect people from environmental hazards, to provide safe drinking water, to leave no stone unturned to improve the remote Alaska and health care in the remote state.

So it might have been the disease I contracted from Senator Ted Stevens or my drive to leave Alaska a better place, but the real credit goes to all those people that worked so tirelessly day in and day out to leave Alaska a better place, to improve the quality of life for people in rural Alaska.

So it might be my name on the Louis Gorin award but the real credit goes to all those people I have had the honor of serving with. So I am greatly honored and very pleased to accept the Louis Gorin award on behalf of all those people that I had the pleasure of working with over the years that have given so much of themselves to improve the quality of life and health care for Alaskans in remote and isolated areas. Truly the tribute belongs to them.

Thank you so much for this prestigious award.

McIntosh: Mr. Johnson has successfully transformed his compassion for the health and well-being of highly rural Alaskans into successful health care solutions by sharing resources, leveraging technology and building highly collaborative coalitions.

It is also my pleasure to introduce the winner of the Outstanding Rural Health Program award. This short video will introduce the Alaska Federal Health Care Partnership's Home Telehealth Monitoring program.

Johnson: There is 280,000 federal patients in the state of Alaska. That's roughly 42 percent of the state's population. A very large number of those patients live in the bush where there is no road system. Some of these villages when you are sick the weather can be bad and you literally cannot get out so you need some way to connect with the patient.

Health care in remote Alaska is very expensive. The management of chronic disease, in my opinion, requires constant management, constant education, and constant interface with that patient. So how do you provide health care to people as close to home as possible? The only way we think we can do it is through technology.

Phone rings

Patient: Hello.

Phone operator: Good morning. Is Shirley available?

Patient: This is Shirley.

Phone Operator: Oh hi, ma'am. This is the telehealth station. I just wanted to call and check in because we see your blood pressure came in a little elevated this morning. Are you feeling alright?

Marguerite Linteau, Chief Clinical Officer of Critical Signal Technologies (CST) – CST is a monitoring company that keeps people independent and safe in their home from personal emergency response systems to medication management systems and telehealth. We can have their all of their vital signs in a date range from their last visit forward sitting there ready for the doctor to look at it.

Johnson: You are empowering the patient to look after their own care, to manage their own care, you are not only helping them live a better life, you are reducing the cost of the system.

Video text: According to the Alaska Native Medical Center, a one year review of three patients showed over $600,000 in savings.

Johnson: What an honor it is to receive two awards from the National Rural Health Association. I am extremely pleased to be able to receive the Outstanding Rural Health Program award on behalf of the Alaska Federal Health Care Partnership and the Home Telehealth Monitoring Team. Our strong, innovative and collaborative partnership enabled us to increase access to high quality health care in rural Alaska.

Appendix G

Interview by Author with David Schmitz, MD
Chief Rural Officer and Director of Rural Training Tracks at the Family Medicine Residency of Idaho
Interviewed in Las Vegas, NV on April 22, 2014

Erin Mahn: What evidence have you seen that telehealth is having an impact in rural health care?

David Schmitz: One of the things I would share with you is in the work we've done with the Community Apgar Program.

The Community Apgar Program, actually, has been performed in several states: Idaho, Wyoming, North Dakota, Wisconsin, Alaska, and Maine. Now we're doing the work in Indiana, Montana and Utah. Those three states we're just starting. The Community Apgar Program looks at 50 factors, which are weighted for importance, in rural recruitment and retention of family physicians to either Critical Access Hospitals or rurally-located FQHCs [Federally Qualified Health Centers].

One of those 50 factors is telemedicine. We actually ask this question and we ask it of both practicing rural physicians as well as hospital administrators or FQHC administrators who are looking to recruit or retain a family physician workforce, as to the importance of the factor related to telemedicine. I have some anecdotal evidence, although we've not done a statistical analysis, to give you the confidence intervals around this. But I can tell you we have anecdotally in both stories and examples come up with the fact that telemedicine definitely has an impact.

Mahn: What areas are seeing the biggest impact?

Schmitz: I would tell you right now based on our anecdotal experience doing these interviews -- we've interviewed several hundred persons -- telepsychiatry is probably the most utilized. I'm not sure if that's both due to demand as well as payment systems. Part of telemedicine being accessible for people, is to have a mechanism for both rendering the care -- access -- and also how is that supported and reimbursed -- how is it paid for.

There's other issues coming to the forefront around interstate licensure. That's probably most predominant in the area around teleradiology. But telepsychiatry has certainly probably in my mind been the number one change with regard to increased access.

The other two examples that I feel are really salient, although probably not as frequently used would include tele-emergency room. I'm reminded of a system in North Dakota where tele-ER has become used more frequently in critical access hospital settings. It would not be uncommon in North Dakota to have a small critical access hospital in a community between one and two thousand people with a catching area quite a bit larger.

Maybe 8, 000 people. So you can imagine the medical staff might be as small as one or two physicians with several PAs or nurse practitioners providing additional staff support.

I was talking to one of the physicians, he had a good deal of experience and he shared with me essentially what you can do. If you had a big trauma and there were two trauma victims from a motor vehicle accident you could literally push a red button on the wall and up would come the emergency room physicians, or the trauma center, to be there with you during the trauma situation, the attempt at resuscitation.

I think what was most noticeable in that lesson for me is that it wasn't that the care was rendered differently. But you can imagine in a resource-limited environment like a small hospital you can have outcomes that are successful and you can do everything you need to do and still have the treatments fail.

This physician told me, he said, "you know, having the physician on the other hand, and the person who can take the notes on the code. It didn't necessarily change our care but when I heard we had done everything we had been able to do for the patient, I was able to get to sleep in just a couple of nights instead of just a couple of weeks."

Mahn: So is telehealth something that helps boost the confidence of physicians?

Schmitz: There can be a rendering of not feeling quite as isolated, not feeling quite as alone, as a practitioner, as a clinician, as a physician. Especially in those tough moments when it's usually your friends and your neighbors that you're doing your best for.

There a factor of not only being able to recruit physicians to communities? Maybe one of the areas of lack of complete confidence is in those emergency room skills, because much of our medical education occurs in urban centers.

It can feel a little pit-of-your-stomach when you drive your pickup truck to your first shift in the ER as a new physician, minted out of residency in your rural town. To have that connection to telemedicine to the ER is a positive. So I think it can be a positive for recruitment, I think it can potentially help avoid burnout and be a positive for retention. I think it can affect quality, access to clinical care, but also keep the doctors on the ground connected.

The other example I would give you is Tele-ICU. We all know patients are well-served by being in their communities, with their community resources, their relationships, their families. With transitions back to home. With their local pharmacist, with all the help they have in their community, that infrastructure, which is often undocumented but appreciated, to help keep patients healthier and out of the hospital. In those settings, having tele-ICU avoids not only a costly and possibly dangerous helicopter transfer in a state like Idaho, but also allows that patient to be able to stay as close to home as possible. One of my colleagues and mentors told me: `Access to care means the appropriate level of care that's necessary as close to home as possible.' Telemedicine,

while not substituting for people can be an adjunct to what we all try to do in rural practice.

Mahn: What barriers do you see facing telehealth for providers?

Schmitz: Like any new technology, it may be difficult to articulate. Maybe we just need more education as what telemedicine can or cannot do. We talk about evidence-based medicine. It'd be nice to see evidence produced regarding the outcomes of telemedicine as opposed to a traditional modality.

For example, if you have telemedicine looking at a frozen section from a rural general surgeon's cancer surgery, we would expect that outcome would be just as good as if the slide was in the urban center being read live by a pathologist. But in other cases, is telepsychiatry the same as sitting down with a psychiatrist and face-to-face? Evidence would help.

Mahn: Are physicians aware of the potential impact of telehealth?

Schmitz: Education around exactly the scope of practice in telemedicine would be helpful. What's available and where are we going from here. Are we talking about telemedicine in the home or telemedicine in the clinic setting? A lot of the places I've been have found that the telemedicine resources are often located in the administrative facility rather than where patient care is occurring most in the out-patient setting.

Mahn: What are the big challenges you still see facing telehealth?

Schmitz: It's a transition of adaptation to technology. Change is harder when people don't know what change looks like going forward.

Another thing is, there's always a limited amount of resources, especially in some rural resource-limited environments, if we do adapt new technologies, what's the value proposition of the cost versus will that funding take away from other aspects of care, such as the live provider who's able to be there and render care in person? I think there's certainly a risk equation around the transfer in a zero-sum finance model. The transfer of those resources to telemedicine and away from what? Away from something else that again may jeopardize some of the good aspects of care. I think that's not been fully articulated.

