

Essays on Occupational Licensing

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“The fundamental threat to freedom is power to coerce, be it in the hands of a monarch, a dictator, an oligarchy, or a momentary majority.”

— Milton Friedman, *Capitalism and Freedom*

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Abstract.

These essays analyze the labor market implications for workers in the health industry licensed by government agencies in the United States. Licensure is often justified on the grounds that it will protect the public from incompetent practitioners. In practice, however, occupational licensing is often used to restrict entry to a profession in order to raise wages for incumbent practitioners. The first essay examines how the expansion of optometrist scope of practice affects optometrist earnings and population eye health outcomes. Using the scope of practice expansion across states from 1976 to 2011, our estimation shows the expansion increased optometrist hourly wages by about 14 percent. In the second essay, we explore the effect of the Nurse Licensure Compact on telemedicine. The study shows that patients in NLC states used more telemedicine services from out-of-state providers than patients in non-NLC states. Our evidence indicates that the NLC reduces some barriers to practicing telemedicine for nurses. The third essay examines the possibility of using referenda to reform occupational licensing. More specifically, the essay examines how referendum would have impacted policy in regard to the Enhanced Nurse Licensure Compact in California

CHAPTER I: Introduction.

This essays studies occupational licensing in the United States and its influence on the labor market. The first chapter looks at the Optometrist's scope of practice and its effect on optometrist earnings, and subsequent improvement in a population's eye health outcome. The Optometrist's role in recent times has undergone substantial development to include extended areas of practice that ophthalmologists traditionally undertook. This corresponds with a growing demand for increased capacity in ophthalmic services and an aging population that would debate how best to meet the increased demand for eye services at an affordable cost care. It was not until January 16, 1968, almost thirty years after Albert Fitch's failed attempt in 1937, that the modern era expansion of optometry finally began. Norman Haffner was finally able to split the profession in two and settled the debate to rest. Optometrists are state-licensed health care professionals who specialize in eye health. Optometrists treat and manage various visual system conditions and related structures, including diseases, injuries, and disorders. As it is a legislated profession, state and federal law dictate the testing and procedures. Optometrists perform specified surgical procedures, prescribe glasses, contact lenses, and prisms, and use diagnostic instruments or ultrasound technology to diagnose eye-related diseases. For years, the state optometric boards have been outlining the optometric scope of practice, but with changing times, states may find it deemed to modify the scope of practice to meet the increasing demand of patients and change practice requirements. As the scope of practice differs across states, the scope of practice should start with

identifying and evaluating the state's applicable statutes, regulations, and other policies issued by the regulating body. The argument against optometry's scope expansion was due to the lack of educational background and specific training required to perform certain tasks. However, with recent technological improvements, there is growing evidence that optometrists can assume these roles effectively and maintain patient care. The scope of practice is defined based on a specified level of education, training, and various state regulations in which the person practices. The difference between ophthalmologists and optometrists is that of a medical degree. An ophthalmologist is a physician who specializes in the refractive, medical, and surgical care of the eyes and visual system and the prevention of disease and injury. In contrast, optometry practice includes examining the eye for vision prescription and corrective lenses and examining, diagnosing, treating, and managing disorders of the eye and visual system. After obtaining an undergraduate degree, ophthalmologists attend a four-year medical school and a residency program. Only after this can ophthalmologists become licensed to practice medicine and perform surgery, but optometrists' education does not include medical school. After undergraduate education, optometrists must complete four years of an accredited optometry college, after which they are awarded the Doctor of Optometry degree.

While optometrists continue to practice in the traditional clinical roles of refraction, contact lenses, and low vision rehabilitation, it is evident that these professionals now undertake a wide range of extended clinical roles, with a transformed scope of practice incorporating diverse roles. Most states prohibit optometrists from performing surgery

as statutes often require a license. Colorado and North Carolina specifically ignore surgery from their definitions of optometry practice. Simultaneously, attempts are being made to extend the scope of practice in other states to allow optometrists to perform surgery. Some of these statutes distinguish between laser and non-laser surgery. As to the contrary belief, nonetheless, it is inevitable that, over time, optometrists have been involved in delivering a wide range of more traditional services in addition to their core area of specialization. There is evidence that optometrists engaged in these extended roles do so without any damage or concern to public health. Since 1997 there have been 46 attempts in 21 states, but in vain, to allow surgery privileges. The scope of practice will continue to evolve. The modifications may be the change of the hour necessary to keep pace with technological changes, scientific advancement, and increased societal needs. The state's approach to modifying the scope of practice was in conjunction with the similar skill sets necessary to meet the particular demands allowing experienced personnel to engage in certain activities and some with direct oversight of a physician or other specified practitioner. Allowing optometrists to practice independently will further enhance their skills and provide patients quicker access to eye care.

Optometrist's three main areas of scope of practice are practice authority, prescriptive authority, and surgical authority. Practice authority is defined as an optometrist's ability to perform procedures as determined by the state board of optometry. Procedures include foreign body removal, advanced surgical procedures, and other state-authorized procedures. Prescriptive authority allows optometrist to prescribe certain medications and classifications of controlled substances. Surgical authority refers to the surgical

procedures an optometrist can provide in treating the orbital structures for tear production and drainage, also known as the lacrimal system. Five states allow foreign body removal, also referred to as lumps and bumps treatment. Four states allow advanced surgical authority, meaning optometrists have laser privileges beyond foreign body removal. Ten states allow optometrists to perform additional surgical procedures as authorized by a state's board of optometry. The following expansion would continue to significantly benefit the patient population in the coming days as optometrists, in their role as primary vision and eye care experts will be critical in meeting the needs of an aging population, which is expected to outpace the current supply of ophthalmologists.

The second chapter examines healthcare Shortages and the Nurse licensing compact (NLC) and their Impact on telemedicine. NLC is a national agreement that allows nurses to practice in participating licensing states, thereby improving access to care, easing staff shortages, and reducing costs. The. Nurses with an NLC license can practice quickly and efficiently, which is essential for many rural and underserved communities, given the shortage of healthcare workers. Telemedicine allows patients to access a healthcare provider using technology instead of physically visiting a doctor's office. Since the 1950s, healthcare providers have been offering remote services. Telemedicine first started on landline telephones, but with the technological advancement and the rise of the internet, telemedicine has started offering a host of other services, including online portals managed by a physician and video software for remote consultations. Over the past several decades, healthcare professionals have incorporated telehealth to provide treatment for patients. Incorporating electronic information and telecommunication

technology makes health care more convenient, faster, and less expensive than making a physical trip to a healthcare professional. As patients and healthcare providers discover the convenience of telemedicine, its usage has continued to grow nationwide. With technological advancement, telemedicine has proven to be more effective than traditional healthcare for patients in some locations, with various services proliferating. High-speed internet access has been the game-changer in interactions among patients, their physicians, and other health care practitioners. Although telemedicine increases access to care and reduces cost, cross-state licensure has been one of the top barriers to telemedicine delivery. The state regulatory boards have been slow to adopt the increasing use of technology to ensure quality. The bureaucracy and the state licensing norms remain a challenge. The nature of these laws restrains the usage of convenient telemedicine services. The nurses need to apply and spend time and resources to obtain the license for each state as the licensing laws limit the practice of telemedicine to the state that the provider is located in, posing challenges for the practice of telemedicine. This essay makes a data comparison from Change Healthcare between NLC and non-NLC states to examine whether the adoption of the NLC is associated with more significant usage of telemedicine from out-of-state providers. The essay also provides policy recommendations that would enhance cross-state consultations and promote telemedicine usage in the future, eliminating excessive red tape and bureaucratic hurdles. The final chapter looks at how Institutions play a crucial role in shaping public policies through direct legislative measures like ballot initiatives and referendums. Many states have enacted and reformed policies using such measures. The usage of the direct

democracy mechanism can be interpreted as a manifestation of an intense struggle of ordinary citizens with the political elites. States have exercised popular initiatives and referendums, allowing voters to approve or repeal an act of the Legislature, while advisory referendums have been used. The future possibilities for nurse licensing compact are expanding and can benefit many. Patients in remote locations worldwide can have access to needed care through remote consultations or monitoring. Specialists can consult through internet connections on cases more quickly. Patient medical records can be accessible to any patient's doctor without the need to have them copied, mailed, or reentered. Even medical training is conveniently accessible as a continuing education option for medical staff. However, if an organization plans to implement a telemedicine program, the results can potentially benefit if approached correctly. With vision and planning, the world can connect more closely to a comprehensive medical system accessible to the world.

Chapter 2: Returns to Expanded Scope of Practice: Evidence from Optometrist Prescription Authority

I. Introduction

The demand for healthcare service is rapidly increasing in most countries as a result of population aging. However, the provision of healthcare service is typically restricted by occupational licensing. Occupational licensing restrictions are most stringent in medicine (Friedman 1962). As a result, the United States experiences a shortage of physicians, and the shortage is expected to grow due to the aging of population and healthcare workforce (IHS Market Ltd. 2021).

Pivoting specifically to the provision of eye care, the availability of ophthalmologists is trending downwards despite a growing demand for eye care. Similar to many other health issues, elderly people generally experience eye health problems more frequently than young people. For example, cataracts affect more than 24.4 million Americans aged 40 or older, and approximately half of all Americans have cataracts by age 75 (American Academy of Ophthalmology 2021). However, the number of ophthalmologists per 100,000 individuals dropped from 6.30 in 1995 to 5.68 in 2017 (Feng et al. 2020).¹ Given the limited accessibility to ophthalmologists, it has long been suggested to leverage optometrists who have complementary skills for eye care (Feng et al. 2020, Gibson 2015).

¹ During the period, the number of medical doctors per 100,000 individuals increased from 243.9 in 1995 to 260.4 in 2018 (World Health Organization 2021). The decline of ophthalmology in medicine is mostly attributed to a diminishing ophthalmology curriculum in medical schools, limited residency slots, and difficulty in a crossover between ophthalmology and other disciplines (Moxon et al. 2020, Liao 2021, Linz et al. 2018).

To alleviate these issues, states have been expanding the role of optometrists as primary eye care providers over the last several decades. In the early twentieth century, optometrists were strictly eye examiners with no permission to treat patients using medication. Beginning in the 1970s, optometrists have gradually obtained the authority to prescribe medications. This scope of practice expansion has allowed optometrists to diagnose and treat patients with eye diseases or disorders without referrals to ophthalmologists. This means that upon the receipt of prescription authority, optometrists started transforming from “eye examiners” to “eye doctors.” Moreover, the federal government added to the momentum by classifying optometrists as medical doctors for Medicare reimbursement since 1986.² With their extended role in eye care, the number of optometrists substantially increased from 110.6 per 100,000 individuals in 1990 to 161.1 in 2017 (Feng et al. 2020). In the healthcare sector and even in the labor market as a whole, it is a remarkable and unprecedented change in the role of a particular occupation. Furthermore, their expanded role in primary eye care coincides with a noticeable decline in visual impairment in the U.S. between 1984 and 2010 (Tanna and Kaye 2012). Despite this, little attention has been paid to the impact of optometrist scope of practice on the labor market or health outcomes in the existing literature.

² Since the Medicare Optometry Parity Amendment in 1986, the federal government has classified optometrists as medical doctors for Medicare reimbursement (Garland 1987). The legislation made optometrists eligible for Medicare reimbursement for any services that would be covered if provided by a medical doctor. Private insurance reimbursements to optometric eye care might also change upon the federal law change. Also, it is likely that favorable scope of practice and insurance reimbursement policy might interplay and reinforce potential improvements in access to optometric eye care. But still, the change in insurance reimbursements might have a similar impact nationwide so that it may not threaten our study with state-level variations in the scope of practice.

In this paper, we examine the effects of optometrist therapeutic prescription authority on optometrist hourly wages and a population eye health outcome. States have expanded optometrist prescription authority in multiple phases. States first allowed optometrists to use medications for diagnostic purposes: diagnostic pharmaceutical agent (DPA) authority was granted in the 1970s and 1980s. After this change, states passed laws on therapeutic pharmaceutical agent (TPA) authority that allow optometrists to use certain types of medications for treatment purposes. Then, many states expanded optometrist TPA authority by enacting amplification laws on medications that were not allowed in the first TPA law. This study focuses on identifying the effects of TPA laws including both the first TPA law and subsequent amplification laws.

We hypothesize that scope of practice expansion improves both optometrist earnings and population eye health, because it enables optometrists to provide primary eye care and therefore patients may have better access to eye care. However, the impact of optometric prescription and treatments has been largely unexplored by researchers and policymakers. There are a few studies on laser surgery authority that was recently allowed to optometrists in a handful of states that find limited benefits from this specific scope of practice expansion (Stein et al. 2016, Stein et al. 2018, Mahr and Erie 2017). In contrast, looking into the major scope of practice expansion through prescription authority allowed by all states, our study provides a more complete understanding of the impact of optometrist scope of practice expansion. Other than optometry, several studies have documented that scope of practice regulations affect labor market outcomes like

earnings.³ For example, Kleiner et al. (2016) find that nurse practitioner scope of practice expansion raised nurse practitioner wages but reduced physician wages. Also, a growing number of studies have shown that broadening scope of practice improves access to care without a discernable compromise in care quality.⁴ Two recent studies, Traczynski and Udalova (2018) and Alexander and Schnell (2019), have found evidence of improvements in health outcomes after the scope of practice expansion of nurse practitioners.

To identify the effect of optometrist TPA authority, we use variations in the timing of states' introduction and expansion of optometrist TPA authority. We examine optometrist hourly wages as a labor market outcome and the proportion of people with difficulty in seeing as a population eye health outcome. Using a generalized difference-in-differences approach, we compare the outcome in states that changed TPA authority with other states before and after the policy change. This approach is essential to isolate the effects of scope of practice expansions at the state level from the effects of contemporary changes in the eye care demand and supply at the national level due to the federal insurance reimbursement policy changes or technological advances in eye care.⁵

³ Perry 2009, Kleiner et al. 2016, Timmons, Hockenberry, and Durrance 2015, Cai and Kleiner 2020, Goldsmith 1989, Kleiner and Park 2010.

⁴ About access to care, see Stange 2014, Kurtzman et al. 2017, Spetz et al. 2013, Traczynski and Udalova 2018. About care quality, see Kleiner et al. 2016, Perloff et al. 2019, Markowitz et al. 2016, Dulisse and Cromwell 2010, Traczynski and Udalova 2018, Alexander and Schnell 2019.

⁵ See Footnote 2 for more details on the contemporary insurance reimbursement policy changes. There were crucial developments in diagnostic imaging technology, laser surgery like LASIK, and silicone hydrogel contact lenses in the 1990s and 2000s (AOA Excel and Jobson Medical Information 2013, Jayasimha 2019, Lobaugh 2020). We believe that these new technologies quickly diffused among eye care providers across the states and had similar effects on optometrist earnings and population health outcomes across states conditional on optometrist scope of practice.

We use data from three different sources. First, we employ information on state legislation on optometrist TPA authority compiled by Cooper (2012). Next, in the analysis of optometrist hourly wages, we use the 1980 to 2000 decennial Census and the 2001 to 2010 American Community Survey (ACS). Lastly, in the analysis of the proportion of people with difficulty in seeing, we utilize the 1984 to 2008 Survey of Income and Program Participation (SIPP).

Our estimates provide evidence that granting optometrists TPA authority improved both optometrist earnings and a population eye health outcome. Optometrist hourly wages increased by about 14% after the adoption of TPA authority, and subsequently the proportion of people with difficulty in seeing fell by 29%. Our estimation results also reveal a large improvement in the eye health outcome of the population aged 50 or above following optometrist TPA expansion to glaucoma medications. These estimates are broadly robust to changes in sample and model specification as well as falsification tests. As a corollary, our study shows that despite the shortage of ophthalmologists, the expansion of optometrist scope of practice contributed to the decline in vision impairment in the U.S. in the recent decades.

