

▀ Independent Market Evaluation and Recommendations
for the Development of an Osteopathic Medical School at
the University of Northern Colorado

Prepared by Tripp Umbach

FINAL REPORT

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Executive Summary

Introduction

Tripp Umbach¹ was retained by the University of Northern Colorado (UNC)² in July 2021 to analyze and independently assess the feasibility of the development of a four-year osteopathic medical school in Greeley, Colorado. Tripp Umbach completed a comprehensive feasibility study process involving secondary data analysis, key stakeholder interviews, a review of the financial model, and economic impact projections. (Refer to Appendix A for Project Overview). The report sets forth Tripp Umbach's findings and recommendations with respect to the feasibility of an osteopathic medical school developed by UNC.

The findings contained herein represent the professional opinions of Tripp Umbach personnel based on assumptions and conditions detailed in this report. The report plays an integral role in furthering ongoing planning efforts required if the proposed medical school applies for accreditation and requests approval from the American Osteopathic Association's Commission on Osteopathic College Accreditation (COCA). Specifically, this report allows the UNC leadership team to understand the overall health-care needs of the state of Colorado as well as the benefits associated with the development of a new four-year osteopathic medical school to serve the state.

Key Findings

In no particular order, Tripp Umbach's analysis completed for UNC supports the following key findings:

1. [The state of Colorado is in need of more physicians due to increased population and an aging physician workforce.](#)

The need for more primary-care physicians as shown by the Health Resources and Services Administration (HRSA) Health Workforce is significant. As of October 2021, throughout the United States there are 7,469 Primary Care Health Professional Shortage Area's (HPSAs), with 84 million people living within these areas. Nationally, 14,914 practitioners would be required to meet primary-care physician needs, based on a population-to-practitioner ratio of 2,000:1. Colorado has 116

¹ Tripp Umbach is the nation's most experienced consulting firm in academic medicine, serving national associations, 75 existing medical schools, more than 500 hospital systems, and 200 universities since 1990. Over the past 15 years, Tripp Umbach has been involved in the majority of medical school development and expansion projects in the United States, completing more than 30 similar studies that have led to 12 new medical schools.

² Founded in 1889 and tucked between the Rocky Mountains and Colorado's stunning high plains, UNC is a public doctoral research university committed to the success of its students, with more than 100 undergraduate programs and 113 graduate programs. The university's just-right size, expert faculty and tradition of research and hands-on learning give students exceptional opportunities and a personalized education.

primary-care HPSA designations, totaling a population of 1.1 million within the HPSAs. Therefore, the state would need 262 practitioners to remove the designations.

The Robert Graham Center³ forecasts that by 2030, Colorado will need an additional 1,773 primary-care physicians (PCPs), a 49% increase compared to the state's 2010 primary-care physician workforce. The 2030 projection stands below the West overall and above the nation overall. Components of Colorado's increased need for PCPs include 19% (338 PCPs) from increased utilization because of aging, 72% (1,283 PCPs) because of population growth, and 8% (152 PCPs) because of a greater insured population following the Affordable Care Act (ACA). Population growth and aging physicians continue to be the primary drivers of increasing physician demand.

Additionally, the aging population will affect physician supply, since one-third of all active doctors will be older than 65 in the next decade. In 2019, Colorado reported 16.6% of the state's physicians being younger than 40, while nearly one-third (29.5%) were 60 and older. Colorado shows the 10th-highest rate across the country of active physicians aged 60 or older, and their retirement within the next few years will leave a significant hole in the state's physician workforce and further impact Coloradans' ability to seek care. For a state already experiencing primary-care physician shortages, an aging physician workforce will pose a greater issue as the number of physicians retiring will increase the need.

Colorado needs more doctors, specifically in underserved areas. A statewide focus is needed on the redistribution of doctors to rural areas. Particularly, residents living in rural areas face greater health challenges, as distance from health providers often creates disparities that are difficult to overcome. Access issues — such as lack of health insurance, lack of available providers, and health-care affordability — all lead to an increased risk of illness or death. More than 26.6% of the adults in Colorado reported not having a personal doctor in 2019.⁴ A total of 7.8% of Colorado residents lack health insurance.⁵

³ Robert Graham Center.

⁴ Kaiser Family Foundation.

⁵ Ibid.

2. Osteopathic medicine is one of the fastest-growing health-care professions in the country.

Osteopathic medical schools typically train primary-care physicians as part of their mission. Thirty-seven accredited colleges of osteopathic medicine are teaching at 58 locations in the United States. This past year, the number of osteopathic physicians in the United States climbed to nearly 135,000, an 80% increase over the past decade.⁶ There are currently 168,701 Doctor of Osteopathic Medicine (D.O.) and osteopathic medical students in the United States, with 134,901 being D.O.s. The osteopathic medical profession has a long tradition of providing care where patients lack doctors.