Then I suppose bandwidth. Some states like North Dakota are amazingly wired. Other states, like most noticeably Alaska, was a state we were doing research in where internet access was still a pretty significant issue.

Mahn: Is there potential for satellites to be used in telemedicine when Internet is absent?

Schmitz: I've seen ultrasounds. I was in a conference in Spokane, they had ultrasound by satellite. There is some interesting research going on about what people can do with ultrasound. International folks like in the Amazon in Brazil and such. They're even using

ultrasounds to diagnose intracranial hemorrhage where there's no CT available and I think they're transmitting those images by satellite, but this is just an incidental example I ran into that I don't know anything about.

Mahn: What are your thoughts on telehealth going forward?

Schmitz: I think that telehealth should be a part of the consideration of health innovation plans going forward, for example, I served on the networking committee of our state health improvement plan, the SHIP program, and we took into account all sorts of technology including telehealth, telemedicine, as to how it would shape the articulation of the patient-centered medical home with the medical neighborhood and urban resources in a rural state like Idaho. So I definitely think it's important.

I think there's regulatory aspects that need to be considered. I'll give you an example, of telepharmacy, and how CAHs and how very isolated rural health clinics or FQHCs, can benefit from telepharmacy. There are some low-hanging fruit that we can all agree could be moved forward as we and the technology evolve together. It's definitely an adjunct that needs to continue to be explored and have more work going forward.

Appendix H

Notes from Interview by author with Janice C. Probst, PhD
Professor, University of South Carolina, Health Services Policy and Management
Director, South Carolina Rural Health Research Center
Interviewed in Las Vegas, NV on April 22, 2014

Erin Mahn: What are the challenges of recruitment and retention in rural America?

Janice C. Probst: There are no resources to keep providers in rural, not talking about high tech specialists, but it is difficult to even keep pediatricians. "It all started with money. Rural Practitioners don't get reimbursed well enough."

Education is another factor. It is hard to maintain skills if not seeing patients regularly. Another barrier is physicians feel out of the education loops, won't know the latest medical technology. Providers can use "tele-education" as telehealth to learn latest techniques.

Radiologists, neurologists, psychologists and psychiatrists are rare in rural and basic in telehealth. Anytime you can insert a microscope in one person and see at the other end of it, you can use telemedicine.

Lifestyle as a rural provider also makes it difficult for recruitment and retention.

Mahn: What are ways to increase telehealth?

Probst: There are five ways to increase telehealth:

(1) More money – right now there is an unwillingness to get rid of the rural and urban differential
(2) Increase midlevels – "If you use midlevel person, a telehealth adjutant so patients don't have to drive 200 miles."
(3) High bandwidth
(4) Federal licensure instead of state, erase state issues that would go away, but unfortunately this is not going to happen. Should promote state level agreements
(5) Re-credentialing/re-licensing different for different states

Mahn: Explain how cost is a barrier for telehealth.

Probst: You don't need a $60,000 screen when you can go to Best Buy to get the same quality." As the use of telehealth increases, the technology cost will decrease. "Without changing financial model, not foreseeable in large-scale implementation."

Additional Comments from Probst: HIPPA drives everything for telehealth security. We think telemedicine is on the cutting edge. Internationally, telehealth is growing and it is worth looking at.

Appendix I

Centers for Medicare and Medicaid Services standards for evaluating whether to expand coverage for new telehealth services, places telehealth proposals into two categories.

> *Category #1: Services similar to office and other outpatient visits, consultation, and office psychiatry services.* We would review these requests to ensure that the services proposed for addition to the list of Medicare telehealth services are similar to the current telehealth services. For example, we would look for similarities between the proposed and existing telehealth services in terms of the roles of, and interactions among, the beneficiary, the physician (or other practitioner) at the distant site and, if necessary, the telepresenter. We would also look for similarities in the telecommunications system used to deliver the proposed service, for example, the use of interactive audio and video equipment. If a proposed service meets the criteria set forth above, we would add it to the list of Medicare telehealth services.
>
> *Category #2: Services that are not similar to the current list of telehealth services, for example, physical therapy services, endoscopy services, and distant monitoring of patients in intensive care units.* Our review of these requests would include an assessment of whether the use of a telecommunications system to deliver the service produces similar diagnostic findings or therapeutic interventions as compared with a face-to-face "hands on" delivery of the same service. In other words, the discrete outcome of the interaction between the clinician and patient facilitated by a telecommunications system should correlate well with the discrete outcome of the clinician-patient interaction when performed face-to-face.[269]

[269] Centers for Medicare and Medicaid Services, "Revisions to Payment Policies under the Physician Fee Schedule for Calendar Year 2003," *Federal Register* 69, no. 125 (June 28, 2002).

Appendix J

Table 2.1. Telehealth Policies in Different States

	Mandated private insurance coverage	**Legislated Medicaid coverage**	**Store and forward coverage**	**Remote patient monitor-ing coverage**	**Special telehealth licensure**	**Telemen-tal health coverage**
Alabama	No	No	No	Yes	Yes	Yes
Alaska	Proposed	No	Yes	Yes	No	Yes
Arizona	Yes	No	Yes	No	No	Yes
Arkansas	No	No	No	No	No	Yes
California	Yes	Yes	Yes	No	No	Yes
Colorado	Yes	Yes	No	Yes	No	Yes
Connecticut	Proposed	No	No	No	No	No
Delaware	No	No	No	No	No	Yes
District of Columbia	Yes	Yes	No	No	No	No
Florida	Proposed	Proposed	No	No	No	No
Georgia	Yes	No	No	No	No	Yes
Hawaii	Yes	No	No	No	No	Yes
Idaho	No	No	No	No	No	Yes
Illinois	Yes	No	Yes	No	No	Yes
Indiana	No	Yes	No	Yes	No	Yes
Iowa	Proposed	Proposed	No	No	No	No
Kansas	No	No	No	Yes	No	Yes
Kentucky	Yes	Yes	No	No	No	Yes
Louisiana	Yes	Proposed	No	Yes	Yes	Yes
Maine	Yes	No	No	No	No	Yes
Maryland	Yes	Yes	No	No	No	Yes
Massachusetts	Proposed	Proposed	No	No	No	No
Michigan	Yes	No	No	No	No	Yes
Minnesota	No	Yes	Yes	Yes	No	Yes
Mississippi	Yes	Yes	No	No	No	No
Missouri	Yes	Proposed	No	No	No	Yes
Montana	Yes	No	No	No	Yes	Yes
Nebraska	Proposed	Yes	No	No	No	Yes
Nevada	No	No	No	No	Yes	Yes
New Hampshire	Yes	No	No	No	No	No
New Jersey	No	No	No	No	No	Yes
New Mexico	Yes	No	Yes	No	Yes	Yes

New York	Proposed	Proposed	No	Yes	No	Yes
North Carolina	No	No	No	No	No	Yes
North Dakota	No	No	No	No	No	Yes
Ohio	Proposed	Yes	No	No	Yes	No
Oklahoma	Yes	Proposed	Yes	No	Yes	Yes
Oregon	Yes	Yes	No	No	Yes	Yes
Pennsylvania	Proposed	No	No	No	No	Yes
Rhode Island	Proposed	Proposed	No	No	No	No
South Carolina	Proposed	No	No	No	No	Yes
South Dakota	No	No	Yes	No	No	No
Tennessee	Yes	Yes	No	No	Yes	No
Texas	Yes	Yes	No	Yes	Yes	Yes
Utah	No	No	No	Yes	No	Yes
Vermont	Yes	Yes	No	No	No	Yes
Virginia	Yes	No	Yes	No	No	Yes
Washington	Proposed	Proposed	No	Yes	No	Yes
West Virginia	Proposed	Proposed	No	No	No	Yes
Wisconsin	No	No	No	No	No	Yes
Wyoming	No	No	No	No	No	Yes

Source: American Telemedicine Association and Center for Connected Health Policy

Appendix K

Telephone Interview by Author with Tim Wolters, Director of Reimbursement and Angela Davison, Telehealth Coordinator
Citizens Memorial Hospital
Bolivar, Missouri
Interviewed from Washington, DC on July 28, 2014

Erin Mahn: Can we start with some background on what telehealth procedures your hospital does? When did you start? How many do you do now? How the process has started with your hospital?

Angela Davison: We started with a DLT [Distance Learning and Telemedicine] Grant in 2009 and began purchasing through that grant some telehealth units for clinics, long term care. We have now through two additional DLT grants, and some HRSA grant work that we have, over 20 telehealth units in operation now. Some of the things we do we have conducted some internal meetings from site to site, we have completed visits between long-term care patients and psychiatrists; some clinic visits for patients who have outreached to their Columbia [where the University of Missouri is located] physician; some of our own specialists here in Bolivar; and rural health clinic patients to specialists in Bolivar.