These findings imply that allowing healthcare professionals to practice to the full extent of their training may encourage them to provide higher valued-added services and subsequently improve public health. For example, treating eye diseases like glaucoma is a higher value-added service than writing a prescription for eyeglasses or contact lenses. As states allowed optometrists to use medications, particularly for treatment purpose,

optometrists became able to treat patients without sending them to ophthalmologists.⁶ Their increased earnings may be attributable to optometrists who started to provide higher value-added services after the policy change. The appearance of eye treating optometrists might also increase access to eye care, thereby improving the eye health of the general population.⁷

II. Optometrist Scope of Practice

1. Evolution of Optometrist Scope of Practice

The eye care industry specializes in safeguarding ocular health and the correction of eye problems that can impact vision capacity. The global eye care market size was \$125.16 billion in 2018 and is expected to reach \$192.85 billion by 2026, as per Vision Care Market 2020.⁸ In the eye care industry, ophthalmologists and optometrists provide primary eye care that consists of diagnosing and treating eye diseases or disorders.⁹ Primary eye care is supported by other eye care professionals such as ophthalmic registered nurses, ophthalmic medical assistants, and ophthalmic photographers.¹⁰ In addition, opticians

⁶ Ideally, we would be able to explore the effect of these changes on ophthalmologists specifically, but it is not possible to separate out ophthalmologists from other physicians in the Census or ACS data.

⁷ According to the AOA Excel and Jobson Medical Information (2013), optometrists provided 85% of comprehensive eye exams in the U.S. in 2012. Moreover, 18% of patient visits to optometrist offices are for medical eye care, and 80-85% of optometrists have some level of involvement with medical eye care.

⁸ <https://www.fortunebusinessinsights.com/industry-reports/vision-care-market-101731>

⁹ The difference between ophthalmologists and optometrists in education and training can be summarized as the following. After obtaining an undergraduate degree, ophthalmologists attend a four-year medical school to be a Medical Doctor (MD) and a three-year required residency program in ophthalmology, while optometrists attend a four-year optometry school to be a Doctor of Optometry (OD) and a year of an optional residency program.

¹⁰ Ophthalmic registered nurses usually assists in injecting medications or assisting with a hospital or office surgery, whereas ophthalmic technicians/technologists are trained medical assistants who support physicians with technical, medical tests, and minor office surgery. The role of the ophthalmic photographer is to document patient's eye conditions in photographs.

manufacture or sell corrective eyeglasses or contact lenses. According to Feng et al. (2020), there are 18,512 ophthalmologists and 52,625 optometrists in 2017.

Optometrists were not allowed to diagnose or treat eye diseases or disorders until the 1970s. Before the time, ophthalmologists essentially had a monopoly in the market for primary eye care services—having unique authority to diagnose and treat eye diseases or disorders, in addition to providing prescriptions for eyeglasses and contact lenses. Conversely, optometrists focused on vision correction areas through general eye examinations that often lead to prescriptions for eyeglasses or contact lenses.¹¹ Since the 1970s, however, the role of optometrists has gradually expanded to include the practices previously reserved for ophthalmologists.¹² This crucial change in eye care provision coincides with a growing demand for ophthalmic services due to population aging and advancements in eye care technologies given the limited supply of ophthalmologists. To address the excess demand for eye care at an affordable cost, states have expanded the optometrist scope of practice by allowing optometrists to use medications and perform surgical procedures.¹³

¹¹ Minnesota was the first state to license optometrists in 1901, and by 1924 the remaining of the states and District of Columbia completed their licensure requirement for optometrists. Minnesota's 1901 statute defined the scope of the legal practice of optometry as "[t]he employment of subjective and objective mechanical means to determine the accommodative and refractive states of the eye and the scope of its functions in general." (Cooper 2012 and Minnesota Senate Bill 188, Approved April 13, 1901)

¹² There was an early attempt to permit optometrists to use both diagnostic and therapeutic medications in Pennsylvania in 1937 (Optometry Cares – The AOA foundation 2021).

¹³ Optometrist surgical authority expansion has been limited at the time of this writing. Only five states enable optometrists to practice with a broad range of ophthalmic surgery. Seven other states allow the excision of lumps and bumps, and several states have a provision that additional surgical procedures can be authorized by the state's board of optometry. However, 29 states and DC prevent optometrists from practicing most types of surgery, with exclusions for the most elementary procedure of inserting punctal plugs or removing foreign bodies (American Optometric Association 2021).

Optometrist scope of practice expansion in prescription authority mostly occurred from the 1970s to 1990s.¹⁴ States initially enacted DPA laws that authorized optometrists to use medications for diagnostic purposes. Rhode Island enacted the first DPA law in 1971 and Maryland was the final state to enact this change in 1989. With the DPA authority, optometrists can utilize drugs to facilitate eye examinations. The next wave of optometrist scope of practice expansion established TPA laws that allowed optometrists to use medications for treatment purposes. West Virginia and North Carolina, early adopters of this legislation, introduced the DPA and TPA law together in 1976 and 1977, respectively. Other states first enacted TPA laws in the 1980s and the 1990s – several years after enacting DPA laws. The District of Columbia was the last jurisdictions to enact TPA legislation in 1998. Table 1 shows when each state passed the first TPA legislation, and Figure 1 provides a color-coded map on the timing of the first TPA law enactment by three groups of states: those allowed TPA in the 1970s, 1980s, and 1990s. As shown in Figure 1, states in the Midwest expanded optometrist scope of practice earlier than states in New England, the Mid-Atlantic, and Pacific regions.

After the establishment of the first TPA law, optometrists were authorized to use legend drugs to treat eye diseases or disorders, meaning that they can treat patients with certain eye problems without referring them to ophthalmologists.¹⁵ But their eligibility to use

¹⁴ This paragraph is heavily indebted to Cooper (2012).

¹⁵ TPA laws typically require the state Board of Optometry to specify a minimum level of education in prescription for therapeutic purposes, either as a curriculum in optometry schools or as continuing education, and pass examinations on the contents. For example, Pennsylvania requires a minimum 100 hours of education in the prescription and administration of pharmaceutical agents for therapeutic purposes and 18 hours of education in glaucoma (Pennsylvania State Board of Optometry 2003). According

other types of drugs such as drugs for glaucoma treatment, oral drugs, controlled substances, or injectable drugs differs across states. Four states (AL, NC, UT, WI) were exceptional and granted optometrists full TPA authority immediately upon the passage of TPA law. Thereafter, states have broadened TPA authority beyond legend drugs through amplification laws. For example, 24 states allowed the use of drugs for glaucoma treatments in amplification laws while 26 states and DC did in the first TPA law. Table 1 shows when each state passed amplification laws. However, there is no common sequence of TPA amplifications by states. Figure 2 shows the number of states, cumulatively, that have allowed optometrists to prescribe each type of drugs for treatment purposes. The figure reveals that states tend to have amplified the TPA authority from legend drugs to drugs for glaucoma treatment to controlled substances. As a result of a continuation of the scope of practice expansion, optometrists today can use legend drugs and drugs for glaucoma treatment in all jurisdictions and oral drugs, controlled substances, and injectable in more than two-third of all states and jurisdictions.

2. Relevant Literature

In the area of optometry, little research exists on the effects of scope of practice despite the substantial expansion of it over the past several decades. Several studies on optometrist laser surgery authority that were allowed in Oklahoma in 1998 and a few other states later on are exceptions. Mahr and Erie (2017) showed that there was no

to the Caplan (2017), optometry schools started to extend their programs to five or six years with an emphasis on diagnosis and treatment of eye diseases in the 1960s.

difference in access to laser capsulotomy in Oklahoma, measured by driving distance or time, between Medicare beneficiaries' who received the procedure from an optometrist and those who did from an ophthalmologist. From a similar perspective, Stein et al. (2018) documented that about a half of Medicare beneficiaries who received surgical care from optometrists lived within a 30-minute travel distance from the nearest ophthalmologist office. Also, Stein et al. (2016) examined a clinical outcome of laser trabeculoplasty and found that ophthalmologists were less likely to repeat the same procedure than optometrists. These studies imply limited improvements in the geographic proximity to and quality of eye care from the optometrist scope of practice expansion to laser surgical procedures. Two other studies on optometrist prescription of contact lens are also relevant to our study. Norris and Timmons (2018) examined the impact of the 2004 Fairness to Contact Lens Consumers Act that required optometrists to release contact lens prescriptions to opticians. They found that the legislation effectively reduced the monopolistic power of optometrists with respect to selling contact lenses and subsequently their earnings. Cooper (2012) showed that the same legislation did not have a systematic effect on pricing in the contact lens market.

Outside of the optometrist market specifically, there are a growing number of papers that explore the effects of scope of practice changes. Several studies have documented that the scope of practice expansion for a certain profession has a positive earnings effect on the profession but a negative earnings effect on competing professions (Kleiner 2016). Perry (2009) found that greater practice authority for nurse practitioners raised their own

earnings and reduced physicians' earnings, and that greater practice authority for physician assistants lowered nurse practitioners' earnings. Similarly, Kleiner et al. (2016) showed that independent prescription authority for nurse practitioners raised their wages by 5% but reduced physician wages by 3%. Cai and Kleiner (2020) found that allowing physical therapists to access patients without physician referral reduced earnings of occupational therapists. Timmons, Hockenberry, and Durrance (2015) documented that favorable scope of practice for chiropractors raised their wages by 7 to 8 percent. In dentistry, Goldsmith (1989) found that as dental hygienists experience less autonomy from dentists, their incomes subsequently decrease. A related paper by Kleiner and Won Park (2010) also showed that allowing dental hygienists to be self-employed raised their wages by 10 percent. But not all studies have found the positive earnings effect of a scope of practice expansion. Dueker et al. (2005) found that advanced practice registered nurses (APRN) wages were twenty one percent lower in states with full prescriptive authority. Nichols (1996) found that as physical therapists gained greater professional independence from physicians that they experienced a reduction in earnings. Furthermore, several studies have reported that expanding scope of practice leads to improved access to care, particularly among rural and underserved populations, without decreasing care quality. For example, nurse practitioners' independent practice increased visits to doctor's office (Stange 2014), the number of prescriptions in community health centers or retail clinics (Kurtzman et al. 2017, Spetz et al. 2013), and the frequency of routine checkups (Traczynski and Udalova 2018). Conversely, their restricted scope of

practice turned out not to improve the quality of primary care, such as chronic disease management and cancer screening (Perloff et al. 2019) and infant mortality rates (Kleiner et al. 2016). Similarly, independent practice of certified nurse midwives did not reduce maternal and infant health outcomes (Markowitz et al. 2017, Yang et al. 2016, Hoehn-Velasco et al. 2021), and independent practice of certified registered nurse anesthetists did not increase surgical inpatient mortality rates or complication rates from anesthesia (Dulisse and Cromwell 2010). There is even some evidence on the improvement in health outcomes after the scope of practice expansion: nurse practitioner independent practice improved people's self-reported health status (Traczynski and Udalova 2018) and mental health outcomes (Alexander and Schnell 2019), and psychologist prescription authority reduced suicide rates (Choudhury and Plemmons 2021). In addition, there is some evidence that restrictions on nurse practitioner practice caused an increase in service prices (Kleiner et al. 2016), and that broader physician assistant prescription privileges lowered the cost of outpatient claims per Medicaid beneficiary (Timmons 2017).

III. Data and Empirical Method

1. Measures of the Scope of Practice

We use data providing specifics on state legislation with respect to optometrist TPA authority compiled by Cooper (2012). As shown in Table 1, Cooper's data provides detailed information on the introduction and expansion of optometrist TPA authority as of February 23, 2012. It breaks down TPA into five categories and specifies the timing of legislative changes relevant to each category.

In this study, we exclusively focus on optometrist TPA authority as an economically meaningful scope of practice expansion. Even though DPA authority is important as a prerequisite for the subsequent TPA authority, it alone is not likely to have an economically meaningful effect on the services provided by optometrists. Without TPA authority, optometrists can diagnose patients with eye diseases or disorders, but are not permitted to treat patients. Conversely, if optometrists were allowed to use medications for both diagnosing and treating patients, they could more effectively provide primary care of eye diseases or disorders. Thus, our main focus in this paper is estimating the effects of the TPA authority rather than the DPA authority.¹⁶

We use three policy dummy variables to measure optometrist TPA authority. If all states allowed full TPA authority at once, we would use just one policy dummy variable to estimate the policy's treatment effect. However, most states granted optometrists a limited TPA authority with the first TPA legislation and subsequently expanded it through multiple amplification laws. Accordingly, we define three policy variables: the first TPA law, TPA law allowing glaucoma medications, and TPA law allowing controlled substances. We use these three variables to separately estimate the treatment effect of each phase of TPA law – fully accounting for differential effects from each phase of TPA law. We do

¹⁶ Furthermore, there are two barriers against studying the effect of the optometrist DPA authority. First, 23 states adopted DPA laws in the 1970s, whose effect on hourly wages cannot be analyzed by the Census data. Next, the remaining 27 states and DC allowed DPA laws in the 1980s, but its effect is not correctly identifiable because 14 out of the 23 states that adopted the DPA law in the 1970s introduced TPA laws in the 1980s. For these reasons, we ignore the effect of the DPA and estimate the effect of TPA. If DPA had any positive earnings effect, then ignoring the effect of the DPA authority adopted in some states in the 1980s may cause our estimates of the effect of TPA authority introduced in other states in the same decadal period to be biased downwards.

not separately consider TPA laws allowing oral or injectable medications because these medications were mostly allowed with controlled substances, as shown in Table 1.

2. Labor Market Outcome

To examine how optometrist TPA authority affects optometrist hourly wages, we use decennial Census data from 1980 to 2000 and American Community Survey (ACS) data from 2001 to 2010 obtained from the IPUMS USA website (Ruggles et al., 2021). Each decennial Census dataset is a five-percent sample of the U.S. population, and each ACS dataset is a one-percent sample. The 1980 Census is the first decennial Census with information on usual working hours a week—an essential variable necessary for the computation of hourly wages.

We study the sample of 1,211 optometrists who are full-time, full-year wage workers (not self-employed) aged 18 to 64. Our analysis focuses on those who are not self-employed because their wage income may better reflect the market value of optometric services than the business income of self-employed optometrists. According to Hurst et al. (2014), self-employed individuals tend to underreport their income by about 25% in U.S. household surveys, and the share of underreported income varies over time. As a result, the majority of optometrists who are self-employed during the sample period are excluded from the study sample.¹⁷ In this study, full-time workers are defined as workers who usually work no less than 35 hours a week and full-year workers worked no less than

¹⁷ The share of self-employed optometrists gradually declined from 77% in 1980 to 55% in 2010 to 42% in 2019, which is similar to the diminishing proportion of self-employed physicians (47% in 1980, 25% in 2010, and 17% in 2019)

50 weeks the previous year. The sample does not have optometrists in two states (AK, ME).