More aspiring physicians than ever are choosing osteopathic medicine, leading to an increasingly youthful profession. In 2021, 67 percent of all D.O.s were age 45 or younger. The number of female D.O.s also continues to trend upward each year. While roughly 43 percent of D.O.s are women, female physicians make up 74 percent of the D.O. population under age 45. Also, the diversity of students continues to increase – in 2019-20 10.7% of first year enrollees were under-represented minorities compared to in 2010-11 at 7.2%.⁷

The profession's strong base in primary care also contributes toward addressing physician shortages in medically underserved regions. In fact, six of the 10 U.S. medical schools that produce the most primary-care residents are osteopathic medical schools, according to U.S. News & World Report's annual ranking of medical schools for 2022, including campuses in Kentucky, Mississippi, Oklahoma, Pennsylvania, Tennessee, and West Virginia.⁸

3. The development of an osteopathic medical school will have a positive impact on other health science programs at UNC.

Based on experiences of other new osteopathic medical schools that have been developed at established universities, the osteopathic medical school will enroll highly qualified students who are diverse across racial, ethnic, sociodemographic, and geographic lines to reflect a variety of student experiences, personal interests, and academic goals. UNC already has successful pipeline relationships through its established health science programs. Besides a record of academic excellence, students will be admitted based upon characteristics such as intrinsic motivation to pursue the D.O. degree; social skills; cultural competence; teamwork; verbal communication skills; written communication;

⁶ 2020-21 AOA: Osteopathic Medical Education Report

⁷ AACOM, Annual Osteopathic Medical School Questionnaires, 1976-1977 through 2019-20 academic years.

⁸ Ibid.

ethical responsibility to self and others; reliability and dependability; resilience and adaptability; altruism; capacity for improvement; and critical thinking and ability to succeed academically, to be further defined by the Founding Dean.

The establishment of a D.O. program at UNC is likely to increase enrollment throughout the university in other disciplines, especially in the health sciences as students may matriculate into other UNC programs at the undergraduate or master's level with the hope of continuing their studies in osteopathic medicine. Also, the new osteopathic medical school will work closely with clinical partners throughout the region to provide required clinical education in clerkships and electives. Critical to the success of clinical partnership and financial participation will be placing a value on the benefits of the new medical school to multiple clinical partners. The new osteopathic medical school is likely to expand clinical training opportunities for other disciplines, as the number of clinical partners for an osteopathic program is far greater than for other health science programs.

UNC brings together faculty with expertise in a wide range of disciplines including nursing, public health, health sciences, and business, with a culture of inter-professional engagement. Facilitated by UNC's unique organizational structure and culture, the proposed osteopathic medical school faculty will engage in interdisciplinary, collaborative research projects and novel teaching approaches much more effectively than would be possible in a larger, more traditionally structured institution.

4. [Opportunities exist for developing and expanding clinical training sites and graduate medical education in Colorado and neighboring states.](#)

While the need for physicians is apparent, the ability to educate medical students goes hand-in-hand with available clinical capacity. Growth is needed in both undergraduate medical education (UME) and graduate medical education (GME) availability throughout the state of Colorado. Providing clinical training to students locally is critical in keeping physicians practicing in the state.

National trends show that the most difficult challenge with opening a medical school is the development of sufficient clinical experiences for medical students, as well as new formation of residency training positions. However, new osteopathic medical schools are playing a leading role in developing GME opportunities in the nation. UNC has the opportunity to be a critical player in developing new residency programs throughout Colorado and Wyoming. UNC has the opportunity to develop partnerships with community-based hospitals, county-based hospitals, and private practice offices, which will provide students a variety of clinical experiences.

The future of health care requires innovation and collaboration. Health-care centers with limited to no undergraduate or GME infrastructure can be found across the state and in surrounding states; the proposed osteopathic medical school can explore these sites for new clerkship and residency opportunities. This makes the proposed osteopathic medical school well-positioned to develop new residency programs to meet the state's need.

UNC sees the opportunity to work with multiple entities throughout the state to be a critical player in diversifying the health-care workforce. Specifically, UNC has been in conversation with both Banner Health and UCHHealth to discuss clinical rotations for third- and fourth-year students and potential GME development/expansion. Both organizations have clinical teaching capacity at both the undergraduate and graduate levels and could become teaching sites for UNC with additional residency programs.

5. [The local community is supportive of UNC developing a four-year osteopathic medical school.](#)

Stakeholders interviewed by Tripp Umbach unanimously believe that UNC is uniquely positioned to develop an osteopathic medical school. Stakeholders mentioned that the proposed osteopathic medical school at UNC could leverage the strengths of the other colleges within the university to train physicians to provide team-based, inter-professional patient care to prevent and treat complex and chronic diseases, while also improving population health status.

Besides the ability to provide learning experiences with the other colleges, the new medical school will have access to UNC's resources and infrastructure such as library resources, shared faculty resources, research labs, and shared space, allowing the medical education program to be provided much more cost effectively than other new medical schools. Existing education and resources at UNC will be an important component of the new medical school and will contribute to the development of innovative ways to teach and deliver cost-effective, high-quality health care.

6. [An osteopathic medical school will be a driver of the regional economy, creating jobs and generating significant economic and social impacts to the state of Colorado.](#)

The opening of the proposed osteopathic medical school in Greeley will bring significant "fresh dollars" to the state and is likely to inspire additional economic development through the potential expansion of other health science education programs and clinical and research partnerships with nearby community hospitals and private business expansions that may be developed.

Tripp Umbach estimates that UNC will invest approximately **\$50 million** in facilities, equipment, and other start-up expenses. When the school is fully operational, it will support directly and indirectly support **420 jobs** in the region, generate **\$66.7 million** in total economic impact per year (direct, indirect, and induced impacts), and will add **\$2.7 million** in state and local government revenue.