We have done some education. We participate with the University of Missouri to provide some online education through telehealth that our physicians participate in. We did an education piece for health literacy that we provided on-site here at the hospital in Bolivar.

Mahn: Are you participating as the hub (distant) site or spoke (originating) site?

Davison: We are both. For instance, a patient in long-term care can see a specialist here in Bolivar, meaning that a patient can be at the originating site, which is our own long-term care and the distant site is the specialist here in Bolivar. We do both sites.

Tim Wolters: CMH has six long-term care facilities that are all Medicare certified. They are run out of a sister corporation that CMH is affiliated with closely. There are a couple located here in town where the hospital is located. The others are in the surrounding areas in about a 40-mile radius from Bolivar.

We also have 11 rural health clinics with several in Bolivar and the others scattered around the area, as well as specialty clinics that are primarily located in Bolivar. A lot is originating in Bolivar and we are reaching out to long-term care facilities in other communities, as well. Like a patient that comes from a neighboring health community that needs to see a specialist here in Bolivar without having to travel what may be 40 miles to Bolivar.

Mahn: Where have you found telehealth to be the most useful for CMH?

Davison: Probably two things. We do have a lot of children who need access to providers outside the area. A lot of childhood specialists are in Columbia. Even though there have only been a few of those visits, those are very important to us.

We probably utilize more times than not the patient to our own specialist, so that is primarily what we are using it for.

Mahn: What are the biggest challenges you face with telehealth?

Davison: Reimbursement right now. We recently had the Medicare RUCA [Rural-Urban Commuting Area] updated for us and we now have rural health clinics who cannot be originating sites. We have patients in those areas that can't utilize it. Another problem is a provider cannot be a distant site so our providers that are located in our rural health clinic cannot provide services via telehealth.

Wolters: Those are the two issues. CMS clarified and in some way improved regulation of what are rural shortage areas. But they tried to define that by the RUCA codes, then literally a month later the RUCA codes were updated and knocked out a couple of our locations that, while they are still very rural, when you drive through you would never know it was considered urban. It is deemed urban just because we are adjacent to an urban area that is 20 miles south of us. We thought they were approving but we are back to where we started and now some areas cannot utilize telehealth.

Another issue is that we don't have enough mental health providers but we do have mental health providers who would like to see patients throughout the service area but there aren't enough hours in the day to travel, as they need to, to cover the area. So we would like to accomplish some of this via telehealth by a provider in a rural health clinic as their home base. Medicare at this point won't allow that due to an overly restrictive reading of the statute.

Davison: You have two big drawbacks of us utilizing telehealth.

Mahn: Do you run into any challenges with the licensure system? The state-by-state licensing?

Davison: I have only come across that once. Someone who needed to see a mental health provider that traveled, lived here, family is here, but travels for the job months at a time. Was going to be on a job for 4-6 months and needed to see a behavioral health specialist. Because they are out of state we couldn't get that done.

Mahn: Are any of your specialists licensed outside of Missouri?

Davison: No, not that I am aware of.

Mahn: Why is Medicare reimbursement so important to rural hospitals and providers?

Wolters: Especially in rural areas, at the hospital, over half of our patients are Medicare patients. In the rural health clinics, it is virtually the same in most cases. We are dealing with a very rural population. Elderly patients are in some cases limited in their ability to travel so that is why telehealth can be so valuable to them, particularly compound that with some areas with high poverty rates too. People who do not have the resources to travel even if they have the ability. It is kind of a compounding situation. Both Medicare and Medicaid combined is over 70 percent of our population. Add the uninsured and that's over 75 percent of the population that falls into the three categories: Medicare, Medicaid and Uninsured. We are heavily dependent on the federal and state Medicare and Medicaid funding to try to keep doors open and provide services to as many people as you can.

Mahn: What are solutions to the Medicare barriers?

Wolters: I would say flexibility. CMS has the ability to change their rules without congressional action, without changing the statute but they are simply being overly cautious in how they interpret the rules. Although at the same token they would be relatively simple legislative fixes too. If we could get Congress to actually do something to ease up on the wording just a little bit that would probably open up the window to more patients being able to access telehealth. CMS could make some actions on their own but it would be a relatively small and simple legislative fix that, again, I don't think would have significant costs because we are talking about primary care getting patients access to care at the right time in a more convenient location. That would be the idea being we can treat them at the primary care level. That prevents the situations from getting worse and resulting in emergency visits and/or worse as far as hospitalization.

Davison: If would be relatively simple to say that if you are a qualified provider you can provide a service.

Mahn: How many of your specialists participate in telehealth procedures?

Davison: Five of our specialty providers.

Mahn: How do the patients react to using telehealth?

Davison: Patients really react well to it. I've never heard a patient complain about a telehealth visit.

Mahn: Do you have to do extensive training for the specialists who participate in telehealth?

Davison: I wouldn't say it is extensive. It is very simple. We have to provide support for the connection if something goes wrong with the connection between the two units. As far as training staff or the provider it is not extensive.

Mahn: How many beds does the hospital have?

Wolters: We have 74 beds including an-inpatient psych unit.

Appendix L

In-person Interview by Author with Andrew Mekelburg, Vice President, Federal Government Relations
Verizon Communications
Interviewed in Washington, DC on August 1, 2014

Erin Mahn: Can you give me background on Verizon's telehealth initiatives?

Andrew Mekelburg: Let me give you the initial perspective of why we got involved. It is mainly as an employer. Verizon spends $4 billion a year providing health care to about 800,000 employees, retirees, and their dependents. We have always believed technology can help lower health care costs and improve access. That's been my initial take. Secondarily, Verizon as a broadband network company both wireless and wire line have spent multiple billions of dollars deploying the most advanced network in the world and telemedicine, not that we expect to get any major revenues because of use of the network but that is what the network is there for. It's a good use of the network. We are promoting it for the social good.

Thirdly, and this came up in the last month or so we have come up with a product called the Virtual Visit which is sort of a platform that we would partner with people to perform telemedicine for people out there via desktop or cellphone. We haven't sold that yet.

Mahn: What areas do you think telehealth has the most potential?

Mekelburg: Telehealth is limitless. They asked that question yesterday at the hearing and there was a dermatologist was there, a pediatric physician. You can do about anything with telehealth except like giving shots. Let's say you have a knee operation and not that you would do it over telemedicine but you have to go home and come back in for a checkup wouldn't it be just as easy instead of lugging your bad knee back to the doctor you can walk into a HD display and who him your gait and all that stuff? Just things like that you don't even think about. Follow Up visits, chronic care management, telepsychiatry is very popular as well. Certain people with certain disease it's easier for them to talk to a computer than an actual person. Wound management, dermatology.

In terms of [geographic] areas, people always think that rural areas are better for telehealth because they don't have specialties and all that and that is a tremendous thing but think of urban areas too. Some of these urban inner cities don't have access to specialist. It would be good if they could walk into a community center or something like that and link up.

Mahn: What do you think are the biggest challenges or barriers for telehealth?

Mekelburg: Interest and money. For the money it is critical to show that this is not going to increase the cost of health care – it is actually going to reduce it. We have been working with the Alliance for Connected Care.

Mahn: Can you elaborate on the barriers of state licensing?

Mekelburg: The two groups of people who have come out against it are AMA and Federation of the State Medical Boards. What the AMA has said is that it's important that doctors get licensed in the states that their patients are in. When you think of that particular statement, it doesn't hold that much water to me. I guess that still made sense when doctors still made house calls or before patients got cars. What happens if you are a doctor in the same state that the patient is in and the patient travels? Why shouldn't you be able to take care of that person? What if the doctor travels? The technology has rendered that argument off a little bit.

The state medical boards did come up with this compact. The problem with the compact is that it has to be approved by 50 states. The nurses' compact only has 26. The nurses' compact is much better because it's like a reciprocal licensing so you can get once license and boom. This Federation plan is what I call expediting licensing. You still have to get a license in all 50 states if you want to do telemedicine in all 50 states. I would call it non-participatory. So again you have your patients, he goes out of town so you need to have the foresight to know that one of your patients is going to from DC to Ohio and you should get a license there in case something happens. It just doesn't make sense when you think about. It still adds cost. You have to pay for another license. I give them credit for trying. There are limited by the politics too. They are a federation of state medical boards and medical boards are protecting their own interests and revenue streams. They are doctors. It's complicated politics. It's difficult to break through the status quo.