In the sample, optometrist hourly wages are on average \$53.85 (in 2019 dollars), as shown in column (1) in Table 2. Females (31.2%), blacks (1.8%), and Hispanics (2.6%) are underrepresented in the optometrist population, while postgraduate education (94%) is overrepresented. Columns (2) to (5) show that optometrist hourly wages gradually increased from \$46.71 in the 1980 Census to \$57.07 in the 2001-2010 ACS. Their hourly wages substantially increased between the 1990 and 2000 Census, when the fraction of optometrists with TPA authority also substantially increased. The shares of female and black optometrists gradually increased over time, and optometrists without postgraduate education almost disappeared by the 2000 Census.^{18 19}

Figure 3 shows trends in hourly wages of optometrists by three groups of states: states that enacted the first TPA law in the 1970s, the 1980s, and then the 1990s. The first group includes NC only, which allowed full TPA authority in 1977. This may explain why NC's trend line starts at its highest point in 1979. When the second group of states allowed the

¹⁸ Optometry schools extended their programs to five or six years with an emphasis on diagnosis and treatment of eye diseases in the 1960s (Caplan 2017). This increase in education may have provided a foundation for optometrists to pursue an expanded role in eye care in the following decades. As a result, a majority of optometrists in the 1980 Census obtained postgraduate education, and also optometrists without postgraduate education rapidly diminished in the 1980s and 1990s and almost disappeared by the 2000 Census.

¹⁹ The number of observations grows over the years primarily because more and more optometrists work for an employer rather than for their own business. Caplan (2017) provides a detailed account on the change in modes of optometrist practice around the 1990s as the following: "The solo practice mode, the keystone of the practice of optometry when I started in 1950 was gradually fading from the scene. The cost of furnishing, equipping and running a solo practice had become so astronomical that it was no longer feasible to be a solo practitioner. Many private practices were purchased by ophthalmology and optometry group practices, referral centers and multi-disciplinary practices."

TPA authority in the 1980s for the first time, the group's average log hourly wages noticeably increased more than the other two groups. Similarly, when the third group of states enacted the first TPA law in the 1990s, the group's outcome increased absolutely and relatively to the other two groups.

3. Population Eye Health Outcome

To analyze the effect of optometrist TPA on a population eye health outcome, we use 1984 to 2008 Survey of Income and Program Participation (SIPP) panels obtained from the NBER and CEPR websites (National Bureau of Economic Research 2021, Center for Economic and Policy Research 2014). The SIPP collects data on functional limitations and disability in topical modules in most panels. Particularly, we use data in SIPP 1984 Wave 3, SIPP 1988 Wave 6, SIPP 1990 Wave 3, SIPP 1991 Wave 3, SIPP 1992 Wave 6, SIPP 1993 Wave 3, SIPP 1996 Wave 5, SIPP 2001 Wave 5, SIPP 2004 Wave 5, and SIPP 2008 Wave 6. These waves all use the same question about limitations in seeing: "Does [the person] has any difficulty seeing words and letters in ordinary newspaper print even when wearing glasses or contact lenses if [the person] usually wears them?"

We study the sample of individuals aged 15 or above, who are in the universe of SIPP questions on functional limitations and disability throughout the sample period. Among 50 states and DC, observations in 12 states (AK, IA, ID, ME, MS, MT, ND, NM, SD, VT, WY, WV) that are not consistently identifiable in the SIPP are excluded from the sample. Observations in 3 states (NH, NV, and UT) that have less than ten individuals surveyed in 1984 are also excluded from the sample. As a result, our study sample contains 429,916

individuals in 35 states and the District of Columbia (DC) surveyed in 9 calendar years spanning from 1984 to 2010.

In the sample, 4.6% of individuals have difficulty in seeing, as shown in column (1) in Table 3. Columns (2) to (4) show that the proportion of people with difficulty in seeing gradually declined from 6.7% in the 1980s to 4.9% in the 1990s to 3.7% in the 2000s. Figure 4 details the declining trend of three groups of states based on the timing of their first TPA law enactment. All three groups show gradually improvements in the population eye health outcome. North Carolina, the first state allowing optometrist TPA in the 1970s, saw a sharp decline in the proportion of people with difficulty in seeing in the 1980s. In the second group of states that passed their first TPA laws in the 1980s, the eye health outcome on average worsened relative to other groups in the 1980s but improved in the 1990s. The third group of states that allowed optometrist TPA in the 1990s saw relative improvements in the eye health outcome in the early 1990s and early 2000s. These patterns indicate that there might be a time lag between the scope of practice expansion and improvements in the eye health outcome.

4. Empirical Methodology

We use the staggered introduction and expansion of the optometrist TPA authority by states to identify the policy's effect on optometrist wages and the population eye health outcome. More specifically, we use a generalized difference-in-differences model with two-way fixed effects that exploits within-state variations for estimation. The basic form of our regression model is:

$$Y_{ist} = \beta_0 + \beta_1 S_s + \beta_2 T_t + \beta_3 P_{st} + \beta_4 X_{ist} + \epsilon_{ist}$$

where i indexes individuals, s indexes state, t indexes year, Y_{ist} is the outcome variable, S_s is a vector of state fixed effects, T_t is a vector of year fixed effects, P_{st} is a vector of policy dummy variables, X_{ist} is a vector of individual characteristics, and ϵ_{ist} is the error term.

Our outcome variable is the log of hourly wages in our initial analysis of optometrist labor market outcomes. When turning to our analysis of health outcomes, we instead use a binary indicator on whether a person has difficulty in seeing. The key explanatory variable is three policy dummy variables, varying across state-by-year cells: the first TPA law, TPA law allowing glaucoma medications, and TPA law allowing controlled substances. Each policy dummy has a value of 1 for a state-by-year cell if the state allowed that particular type of TPA by the year, and a value of 0 otherwise.

In the analysis of the eye health outcome, we also estimate the model with a ten-year lagged policy dummy variables instead of the policy dummy variables with no time lag. The lagged policy dummy has a value of 1 for a state-by-year cell if the state allowed that particular type of TPA at least ten years ago, and a value of 0 otherwise. In this model, we assume that it takes ten years for the policy change to take effect on the eye health outcome. Our assumption is based on a medical consensus that glaucoma progresses slowly with aging (Centers for Disease Control and Prevention 2021) and that medical studies usually track patients with glaucoma treatments more than 10 years after treatment to measure the effect on vision loss or blindness (Susanna et al. 2015).

The coefficient vector β_4 measures the effect of each phase of TPA laws on the outcome after accounting for the other phases of TPA laws.²⁰ We are primarily interested in the sum of the individual coefficients in β_4 as an estimate of the overall effect of the TPA law. The estimation compares the average difference in the outcome before and after the change in TPA authority between states with the policy change and states without. The identifying assumption for the generalized difference-in-differences model is that there are no state-specific time-varying factors that correlates with both the policy and outcome.²¹

²⁰ If we estimate the effect of the first TPA law in some states without accounting for concurrent amplification laws in other states, the effect of the first TPA law would be underestimated. For example, there are 13 states that passed the first TPA law in the 1980s, and that expanded the TPA authority by allowing glaucoma medications through amplification laws in the 1990s. If an estimation does not account for the amplification law in the 13 states, the effect of the first TPA law passed in 27 other states in the 1990s would be underestimated.

²¹ Recent studies on difference-in-differences in staggered adoption provide some insights on the interpretation of our two-way fixed effect estimates. Athey and Imbens (2021) show that our two-way

The model also include control variables including the state fixed effects, year fixed effects, and individual characteristics. For estimations on optometrist hourly wages, we account for the following individual characteristics: age, age squared, female dummy, black dummy, Hispanic dummy, and educational attainment dummies (individuals without college education, those with some college education, and those with four-years of college education). For estimations on the population eye health outcome, we include age, age squared, female dummy, black dummy, Hispanic dummy, and other race and ethnicity dummy. We do not control for education in the model of eye health due to a potential endogeneity issue – difficulty in seeing may lower educational attainment.²²

We use two alternative approaches to estimate the policy's effect with the regression model above. One approach is ordinary least squares (OLS) with individual-level data. Another estimation strategy is a two-step approach that is described in Donald and Lang (2007) and Conley and Taber (2011) and employed in Kleiner et al. (2016). In the approach, the first step aggregates the outcome (Y_{ist}) within state-by-year cells while accounting for individual characteristics. The second step estimates the policy's effect by running the aggregated outcomes on the policy variables.²³ The two-step approach has several advantages: theoretically it requires a weaker econometric assumption on error

fixed effects estimate is a weighted average of potentially heterogeneous treatment effects. Callaway and Sant'Anna (2020) point out limitations in the two-way fixed effects estimate and propose a new estimation method. However, their econometric model with one policy variable is not directly applicable to our model with three policy variables, so we cannot directly adopt their interpretation and proposed estimation method.

²² Our results do not change substantially if we include education controls in the regression.

²³ See Conley and Taber (2011) for more details on the two-step approach.

terms and often provides more conservative estimates on standard errors. Conceptually the two-step approach with aggregation equally treats state-by-year cells regardless of how many individuals are in each cell. But the two-step approach demands sufficiently large individuals in each state-by-year cell, which is not satisfied by the sample of optometrists in the analysis of labor market outcomes. Therefore, we use ordinary least squares with individual-level data for estimations on optometrist hourly wages, and the two-step approach for estimations on the public eye health outcome. In both estimations, standard errors are clustered by states because the policy varies at the state level.

IV. Results

1. Scope of Practice and Optometrist Hourly Wages

The results of our estimates consistently show that granting prescription authority to optometrists had a positive effect on their hourly wages. As shown in column (1) Table 4, optometrist hourly wages on average increased by 0.073 log points (or 7%) more in states that introduced the first TPA law than in other states after the policy change. But the estimate is obtained without a consideration of amplification laws and are statistically insignificant.

In contrast, column (2) accounts for the effects of amplification laws on glaucoma medications. Each of the two estimates in the column is smaller than the estimate in column (1), but they jointly are larger and statistically significant at the 10% level. That is, if we separately estimate the effect of the initial TPA law and TPA law on glaucoma medications, we obtain a larger estimate on the overall effect of both laws. Column (3)

shows estimates when we further accounts for amplification laws on controlled substances. Again, each of the three estimates in the columns is small and insignificant, but they jointly are the largest and most significant.

Our baseline specification is column (3), which includes all three policy variables and individual controls. The sum of estimates in column (3) shows that optometrist TPA laws overall raised optometrists' hourly wages by 0.131 log points (12.3%), which is statistically significant at the 10% level. Individual estimates on the first TPA law, TPA law on glaucoma medications, and that on controlled substance are all statistically insignificant but in a similar size between 0.038 and 0.049 log points, which suggests that each phase of the TPA expansion made a small positive incremental change in earnings.

These results indicate that the scope of practice expansion with TPA laws raised the value of service provided by optometrists. Although optometrists had been trained to diagnose and treat eye diseases and disorders in optometry schools at least from the 1960s (Caplan 2017), they could not fully utilize their new training until obtaining the authority to legally do so. Upon the passage of the initial TPA law, optometrists became eligible to treat patients with eye diseases and disorders, a market long monopolized by ophthalmologists. Moreover, as they were allowed to use medications for glaucoma treatment, controlled substances, and injectable by amplification laws, they became able to engage in more advanced procedures of eye diagnosis and treatment.

2. Scope of Practice and Population Eye Health Outcome

Our estimation results indicate that allowing optometrists to prescribe medications for treating patients improved the public eye health outcome with a decadal time lag. Table 5 presents two sets of estimation results on the health outcome with or without time lags. First, columns (1) to (3) show estimation results without time lags, which we did in the analysis of optometrist hourly wages in the previous section. Column (1) includes the First TPA dummy as a policy variable, but columns (2) and (3) account for amplification laws on glaucoma medications and controlled substances. Estimates in columns (1) to (3) show that optometrist TPA did not lead to an instant reduction in the proportion of people with difficulty in seeing. In column (3), the sum of estimates on the three policy variables is jointly statistically insignificant.

Turning our attention to columns (4) to (6), we do find that the policy change significantly reduced the proportion of people with difficulty in seeing with a decadal time lag. Considering the slow progress of common eye diseases and disorders (Centers for Disease Control and Prevention 2021), states might not see an instant improvement in the eye health outcome upon the passage of optometrist TPA authority. However, they might observe the outcome improved years after the policy change when patients treated by optometrists maintain good vision while those who did not have access to treatments by optometrists lose their vision. In line with this conjecture, estimates in columns (4) to (6) are negative and jointly statistically significant. The sum of estimates in column (6) shows that optometrist TPA overall reduced the probability of people with difficulty in seeing by

1.4 percentage points, which is about 29% of the sample mean (4.6%). Particularly, the estimate on glaucoma medications shows that allowing optometrists to treat glaucoma, the leading causes of irreversible blindness, reduced the probability of people with difficulty in seeing by 0.7 percentage points or 15%. In addition, in column (6) estimates on policy variables are all negatives, suggesting that the first TPA laws and amplification laws made cumulative improvements in public eye health.

Given that eye diseases and disorders arise from aging, we also estimate the policy's effect on two subsamples: young population aged below 50 and old population aged 50 or above. Table 6 presents our baseline estimates in column (1) and two subsample estimates in the following columns. Columns (2) and (3) show that eye health outcome improved among both age groups after optometrist TPA laws, but that the older population benefited more, consistent with our expectations. Estimates in column (3) show that the policy reduced the proportion of seniors with difficulty in seeing by 2.4 percentage points with a decadal time lag, which is about 26% of the sample mean (9.45%). Moreover, our estimated coefficient on glaucoma medications is sizable and statistical significant in the sample of the older population only. This finding is consistent with the fact that glaucoma mostly develops among seniors, and that they are likely to have benefited the most from glaucoma treatments newly offered by optometrists after the scope of practice expansion.

These results, combined with the results on the labor market, provide a more complete picture on the economic and health implications of optometrist scope of practice

expansion. Optometrist TPA improved public eye health, as well as optometrist earnings, by expanding the role of optometrists from eye examiners to primary eye care providers. We believe the two results are complementary because the increase in optometrist earnings may reflect the value of the improvement in public eye care.

3. Robustness Check

1) Sensitivity to Changes in Sample or Specification

Our estimates are broadly robust to changes in sample and model specification. Table 7 compares our baseline estimates on hourly wages in column (1) with two alternative estimates in columns (2) and (3). Column (2) shows that estimates obtained from a regression that account for a contemporary policy change in contact lens prescription release by optometrists between the 1970s and the 2000s. As shown in columns (1) and (2), the additional control for the contemporary policy change make the estimates slightly smaller and less significant. According to the result, the positive effect of expansion of prescription authority on optometrists seems unconfounded much with the contact lens prescription release policy's negative earnings effect (Norris and Timmons 2020). In addition, column (3) shows estimates if we excludes North Carolina (NC) from the sample. NC is the only state that allowed the full TPA authority in the 1970s and made no change in the TPA authority during the sample period. Compared to the baseline estimates in column (1), estimates from the new sample in column (3) are a bit smaller and statistically less significant. But still the alternative estimates support that the optometrist TPA's effect on labor market outcomes are not dominated by NC.

Similarly, Table 8 shows our baseline estimates on eye health and alternative estimates. A comparison of columns (1) and (2) clarifies that the contemporary policy changes in contact lens prescription makes little change in our estimates of the effect of optometrist TPA on the eye health outcome. Column (3) shows that our estimated effect of optometrist TPA slightly decreases if NC is excluded from the sample.

2) Falsification Tests

As a further robustness check to our estimates on hourly wages, we conduct triple differences estimation using healthcare practitioners other than optometrists as a control group. Optometrists and other healthcare practitioners are both working in the healthcare sector, but only optometrists are expected to have been affected by changes in optometrist TPA authority. Hence, it is reasonable to assume that other healthcare professional wages might not be systematically affected by changes in optometrist TPA authority and to use them as the control group in the triple difference's estimation. If there were state-specific time-varying shocks on optometrist earnings, and if the shocks had similar effects on other healthcare professional earnings, the triple differencing would remove a potential bias arising from the shocks.