In addition, by 2035, the economic impact of the campus will grow to **\$78.9 million** as communities in Northern Colorado will begin realizing health-care benefits and additional economic impact because graduates locate in the region and surrounding states. Assuming that 25% of graduates from the school practice in underserved communities, Tripp Umbach estimates that by 2035 these new primary-care physicians will also yield real savings, as emergency room utilization declines, and quality of care improves. These savings are expected to total **\$136.8 million** annually by 2035.⁹

A new osteopathic medical school will also:

- Expand health-care access for underserved populations.
- Address workforce needs by expanding numbers of highly qualified doctors who have regional connections and interests.
- Accelerate expansion of an innovation economy whereby biomedical companies are launched in and attracted to the region; new jobs are created; and research sparks technology transfer, commercialization, and economic value through improvements in prevention, treatment, and practice.
- Focus the health-care delivery system on underserved populations. As a result, the quality of life for community residents improves as well as the ability to leverage health-care cost savings.

⁹ Based on Tripp Umbach's estimates each primary-care physician who serves in underserved area generates \$3.6 million in health-care cost-savings.

Consultant Recommendations

1. UNC should move forward with the establishing a four-year osteopathic medical school in Greeley, Colorado.

Tripp Umbach recommends that UNC move forward with additional planning to develop a four-year osteopathic medical school in Greeley. By focusing the osteopathic medical school on primary care and population health improvement, the medical school will secure financial support and participation from multiple education, health-care, and industry partners. Provided that the key factors for success outlined below are developed, UNC should be successful in opening a high-quality sustainable osteopathic medical school that meets the needs of 21st-century learners, teachers, health-care delivery systems, and most importantly patients.

Tripp Umbach recommends a starting class size of 75 students, growing to 150 students at full maturity. The majority of new osteopathic medical schools opened in the last 15 years began with 120 to 150 students per class.

2. UNC should continue to engage in conversation with Banner Health and UHealth and other clinical partners to establish a strategic plan for clinical training (i.e., third and fourth year) and the development/expansion of GME in Colorado and neighboring states.

The availability of clinical positions is imperative not only for the COCA accreditation purposes but also to meet workforce goals. As part of UNC's self-study, UNC will need to provide documentation that it is able to meet candidate element 6.5, which outlines details related to clinical affiliation agreements.¹⁰ UNC is in the process of developing relationships with local health service providers through local hospitals, community physicians, teaching health centers/federally qualified health centers (FQHCs), and behavioral health providers.

By bridging and obtaining health-care community support, the proposed osteopathic medical school can leverage the positive outcomes of populating and introducing new physicians back into the region. Tripp Umbach recommends that UNC continue conversations with multiple clinical partners to establish a strategic plan for clinical training at the UME and GME levels – it is important that UNC

¹⁰ Under Element 10.1 it states that in states where PGY-1 placement in GME is required by law (i.e., Montana), a proposed COM must demonstrate how it intends to comply with the requirement. Element 10.1 additionally asks for Policies, Procedures, Personnel, and Budgetary resources to support the continuum of osteopathic education in both UME and GME.

continues dialogue with Banner Health and UCHealth, along with other with health systems throughout Wyoming, throughout 2022.

Key Factors for Success

The ultimate yardstick for measuring the success of a medical school is the ability for the school to graduate medical students who pass national tests, matriculate into residency training programs, and become quality physicians. The Commission on Osteopathic College Accreditation (COCA) that accredits osteopathic medical schools in the United States awarding the D.O. degree has multiple standards that must be met and maintained. The success of the new osteopathic medical school will be based upon having the following in place:

- Clear mission and areas of focus that distinguish the new osteopathic medical school at UNC in curriculum, research, and community service.
- The recruitment of an effective Founding Dean.
- Deeply rooted clinical education partnerships with hospitals and other clinical partners.
- Integrated GME programs with clinical partners.
- The development of appropriate facilities to deliver the medical education program.
- The recruitment of high-quality faculty and students.
- Facilities and technology that support student achievement.
- Ongoing development of community health improvement programs.
- Ongoing demonstration of economic impact and return on investment.