Mahn: What are some policy recommendations when it comes to telehealth that you recommend or would like to see fixed?

Mekelburg: The two big ones are the interstate licensing and the reimbursement. We are taking an incremental approach on the licensing. One of the reasons I don't focus on reimbursement as much is I think the whole health care delivery system is changing and if we just talk about paying we are talking about a fee-for-service structure even with telemedicine when you talk about reimbursement. If we just change it to make it coordinated care and Accountable Care Organizations this whole concept of paying for telemedicine – telemedicine is far more efficient and it's going to cost a whole lot less than an office visit and these people can see more patients. The dermatologist yesterday asked her how many more patients could you see and she Said 5 to 10 if she did telemedicine. I think we will be shifting in the health care delivery system. I don't like reimbursement. I like payment better. Three general pools Medicaid, Medicare, and private payers and insurance companies. Companies are starting to offer telemedicine as a benefit. We can now call up and see a doctor for a non-urgent thing such as a rash, flu, or sinus.

Appendix M

Telephone Interview by Author with Jesse Ward, Industry & Policy Manager
NTCA – The Rural Broadband Association
Interviewed from Washington, DC on December 4, 2014

Erin Mahn: Rural communities are notoriously underserved on the internet – how can this obstacle be overcome so they can even use these telehealth services?

Jesse Ward: Our communities are typically well served by broadband via our members. There's definitely a rural-rural divide between communities that are served by small telecommunications companies regulated by rate-of-return, which are our members, and telecommunications companies that may be served by the larger price capturers like AT&T or Verizon. So those are areas where you would see the underserved.

Having said that, as I said, our areas are places where they have adequate access to broadband right now. A lot of them are really evolving their services from offering fiber-to-the-home or fiber-to-the-premises. So we're doing a lot of work on Capitol Hill to ensure that those networks can be maintained via Universal Service Funds.

Mahn: When you talk about getting it to the home, is that also getting it to businesses as well and hospitals?

Ward: Exactly. All of our members serve the community. They're community-based. A number of them are cooperative, so they're owned by the community. It's in their best interest to not only serve the customers but all of the anchor institutions.

Mahn: Can you give me some examples of the anchor institutions?

Ward: Hospitals, clinics, schools, libraries, public safety entry-points, 9-11 call centers. Lots of businesses, even though there's a couple of members who have telecommuting hotels where they have a huge business center where a lot of different businesses reside and people can telecommute from there to other places.

Mahn: Why is broadband taking so long to reach so many rural communities? Is it a "Last Mile" problem?

Ward: In the areas that our members serve and the areas that are traditionally probably underserved by some larger carriers, they're high cost. It's the distance from the facility the telecommunications providers maintain to a customer's home or anchor institution are very far. And you have a lot fewer customers to spread the cost of creating and maintaining and evolving that network.

And that's why it's really difficult to maintain a network or operate a network without support from Universal Service Funds. I have to say geography is a problem, and topography, and then distance.

Mahn: Some background on Universal Service Funds?

Ward: Universal Service Funds come from the Communications Act of 1934. It was further expanded in the Telecommunications Act of 1996. And the goal is really to provide telephone service to lower-income customers, schools and libraries, and high-cost areas of the country. There are several programs that provide for that.

It's paid for based on an assessment of their interstate revenues. So they pay into a fund, all the telecommunications providers that provide interstate voice services. And then that money is distributed back to several programs, again, that fund schools and libraries, the E-Rate program; the rural health care program; the Connect America fund for rural areas; and LifeLine which is for lower income phone service.

Mahn: What are the next steps you see for private-public partnerships? Or any steps to ensure policy coordination?

Ward: I think unfortunately the FCC and others who regulate the Universal Service Fund are not understanding what it takes to operate, maintain and evolve the network in rural areas. So they've made some changes to the Universal Service Fund and how the disbursements are made that are impacting and jeopardizing the networks that our members already have for the broadband that's already there.

I definitely think that additional advocacy is needed and that's what we've been working so hard on the last few years. I think that we need to work together between NTCA and health care organizations, and we've been working libraries too, to make sure all the Universal Service programs work together as they were intended to. So, for instance, if you use the Universal Service Funds to build out a network, as our members have, that network should then be serving all of the anchor institutions and expanding as much as it can, putting in fiber to the health care institutions and other things of that nature.

There've been some changes that have also made it so that some of these schools and libraries, or hospitals may want to put in fiber themselves, and unfortunately it's duplicating fiber that's already there, that just takes away money from other areas that might need it.

I think it's just that working together to make sure that what is existing already is used and places that aren't served can be either by our members or by another larger carrier. And if all else fails, then of course, those anchor institutions can certainly install a network themselves.

Work Cited

Alliance for Connected Care. "Letter from Alliance for Connected Care to Sylvia Burwell." Last modified June 9, 2014. Accessed August 19, 2014. https://www.documentcloud.org/documents/1184258-alliance-and-advisory-%09board-letter-to-hhs-on-acos.html.

Association of American Medical Colleges. *2013 State Physician Workforce Data Book.* Washington, DC: Association of American Medical Colleges, 2013. Accessed April 4, 2014. https://www.aamc.org/download/362168/data/2013statephysicianworkforcedatabook.pdf.

American Telemedicine Association. "ATA Supports Telehealth Enhancement Act to Improve Telehealth Coverage." Last modified October 24, 2013. Accessed November 2, 2014. http://www.americantelemed.org/news-landing/2013/10/23/ata-supports-telehealth-enhancement-act-to-improve-telehealth-coverage#.VFa6APl4rig.

American Telemedicine Association. *Medical Licensure and Practice Requirements.* Washington, DC: American Telemedicine Association, 2011. Accessed August 14, 2014. http://www.americantelemed.org/docs/default-source/policy/ata-policy-on-state-medical-licensure-and-practice-requirements.pdf.

American Telemedicine Association. "Six Fixes: How the Obama Administration Can Improve Healthcare Delivery Using Telemedicine." Last modified 2011. Accessed July 7, 2014. http://www.americantelemed.org/docs/default-source/policy/six-immediate-actions-for-president-obamas-administration-for-telehealth.pdf?sfvrsn=16.

American Telemedicine Association. "State Policy Toolkit." Last modified 2014. Accessed July 13, 2014. http://www.americantelemed.org/docs/default-source/policy/ata-state-policy-toolkit.pdf?sfvrsn=34.

American Telemedicine Association. "State Telemedicine Legislation Tracking." Last modified July 3, 2014. Accessed July 13, 2014. http://www.americantelemed.org/docs/default-%09source/policy/state-telemedicine-policy-matrix.pdf?sfvrsn=44.

American Telemedicine Association. "Telemedicine in the Patient Protection and Affordable Care Act (2010)." Last modified 2010. Accessed June 15, 2014. http://www.americantelemed.org/docs/default-source/policy/telehealth-provisions-within-the-patient-protection-and-affordable-care-act.pdf?sfvrsn=14.

Baker, Samuel L. "Physician Licensure Laws in the United States, 1865-1915." *Journal of the History of Medicine and Allied Sciences* 39, no. 2 *(1984): 173-197. Accessed August 14, 2014. doi:10.1093/jhmas/39.2.173.*

Beck, Melinda. "Where Does It Hurt? Log On. The Doctor Is In: Telemedicine Sector Attracts Funding, But Some Physician Groups Worry About Quality of Care." *Wall Street Journal*, May 8, 2014. Accessed August 8, 2014. http://online.wsj.com/news/articles/SB10001424052702303678404579536284129 49456- 4.

Béland, Daniel. "Policy Change and Health Care Research." *Journal of Health Politics, Policy & Law* 35, no. 4 (August 2010): 615-641. Accessed October 25, 2014. doi:10.1215/03616878-2010-019.

Bell, Mandy, Mary Hughes, Deanna Larson, and Jay Weems. *Geographic Restrictions for Medicare Telehealth Reimbursement*. Washington, DC: National Rural Health Association, 2011. Accessed April 18, 2014. http://www.ruralhealthweb.org/ index.cfm?objectid=80E523E9-3048-651A-FE53EF1E8BB0DDAB.

Bennett, Kevin J., Bankole Olatosi, and Janice C. Probst. *Health Disparities: A Rural-Urban Chartbook.* Columbia: South Carolina Rural Health Research Center, 2008. Accessed April 10, 2014. http://rhr.sph.sc.edu/report/(7-3)%20Health%20 Disparities%20A%20Rural% 20Urban%20Chartbook%20-%20Distribution%20Copy.pdf.