Table 9 shows triple differences estimates of the optometrist TPA effect on optometrist hourly wages. These estimates are slightly larger and statistically more significant than our baseline difference-in-differences estimates. Estimates in column (1) show that the optometrist TPA laws altogether raised optometrist hourly wages by 0.136 log points

(12.7%), which is similar to the result from our baseline specification (0.131 log points or 12.3%). It is also informative to look at triple differences estimates after excluding ophthalmologists or opticians from the control group because they work in the eye care industry and their earnings might be affected by the optometrist TPA laws. Columns (2) and (3) confirms that triple differences estimates slightly increase even if we exclude physicians or opticians from the control group.²⁴ Lastly, column (4) shows that triple differences estimates become larger if we account for potentially different trends in occupational earnings among other healthcare professionals.

In another set of robustness checks, we estimate how population health outcomes other than eye health changed after optometrist TPA laws. Optometrist TPA is expected to improve eye health outcome, but not health outcomes unrelated to eye diseases or disorders. The SIPP provides data on difficulties in hearing, speech, lifting, and walking as well as difficulty in seeing. For this falsification test, we examine how these health outcomes are associated with optometrist TPA laws with a decadal time lag.

As shown in Table 10, three out of four other health outcomes (speech, lifting, and walking difficulty in Columns (3) to (5)) turn out to be almost unrelated to optometrist TPA laws. Column (2) shows that difficulty in hearing is highly associated with optometrist TPA laws. Given the association between hearing and vision impairments (Chia et al. 2006, Schneck et al. 2012, Loiselle et al. 2020), some of the reduction in hearing loss could be

²⁴ Opticians are identifiable as a standalone occupation in the Census and ACS data while ophthalmologists are not and are lumped together with other physicians.

related to optometrist TPA laws. But we believe that such a large and significant estimate in Column (2) might be a statistical artifact due to a large fluctuation in the proportion of people with hearing difficulty around the early 1990s coinciding with optometrist TPA law changes with a time lag. As shown in Appendix Figure 1, the proportion of people with hearing difficulty spiked in the early 1990s and regressed in the mid-1990s. Ikeda et al. (2009), a study on U.S. trends in the prevalence of hearing loss from 1976 to 2006, proposed two likely explanations to the decline in hearing loss in the 1990s: occupational noise regulations and an improvement in screening and use of hearing aids.

V. Conclusion

In this paper, we provide the first evidence that granting optometrists therapeutic prescription authority resulted in an increase in optometrist earnings and a subsequent improvement in a population eye health outcome, as policy makers intended. Our generalized difference-in-differences estimation finds that TPA laws overall raised optometrist hourly wages by about 13% and reduced the proportion of people with difficulty in seeing by about 29% with a decadal time lag. We also found suggestive evidence that each phase of the TPA authority expansion contributed to an incremental and cumulative change in both the optometrist labor market and general population health.

In addition, our study suggests that independent practice authority is important to fully leverage prescription authority. One example of a profession where prescription authority is often limited is advanced practice registered nurses who may need to work

under some form of oversight from physicians. Our estimate of the wage effect of the optometrist scope of practice expansion (13%) is somewhat larger than estimates of the wage effect of other healthcare practitioner scope of practice expansion by previous studies (5 to 10%). This difference may be attributable to the fact that optometrists face no restrictions on independent practice—they work completely free of physician control. Other healthcare professionals experiencing changes in scope of practice face more restrictions and are less likely to substitute as closely for physicians. For example, states have been separating independent practice authority and independent prescription authority of nurse practitioners. In this case, even if nurse practitioners are allowed to prescribe medications independently, they cannot practice by themselves. However, optometrists can realize full benefits from scope of practice expansion without the interference of independent practice restriction.

These findings have important implications on ongoing policy debates on scope of practice expansions of optometrists and other healthcare practitioners to meet the rapidly growing demand for medical services given the limited supply of physicians. Policy makers may learn from the experience of optometrists and our estimated effects of TPA authority. Changes to scope of practice for medical professionals appear to be more impactful when providers are permitted to practice independently to the full extent of their specialized training.

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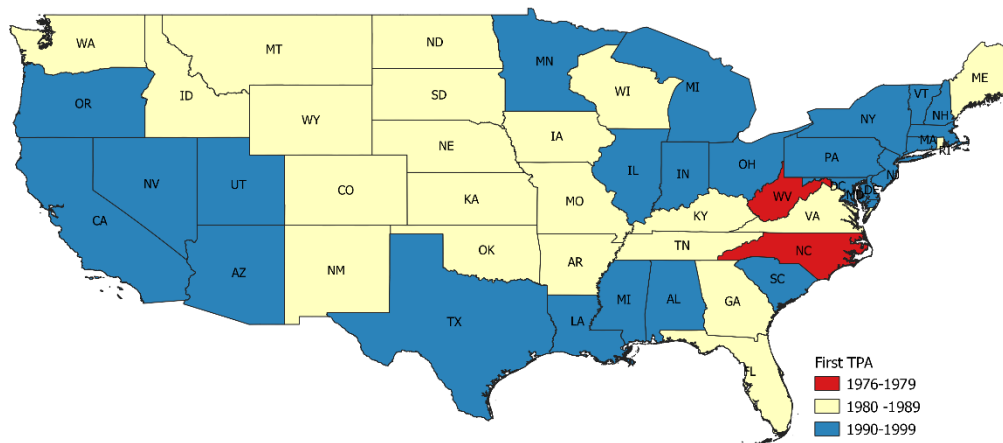
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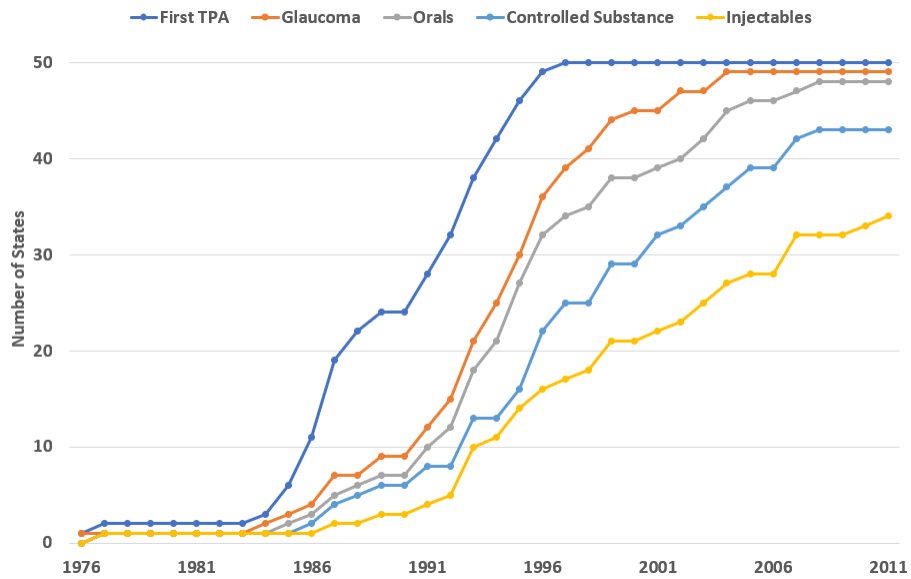
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Figure 1. When States First Allowed Optometrist Therapeutic Prescription Authority



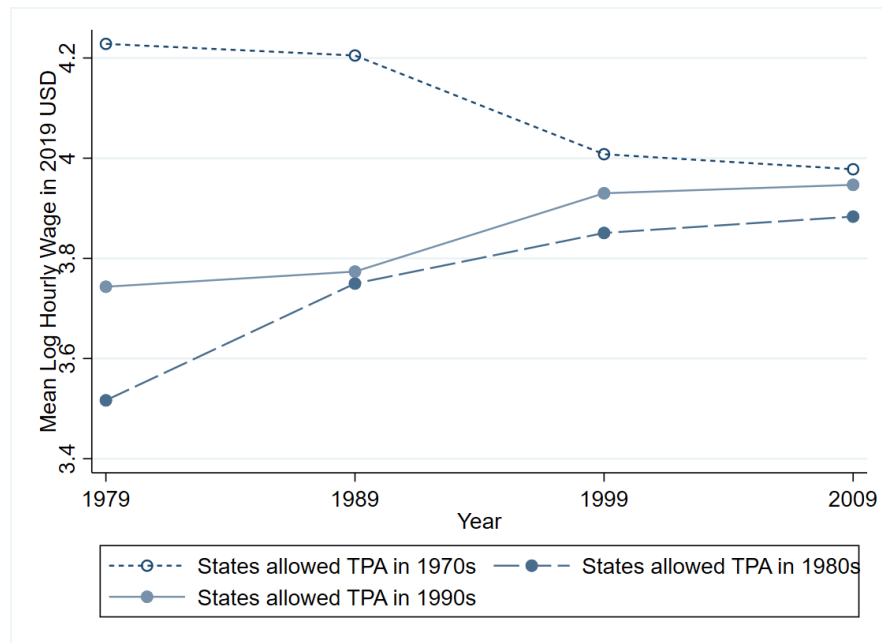
Notes: The figure is based on state legislations on optometrist prescription authority compiled by Cooper (2012).

Figure 2. Trends in Optometrist Therapeutic Prescription Authority Expansion



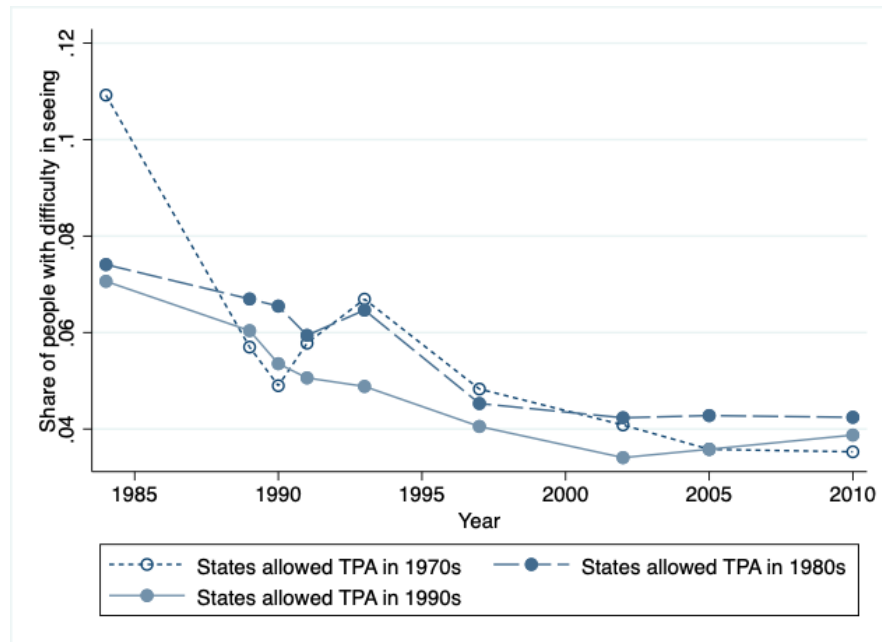
Notes: The figure is based on state legislations on optometrist prescription authority compiled by Cooper (2012).

Figure 3. Trend in Hourly Wage of Optometrists



Notes: The figure is based on optometrists in 25 states that have at least one full-time, full-year, non-self-employed optometrist in each decade (1980, 1990, 2000 Census and ACS 2001-2010). Considering the reference year of wage variables in the Census, data points are located on 1979 for the 1980 Census, 1989 for the 1990 Census, and 1999 for the 2000 Census. The average of the ACS 2001-2010 data is located on 2009 for presentation purposes.

Figure 4. Trend in Population Eye Health Outcome



Notes: The figure is based on population aged 15 or above in 35 states and DC that are consistently identifiable in the SIPP 1984 to 2008 and have no less than 30 individuals surveyed in each year.

Table 1. State Legislation on Optometrist Therapeutic Prescription Authority

State	First TPA	Glaucoma	Orals	Controlled substances	Injectables
Alabama	1995	1995	1995	1995	1995
Alaska	1992	1992	2007	2007	2007
Arizona	1993	1993	1999	1999	1999
Arkansas	1987	1987	1997	1997	1997
California	1996	2000	1996	2000	2000
Colorado	1988	1996	1988	1988	2011
Connecticut	1992	1996	1992	1996	1996
Delaware	1994	1994	1994		
D.C.	1998	1998	1998		1998
Florida	1986	1986			
Georgia	1988	1988	1994	1994	
Hawaii	1996	1996	2004		2004
Idaho	1987	1993	1993	1993	1993
Illinois	1995	1995	1995	2007	2007
Indiana	1991	1991	1991		
Iowa	1985	1987	1985	1987	2002
Kansas	1987	1996	1999	1999	
Kentucky	1986	1986	1996	1996	1996
Louisiana	1993	1993	1993	2005	1993
Maine	1987	1996	1996	1996	1995
Maryland	1995	1995	1995		1995
Massachusetts	1997				
Michigan	1994	1997	2002	2002	
Minnesota	1993	1993	2003	2003	2003
Mississippi	1994	1994	2005	2005	2005
Missouri	1986	1995	1986	1986	
Montana	1987	1999	1987	1987	1999
Nebraska	1986	1998	1993	1993	
Nevada	1995	1999	1995	1999	
New Hampshire	1993	2002	1993	1993	1993
New Jersey	1992	1992	2004	2004	1992
New Mexico	1985	1985	1995	1995	2007
New York	1995	1995			
North Carolina	1977	1977	1977	1977	1977
North Dakota	1987	1997	1987	1997	1987
Ohio	1992	1992	1992	2007	2007
Oklahoma	1984	1984	1994	1994	1994
Oregon	1991	1991	2001	2001	2001
Pennsylvania	1996	2002	1996	1996	
Rhode Island	1985	1997	2008	2008	
South Carolina	1993	1993	1993	1993	
South Dakota	1986	1994	1991	1991	
Tennessee	1987	1993	1993	1993	1993
Texas	1991	1999	1999	1999	1999
Utah	1991	1991	1991	1991	1991
Vermont	1994	2004	2004	2004	2004
Virginia	1988	1996	1996	1996	1996
Washington	1989	1989	2003	2003	2003
West Virginia	1976	1976	1997	1997	2010
Wisconsin	1989	1989	1989	1989	1989
Wyoming	1987	1987	1995	1995	

Source: Table 3. The Date Legislation Was First Enacted Authorizing The Prescription Of Drugs, Glaucoma Drugs, Oral Drugs, Controlled Narcotic Substances, Or Use Of Injectable Agent. As of Feb. 23, 2012.

Cooper (2012)

Table 2. Descriptive Statistics on Optometrists: Labor Market Outcome

Variable	(1) All	(2) 1980 Census	(3) 1990 Census	(4) 2000 Census	(5) 2001-2010 ACS
Hourly wages (\$2019)	53.85 (28.35)	46.71 (24.28)	47.98 (22.68)	54.61 (25.47)	57.07 (31.38)
Age	40.0 (10.3)	40.3 (12.7)	37.3 (9.8)	39.5 (9.5)	41.1 (10.0)
Female	0.312	0.202	0.215	0.305	0.373
Black	0.018	0.000	0.014	0.016	0.025
Hispanic	0.026	0.032	0.023	0.012	0.033
No college education	0.022	0.121	0.014	0.000	0.013
Some college education	0.013	0.097	0.009	0.000	0.003
4-year college education	0.023	0.105	0.064	0.000	0.002
Postgraduate education	0.942	0.677	0.913	1.000	0.982
First TPA	0.763	0.008	0.251	1.000	1.000
TPA on glaucoma	0.665	0.008	0.142	0.731	0.958
TPA on controlled substances	0.472	0.008	0.082	0.387	0.742
Observations	1,211	124	219	256	612

Notes: Unweighted means. Standard errors are in parentheses. The sample consists of full-time, full-year optometrists who are wage workers (not self-employed) aged 18 to 64 in 48 states and the District of Columbia.