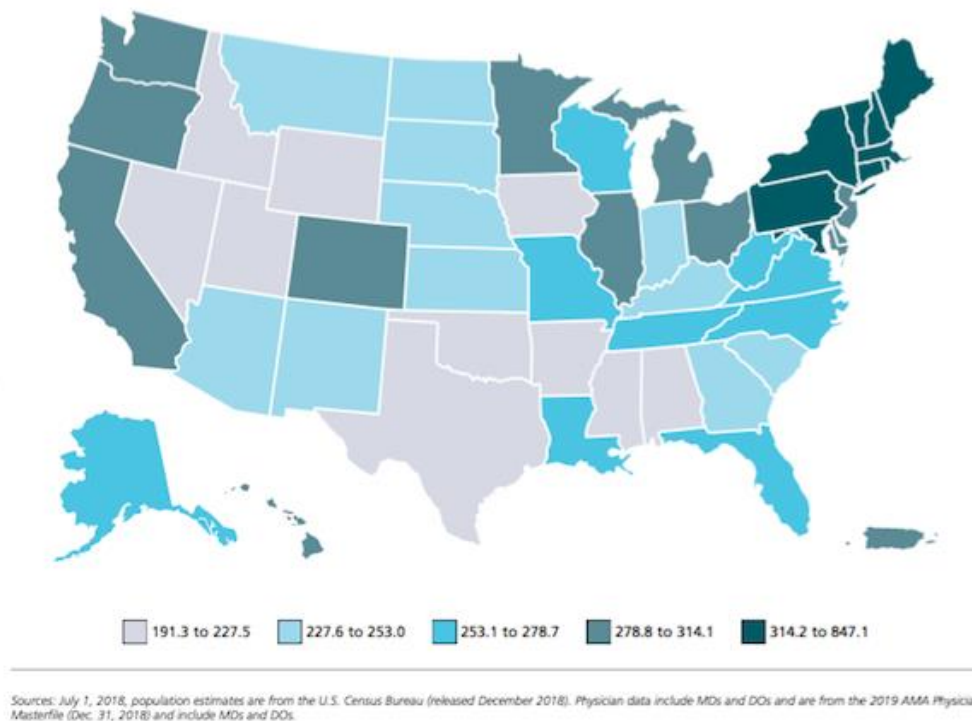
Environmental Scan – National Outlook

The Supply and Demand Imbalance for Physicians Across the United States

The United States is facing a serious shortage of physicians, largely because of the growth and aging of the population and the impending retirements of older physicians. Even though medical schools have increased enrollment by 30% since 2002, new data from the Association of American Medical Colleges (AAMC) predicts that the United States will face a shortage of 54,100 to 139,000 physicians by 2033. By 2033, the study estimates a shortfall of 21,400 to 55,200 primary-care physicians. At the same time, a shortage in non-primary-care specialties will total 33,700 to 86,700 physicians.¹¹

In 2018, there were 277.8 active physicians per 100,000 population in the United States, ranging from a high of 449.5 in Massachusetts to a low of 191.3 in Mississippi. The states with the highest number of physicians per 100,000 population are concentrated in the Northeast (see Figure 1).¹²

Figure 1: Active Physicians per 100,000 Population, 2018



¹¹ “New AAMC Report Confirms Growing Physician Shortage.” AAMC News, 26 June. 2020

¹² AAMC, 2019 State Physician Workforce Data Book

The Increased Effect COVID-19 has on Physician Shortages Across the United States

The 2020 AAMC physician workforce projections were prepared before the pandemic, and the AAMC stated that COVID-19 is likely to have short- and long-term consequences for the nation's physician workforce, including changes in the specialties physicians choose, the educational pipeline, licensure, reimbursement regulations, how medicine is practiced, and workforce exit patterns. The COVID-19 pandemic has already highlighted shortages in specialty physicians, especially those with hospital-based specialties such as critical care, pulmonary care, and emergency medicine.¹³

As a result of COVID-19 and its profound disruption, The Physicians Foundation redirected the focus of its survey exclusively to the pandemic. The survey found that 8% of physicians had closed their practices.¹⁴ With more than 200,000 medical practices in the United States, that means about 16,000 had closed. Another 4% of doctors planned to close shop within 12 months. The closing of practices and burnout raise the specter of an even greater doctor shortage than is already expected.¹⁵

Addressing the shortage will require a multipronged approach, including innovation in care delivery; greater use of technology; improved, efficient use of all health professionals on the care team; and an increase in federal support for residency training.¹⁶ The magnitude of the projected shortfalls is significant enough that no single solution will be sufficient to resolve physician shortages. Because physician training can take up to a decade, a physician shortage in 2033 is a problem that needs to be addressed now.¹⁷

¹³ AAMC Physician Supply and Demand — A 15-Year Outlook: Key Findings

¹⁴ Ibid.

¹⁵ The Physicians Foundation Survey.

¹⁶ Ibid.

¹⁷ Ibid.

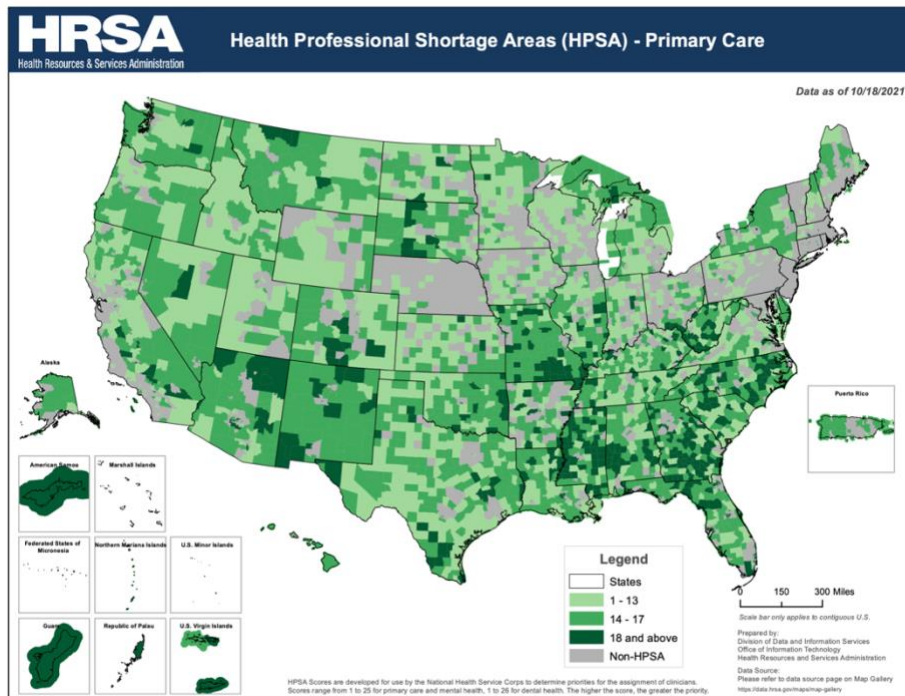
Current and Future Physician Workforce Shortages

The U.S. Department of Health and Human Services Health Resources and Services Administration (HRSA) develops shortage designation criteria and uses them to decide whether a geographic area, population group, or facility is a Health Professional Shortage Area (HPSA) or a Medically Underserved Area or Population (MUA/P). HPSAs may be designated as having a shortage of primary medical care, dental, or mental health providers.