Benschoter, Reba Ann, Merril T. Eaton, and Pringle Smith. "Use of Videotape to Provide Individual Instruction in Techniques of Psychotherapy." *Academic Medicine* 40, no. 12 (December 1965): 1159-61.

Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds. *2012 Annual Report of the Boards of Trustees*. Washington, DC: Centers for Medicare and Medicaid Services, 2012. Accessed August 12, 2014. http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and Reports/ReportsTrustFunds/downloads/tr2012.pdf.

Borzorgchami, Hormozd. "Telemedicine Brings Stroke Expertise Bedside." *Oregon Health and Science University Blog*, May 17, 2013. Accessed July 6, 2014. http://www.ohsu.edu/blogs/96kmiles/2013/05/17/telemedicine-brings-stroke-expertise-bedside.

Bovbjerg, Randall R., Joshua M. Wiener, and Michael Housman. "State and Federal Roles in Health Care: Rationales for Allocating Responsibilities." In *Federalism and Health Policy,* edited by John Holahan, Alan Weil, and Joshua M. Wiener, 25-57. Washington, DC: Urban Institute Press, 2003.

Bresnick, Jennifer. “AMA adopts new telemedicine reimbursement policy.” *EHRintelligence.com*, June 12, 2014. Accessed June 12, 2014. http://ehrintelligence.com/2014/06/12/ama-adopts-new-telemedicine-reimbursement-policy/.

Britain, Catherine. “Oregon Searches for Solutions to Credentialing of Physicians Providing Telemedicine Services.” *Oregon Rural Health News,* August 21, 2013. Accessed August 15, 2014. http://www.ohsu.edu/xd/outreach/oregon-rural-health/about/news/credentialing-telemed-services.cfm.

Center for Connected Health Policy. “HR 3077: TELE-MED Act of 2013.” Last modified October 2013. Accessed October 21, 2014. http://cchpca.org/sites/default/files/resources/HR%203077%20Telemedicine%20for%20Medicare%20Act%20of%202013.pdf.

Center for Connected Health Policy. “HR 3306: Telehealth Enhancement Act Fact Sheet.” Last modified October 2013. Accessed September 20, 2014. http://cchpca.org/sites/default/files/resources/HR%203306%20Telehealth%20Enhancement%20Act%20of%202013.pdf.

Center for Connected Health Policy. “HR 3750: Telehealth Modernization Act of 2013 Fact Sheet.” Last modified October 2013. Accessed September 20, 2014. http://cchpca.org/sites/default/files/resources/D.%20Matsui%203750.pdf.

Center for Connected Health Policy. *State Telehealth Laws and Reimbursement Policies*. Sacramento: Center for Connected Health Policy, 2014. Accessed July 10, 2014. http://telehealthpolicy.us/sites/telehealthpolicy.us/files/uploader/50-State%20February%202014%20-%20Correct%20Grant%20Numbers.pdf.

Center for Connected Health Policy. “Telehealth and Medicare.” Accessed October 5, 2014. http://cchpca.org/telehealth-and-medicare.

Center for Responsive Politics. “Issue Lookup.” Open Secrets. Accessed November 6, 2014. https://www.opensecrets.org/lobby/lookup.php.

Center for Telehealth and e-Health Law. “Reimbursement Overview.” Last modified 2011. Accessed June 21, 2014. http://ctel.org/expertise/reimbursement/reimbursement-overview/#.

Centers for Disease Control and Prevention. “Stroke Fact Sheet.” Division for Heart Disease and Stroke Prevention. Last modified August 20, 2014. Accessed August 20, 2014. http://www.cdc.gov/dhdsp/data_statistics/fact_sheets/fs_stroke.htm.

Centers for Medicare and Medicaid Services. “Medicare Program; Payment Policies Under the Physician Fee Schedule and Other Revisions to Part B for CY 2012.” *Federal Register* 76, no. 138 (July 19, 2011).

Centers for Medicare and Medicaid Services. “National Health Expenditures 2012 Highlights.” Accessed August 15, 2014. http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and Reports/NationalHealthExpendData/downloads/highlights.pdf.

Centers for Medicare and Medicaid Services. “Revisions to Payment Policies Under the Physician Fee Schedule for Calendar Year 2003.” *Federal Register* 69, no. 125 (June 28, 2002).

Centers for Medicare & Medicaid Services. “Telehealth Fact Sheet.” Last modified April 2014. Accessed August 15, 2014. http://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/telehealthsrvcsfctsht.pdf.

Charleston, Larry, and Randolph W. Evans. “Public Policy and Headache: Observations of Health Care Policy in the US Congress from a Legislative Fellow's Perspective.” *Headache: The Journal of Head & Face Pain* 53, no. 5 (May 2013): 827-830. Accessed October 25, 2014. http://dx.doi.org/10.1111/head.12098.

Cole, Stacey L., John H. Grubbs, Cathy Din, and Thomas S. Nesbitt. “Rural Inpatient Telepharmacy Consultation Demonstration for After-Hours Medication Review.” *Telemedicine Journal and E-Health* 18, no. 7 (September 2012): 530-537. Accessed March 30, 2014. doi:10.1089/tmj.2011.0222.

Congressional Budget Office. “CBO’s Estimate of the Net Budgetary Impact of the Affordable Care Act’s Health Insurance Coverage Provisions Has Not Changed Much Over Time.” Accessed April 18, 2014. http://www/cbo.gov/publication/44176.

Council on Graduate Medical Education. *Advancing Primary Care*. 20th ed. Rockville, MD: The Health Resources and Services Administration, 2010. Accessed April 21, 2014. http://www.hrsa.gov/advisorycommittees/bhpradvisory/cogme/Reports/twentiethreport.pdf.

Council on Graduate Medical Education. *New Paradigms for Physician Training for Improving Access to Health Care*. 18th ed. Rockville, MD: The Health Resources and Services Administration, 2007. Accessed April 21, 2014. http://www.hrsa.gov/advisorycommittees/bhpradvisory/cogme/Reports/eighteenthreport.pdf.

Council on Graduate Medical Education. *Physician Workforce Policy Guidelines for the United States, 2000-2020*. 16th ed. Rockville, MD: Health Resources and Services Administration, 2005. Accessed April 21, 2014. http://www.hrsa.gov/advisorycommittees/bhpradvisory/cogme/

Reports/sixteenthreport.pdf.

Craig, John, and Victor Patterson. "Introduction to the Practice of Telemedicine." *Journal of Telemedicine and Telecare* 11, no. 1 (January 2005): 3-9. Accessed April 1, 2014. http://search.proquest.com.proxy3.library.jhu.edu/docview/210708401?accountid=11752.

Currell, Rosemary, Christine Urquhart, Paul Wainwright, and Ruth Lewis. "Telemedicine Versus Face to Face Patient Care: Effects on Professional Practice and Health Care Outcomes." *Cochrane Database of Systematic Reviews* 2, no. 2 (January 2000): 1-35. Accessed March 20, 2014. doi:10.1002/14651858.CD002098.

Cwiek, Mark A., Azhar Rafiq, Aamna Qamar, Charles Tobey, and Ronald C. Merrell. "Telemedicine Licensure in the United States: the Need for a Cooperative Regional Approach." *Telemedicine and e-Health* 13, no. 2 (April 2007): 141-147. Accessed June 14, 2014. doi:10.1089/tmj.2006.0029.

Denis, Marion. "The Ethics of Allocating Resources Toward Rural Health and Health Care." In *Ethical Issues in Rural Health Care*, edited by Craig M. Klugman and Pamela M. Dalinis, 71-96. Baltimore: The Johns Hopkins University Press, 2008.

Doarn, Charles R., Sherilyn Pruitt, Jessica Jacobs, Yael Harris, David M. Bott, William Riley, Christopher Lamer, and Anthony L. Oliver. "Federal Efforts to Define and Advance Telehealth – a Work in Progress." *Telemedicine and e-Health* 20, no. 5 (May 2014): 409-418. Accessed August 15, 2014. doi:10.1089/tmj/2013.0336.

Ekeland, Anne G., Alison Bowes, and Signe Flottorp. "Methodologies for Assessing Telemedicine: A Systematic Review of Reviews." *International Journal of Medical Informatics* 81, no. 1 (January 2012): 1-11. Accessed June 15, 2014. doi:10.1016/j.ijmedinf.2011.10.009.

Emery, Sherry. *Telemedicine in Hospitals: Issues in Implementation*. New York: Garland Publishing, 1998.

Federal Communications Commission. "FCC Broadband Report Finds Significant Progress in Broadband Deployment, But Important Gaps Remain." Last modified August 21, 2012. Accessed December 4, 2014. http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-315866A1.doc.