Table 3. Descriptive Statistics on Population: Eye Health Outcome

Variable	(1) All	(2) 1984-1989	(3) 1990-1999	(4) 2000-2010
Any difficulty in seeing	0.046	0.067	0.049	0.037
Age	43.6 (18.5)	42.0 (18.4)	42.8 (18.2)	45.0 (18.7)
Female	0.531	0.530	0.533	0.529
Black	0.111	0.096	0.106	0.122
Hispanic	0.097	0.063	0.096	0.110
Other race and ethnicity	0.047	0.027	0.039	0.063
First TPA law	0.689	0.111	0.574	1.000
TPA on glaucoma	0.571	0.065	0.362	0.959
TPA on controlled substances	0.375	0.043	0.168	0.704
Observations	429,916	57,777	193,131	179,008

Notes: Unweighted means. Standard errors are in parentheses. The sample consists of individuals aged 15 or above in 35 states and DC that are consistently identifiable in the SIPP and have no less than 30 individuals surveyed in each year.

Table 4. Effects of Optometrist TPA on Optometrist Hourly Wages

Outcome: Log(hourly wage)	(1)	(2)	(3)
Policy variables			
First TPA (a)	0.073 (0.063)	0.047 (0.068)	0.049 (0.068)
Glaucoma medications (b)		0.059 (0.045)	0.045 (0.046)
Controlled substances (c)			0.038 (0.049)
Individual controls	Yes	Yes	Yes
Observations	1,211	1,211	1,211
Clusters	49	49	49
R-squared	0.25	0.25	0.25
Joint test (d=a + b + c)	0.073 (0.063)	0.105* (0.060)	0.131* (0.073)

Notes: Outcome variable is the log of hourly wages. The sample consists of full-time, full-year optometrists who are wage workers (not self-employed) aged 18 to 64 in 48 states and the District of Columbia, except Alaska and Maine with no records on optometrists during the sample period. All regressions include state and year fixed effects, whose estimates are not reported in the table. Individual controls include age, age squared, female, black, Hispanic, and three education group dummies. Standard errors are clustered by state and presented in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 5. Effects of Optometrist TPA on Population Eye Health

Outcome: Difficulty Seeing	(1)	(2)	(3)	(4)	(5)	(6)
Policy variables	Without Time Lag			With 10 Year Time Lag		
First TPA (a)	0.004 (0.004)	0.001 (0.005)	0.001 (0.005)	-0.008** (0.003)	-0.003 (0.003)	-0.003 (0.003)
Glaucoma medications (b)		0.007 (0.005)	0.007 (0.005)		-0.008*** (0.003)	-0.007** (0.003)
Controlled substances (c)			-0.003 (0.005)			-0.003 (0.004)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations (1 st stage)	429,916	429,916	429,916	429,916	429,916	429,916
Observations (2 nd stage)	324	324	324	324	324	324
Clusters	36	36	36	36	36	36
R-squared	0.50	0.51	0.51	0.51	0.51	0.51
Joint test (d=a + b + c)	0.004 (0.004)	0.008* (0.004)	0.006 (0.005)	-0.008** (0.003)	-0.011*** (0.003)	-0.014*** (0.004)

Notes: Outcome variable is a binary indicator of whether a person has difficulty in seeing. The sample consists of individuals aged 15 or above in 35 states and DC that are consistently identifiable in the SIPP and have no less than 30 individuals surveyed in each year. Columns (1) to (3) estimate the policy's effect without a time lag, and columns (4) to (5) do it with 10 years of a time lag by using 10-year lagged policy variables. All regressions include state and year fixed effects, whose estimates are not reported in the table. Individual controls include age, age squared, female, black, Hispanic, and other race and ethnicity dummy. Standard errors are clustered by state and presented in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 6. Effects of Optometrist TPA on Population Eye Health: Young vs Old

Outcome: Difficulty Seeing Policy variables	(1) Baseline (All)	(2) Young (Age below 50)	(3) Old (Age 50 or above)
First TPA (a)	-0.003 (0.003)	-0.002 (0.003)	-0.006 (0.007)
Glaucoma medications (b)	-0.007** (0.003)	-0.003 (0.002)	-0.014* (0.007)
Controlled substances (c)	-0.003 (0.004)	-0.002 (0.002)	-0.004 (0.009)
Individual controls	Yes	Yes	Yes
Observations (1 st stage)	429,916	275,600	154,316
Observations (2 nd stage)	324	324	324
Clusters	36	36	36
R-squared	0.51	0.32	0.48
Joint test (d=a + b + c)	-0.014*** (0.004)	-0.007** (0.003)	-0.024** (0.010)

Notes: Columns (1) replicate the estimates in column (6) in Table 5. The sample of column (2) includes only individuals aged below 50, and the sample of column (3) includes only those aged 50 or above. Outcome variable is a binary indicator of whether a person has difficulty in seeing. All regressions include state and year fixed effects, whose estimates are not reported in the table. Individual controls include age, age squared, female, black, Hispanic, and other race and ethnicity dummy. Standard errors are clustered by state and presented in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 7. Robustness of Estimates on Hourly Wages: Changes in Sample and Specification

Outcome: Log(hourly wage)	(1)	(2)	(3)
Policy variables	Baseline	Lens Policy Controlled	Except NC
First TPA (a)	0.049 (0.068)	0.050 (0.067)	0.035 (0.070)
Glaucoma medications (b)	0.045 (0.046)	0.035 (0.054)	0.041 (0.047)
Controlled substances (c)	0.038 (0.049)	0.033 (0.054)	0.036 (0.050)
Individual controls	Yes	Yes	Yes
Clusters	49	49	48
Observations	1,211	1,211	1,186
R-squared	0.25	0.25	0.25
Join test (d=a + b + c)	0.131* (0.073)	0.117 (0.087)	0.111 (0.076)

Notes: Columns (1) replicate the estimates in column (3) in Table 4. The model of column (2) adds a lens policy dummy to the baseline model of column (1) to account for the contract lens prescription release policy by states. The sample of column (3) excludes optometrists in North Carolina from the sample of column (1). Outcome variable is the log of hourly wages. All regressions include state and year fixed effects, whose estimates are not reported in the table. Individual controls include age, age squared, female, black, Hispanic, and three education group dummies. Standard errors are clustered by state and presented in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 8. Robustness of Estimates on Eye Health: Changes in Sample and Specification

Outcome: Difficulty Seeing Policy variables	(1) Baseline	(2) Lens Policy Controlled	(3) Except NC
First TPA (a)	-0.003 (0.003)	-0.003 (0.003)	-0.003 (0.003)
Glaucoma medications (b)	-0.007** (0.003)	-0.008** (0.003)	-0.007** (0.003)
Controlled substances (c)	-0.003 (0.004)	-0.003 (0.004)	-0.002 (0.004)
Individual controls	Yes	Yes	Yes
Observations (1 st stage)	429,916	429,916	416,235
Observations (2 nd stage)	324	324	315
Clusters	36	36	35
R-squared	0.51	0.51	0.50
Joint test (d=a + b + c)	-0.014*** (0.004)	-0.014*** (0.004)	-0.012** (0.005)

Notes: Columns (1) replicate the estimates in column (6) in Table 5. The model of column (2) adds a lens policy dummy with a lag of 10 years to the model of column (1) to account for the contract lens prescription release policy by states. The sample of column (3) excludes individuals in North Carolina from the sample of column (1). Outcome variable is a binary indicator of whether a person has difficulty in seeing. All regressions include state and year fixed effects, whose estimates are not reported in the table. Individual controls include age, age squared, female, black, Hispanic, and other race and ethnicity dummy. Standard errors are clustered by state and presented in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 9. Effects of Optometrist TPA on Optometrist Hourly Wages: Triple Differences

Outcome: Log(hourly wage) Policy variables	(1) Baseline	(2) Except Physicians	(3) Except Opticians	(4) Occupation Dummies Controlled
First TPA (a)	0.069 (0.067)	0.069 (0.072)	0.069 (0.067)	0.075 (0.072)
Glaucoma medications (b)	0.048 (0.043)	0.046 (0.044)	0.048 (0.043)	0.052 (0.043)
Controlled substances (c)	0.019 (0.047)	0.033 (0.047)	0.020 (0.047)	0.039 (0.048)
Individual controls	Yes	Yes	Yes	Yes
Clusters	49	49	49	49
Observations	717,476	664,780	711,946	717,476
R-squared	0.41	0.37	0.41	0.52
Join test (d=a + b + c)	0.136* (0.077)	0.147* (0.079)	0.136* (0.077)	0.166** (0.081)

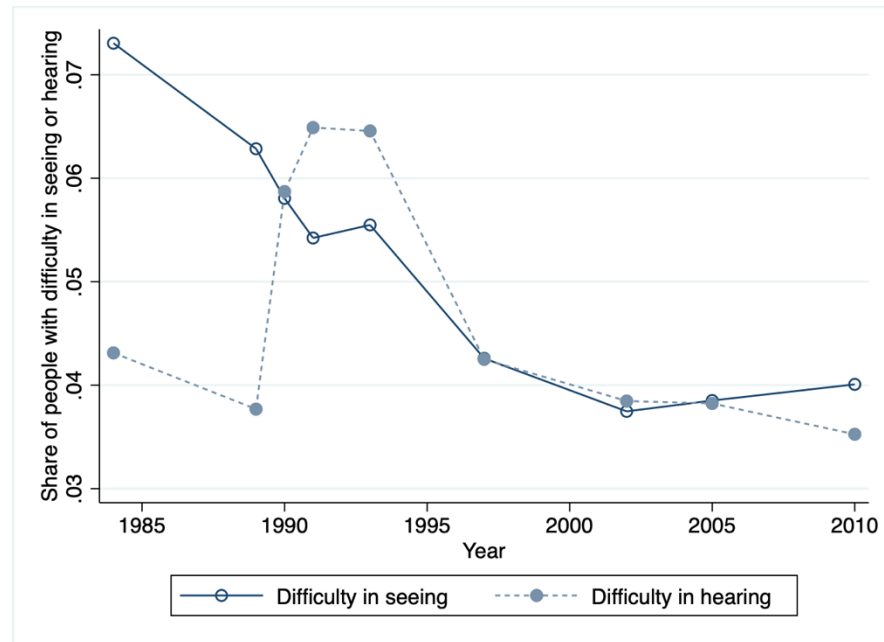
Notes: Outcome variable is the log of hourly wages. The sample consists of full-time, full-year healthcare practitioners who are wage workers (not self-employed) aged 18 to 64 in 48 states and the District of Columbia, except Alaska and Maine with no records on optometrists during the sample period. The sample of column (1) includes optometrists and all other healthcare professionals. The sample of column (2) excludes physicians. The sample of column (3) excludes opticians. All regressions include optometrist dummy, policy dummies, state and year fixed effects, and the interaction terms between optometrist dummy and state and year fixed effects, whose estimates are not reported in the table. Individual controls include age, age squared, female, black, Hispanic, and three education group dummies. The regression model of column (4) additionally includes occupation dummies. Standard errors are clustered by state and presented in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Table 10. Optometrist TPA and Other Functional Limitations: Falsification Tests

Policy variables	(1) Baseline (Seeing Difficulty)	(2) Hearing Difficulty	(3) Speech Difficulty	(4) Lifting Difficulty	(5) Walking Difficulty
First TPA (a)	-0.003 (0.003)	-0.005 (0.003)	0.001 (0.001)	-0.005 (0.006)	-0.004 (0.005)
Glaucoma medications (b)	-0.007** (0.003)	-0.010** (0.003)	-0.003 (0.002)	-0.005 (0.004)	-0.002 (0.004)
Controlled substances (c)	-0.003 (0.004)	-0.001 (0.003)	0.001 (0.002)	0.009* (0.004)	0.006 (0.005)
Individual controls	Yes	Yes	Yes	Yes	Yes
Observations (1 st stage)	429,916	429,916	429,916	429,916	429,916
Observations (2 nd stage)	324	324	324	324	324
Clusters	36	36	36	36	36
R-squared	0.51	0.54	0.05	0.42	0.11
Joint test (d=a + b + c)	-0.014*** (0.004)	-0.016*** (0.004)	-0.001 (0.002)	-0.002 (0.006)	-0.000 (0.005)

Notes: Columns (1) replicate the estimates in column (6) in Table 5. The outcome variable of column (2) to (5) is a binary indicator of whether a person has difficulty in hearing, speech, lifting, or walking, respectively. All regressions include state and year fixed effects, whose estimates are not reported in the table. Individual controls include age, age squared, female, black, Hispanic, and other race and ethnicity dummy. Standard errors are clustered by state and presented in parentheses. *, **, *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Appendix. Figure 1. Trend in Population Eye and Ear Health Outcome



Notes: The figure is based on population aged 15 or above in 35 states and DC that are consistently identifiable in the SIPP 1984 to 2008 and have no less than 30 individuals surveyed in each year.

CHAPTER 3: The Nurse Licensure Compact: A Pathway to Expanded Telemedicine Usage

Introduction

The demand for healthcare continues to grow in the United States, increasing the need for healthcare professionals and putting pressure on our healthcare capacity. We currently face shortages for both physiciansⁱ and nursesⁱⁱ, which are projected to continue to grow. Despite the employment in healthcare increasing at three times the rate in the overall economy, this shortage is likely to persist. States like California, New Jersey, South Carolina, and Texas are expected to have nursing shortages larger than 10,000.ⁱⁱⁱ Lack of access to care is not only inconvenient for patients, but it also has a negative impact of health outcomes. In particular, both rural communities and low-income urban communities experience this lack of access to care. As a result, policymakers have been exploring solutions to shortages that ensure patients have access to healthcare.

Healthcare professionals are licensed at the state level, limiting their ability to practice in other states. For instance, a nurse licensed in one state will be forced to obtain a new license to practice when trying to move to a new state. State level licensing not only reduces geographic mobility, but it also hampers the ability of healthcare professionals to practice telemedicine with a patient located in another state. Telemedicine refers to healthcare professionals providing remote care through telecommunications. Currently, states require that healthcare professionals be licensed in the state where the patient is located, reducing access to out-of-state healthcare professionals through telemedicine.

One solution to the frictions caused by state level licensing laws are interstate licensing compacts. The Nurse Licensure Compact (NLC) allows nurses to practice telemedicine, commute across state lines, and temporarily relocate to any other state in the compact without first obtaining a new license. While the NLC does not increase the supply of nurses, the ability to practice telemedicine across state lines will help expand access to healthcare services. Using existing healthcare professionals in a more efficient manner will reduce the effects of healthcare provider shortages and make treatment available for those in healthcare shortage areas.

In this policy brief, we explore the effect of the NLC on telemedicine. Using data from Change Healthcare, we use insurance claims data to compare telemedicine usage between states that have adopted the NLC, and those that have not adopted it in 2019. We find evidence that patients in NLC states used more telemedicine services from out-of-state providers than patients in non-NLC states. This suggests that the NLC reduces some barriers to practicing telemedicine for nurses. The NLC should serve as an example for other health professional licensing compacts, to help ensure patients have access to timely, high quality telemedicine care.

Healthcare Shortages

U.S health care is facing a significant primary care professional shortage. There were 807,400 practicing physicians in the US in 2018.^{iv} Most of the physicians are specialists; just 228,100 practice in primary care settings.^v By 2033, the AAMC projects that the number of physicians will grow to 807,500. However, this growth will leave us with a

projected shortage of 54,100 to 139,000 physicians. The primary care physician shortage is projected to reach between 21,100 and 55,200 by 2033. The US has one of the lowest number of physicians per 100,000 residents among OECD countries.^{vi} Additionally, the physician workforce continues to age, increasing the concerns of professional burnout among physicians. Physicians reporting burnout are more likely to retire. In 2018, 42 percent of physicians reported professional burnout. If physicians retire 2 years earlier on average, the number of physicians in 2033 would fall to 807,200.^{vii} The greater integration of other healthcare providers can decrease the need for physicians, and by reducing the pressure on them, reduce burnout.