As of October 2021, across the United States there were:¹⁸

- 7,469 Primary Care HPSAs, with 84 million people living within these areas. Nationally, 14,914 practitioners would be required to meet primary-care physician needs, based on a population-to-practitioner ratio of 2,000:1.
- 5,935 Mental Health HPSAs totaling a population of 130 million. It would take 6,578 practitioners to meet their need for mental health providers (a population-to-practitioner ratio of 30,000:1).

Figure 2: Primary Health HPSA Designated Type.¹⁹

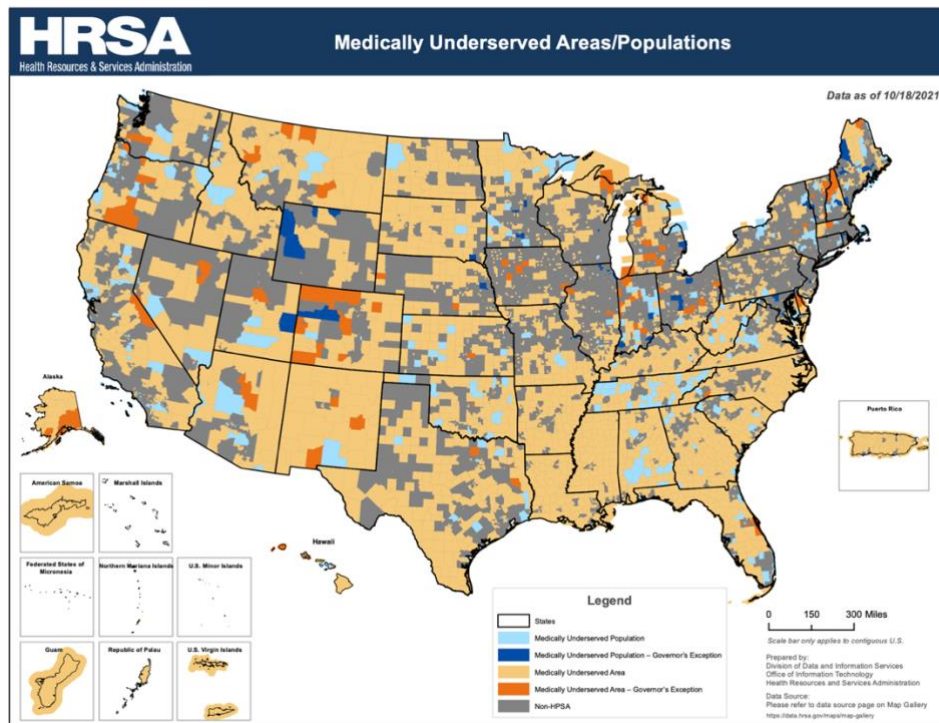


¹⁸ <https://data.hrsa.gov/topics/health-workforce/shortage-areas>

¹⁹ <https://data.hrsa.gov/ExportedMaps/MapGallery/HPSAPC.pdf>

Medically Underserved Areas (MUA) may be a whole county or a group of contiguous counties, a group of counties or civil divisions, or a group of urban census tracts in which residents have a shortage of personal health services. Medically Underserved Populations (MUPs) may include groups of persons who face economic, cultural, or linguistic barriers to health care.

Figure 3: MUAs and MUPs Designated Type.²⁰



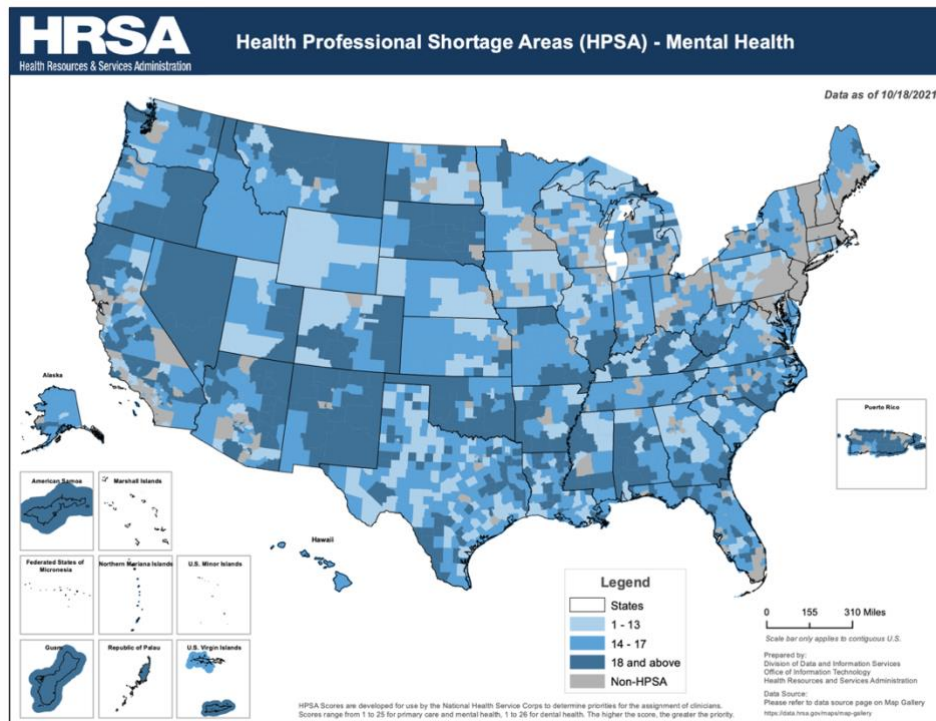
Besides the number of providers required to meet the demand in the HPSAs, the United States would need an additional 95,900 doctors immediately if use of health care were equalized across race, insurance coverage, and geographic location.