Federal Communications Commission. "New Healthcare Connect Fund Expands Access to Broadband for Healthcare." Washington, DC: Federal Communications Commission, December 12, 2012. Accessed April 1, 2014. http://www.fcc.gov/document/new-healthcare-connect-fund-expands-access-broadband-healthcare.

Federation of State Medical Boards. "FSMB: Draft Interstate Compact for Physician Licensure Nears Completion." Last modified July 25, 2014. Accessed August 20, 2014. http://www.fsmb.org/Media/Default/PDF/Publications/07%2025%202014%20FSMB%20statement%20on%20draft%20compact_FINAL.pdf.

Federation of State Medical Boards. *Model Policy for the Appropriate Use of Telemedicine Technologies in the Practice of Medicine: Report of the State Medical Boards' Appropriate Regulation of Telemedicine Workgroup*. Washington, DC: Federation of State Medical Boards, 2014. Accessed June 20, 2014. http://library.fsmb.org/pdf/FSMB_Telemedicine_Policy.pdf.

Florida Medical Association. "Patients Oppose Unlicensed, Out of State Physicians Practicing Telemedicine and Prescribing Drugs, Controlled Substances in Florida." Last modified February 19, 2014. Accessed August 14, 2014. www.flmedical.org/pr_telemedicine.aspx.

Gamm, Larry, Linnae Hutchison, Betty Dabney, and Alicia Dorsey, eds. *Rural Healthy People 2010: A Companion Document to Healthy People 2010.* College Station: The Texas A&M University System Health Science Center, 2003. Accessed April 18, 2014. http://sph.tamhsc.edu/centers/rhp2010/Volume2.pdf.

Garg, Vaibhav and Jeffrey Brewer. "Telemedicine Security: A Systematic Review." *Journal of Diabetes Science and Technology* 5, no. 3 (May 2011): n.p. Accessed October 30, 2014. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3192643.

Gillespie, Lisa. "Telemedicine Policy Draws Opposition from Patient Advocates, Health Care Providers." *Kaiser Health News*, May 2, 2014. Accessed August 19, 2014. http://www.kaiserhealthnews.org/stories/2014/may/02/telemedicine-policy-draws-opposition-from-patient-advocates.aspx.

Gordon, H.L., M. Hoeber, and A. Schneider. "Telepharmacy in a Rural Albert Community Cancer Network." *Journal of Oncology Pharmacy Practice* 18, no. 3 (February 2012): 366-376. Accessed April 15, 2014. doi:10.1177/1078155211431858.

Grogan, C. "The Murky Relationship Between Ideology and the Role of Government in Health Policy." *Journal of Health Politics, Policy & Law* 37, no. 3 (June 2012): 361-364. Accessed October 25, 2014. doi:10.1215/03616878-1573058.

Grossman, Matt."Interest Groups Influence on US Policy Change: An Assessment Based on Policy History." *Interest Groups & Advocacy* 1, no. 2 (2012): 1-33.

Hacker, Jacob S. "Privatizing Risk without Privatizing the Welfare State: The Hidden Politics of Social Policy Retrenchment in the United States." *The American*

Political Science Review 98, no. 2 (May 2004): 243-260. Accessed October 25, 2014. http://www.jstor.org/stable/4145310.

Hall, Margaret Jean, Jill Marsteller, and Maria Owings. *Factors Influencing Rural Residents' Utilization of Urban Hospitals.* Hyattsville, MD: National Center for Health Statistics, 2010. Accessed April 1, 2014. http://www.cdc.gov/nchs/data/nhsr/nhsr031.pdf.

Hayes, Elizabeth. "How OHSU used telemedicine to save a baby's life." *Portland Business Journal*, November 12, 2013. Accessed April 10, 2014. http://www.bizjournals.com/ portland/ blog/health-care-inc/2013/11/how-ohsu-used-telemedicine-to-save-a.html?page=all.

Health Affairs. "Electronic Health Record Standards." Health Policy Briefs. Last modified September 28, 2010. Accessed April 19, 2014. http://www.healthaffairs.org/healthpolicybriefs/brief.php?brief_id=26.

Health Resources and Services Administration. "Telehealth." About Rural Health. Accessed April 16, 2014. http://www.hrsa.gov/ruralhealth/about/telehealth/.

Health Resources and Services Administration. *Telehealth Licensure Report,* by Mary K. Wakefield. 111th Cong., Senate, 2010. Accessed August 14, 2014. http://www.hrsa.gov/healthit/telehealth/licenserpt10.pdf.

Hersh, W.R., D. H. Hickam, S. M. Severance, T.L. Dana, K.P. Krages, and M. Helfand. "Telemedicine for the Medicare Population: Update." *Evidence Report/Technology Assessment* 131 (February 2006): 1-41.

Hjelm, N.M. "Benefits and Drawbacks of Telemedicine." *Journal of Telemedicine and Telecare* 11, no. 2 (2005): 60-67. Accessed October 5, 2014. http://search.proquest.com/docview/210708914?accountid=11752.

Hoffmann, Diane, and Virginia Rowthorn. "Legal Impediments to the Diffusion of Telemedicine." *Journal of Health Care Law Policy* 14, no. 12 (2011): 1-53. Accessed June 14, 2014. http://digitalcommons.law.umaryland.edu/jhclp/vol14/iss1/2.

Holloway, James E. "Revisiting Cooperative Federalism in Mandated Employer-Sponsored Health Care Programs under the ERISA Preemption Provision." *Quinnipiac Health Law Journal* 8 (2005): 239-287. Accessed June 17, 2014. http://www.quinnipiac.edu/prebuilt/pdf/SchoolLaw/HealthLawJournalLibrary/12_8QuinnipiacHealthLJ239(2004-2005).pdf.

Gabriel, Meghan Hufstader, Michael F. Furukawa, Emily B. Jones, Jennifer King, and Leila K. Samy. *Progress and Challenges with the Implementation and Use of*

Electronic Health Records among Critical Access Hospitals. Washington, DC: Office of the National Coordinator for Health Information Technology, 2013. Accessed December 3, 2014. http://www.healthit.gov/sites/default/files/cahdata_brief12.pdf.

Hughes, Mary, Mandy Bell, Deanna Larson, and Jay Weems. *Telemedicine Reimbursement.* Washington, DC: National Rural Health Association, 2010.

Hutcherson, Carolyn M. "Legal Considerations for Nurses Practicing in a Telehealth Setting." *Online Journal of Issues in Nursing* 6, no. 3 (September 2001). Accessed August 19, 2014. www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Volume62001/No3Sept01/LegalConsiderations.aspx.

Ibrahim, Said A. "Health in the Age of Politics," *American Journal of Public Health* 102, no. 12 (December 2012): 2200. Accessed October 25, 2014. doi:10.2105/AJPH.2012.301067.

Institute of Medicine. *The Role of Telehealth in an Evolving Health Care Environment: Workshop Summary*. Washington, DC: The National Academies Press, 2012.

Institute of Medicine. *Telemedicine: A Guide to Assessing Telecommunications for Health Care.* Washington, DC: The National Academies Press, 1996.

Jacobson, Peter D., and Elizabeth Selvin. "Licensing Telemedicine: The Need for a National System." *Telemedicine Journal and e-Health* 6, no. 4 (December 2000): 429-439. Accessed June 14, 2014. doi:10.1089/15305620050503915.

Johnson, Samuel C. "Louis Gorin and Outstanding Rural Health Program Awards" (video). Annual Conference 2014. National Rural Health Association. April 28, 2014. Accessed April 28, 2014.

Kaiser Family Foundation. "The Facts on Medicare Spending and Financing." Last modified July 28, 2014. Accessed October 18, 2014. http://kff.org/medicare/fact-sheet/medicare-spending-and-financing-fact-sheet.

Kay, Misha, Jonathan Santos, and Marina Takane. *Telemedicine: Opportunities and Developments in Member States*. Geneva: World Health Organization, 2010. Accessed April 9, 2014. http://www.who.int/goe/publications/goe_telemedicine_2010.pdf.

Kepler, Tara, and Charlene L. McGinty. *Telemedicine: How To Assess Your Risks and Develop a Program That Works.* Washington, DC: American Health Lawyers Association, 2009. Accessed August 14, 2014. http://www.healthlawyers.org/Events/Programs/Materials/Documents/HHS09/kepler_mcginty.pdf.

Khoja, Shariq, Hammad Durrani, Parvez Nayani and Ammad Fahim. "Scope of Policy Issues in eHealth: Results from a Structured Literature Review." *Journal of Medical Internet Research* 14, no. 1 (February 17, 2012): e34**.** Accessed September 20, 2014. http://dx.doi.org/10.2196/jmir.1633.