Physician assistants (PAs) and nurse practitioners (NPs) are highly skilled healthcare professionals who can augment physicians in the healthcare system. In 2018, there were 248,000 NPs, 78 percent of whom were in primary care.^{viii} There were also 131,200 PAs in 2018. About 94 percent were in clinical settings, 27 percent in primary care, and 13 percent in emergency care.^{ix} Both professions are growing rapidly, unlike physicians. The number of PAs and NPs are expected to double in the next 10 years. Physicians working as a part of a healthcare team are able to treat more patients, and PAs and NPs are skilled members of those teams who can lessen the severity of the physician shortage.

Other nurses, like registered nurses (RNs), are also able to provide relief to the physician shortage. RNs are valuable members of the healthcare team that work closely with patients during treatment and develop relationships with them that physicians are unable to. RNs are another resource to lessen the severity of the physician shortage. However,

we are facing a nursing shortage as well. By 2030, that shortage is projected to grow to 510,394.^x Thirty-seven states are projected to be experiencing a significant shortage. This shortage will not be felt evenly; the south and west will experience the greatest shortage. The states of Arizona, New Mexico, California, and Nevada are projected to face the greatest shortage, as their populations are expected to continue to grow while the number of RNs will grow much more slowly. Because of the uneven geographic distribution of the nursing and physician shortages, healthcare systems will need to harness healthcare professionals from outside the region or even their state to ensure access for patients.

Telemedicine

Telemedicine is a broad category of care, which includes information, communication, or monitoring technology that allows healthcare providers to evaluate, manage, or treat patients remotely. It can be used to either supplement or replace a traditional, in-person visit. The incorporation of telecommunication technology can provide healthcare in a more convenient, faster, and less expensive way than making a trip for in-person treatment. Telemedicine allows a patient to stay home when they are contagious, or fear others who are contagious. Additionally, patients in rural areas located far from healthcare services have access to care without travelling long distances. For non-English speakers, telemedicine provides access to healthcare providers who speak the same language.

Nurses, who are often the first point of contact for patients when receiving care, have been integrating telemedicine into the care they provide. They provide telemedicine through many different means, like nurse hotlines, telemedicine websites, and online chat technology. Telemedicine can make monitoring patients with chronic conditions much easier by allowing them to do so remotely, rather than scheduling frequent, in-person appointments.

Traditionally, the adoption of telemedicine by healthcare professionals and patients has been hampered by our regulatory regime, despite the rapid advancements in technology. Even in the past decade, interactive video communications and smartphone applications have advanced to the point that they can be used in the delivery of care. From 2010 to 2018 the percentage of hospitals offering telemedicine increased from 35% to 75%.^{xi} However, until recently providers were not compensated for telemedicine at the same level as traditional care. Medicaid limited its coverage of telemedicine to only patients living in rural areas until 2019. Private insurers have only recently begun to cover telemedicine and Medicare has been slower to adjust.

As more insurance providers cover telemedicine and the range of services available continue to grow, we will see an increase in usage. Despite the substantial growth in hospitals offering telemedicine, only .104% of healthcare services are done through telemedicine.^{xii} During the COVID-19 pandemic, we experienced a substantial growth in telemedicine, as healthcare providers and patients were concerned about the spread of

the virus.^{xiii} The usage of telemedicine remained elevated through the pandemic,^{xiv} and may remain so after the pandemic ends.^{xv}

Licensing Restrictions and Their Impact on Telemedicine

Occupational licensing has a long history in healthcare, being the method that professionals chose to regulate the field. Licensing is designed to protect patients by ensuring that professionals are high quality. These laws accomplish this through two methods. First, they set standards for training and education, which limits entry into the profession to high quality applicants. Occupational licensing also encourages the formation of human capital (Shapiro, 1986).^{xvi} However, research on the effects of licensing finds a mixed effect on quality. The licensing of nurse midwives has been found to reduce infant mortality, but studies measuring the impact of differing education standards between states for physicians and dentists^{xvii} find no effect of increasing education or training on health outcomes.

However, the state licensing regimes remain a challenge, restraining the usage of telemedicine services. In their effort to ensure quality, state regulatory boards have been slow to adopt the increasing use of technology. State level licensing laws limit practice of telemedicine to the state that the provider is located in.

State legislatures have been instrumental in drafting licensing policies since the late 1800s. In *Dent v. West Virginia*, the Supreme Court decided that the states had the power to regulate physicians since the services were carried out entirely in the state. After the legal basis for medical licensing was upheld, states began designing and implementing

licensing standards, first for physicians, then for other healthcare professionals as they developed over time. Because each state set standards for education, training, and scope of practice, inconsistencies between states emerged. Later, efforts to standardize requirements ended the inconsistencies in training and education, although some variation in scope of practice remains for professions like PAs and NPs.^{xviii}

State level licensing allows for local enforcement of professional standards through monitoring, but it has some weaknesses that makes providing care more difficult. Because a professional moving to a new state must obtain a license to practice in their destination, licensing reduces professionals' willingness to move. Research finds that licensing laws reduce interstate mobility by about 7% relative to unlicensed professions.^{xix} Additionally, state level licensing poses a challenge for the practice of telemedicine. Professionals must be licensed in the state where the care is delivered, which is currently defined by states as the location of the patient. Therefore, healthcare providers must be licensed in multiple states simultaneously to provide telemedicine to patients in other states. This additional time and effort of obtaining multiple licenses discourages more providers from practicing telemedicine.

How the NLC Effects Telemedicine

The NLC was designed to retain the state level licensing standards that have characterized nursing, while removing inefficiencies caused by state borders. Traditionally, both the healthcare provider and patient were located in the same state, so state level regulation was appropriate. However, this began to change with improvements in communications

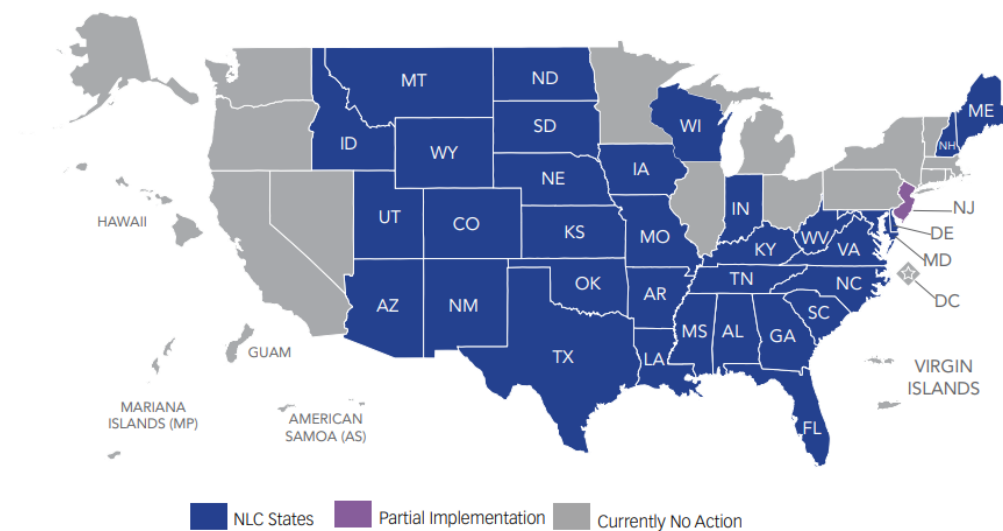
technology. A PEW Commission report found that state level licensing prevented the development of integrated healthcare systems to deliver care, limiting the provision of care to nurses licensed in the patient's state.^{xx} Licensing issues limited the ability to quickly contact healthcare providers in other states. For instance, the 1990s phone and fax networks of physicians would be located entirely in one state to avoid the need for all members to obtain licenses in multiple states.^{xxi} Early telemedicine programs were limited to one or a handful of states for the same reason.

Nurses practicing telemedicine who wanted to treat patients in another state were unable to without obtaining a separate license in that state. Obtaining a license in multiple states posed a substantial cost for nurses seeking to practice telemedicine, who would be forced to pay fees, pass exams, and wait months for the application process. The fee to obtain an RN license range from \$40 in Hawaii and Georgia to as much as \$375 in Alaska.^{xxii} Nurses would be required to go through that process for each state they sought to treat patients in, and to maintain those separate licenses with continuing education and fees.

The National Council of State Boards of Nursing (NCSBN) released the NLC in 1999 and it became active in 2000 when it was adopted by a total of 8 states. The NCSBN designed the NLC to allow nurses to practice in any compact state with one license. Both RNs and licensed practical nurses (LPNs) were included in the NLC, but advanced practice registered nurses, like NPs, are not covered. They proposed a mutual recognition model of nurse licensure, which reduced the barriers to practicing in multiple states while still retaining state level licensing. When an RN or LPN obtains a license in one member state,

they are able to use that license practice in all other member states, without any further licenses or applications. Nurses in a member state have the ability to practice in another member state temporarily, it allows them to commute from one state to another to practice, and it allows them to practice telemedicine in another state. Currently, 33 states are members of the NLC, and New Jersey has passed and partially implemented the compact, which can be seen in figure 1 below.^{xxiii}

Figure 1. Map of NLC States



Source: NCSBN

By allowing a nurse to practice in any participating state, in-person or through telecommunications, state boundaries became more transparent and collaborative care and telemedicine much easier.^{xxiv} The NLC substantially reducing the cost and time necessary to practice across state lines. Rather than being forced to obtain a license to practice in every state that their patients are located in, nurses in the NLC only need to

obtain one license. This significantly reduces the cost of practicing telemedicine across state lines. For patients, it gives them access to nurses located across the country, instead of only those located in their state, greatly expanding their access to healthcare providers.

Data Comparison

For our analysis, we obtained insurance claims data from Change Healthcare. The individual claims data were de-identified and aggregated monthly at the state level. These claims represent over 50 percent of the private insurance claims in the United States. They include Medicare Advantage and Medicaid claims that use private insurance carriers. One shortcoming of the data is that it does not include Medicare and Medicaid data. However, it is the most detailed publicly available data. Our window of analysis is limited to 2019, to ignore the effects of COVID-19. COVID-19 had a significant impact on telemedicine usage;^{xxv} however, many states temporarily waived licensing restrictions, including those that impacted the provision of telemedicine.

We also obtained population data from the National and State Population Estimates from the U.S. Census Bureau. Using state population, we calculated the telemedicine claims per 1,000 residents, to account for the population differences between states. We classified states as NLC members if they had adopted and implemented the NLC prior to 2019, according to the NCSBN. We include the number of insurance claims for in-state providers, insurance claims for out-of-state providers, and the ratio between claims for in-state and out-of-state providers. We then used those same numbers per every thousand residents to account for differences in the number of potential patients.

Tables 1 and 2 below show the summary statistics for non-NLC and NLC states, respectively. Non-NLC states had an average of 5254 telemedicine claims to in-state providers and 2221 claims to out-of-state providers. Meanwhile, NLC states averaged fewer, with 4691 claims to in-state providers and 1781 claims to out-of-state providers. It appears that the NLC states have fewer patients that are willing and able to access telemedicine, when looking at absolute numbers.

Table 1: Summary Statistics

Non-NLC Member States	Mean	SD	Min	Max
Telehealth Claims to In-state Providers	5,254	6,839	44	32,666
Telehealth Claims to Out-of-state Providers	2,221	2,577	15	12,519
Population	8,594,470	8,995,816	624,046	3.94e+07
In-state Telemedicine Claims per 1,000 Residents	0.545	0.350	0.0220	1.678
Out-of-state Telemedicine Claims per 1,000 Residents	0.271	0.218	0.0106	1.040
Ratio of In-state to Out-of-state Claims	2.794	1.748	0.430	12.46
Ratio of In-state to Out-of-state Claims per 1000 Residents	3.648	3.804	.4297	18.70
N	216			

Table 2: Summary Statistics

NLC Member States	Mean	SD	Min	Max
Telehealth Claims to In-state Providers	4,691	10,025	25	66,687
Telehealth Claims to Out-of-state Providers	1,781	2,109	14	12,462
Population	5,403,789	5,879,995	580,116	2.90e+07
In-state Telemedicine Claims per 1,000 Residents	0.835	1.417	0.0184	9.145

Out-of-state Telemedicine Claims per 1,000 Residents	0.337	0.251	0.0180	1.134
Ratio of In-state to Out-of-state Claims	3.011	3.379	0.443	18.70
Ratio of In-state to Out-of-state Claims per 1000 Residents	2.531	2.137	.4429	12.46
N	384			

However, this does not account for population differences between states. Non-NLC states have a population of 8.6 million residents, and NLC states have an average of 5.4 million. When we standardize the populations using the claims per 1,000 residents, we find that NLC states average .835 claims per 1,000 residents and non-NLC states average .545 claims per 1,000 residents. Similarly, NLC states have more claims for in-state providers (.337) than non-NLC states (.271). NLC states may just use telemedicine more because of characteristics of the states. Because of this, we also compare the ratio of in-state telemedicine claims to out-of-state telemedicine claims. A higher average would mean that a greater proportion of total telemedicine claims were to providers that were located in the same state as the patient. The ratio of in-state to out-of-state claims is lower in NLC states is 2.53, while the average in non-NLC states is 3.65. This suggests that out of state professionals provide a greater amount of telemedicine in NLC states.

We also performed a t-test to test if the differences between NLC states and non-NLC states are statistically significant. The difference in out-of-state telemedicine claims between NLC and non-NLC states is significant at the 1 percent level. Similarly, the difference between the NLC and non-NLC states for the ratio of in-state to out-of-state

claims is significant at the 1 percent level. Combined, these suggest that the differences between these states are not due to random chance.

Table 3: Two-sample T Test

Group	N	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Non-NLC	216	.2706463	.014853	.2182935	.2413702	.2999224
NLC	384	.3374115	.012804	.250906	.3122365	.3625864
Combined	600	.313376	.0098645	.2416302	.2940028	.3327492
Difference		-.0667652	.0203862		-.1068025	-.0267278

Difference = mean(non-NLC) - mean(NLC)				t = -3.2750
Ho: diff = 0				Degrees of Freedom = 598

Ha: diff < 0	Ha: diff != 0	Ha: diff > 0
Pr(T < t) = 0.0006	Pr(T > t) = 0.0011	Pr(T > t) = 0.9994

The higher average number of telemedicine claims for out-of-state providers per 1,000 residents in NLC states suggests that being a member of the NLC makes it easier for patients to receive telemedicine from providers located in other NLC states. Because the healthcare providers are not required to obtain a license in the state that the patient is located in, patients have access to a greater number of healthcare professionals. Additionally, the lower ratio of in-state claims to out-of-state claims in NLC states shows that a greater proportion of telemedicine in NLC states is provided by healthcare providers located outside of the state. This is some evidence that the NLC is meeting its goal of reducing barriers to health systems integrated across states.

It is important to note the shortcomings of our analysis to avoid overstating our findings. Our data does not distinguish which state in particular the out-of-state healthcare provider is located in when providing telehealth. While it seems natural to assume that

they are primarily located in NLC states, we cannot be sure. Additionally, we are unable to determine which healthcare profession is providing the care. Thus, physician provided care, unrelated to the NLC, is included in our figures. We cannot establish causality without using control variables to account for differences between states or across time. Nevertheless, we are able to provide some evidence of the impact of the NLC on reducing regulatory barriers to telemedicine, which room for further research.