²⁰ Ibid.

Physician Workforce Shortages in Mental Health

While the shortage of primary-care physicians has been well-documented, the shortage of psychiatrists is an escalating crisis of more severity than shortages faced in nearly any other medical specialty. One in four older adults experiences some mental health disorder including depression, anxiety disorders, and dementia. This number is expected to double to 15 million by 2030.²¹ As stated above, the United States reported 5,935 HPSA mental health-care designations, resulting in the need of an additional 6,578 practitioners to remove the HPSA designation label across the nation.²²

Figure 4: Mental Health HPSA Designated Type.²³



Two-thirds of older adults with mental health problems do not receive the treatment they need. Current preventative services for this population are extremely limited. Untreated substance abuse and mental health problems among older adults are associated with poor health outcomes, higher health-care utilization, increased complexity of the course and prognosis of many illnesses, increased disability, and impairment, compromised quality of life, increased caregiver stress, increased mortality, and higher risk of suicide.

²¹ National Council on Aging.

²² Data.hrsa.gov. November 2020.

²³ Ibid.

The Mental Health America released its annual report, which includes a spotlight on the impact of COVID-19 on mental health, using the more than 1.5 million people who have taken a screening on MHA Screening from January to September 2020.²⁴

Key findings from the State of Mental Health of America 2020:²⁵

- Youth mental health is worsening. A total of 9.7% of youth in the United States have severe major depression, compared to 9.2% in last year's dataset. This rate was highest among youth who identify as more than one race, at 12.4%.
- Even before COVID-19, the prevalence of mental illness among adults was increasing. In 2017-2018, 19% of adults experienced a mental illness, an increase of 1.5 million people over last year's dataset.
- Suicidal ideation among adults is increasing. The percentage of adults in the United States who are experiencing serious thoughts of suicide increased 0.15% from 2016-2017 to 2017-2018 – an additional 460,000 people from last year's dataset.
- Need remains unmet for mental health treatment among youth and adults. A total of 60% of youth with major depression did not receive any mental health treatment in 2017-2018. Even in states with the greatest access, more than 38% are not receiving the mental health services they need. Among youth with severe depression, only 27.3% received consistent treatment. A total of 23.6% of adults with a mental illness reported an unmet need for treatment in 2017-2018. This number has not declined since 2011.
- The percentage of adults with a mental illness who are uninsured increased for the first time since the passage of the Affordable Care Act (ACA). Nationally, 10.8% are uninsured, totaling 5.1 million adults. This figure differs dramatically across states – in New Jersey (ranked No. 1) 2.5% of adults with AMI are uninsured, compared to 23% in Wyoming (ranked No. 51).

The National Alliance on Mental Health estimates that untreated mental illness costs the country up to \$300 billion every year because of losses in productivity. As more people survive to older ages, mental disorders, such as dementia, become increasingly prevalent and are likely to drive spending on mental

²⁴ <https://www.mhanational.org/issues/state-mental-health-america>

²⁵ Ibid.

disorders even higher.²⁶ Psychiatrists are currently the third-oldest type of physicians in the nation. The current workforce is retiring, with 60% of active psychiatrists aged 55 or older and 46% who are 65 or older. Workforce projections show an estimated shortage of at least 21,000 psychiatrists nationwide by 2030. The retirement of these physicians will create a premium on increasing psychiatrist supply through graduate medical education.

Population Growth

The U.S. population is projected to increase by 79 million people in the next four decades, from about 326 million in 2017 to 404 million by 2060.²⁷ This corresponds to an average increase of 1.8 million people per year.²⁸ The population is projected to cross the 400 million mark in 2058.²⁹

An Aging Population

The nation's 65-and-older population is projected to nearly double in size in coming decades, from 49 million in 2016 to 95 million people in 2060.³⁰ Additionally, the aging population will affect physician supply, since one-third of all currently active doctors will be older than 65 in the next decade.³¹ Approximately 80% of older adults have at least one chronic disease, and 77% have at least two. Four chronic diseases — heart disease, cancer, stroke, and diabetes — cause almost two-thirds of all deaths each year.³²

- Chronic diseases account for 75% of the money our nation spends on health care, yet only 1% of health dollars is spent on public efforts to improve overall health.
- Diabetes affects 12.2 million Americans aged 60 and older, or 23% of the older population. Another 57 million Americans aged 20 and older have pre-diabetes, which increases a person's risk of developing Type 2 diabetes, heart disease, and stroke. In a 2007 Centers for Disease Control and Prevention program for people at high risk for developing diabetes, lifestyle intervention reduced risk by 71% among those 60 and older.
- A total of 90% of Americans 55 and older are at risk for hypertension, or high blood pressure. Women are more likely than men to develop hypertension, with half of women 60 and older and

²⁶ Ibid.