Krupinski, Elizabeth A., and Jordana Bernard. "Standards and Guidelines in Telemedicine and Telehealth." *Healthcare* 2, no. 1 (February 2014): 74-93. Accessed June 20, 2014. doi:10.3390/healthcare2010074.

Laguarda, Fernando R. "Federalism Myth: States as Laboratories of Health Care Reform." *Georgetown Law Journal* 82 (1993): 159-191.

Leonard, Elizabeth Weeks. "Rhetorical Federalism: The Value of State-Based Dissent to Federal Health Reform." *Hofstra Law Review* 39 (October 2010): 111-168. Accessed June 18, 2014. http://digitalcommons.law.uga.edu/fac_artchop/769.

LeRouge, Cynthia, and Monica J. Garfield. "Crossing the Telemedicine Chasm: Have the U.S. Barriers to Widespread Adoption of Telemedicine Been Significantly Reduced?" *International Journal of Environmental Research and Public Health* 10, no. 12 (November 2013): 6472–6484. Accessed June 20, 2014. doi:10.3390/ijerph10126472.

Liang, Wen-Yih, Chih-Yi Hsu, Chiung-Ru Lai, Donald Ming-Tak Ho, and I-Jen Chiang. "Low-cost Telepathology System for Intraoperative Frozen-section Consultation: Our Experience and Review of the Literature." *Human Pathology* 39, no. 1 (January 2008): 56-62. Accessed April 2, 2014. doi:10.1016/j.humpath.2007.04.023.

Mann, Thomas E., and Norman J. Ornstein. *It's Even Worse Than It Looks: How the American Constitutional System Collided With the New Politics of Extremism*. New York: Basic Books, 2012.

Medicare Payment Advisory Commission. *Report to the Congress: Medicare and the Health Care Delivery System.* Washington, DC: Medicare Payment Advisory Commission, 2012. Accessed April 18, 2014. http://www.medpac.gov/documents/Jun12_EntireReport.pdf.

Mekelburg, Andrew. Interview by author. Washington, DC. August 1, 2014.

Morris, Tom. Interview by author. Washington, DC. February 7, 2014.

Moses, Lyria Bennett. "Recurring Dilemmas: The Law's Race to Keep Up with Technological Change." *Journal of Law, Technology & Policy* 2007, no. 2 (Fall 2007): 239-285. Accessed October 18, 2014. http://jltp.uiuc.edu/archives/moses.pdf.

Nathan, Richard P. "Federalism and Health Policy." *Health Affairs* 24, no. 6 (November 2005): 1458-1466. Accessed July 1, 2014. doi:10.1377/hlthaff.24.6.1458.

National Council of State Boards of Nursing. *Changes in Healthcare Professions' Scope of Practice: Legislative Considerations.* Chicago: National Council of State Boards of Nursing, 2009. Accessed June 20, 2014. https://www.ncsbn.org/ScopeofPractice_09.pdf.

National Council of State Boards of Nursing. "Nurse Licensure Compact." Last modified 2014. Accessed August 15, 2014. https://www.ncsbn.org/nlc.htm.

National Institute of Neurological Disorders and Stroke, and National Institutes of Health. *Stroke: Challenges, Progress, and Promise.* Bethesda, MD: NIH Publication, 2009. Accessed August 20, 2014. http://stroke.nih.gov/documents/NINDS_StrokeChallenge_Brochure.pdf.

National Organization of State Offices of Rural Health. "About Rural Health in America." National Rural Health Day. Last modified 2014. Accessed April 15, 2014. http://celebratepowerofrural.org/?page_id=30.

National Rural Health Association. *2014 Legislative and Regulatory Agenda.* Washington, DC: National Rural Health Association, 2014.

National Telecommunications and Information Administration. *Broadband Statistics Report: Broadband Availability in Urban Vs. Rural Areas.* Washington, DC: National Telecommunications and Information Administration, 2014. Accessed April 20, 2014. http://www.broadbandmap.gov/download/Broadband%20Availability%20in%20Rural%20vs%20Urban%20Areas.pdf.

Niemira, Denise. "Ethical Dimensions of the Quality of Rural Health Care." In *Ethical Issues in Rural Health Care,* edited by Craig M. Klugman and Pamela M. Dalinis, 119-131. Baltimore: The Johns Hopkins University Press, 2008.

Office of History, National Institutes of Health. "Legislative Chronology." Last modified June 16, 2009. Accessed August 15, 2014. http://history.nih.gov/research/sources_legislative_chronology.html.

Oregon Health & Science University. "OHSU Telemedicine Network Connects Oregonians to Lifesaving Health Care." Accessed August 19, 2014. http://www.ortelehealth.org/content/credentialing-and-privileging.

Oregon Health & Science University. "Stopping the Clock on Stroke Damage." OHSU Extra. Last modified Spring 2013. Accessed July 3, 2014. http://www.ohsu.edu/xd/about/foundation/about/ohsu-extra/stroke.cfm.

Perna, Gabriel. "Neurology: The Next Frontier in Telehealth?" *Healthcare Informatics*, August 28, 2014. Accessed December 3, 2014. http://www.healthcare-informatics.com/article/neurology-next-frontier-telehealth.

Pittman, David. "Medical Boards Engage in Telemedicine Reform." *Politico Pro*, August 25, 2014.

Pollack, Harold. "Health Reform and Public Health: Will Good Policies but Bad Politics Combine to Produce Bad Policy?" *University Of Pennsylvania Law Review* 159, no. 6 (June 2011): 2061-2081. Accessed October 25, 2014. http://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=1117&context=penn_law_review.

Prinz, Linda, Mary Cramer, and Andrea Englund. "Telehealth: A Policy Analysis for Quality, Impact on Patient Outcomes, and Political Feasibility." *Nursing Outlook* 56, no. 4 (July-August 2008): 152-158. Accessed August 19, 2014. doi: 10.1016/j.outlook.2008.02.005.

Probst, Janice C. Interview by author. Las Vegas. April 22, 2014.

Probst, Janice C., Sarah B. Laditka, Jong-Yi Wang, and Andrew O. Johnson. *Mode of Travel and Actual Distance Traveled for Medical or Dental Care by Rural and Urban Residents*. Columbia: South Carolina Rural Health Research Center, 2006. Accessed June 15, 2014. http://rhr.sph.sc.edu/report/SCRHRC_ModeofTravel_Exec_Sum.pdf.

Robeznieks, Andis. "Florida docs gear up for fight against telemedicine bill." *Modern Healthcare*, February 20, 2014. Accessed August 14, 2014. http://www.modernhealthcare.com/article/20140220/NEWS/302209940.

Roney, Kathleen. "Overcoming 4 Challenges in Implementing Telemedicine, Healthcare's Next Frontier." *Becker's Hospital Review*, February 13, 2012. Accessed April 20, 2014. http://www.beckershospitalreview.com/healthcare-information-technology/overcoming-4-challenges-in-implementing-telemedicine.

Ruger, Theodore W. "Of Icebergs and Glaciers: The Submerged Constitution of American Healthcare." *Law and Contemporary Problems* 75, no. 3 (2012): 215-235. Accessed October 18, 2014. http://scholarship.law.duke.edu/lcp/vol75/iss3/11.

Russell, Louise B. *Technology in Hospitals: Medical Advances and Their Diffusion*. Washington, DC: The Brookings Institution, 1979.

Schmeida, Mary, Ramona McNeal, and Karen Mossberger. "Policy Determinants Affect Telehealth Implementation." *Telemedicine and e-Health* 13, no. 2 (May 2007): 100-107. Accessed August 19, 2014. doi:10.1089/tmj.2006.0017.

Schmitz, David. Interview by author. Las Vegas. April 22, 2014.

Shaw, Bill, and Jessica Magaldi. "Analyzing the Politics of Health Care: Let's Buy Ourselves Some Civilization." *Journal of Business Ethics* 92, no. 1 (March 2010): 33-47. Accessed October 25, 2014. doi:10.1007/s10551-009-0137-6.

Shute, Nancy. "Can Free Video Consults Make Parkinson's Care Better?" *NPR*, March 13, 2013. Accessed June 10, 2014. http://www.npr.org/2011/06/27/137089619/the-parkinsons-doctor-will-video-chat-with-you-now.