Policy Recommendations

We have provided evidence, although preliminary that shows the adoption of the NLC is associated with a greater usage of telemedicine from out-of-state providers. State that have not implemented the NLC should consider legislation to adopt it. The NLC allows nurses to provide treatment for patients located in other states using their home state's license. By joining the NLC, patients in that state have access to nurses providing telemedicine in all other states in the NLC. Patients in rural areas, who would be forced to drive for up to an hour for treatment would have access to not just nurses located outside of their area, but also those providing telemedicine in other states, making it easier to receive care. Non-English-speaking patients would have access to a larger number of nurses who speak their language, even if that is rare in their home state.

The implementation of the NLC will not solve all issues with telemedicine. Further reforms will be necessary for more widespread adoption of telemedicine. Despite the implementation of the NLC, the healthcare system remains fragmented along state borders. Telemedicine utilization was less than 2 percent of all healthcare claims prior to

COVID-19.^{xxvi} Eliminating occupational licensing is not practical, but some have suggested replacing state level licensing with a single federal licensing board.^{xxvii} A single-federal licensing system would enhance cross-state consultations and promote telemedicine usage in the future. However, it is not politically feasible and would make potential reforms more difficult to implement in the future. States could offer a special telemedicine license, which could reduce the cost of obtaining a license in each state. However, this would still require professionals to obtain licenses in each state they wish to provide telemedicine, which is costly and time consuming. Because telemedicine is practiced between states, Congress could define and regulate it, and design a regulatory approach that would facilitate practice across state lines while leaving state licensing boards in place to oversee providers.

Another avenue for reform is focusing reforms on corresponding federal regulatory policy that complements the NLC. These could be used to remove other barriers to telemedicine that continue to persist. For instance, the Telecommunications Act of 1996 helped initially expand the Telehealth Program. The \$400 million funding supported access to various telehealth services and helped rural communities overcome hurdles in accessing healthcare. The bill was aimed at connecting care services for low-income and rural individuals through telehealth service, and to promote various telehealth service technology, and improving the effectiveness of the program. For rural Americans living in isolated areas, obtaining access to high-quality healthcare remained a constant challenge.

Broadband connectivity has the potential to break such barriers by delivering cutting-edge telehealth services.

Conclusion

The United States faces a shortage of healthcare professionals, while the demand for healthcare continues to grow. Both rural and low-income urban areas suffer from a lack of access to primary care. A shortage of healthcare professionals not only makes care less convenient, it also worsens health outcomes. State level licensing regimes exacerbate these issues, making it difficult for healthcare professionals to practice across state lines or move permanently.

In particular, current occupational licensing laws hamper telemedicine. Telemedicine has the potential to connect patients in healthcare shortage areas to healthcare providers located anywhere, but regulations currently limit this. The NLC is one potential solution, allowing nurses to with one license to practice in any NLC member state, expanding the number able to practice telemedicine. Using state level data analyzing private insurance claims, we found that patients located in NLC member states use more telemedicine services from out-of-state providers than states outside of the NLC. This suggests that the NLC is effective at breaking down barriers to telemedicine and should serve as an example for other healthcare licensing compacts.

The future possibilities for Telemedicine are expanding and can be of benefit to many. Telemedicine gives patients in remote locations around the world access to high quality care through remote consultations or monitoring. Patients have access to specialists

unavailable in their area, who can provide consultation or diagnoses remotely. Patients also have an easier time monitoring long-term health conditions without needing frequent in-person consultations. The use of telemedicine will continue to grow as more advancements in telecommunications are made. Our regulatory environment should encourage the use of telemedicine and the incorporation of advancements.

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CHAPTER 4: Policymaking through direct democracy *Using public referendum as a tool for licensure reform*

Background on direct democracy.

America was founded in an era where the political system had a complex understanding of the role of people. The declaration of independence which provides the ideological foundations for the democratic government was founded to protect the "unalienable rights" of "all men" and derive "the just power from the consent of the governed." The governments derive their powers from the "consent of the governed," or the will of the people as expressed through elections. James Madison argues in Federalists Number 10 that a system of representation passed through a body of citizens is more likely to institute checks and balances to balance the power of the government. This understanding of democracy is seen as an ode to individual liberty, but frequently we come across politicians who act on their self-interest and bend the rhetoric of popular sovereignty to their ends (Wong, 2000). This has reinforced political reform by paving citizens' opinions to voice their opinion, thus leading to more "democratization" of key American political institutions. The drift has been to fix the problem by reducing politicians and lawmakers' influence and putting a limitation on government who betrayed the trust of people. Direct democracy, where citizens initiate a proposal on the ballot in addressing the current political crisis, addresses the majority's will. In the last one hundred years, there has been a rising mandate for fostering democracy at a local level (Shapiro, 1992). The scale of administration of local governance is directly affected

by the degree of centralization in a country. The role of local governance in a country's federal system may be substantially different from the role of local authorities in small, highly centralized countries (Wolman, 1996). Sustainable development is achieved if the role of local governments is founded on recognized principles of participation and transparency and in a manner that follows basic human rights (Bowler, 2002). There has been a substantial rise in local elections, especially in countries experiencing or undergoing a transition from authoritarian rule to more open political systems (Butler, 1994).

The influence of the referendum on the political agenda depends on whether being initiated by a special interest group or by a certain number of citizens (popular initiative). In the referendum analysis, it has often been perceived as tyranny on the minority (Gamble, 1997), although it seems to be particularly inadequate or unfair. (Riker, 1982) argues that social choice theory may be taken as an argument against the theories of majoritarian democracy. Still, it is not about the realization of 'the will of the majority, as no such social choice method exists which would reveal the majority winner in every possible preference profile (S. Bowler). This is because there is no majority winner that exists in situations with more than two alternatives and at least three voters.

The core of this conception is that there is a substantive concept of public interest, which cannot be reduced to an outcome of the aggregation of individual preferences. In Rousseau's theory, citizens are regarded as judges, and democratic decision-making is seen as the correct interpretation of the law. The general will be seen as a result of the

majority rule, which irons out the individual prejudices and enlightens popular judgments on the common good for the society (Sartori, 1976)

Direct Democracy offers a provocative alternative view grounded in the actual human nature of democratic citizens who makes law directly, rather than elected representatives (Banducci, 1998). The idea of citizens partaking directly in public decisions is as old as human societies and historically dates to the ancient Greeks. Solon succeeded in making the transition from Dracon's laws to more than a codification of the societal norms of tribal society to the first Shackled Leviathan in history. The core of this conception is that there is a substantive concept of public interest, which cannot be reduced to an outcome of the aggregation of individual preferences (King D.). In Rousseau's theory, citizens are regarded as judges, and democratic decision-making is seen as the correct interpretation of the law. The general will be seen as a result of the majority rule, which irons out the individual prejudices and enlightens popular judgments on the common good for the society (Jacobson, 2004).

The constitutional setting determines to a large extent which issues are put on the political agenda, but advocates of direct democracy claim that it delivers more representative policy outcomes than a purely representative democracy (Holden, 1974: 27). The primary institutions of democracy seem incapable of fulfilling the fundamental purpose of democracy when there is a significant gap between the preference expressed by the ordinary citizen and the policy proposed by the political elites. Over the past decade, local governments and people have learned how to work together, which are inherently linked to the nurturing and promotion of local democracy. Without adequate

resources either produced at the local government source or passed down from the provincial or central government, it would be tough for local democracy to survive.

There is growing interest in the use of referendum (Auer and Morel 2001) to eliminate or mitigate public choice concerns ((Buchanan, 1962)[1999] (Boix, 1999). Are the states that allow initiatives and referenda more receptive to public opinion than in states where initiatives and referendums do not exist? Political science theory remains divided on it, with contradictory evidence (Cronin, 1989). Direct democracies empower citizens a direct voice in public policy, which may, directly and indirectly, shape policy to their wishes whereby allowing citizens to directly create public policy, where the institutions evade the filtering mechanisms of representative Democracy that provide a check on the power of the majority (Gerber, 1999).

On the contrary collective choice questions the capability of direct democracy to produce policy that resonates with the underlying mass distribution. However, the jury is still out on conflicting results produced by empirical research that leaves the question of the effectiveness of direct democracies open to debate. In the United States, most citizens do exercise a degree of influence over public policies. The evidence establishes a clear link between mass preferences and policy outputs at all government levels (Dyck, 2009).Traditionally, any representation highlights the importance of elites competing in elections as the apparatus through which the governed exercise control over their leaders (Fiorina 1981; Key 1966; Miller and Stokes 1963).

Direct Democracy as a tool for mitigating regulatory capture

Regulatory capture, especially in health care, is given minimal attention in public discourse but deserves utmost importance. Direct Democracy primarily alters the course of political decision-making (Lee, 1978). Direct Democracy protects ordinary citizens in political decision-making from self-interested betrayal policy by political elites. Referendums and initiatives, in theory, have allowed citizens to share policymaking with their representatives on a much more frequent basis. California tops the list on regular use of referendums and citizens initiatives. California voters voted on 12 statewide ballot measures in areas including criminal justice, rent control, and privacy laws in the last general election of 2020, with voters passing Proposition 22, allowing companies like Uber and Lyft to exempt their drivers from state labor laws. Californians also decided not to expand rent control in the State through Proposition 21, denying local governments the ability to impose new rent control laws. In representative democracies, when politicians repeatedly fail with governmental performances, misrepresentation, and incompetence, direct Democracy serves an important function through a referendum. The initiative has played a significant role in California's politics for the most part of the twentieth century. The citizen-initiated laws have restricted California's legislators on spending, term limits, and declaring English as the State's official language in the past. California, being the most populous State, is also the highest-paying State for nursing in the country. The processing time for a license takes up to three months because thousands of nursing roles go unfilled

Local democracy consists of local government institutions, i.e., mayors, councils, committees, and administrative structures, and the relationships between civil society from the official government (Holden, 1974). The rubrics for social interaction in highly dense urban areas must consider communities' close interaction and encourage cooperation and conflict management. For that reason, large cities are also susceptible to further subdivision and decentralization within cities into sub-metropolitan units such as districts, boroughs, neighborhoods, and other smaller entities.

The unprecedented number of patients affected by COVID-19 with the growing demand of the health care providers has increased awareness of the NLC, mainly in the states that have not joined yet. Compact states benefit due to zero delay for licensing processes than non-compact states as they were subject to various state regulations. The pandemic has left a long-term effect. To tackle the pandemic crisis, states, for the most part, had no options other than relaxing their regulatory control as an emergency policy in light of public health emergency declaration to meet the current crisis. The State has taken action to suspend or waive certain practice requirements for treatment and care of patients. The State analyzed health care licensing waivers and guidance issued by the DCA under the authority of Governor Newsom and issued an Executive Order on March 30, 2020. The waiver authorizes the California Department of Public Health to suspend licensing requirements in Chapter 2 of Division 2 of the Health and Safety Cod during the emergency period. It allows the Emergency Medical Services Authority (EMSA) to allow out-of-state medical personnel to practice in California. From a nursing licensure perspective, states will use critical lessons from the pandemic and put measures in place

to ease the burden of healthcare staffing across borders in the future. Political reforms are far from perfect if not painful, reflecting standing biases, leading to a terrible outcome.

However, the broad influence of the referendum has led to creating legitimate meaningful outcomes, with two states legalizing marijuana in 2012 in direct contradiction to federal law. The effect of popular initiatives showed how involving people in political processes had generated a better understanding and responsibility in making political decisions. The set of ideas has led to believe that the cure for the ills of democracy is more democracy as a remedy to the incompetence of elected representatives. Voting against the status quo has redirected the power and reduced political influences by institutionalizing a potent form of direct democracy (Magleby, 1984).

Direct democracy in California.

The history of direct democracy in California dates to the progressive era with governments started arming citizens with more direct political power. Direct democracy allows voters in a state to write laws. In 1849 the state constitution drafted a new form of democracy, shaping California's political culture and legal landscape. The California counties were given initiative rights in 1893, with state-level initiatives and referendum being adopted in 1911. Direct democracy takes many forms, either local or statewide. The most common form of direct democracy is the initiative or proposition. A popular referendum by which citizens can place a measure on the ballot is alternately called the veto referendum, citizen referendum, statute referendum, or statute remand. Article II, Section 9 of the California Constitution grants the citizen the right to vote directly on

constitutional amendments and to vote on specific other measures through a referendum process. Article II Section 8 provides the following:

“An initiative measure may be proposed by presenting to the Secretary of State a petition that sets forth the text of the proposed statute or amendment to the Constitution and is certified to have been signed by electors equal in number to 5 percent in the case of a statute, and 8 percent in the case of an amendment to the constitution, of the votes for all candidates for governor at the last gubernatorial election. The Secretary of State shall then submit the measure at the next general election held at least 131 days after it qualifies or at any special statewide election held prior to that general election. The governor may call a special statewide election for the measure. An initiative measure embracing more than one subject may not be submitted to the electors or have any effect.”

Direct legislative measures like ballot initiatives and referendum were instituted in California in the early 1900s, allowing citizens to participate in the policy process and end impasses when the legislature refuses to act. Up to 31 days before an election, a referendum can be qualified on a statewide ballot. The petition must be signed by at least five percent of the votes cast in the last gubernatorial election. There has been a distinct increase in citizen-initiated ballot measures in the past two election cycles, with 2016 recording the highest number of ballot measures in a decade (76). It is not a new phenomenon that ballot initiatives are seen as an answer to legislative gridlock and a

check on the special interest group power. Since 2011 in California, when Senate Bill 202 was approved, all referendum measures have appeared only on general election ballots. California's most famous initiative was Proposition 13, approved by voters in 1978. Still, in recent times, Californian has led the nation in high profile initiatives on a wide variety of significant social, economic, and governmental issues, which includes term limits, bilingual education, racial preferences/affirmative action, medical marijuana, punishment for crimes, taxes, government debt, and same-sex marriage. California was also the first State to allow the use of medical marijuana; after the passage of Proposition 215 in 1996. In 2008 Californians voted on Proposition 8, titled "Eliminates Rights of Same-Sex Couples to Marry." The most defining feature regarding referendum is voters determine policy outcomes at the state and local levels. Any amendment proposed with the prerequisite signature may then be submitted to the voters at the next general election. The significance of the initiative and referendum as institutions is a political question that has been raised from time to time. However, measures like Referendum and Initiatives have been used to enact or challenge most legislative measures. Could this mechanism be utilized for licensing reform in California? In the next section, I highlight the case of a recent Senate bill that failed and note how to direct Democracy may have resulted in a different outcome for the initiative.

Using the referendum for licensure reform:

The eNLC and California Senate Bill 1053 (SB 1053)

Like most states, California was a different place when it achieved statehood versus what it is today. In 1850, when California became a state, the population was only 92,597 - now, there are 80 cities in the State with a much higher population. The Nurse Licensure compact, which originated in early 2000, was formulated to allow nurses to relocate quickly and engage in practice with one license in any Compact states. It is governed by a commission made up of member states to protect the public by acting on the nurse's ability to practice in a compact state. Whenever existing political systems have failed over time, there has been an effort to expand the scope of control by examining the deterioration of political institutions. This kind of revolution has brought social turmoil along with political disruption. The reforms were envisaged with the motivation to increase the influence of ordinary citizens by reducing the influence of politicians and lawmakers. Even after a century of progressive era reforms, states kept empowering their citizens by instituting initiatives and referendum in their Constitution to transfer the power of framing laws from official lawmakers to non-official lawmakers. Public participation in democratic politics should be seen as an inherent good critical to human flourishing (Altman, 2011). Bruce Cain, a political scientist with ample experience in California politics, reinforces that a direct form of democracy has empowered a new class of election entrepreneurs to formulate policy and decluttering the asymmetric

information that exists in voters' minds. Cain (2015,8-9) states, "organized interests are a constant presence."