²⁷ Projected Population Size for the United States. 2017-2060 U.S. Census Bureau, Population Division

²⁸ Ibid.

²⁹ Ibid.

³⁰ Ibid.

³¹ AAMC 2019 State Physician Workforce Data Report.

³² <https://www.ncoa.org/news/resources-for-reporters/get-the-facts/healthy-aging-facts/>

77% of women 75 and older having this condition. Hypertension affects 64% of men aged 75 and older.

- Specialist physicians are, in general, older on average than are primary-care physicians, and they will be retiring in proportionately higher numbers.³³ Physician retirement could have the greatest impact on supply.

The longevity associated with improved population health would also raise demand for physicians by 2032. Although achieving population health goals, such as reducing excess body weight; improving control of blood pressure, cholesterol, and blood glucose levels; and reducing smoking prevalence will likely reduce demand for some specialties, the demand for other specialties, like geriatric medicine, will increase as people live longer.³⁴

The Aging Physician

Another issue tied to physician shortages that is often overlooked is the fact that physicians retire. Not only is there currently a national shortage of physicians, but many physicians leave the field every year. Across the United States, there are approximately 906,366 active physicians. Of these physicians, 17.0% are under the age of 40, 50.9% are aged 40-59, and 32.1% are aged 60 or older.³⁵ This equates to more than 290,943 physicians across the country who will be retiring in the next few years. New Mexico had the highest percentage of physicians 60 and older (38.5%), while Utah had the lowest percentage (26.5%).³⁶

Shifts in retirement patterns over that time could have large implications for the supply of physicians to meet health-care demands. Also, growing concerns about physician burnout suggest physicians will be more likely to accelerate than delay retirement. Specifically, the coronavirus, which causes the disease COVID-19, has changed the landscape of medicine in profound ways, prompting some physicians to retire before they had planned and others to close their practices because so many of their patients stopped going to the doctor once the pandemic began.³⁷ The doctor shortage could lead to longer wait times and farther travel, especially for people in rural areas.³⁸

³³ Physician Supply Considerations: The Emerging Shortage of Medical Specialists: Merritt Hawkins, 2017

³⁴ The Complexities of Physician Supply and Demand: Projections from 2017 to 2032, AAMC, April 2019

³⁵ AAMC 2019 State Physician Workforce Data Book

³⁶ Ibid.

³⁷ <http://physiciansfoundation.org/wp-content/uploads/2020/08/20-1278-Merritt-Hawkins-2020-Physicians-Foundation-Survey.6.pdf>

³⁸ <https://www.usnews.com/news/health-news/articles/2020-10-13/pandemic-dangers-drive-some-doctors-to-switch-jobs-retire-early>

Environmental Scan – State of Colorado

Population Data

According to the U.S. Census Bureau, Colorado’s population grew at nearly twice the rate of the rest of the nation from 2010 to 2020, putting it among the fastest-growing states. According to recent data from the U.S. Census Bureau, Colorado’s population was estimated to number at 5.8 million as of April 2020, an increase of 744,518 since 2010. The state saw a 14.8% rate of population growth from 2010 to 2020 and is now the 21st-most populous state in the country. Colorado’s population is shifting in several ways that have important implications for the state’s health-care workforce. By 2040, the state’s total population is projected to increase is expected to grow by roughly 30%, increasing from 5.8 million in 2020 to 7.50 million in 2040. Compared to the projected national growth rate of 13%, Colorado’s population is expected to increase significantly faster than the country as a whole.

While the nation’s population grew only 7.4% over the last decade, Colorado saw nearly 15% growth. But the growth was unevenly distributed, with urban centers continuing to draw more residents and rural counties, especially those in the southeast corner of the state, seeing the biggest declines in population. The state’s white population declined while the Hispanic population increased, similar to national trends. Colorado’s growth mirrors that of other states in the West that grew faster than the national average. It’s a trend that began in the past century. The state’s population more than doubled in the past 40 years, with much of that growth occurring from 1990 to 2000.

The city of Greeley is the home of UNC. Located approximately 50 miles northeast of Denver, at the confluence of the South Platte and Cache la Poudre rivers, Greeley was primarily an agricultural development, with some of the first successful irrigated farmland. Agri-business still provides a solid economic basis, with Weld County (of which Greeley is the county seat) consistently ranking in the top 10 agricultural producing counties in the nation.³⁹ The Greeley metro area has been ranked as the fastest growing “city” in Colorado by 24/7 Wall Street with a population growth of 32.1% from 2010 to 2020.

³⁹ <https://www.colorado.com/cities-and-towns/greeley>

Diverse Population

Equally remarkable has been the population’s increasing diversity. Colorado’s population is expected to increase in racial and ethnic diversity by 2040. The white, non-Hispanic population is projected to decrease from an estimated 66.9% of the population in 2020 to 58.5% by 2040. Conversely, those identifying as Hispanic Origin will grow, in terms of overall population share, the most from 2020 to 2040, from 23.9% to 30.5%. The second-fastest growing group will be those identifying as Asian/Pacific Islander, non-Hispanic, as you can see below. Overall, the Minority population share is projected grow from 2020 to 2040, from 33.1% to 41.5%.⁴⁰

Figure 5: Population of Colorado’s Race and Ethnic Groups, 2000-2050.