Schwamm, Lee H., Robert G. Holloway, Pierre Amarenco, Heinrich J. Audebert, Tamilyn Bakas, Neale R. Chumbler, Rene Handschu, Edward C. Jauch, William A. Knight IV, Steven R. Levine, Marc Mayberg, Brett C. Meyer, Philip M. Meyers, Elaine Skalabrin, and Lawrence R. Wechsler. "A Review of the Evidence for the Use of Telemedicine Within Stroke Systems of Care: A Scientific Statement from the American Heart Association/American Stroke Association." *Stroke* 40, no. 7 (May 2009): 2616-2634. Accessed August 14, 2014. doi: 10.1161/STROKEAHA.109.192360.

Silva, Gisele S., Shawn Farrell, Emma Shandra, Anand Viswanathan, and Lee H. Schwamm. "The Status of Telestroke in the United States, A Survey of Currently Active Stroke Telemedicine Programs." *Stroke* 43, no. 8 (June 2012): 2078-2085. Accessed August 10, 2014. doi: 10.1161/STROKEAHA.111.645861.

Sood, Sanjay, Victor Mbarika, Shakhina Jugoo, Reena Dookhy, Charles R. Doarn, Nupur Prakash, and Ronald C. Merrell. "What Is Telemedicine? A Collection of 104 Peer-Reviewed Perspectives and Theoretical Underpinnings." *Telemedicine and e-Health* 13, no. 5 (October 2007): 573-590. Accessed June 20, 2014. doi:10.1089/tmj.2006.0073.

Stewart, Kate. "Federation of State Medical Boards Passes Model Telemedicine Policy." *Health Law & Policy Matters*, April 30, 2014. Accessed June 12, 2014. http://www.healthlawpolicymatters.com/2014/04/30/federation-of-state-medical-boards-passes-model- telemedicine-policy/.

Tanden, Neera. "If at First You Don't Succeed: A Short History of the Republicans' 48 Attempts to Repeal Obamacare." *Politico Magazine*, January 30, 2014. Accessed November 3, 2014. http://www.politico.com/magazine/story/2014/01/house-republicans-obamacare-repeal-votes-102911.html#ixzz3IJ5WUXvm.

Tanenbaum, Sandra J. "Reducing Variation in Health Care: The Rhetorical Politics of a Policy Idea." *Journal of Health Politics, Policy & Law* 38, no. 1 (2013): 5-26. Accessed October 25, 2014. doi:10.1215/03616878-1898774.

Telehealth Alliance of Oregon. "Oregon Medicaid Reimbursement." Accessed July 12, 2014. http://www.ortelehealth.org/content/oregon-medicaid-reimbursement.

Telehealth Alliance of Oregon. "Oregon Private Payer Reimbursement." Accessed July 12, 2014. http://www.ortelehealth.org/content/oregon-private-payer-reimbursement.

Telehealth Resource Centers. "Licensure and Scope of Practice." Accessed June 10, 2014. http://www.telehealthresourcecenter.org/toolbox-module/licensure-and-scope-practice#3.

U.S. Census Bureau. "2010 Census Urban and Rural Classification and Urban Area pCriteria," Last modified July 22, 2013. Accessed April 4, 2014. http://www.census.gov/geo/reference/ua/urban-rural-2010.html.

US Congress. House. Medicare Telehealth Parity Act of 2014. H. Res. 5380, 113th Cong., 2nd sess. *Congressional Record* 160, daily ed. (July 31, 2014): H7181.

US Congress. House. The SGR Repeal and Medicare Provider Payment Modernization Act of 2014. H. Res. 4015. 113th Cong., 2nd sess. *Congressional Record* 160, daily ed. (February 6, 2014): H1686.

US Congress. House. Telehealth Enhancement Act of 2013. H. Res. 3306. 113th Cong., 1st sess. *Congressional Record* 159, daily ed. (October 22, 2013): H6674.

US Congress. House. Telehealth Modernization Act of 2013. H. Res. 3750. 113th Cong., 1st sess. *Congressional Record* 159, daily ed. (December 12, 2013): H8107.

US Congress. House. TELE-MED Act of 2013. H. Res. 3077. 113th Cong., 1st sess. *Congressional Record* 159, daily ed. (September 10, 2013): H5475.

U.S. Congress. Senate. A resolution recognizing that access to hospitals and other health care providers for patients in rural areas of the United States is essential to the survival and success of communities in the United States. S. Res. 26. 113th Cong., 1st sess. *Congressional Record* (February 2013).

US Congress. Senate. Telehealth Enhancement Act of 2014. S. Res. 2662. 113th Cong, 2nd sess. *Congressional Record* 160, daily ed. (July 24, 2014): S4903.

Vo, Alexander H. *The Telehealth Promise: Better Health Care and Cost Savings for the 21st Century*. Galveston: University of Texas Medical Branch, 2008. Accessed April 19, 2014.

http://telehealth.utmb.edu/presentations/The%20Telehealth%20Promise-Better%20Health%20Care%20and%20Cost%20Savings%20for%20the%2021st%20Century.pdf.

Volden, Craig, and Alan E. Wiseman, "Breaking Gridlock: The Determinants of Health Policy Change in Congress." *Journal of Health Politics, Policy & Law* 36, no. 2 (April 2011): 227-264. Accessed October 25, 2014. doi:10.1215/03616878-1222712.

Volkert, Susan E. "Telemedicine: Rx for the Future of Health Care." *Michigan Telecommunications and Technology Law Review* 6 (2000): 147-246. Accessed April 4, 2014. http://www.mttlr.org/volsix/VolkertTYPE.pdf.

Ward, Jesse. Interview by author. Washington, DC. December 4, 2014.

Weil, Alan. "How Far Can States Take Health Reform?" *Health Affairs* 27, no. 3 (2008): 736-747. Accessed July 1, 2014. doi:10.1377/hlthaff.27.3.736.

Weiner, Jonathan P., Susan Yeh, and David Blumenthal. "The Impact of Health Information Technology and E-Health On the Future Demand for Physician Services." *Health Affairs* 32, no. 11 (November 2013): 1998-2004. Accessed April 1, 2014. http://dx.doi.org/ 10.1377/hlthaff.2013.0680.

Wolters, Tim and Angela Davison. Interview by author. Washington, DC. July 28, 2014.

Wootton, Richard. "Twenty Years of Telemedicine in Chronic Disease Management - an Evidence Synthesis." *Journal of Telemedicine and Telecare* 18, no. 4 (June 2012): 211-220. Accessed April 5, 2014. doi: 10.1258/jtt.2012.120219.

Young, Aaron, Humayun J. Chaudhry, Janelle Rhyne, and Michael Dugan. "A Census of Actively Licensed Physicians in the United States, 2010." *Journal of Medical Regulation* 96, no. 4 (2011): 10-20. Accessed August 16, 2014. http://www.nationalahec.org/pdfs/fsmbphysiciancensus.pdf.

Young, T.L. and C. Ireson. "Effectiveness of School-based Telehealth Care in Urban and Rural Elementary Schools." *Pediatrics* 112, no. 5 (2003): 1088-94. Accessed April 18, 2014. http://www.ncbi.nlm.nih.gov/pubmed/14595051.

Erin Mahn
Emahn2@jhu.edu

Education

The Johns Hopkins University..... Sept. 2012 – Dec. 2014
• MA in Government with Political Communications Concentration candidate
• Cross-enrolled in course work through the Bloomberg School of Public Health and Carey Business School
• **Master's Thesis:** "A Spoonful of Skype Helps the Medicine Go Down: The Potential and Pitfalls of U.S. Telehealth Policy"

Elon University.....August 2003 – May 2007
• BA, Double Major: Journalism and Philosophy Elon, NC
• Honors: President's List, Dean's List, Emerson Philosophy Award for Excellence, Matthew Robert Christian Award
• Elected: President – Phi Sigma Tau (International Philosophy Honor Society)
• Member: Society of Professional Journalists, Public Relations Student Society of America

Experience

National Rural Health Association.....Feb. 2011 – Present
Government Affairs and Policy Representative Washington, DC

Office of the Comptroller of Maryland..... Jan. 2010 – Feb. 2011
Media and Public Affairs Officer Annapolis, MD

Freelance Journalist..... Sept. 2009 – Feb. 2011
Various publications Charlotte, NC; Annapolis, MD

The Daily Banner.....Aug. 2007 – Aug. 2009
Staff Reporter and Photographer Cambridge, MD

Additional Experience

Coastal Hospice, public relations 2007, Salisbury, MD
The Pendulum, reporter 2003-2007, Elon, NC
Burlington Times News, reporter 2006-2007, Burlington, NC
Open Hand Publishing, public relations, copy editor 2005-2006, Greensboro, NC
Colonnades, editor 2003-2007, Elon, NC