Critics of direct democracy would be quick to argue that it is not always necessary that policies that are overwhelmingly preferred by the majority may not be good policies in the broader context with citizens' interest, but a balanced assessment of the impact of direct democracy have shown consistent persistence of such reform. California has been hesitant to join the compact states citing concern about maintaining state training and quality standards. Lawmakers have argued that nurses practicing in other states have varied standards and may lack the necessary knowledge or experience to practice in another one. The promise of NLC has yielded a new generation of nurses and nurses that can find themselves practicing across state lines. The Nursing Licensure Compact comprises of R.N.s and LPNs allows registered nurses to work across states that are part of the compact, replaced by the Enhanced Nurse Licensure Compact (eNLC) on July 18, 2018. The NLC works toward the same goal as that original compact, simplifying the licensure process and smoothing out cross-border movement. The NLC began on January 19, 2018, with Maryland being the first State to join its original Nurse Licensure Compact. According to the National Council of State Boards of Nursing (NCSBN), over two million nurses currently located in NLC states can practice in other compact states without waiting for licensure. The NCSBN also emphasizes that licensed nurses can practice via telenursing in other NLC states and respond to national disasters and staffing shortages in other NLC states. The NLC helps remove the roadblock of licensing by facilitating more

efficient cross-border movement and acknowledging that telehealth is now significant assistance of that simplification.

Twenty-five states approved the original compact; the new enhanced Nurse Licensure Compact has 34-member states with twelve additional states and one U.S. territory having pending legislation waiting on approval to join the NLC. New Jersey went through partial implementation to enact the NLC. Unfortunately, other states were hesitant and cautious due to loss of state revenue and patient privacy concerns. The NLC strives to increase healthcare access, reduce overall costs to insurance companies, hospitals, and individual patients, and support efficient and robust health care delivery.

SB 1053 would have allowed California to join the Enhanced Nurse Licensure Compact (NLC). The NLC allows registered and vocational nurses in bordering states to work in California. It also allows nurses to transfer their license more easily from other NLC states. Despite the possible benefits associated with passage of the bill, The Senate Business, Professions, and Economic Development Committee, with California Nurse Association's support, instead lobbied against the bill. It can be argued that this process reduces access to medical care providers by not allowing for multi-state licensing for nurses residing in California and vice versa. SB1053 would have allowed eligible practicing nurses from other states to come and practice in California. California's nurses would likewise be qualified to practice in those states.

The pandemic shedding light on the need for reform:

The COVID-19 crisis is now broadly seen as the most significant economic catastrophe since the Great Depression. The role of elected representatives and policymakers are put to the test in the fight against the covid-19 pandemic (Powell, 2013). The governments worldwide set to play a more significant role in combatting the pandemic and providing economic support to people and firms. The crisis sharpens our focus on governance due to the pandemic's distressing effects and costs for people and economies. Such long-lasting effects of pandemics have had massively disparate impacts on the employment of people. With the novel coronavirus continues to spread, crippling people and businesses in communities across the United States, policies need to pay specific attention to avoid long-term injury. Nurses continue to play critical roles and responsibilities in combating the pandemic during the COVID19 pandemic. They continue to be at the front line of patient care in hospitals and are actively involved with evaluation and monitoring. The nurses continue to be the key stakeholders providing optimal nursing care and facilitating informed decision-making by assisting patients' needs.

The pandemic has strained nurse staffing at hospitals and clinics throughout California with an estimated 44,500 deficit in registered nurses. It is three times the deficit compared to the next shortest state. California is expected to add 110,500 new registered nurse positions by 2030. As health systems in many states are overloaded with managing the coronavirus pandemic, there has been an unprecedented demand for "travel nurses," or nurses from other states, according to Nurse Fly, a temporary health care staffing platform. Some of the most significant spikes in demand were in the states with the most

confirmed COVID-19 cases and which are not part of the NLC. As the crisis grew and the situation got intensified, the lack of adequate staff highlights the importance of relaxing the licensing guidelines so medical professionals can come from out of State.

When COVID-19 patients continued to flood the California emergency rooms, the state issued a waiver permitting hospitals to evade the nation's only strict nurse-to-patient ratios temporarily. California is the only state in the U.S. to require specific nurse-to-patient ratios, requiring hospitals and private facilities to provide one nurse for every two patients in intensive care and one nurse for every four patients in emergency rooms. The waivers will only temporarily bypass that law. In 2004, California implemented the nurse staffing ratio law limiting the number of patients that nurses could treat at any given time. During the nationwide public health emergency due to COVID-19, California started changing licensing restrictions to allow more qualified practitioners to provide services like the pool of available travel nurses began drying up. The regulatory barriers stopped prompt and efficient responses, which fueled the crisis and affected healthcare consumers

The COVID-19 pandemic has forced to alter the healthcare system and deliver patient care by the American health system, with many hospitals and practices have transitioned to telemedicine. The emergence of medical technology, including telehealth technology, has allowed nurses to monitor patient health and help patients with illness or injury remotely. Telehealth technology permits nurses to interact with doctors and specialists in real time, connecting patients to the best care from anywhere in the country. The World Health Organization (WHO) defines digital health as incorporating the growing use

of technologies for health services by conducting "virtual visits" via videoconference or phone. Even though virtual visits may not be as typical as in-person doctor's appointments but with the growing popularity, 76% of hospitals connect with patients using some form of telemedicine. Considering the current pandemic in the United States, using computers and tablets for telemedicine can reduce staff exposure in ambulances and hospitals. It is primarily up to the state Governments whether they want to practice determining how to regulate telemedicine. Still, the delivery of patient care by the American health system will be forever changed as the new reality of that virtual care has arrived. The COVID-19 pandemic has shown Governments must ensure budgetary resources for quick solutions to respond appropriately in time to avoid severe impact.

Conclusion.

Public Opinion shapes policy formation in a democracy. Political Scientist in the past fifty years have provided great deal of systematic evidence that direct legislation have gradually expanded. The frequent usage of initiatives and referendum can be interpreted as a manifestation of an intense struggle of ordinary citizens with the political elites. There has been a demand for comparative analysis with the rise of referendums emerging as a rational decision-making process for policymaking (Cronin, 1989). An estimated 281 initiatives⁴ were placed on the ballots since the enactment of Prop 13 in 1978 (Jacobson 2004). Most of the elections held in United States are held to facilitate indirect democracy. Since the Progressive Era, governments started empowering citizen with more direct political power. The States that joined the United States after the Civil War frequently would trust their citizens of directly implementing laws or getting rid of corrupt

politicians. Citizens exercise their powers at the ballot to change laws and implement policy in their states. This has led to a renewed interest from a state interventionist model to a more democratic model of economic governance. The increasing usage of direct democracy amplifies the views of ordinary citizens. The usage reminds its usefulness in the state Political system also indicative of the increased partisan politics in the electorate. The shift is also an indicative of the more confrontational politics that California is currently going through resisting strong special interests' group who. Issues ranging from auto insurance to property tax have all appeared on the ballots, Various kinds of referendums have been justified by different theoretical arguments: popular initiatives have been promoted by ordinary citizens allowing voters to approve or repeal an act of the Legislature, whereas advisory referendums⁵ have been used by Governors in the past to gauge voter opinion. Although, for advisory referendum the outcome is non-binding, but it is still held as a successful constitutional instrument that can promote citizen participation and policymaking process. It is important to distinguish as who is setting the agenda for the referendum as these distinctions are crucial in understanding the strategic character of referendum.

As of April, 2021,⁵ new cases per 100K are being reported of COVID-19 infection daily in California, the question still remains as to how to regulate and reimburse for telehealth services. The temporary telehealth policies expire at the end of the COVID-19 public health emergency (PHE). The State legislatures seem reluctant to abolish or ease licensing restrictions for out of state providers, despite some public support. Removal of such licensing barriers would be a huge success of delivering telehealth services in the state.

The critical question on post pandemic telehealth policy changes should be viewed as key to continuing to be providing care beyond the public health emergency. The current Biden administration has recently supported telehealth services and appointed; The Medicare Payment Advisory Commission to provide for a long-term path forward for telehealth policy. The committee though failed to come up with a long-term substantial plan but did recommend Congress to continue the PHE telehealth expansions temporarily with continue Medicare coverage. Although dozens of bills related to telehealth services have been introduced and many in the process of being reintroduced there is a rebuttable presumption that political elites do not perceive the need to increase the access of available healthcare worker. Additionally, states should pursue policies addressing various barriers patients may face when seeking services through telehealth. Michigan authorized telehealth in school settings while Idaho, Mississippi, New Hampshire, South Carolina, and Vermont allocated special fund for improvement of broadband services in the rural area to bolster telehealth services. In a period of scientific citizens need to implement strategies with speed and innovation. (Acemoglu, 1990)

The link between democracy and good health outcome is through greater freedom of expression. A society that is open to suggestions and encourage public trust leads to a robust healthcare infrastructure. The outcome of the voting would be the right step to reform and the way forward to a low-cost telehealth platform for all. Telehealth has the capacity to mitigate health care access, costs, and even remediate certain chronic diseases of vulnerable groups of people. Despite its importance, not much effort has been placed to make it more accessible with an adoption of remote health care service. The

regulatory conditions have contributed to the persistent and growing health disparities. Representative democracies still remain the preferred form of government worldwide but however, if the political elites do not react to demands formulated by ordinary citizens, a popular initiative can pave path for the future of California's telehealth policy.

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CHAPTER 5: Conclusion.

The essay looks at the labor market in healthcare by expanding the scope of practice and adapting the nurse licensing compact across the United States. Occupational licensing laws typically set a scope of practice, a boundary of tasks legitimately performed by licensed practitioners, often limiting the best use of resources in the economy. Given the ongoing shortage of physicians and nurses, expanding the scope of practice has repeatedly drawn attention from policymakers. The current law in many states restricts the efficient use of the healthcare workforce by creating discrepancies between professional skills and the legal scope-of-practice laws. The essays provide insight and guidance for legislative and regulatory agencies regarding expanding the scope of practice and incorporating telecommunication technology that can provide healthcare faster and less expensive. The chapters highlight the reforms needed to strengthen health professions regulation, mainly to promote better consumer care across professions and improve access to care. The effective utilization of changes in the scope of practice would provide transparency on professional qualifications that would lead to more integrated and coordinated healthcare without conceding to patients' safety.

Historically, licensing has been justified to protect against incompetent and dishonest practitioners. However, in reality, occupational licensing raises wages and restricts health care access to a large population. Health care professionals work within the boundaries of state licensing rules preventing them from performing the full range of skills they have been trained. The licensing restriction limits consumer access and increases the cost of

healthcare. The regulations vary from state to state, creating an artificial barrier restricting competition and rising costs. One-quarter of all licensed workers are in the health care sector. The expansion of state-level occupational licensing has dramatically increased over the past two decades compared to earlier. In 1950 only 5 percent of workers required a license compared to more than 20 percent of workers in 2018. Over time, organized interest groups have actively lobbied for licensure, posing severe risks to public health. The effect has been detrimental with the scope of practice restrictions inflating wages in licensed occupations and the healthcare system suffering from workforce challenges. The rising demand for healthcare services is also compounded by the aging of the population. The general public is usually unaware of the licensing rules and their impact on the price of the services they pay. The regulations vary tremendously by state and sometimes within, restricting professionals through the scope of practice.

The first chapter examines the effects of optometrist therapeutic prescription authority on hourly wages and a population's eye health outcome. The Optometrist's role in recent times has undergone substantial development to include extended areas of practice that ophthalmologists traditionally undertook. Optometrists are critical players on the eye care team, providing direct patient care and helping ophthalmologists do their jobs well. The role of optometrists in the past four decades has increased and broadened significantly, serving as frontline providers in primary eye care for the vast majority of the population. This comes at a time when patients are facing a potential lack of access to primary eye care. Expanding the scope of practice is an ongoing process and being legislated on a state-by-state basis makes it more difficult. The American Optometric

Association (AOA) reports that most of the population has access to Optometrist, which means that the passage of these bills could allow people to access potentially vision-saving treatment without having to travel far to see a different doctor. This corresponds with a growing demand for increased capacity in ophthalmic services and an aging population that would debate how best to meet the increased demand for eye services at an affordable cost care. While optometrists continue to practice in the traditional clinical roles of refraction, contact lenses, and low vision rehabilitation, it is evident that these professionals now undertake a wide range of extended clinical roles, with a transformed scope of practice incorporating diverse roles, which were conventionally undertaken by ophthalmologists. Optometrists are prohibited from performing surgery in most states as statutes often require a license. The chapter specifically looks at three main areas of scope of practice for optometrists, practice authority, prescriptive authority, and surgical authority using a generalized difference-in-differences estimation. Expanding the scope of practice allows optometrists to use the training and skills they have undergone in their formative training, with each phase of the TPA authority expansion contributing to an incremental and cumulative change in both optometrists' labor market and general population health.

The second chapter looks at licensing restrictions and their impact on telemedicine. Licensing enforces costs through fees and educational requirements on health care workers. Moreover, with rising costs, telemedicine initiatives must be available to mitigate the absence of universal access, disparate patient costs, and quality care. Interstate telemedicine brings together many stakeholders, including healthcare

providers, researchers, medical-device firms, and mobile application developers. Telemedicine still has a long way to go to connect patients and providers, as substantial inconsistency exists among the regulations across state borders. The use of health-related services and information by using electronic information using remote health care services has been making its mark on the healthcare community for decades. Incorporating electronic information and telecommunication technology remotely makes health care more accessible, faster, and less expensive than making a trip to a doctor. Although telemedicine can increase access to care and reduce cost, the state's licensing policies act as a barrier to the development of telemedicine. The handiness and effectiveness should be the reason for its nationwide implementation. Remote healthcare is more capable than traditional healthcare with the advancing technology in several places. However, the bureaucracy and state licensing norms remain challenging, and in many cases, these laws' nature defeats telemedicine's quick convenience. The increasing use of technology has largely been ignored by the state regulatory bodies governing the healthcare system. Licensure laws limit the geographic footprints of telemedicine to extend healthcare access to more people.

Licensing enforces costs through fees and educational requirements on health care workers. Moreover, with rising costs, telemedicine initiatives must be available to mitigate the absence of universal access, disparate patient costs, and quality care. Eliminating government licensing and options to increase Interstate mobility would be ideal for combating the cost, quality, and access ingrained in American health care. Eliminating licensing would eliminate these barriers and would allow interstate

telemedicine to flourish. A step in the right direction would be a single-federal licensing system that will enhance cross-state consultations and promote remote access in the future. Interstate telemedicine would bring together many stakeholders, including healthcare providers, researchers, medical-device firms, and mobile application developers. Telemedicine still has a long way to connect patients and providers, as substantial inconsistency exists among the regulations across state borders. This inconsistency makes it difficult for workers to move their skills across state lines.

The third chapter looks at how a referendum can be used as a tool for licensure reform. For decades, policymakers have adopted licensure policies to achieve various goals but did not produce the intended effects in practice. Even though researchers found little to no evidence that licensure laws protect consumers from harm. The organizational structure and rules that influence policy outcomes are designed to reduce benefits to the public. State lawmakers have been instrumental in drafting licensing policies; states began their systems of developing and shaping regulations and licensing. This restricts licensed practitioners from offering their service outside the state jurisdiction where they are licensed. The National Council of State Boards of Nursing was able to spot this concern in 1997 and endorsed a mutual recognition model of nursing regulation designed to enhance the protection of public health and safety and measures to reduce regulatory barriers to interstate nursing practice. The compact license allowed a nurse to practice in multiple states, physically and by distance, without additional application requirements or fees.