Population of Colorado's Race and Ethnic Groups, 2000-2050. (Numbers in thousands)									
Group	2010	2015	2020	2025	2030	2035	2040	2045	2050
White, non-hispanic	3,592.5	3,756.2	3,905.8	4,072.5	4,221.4	4,330.7	4,396.7	4,426.9	4,436.2
Hispanic Origin	1,042.0	1,215.9	1,395.7	1,602.9	1,826.5	2,059.3	2,292.7	2,511.7	2,712.1
Black, non-hispanic	205.3	225.9	249.6	274.8	298.2	319.0	337.2	353.3	368.2
Asian/PI, non-hispanic	161.4	193.8	230.1	274.3	321.2	369.6	417.9	464.5	509.4
Am. Indian, non-hispanic	49.1	53.0	56.9	61.8	66.4	70.6	74.4	77.5	80.0
Total	5,050.3	5,444.9	5,838.2	6,286.3	6,733.7	7,149.2	7,518.8	7,833.9	8,105.9
Minority	1,457.8	1,688.6	1,932.3	2,213.8	2,512.3	2,818.5	3,122.1	3,407.0	3,669.7

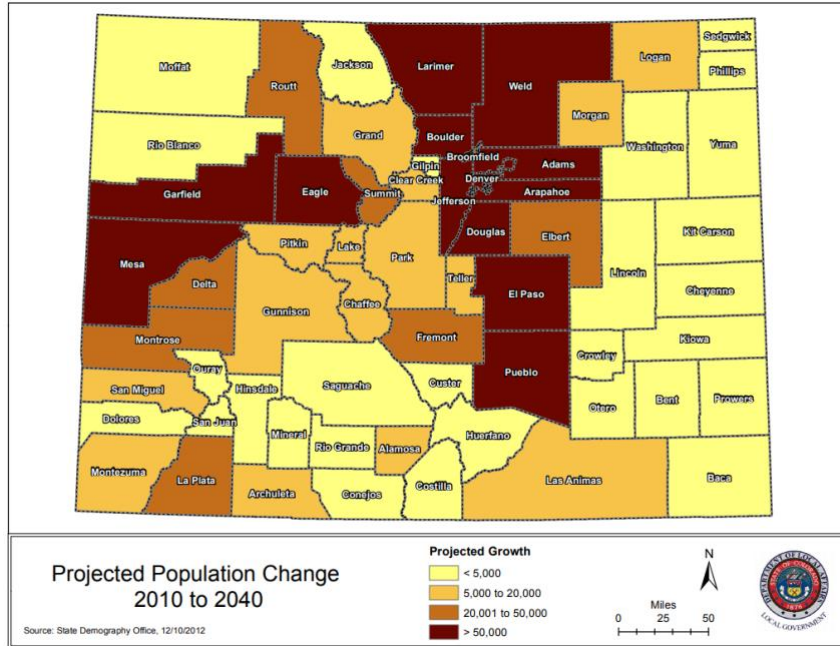
Share of Total Population									
Group	2010	2015	2020	2025	2030	2035	2040	2045	2050
White, non-hispanic	71.1	69.0	66.9	64.8	62.7	60.6	58.5	56.5	54.7
Hispanic Origin	20.6	22.3	23.9	25.5	27.1	28.8	30.5	32.1	33.5
Black, non-hispanic	4.1	4.1	4.3	4.4	4.4	4.5	4.5	4.5	4.5
Asian/PI, non-hispanic	3.2	3.6	3.9	4.4	4.8	5.2	5.6	5.9	6.3
Am. Indian, non-hispanic	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Minority	28.9	31.0	33.1	35.2	37.3	39.4	41.5	43.5	45.3

While growth is still expected to occur within Denver County, much of the growth in the seven-county metro area is projected outside of the county with the state’s capitol. With rising housing costs, increasing traffic, and a steep cost of living in Denver, the idea that people might try to build lives in counties outside of Denver is not shocking. The Aerotropolis may also contribute to growth in the eastern counties of the metro area. On a state level, many of the counties that one would expect to grow as current population centers in Colorado will, in fact, grow significantly. Counties such as Boulder, Denver, Larimer, and El Paso are expected to add at least another 50,000 residents from 2019 to 2040.⁴¹

⁴⁰ <https://www.coronainsights.com/2019/09/colorado-population-2040-4-trends-to-watch/>

⁴¹ Ibid.

Figure 6: Projected Population Change⁴²



In terms of percentage growth from 2019 to 2040, however, the picture is a bit different, as counties such as Garfield (45% growth) are expected to see a drastic increase while others, such as Las Animas, are expected to decrease in the same time frame.⁴³ The top four counties in terms of percentage growth from 2019 to 2040 are expected to be: 1) Weld (79%); 2) Elbert (63%); San Miguel (55%); and Archuleta (48%).

Aging Population

In 2020, 14.6% of Coloradans were age 65 and older. From 2010 to 2015, Colorado’s growth in its 65-plus population was third-fastest in the United States at more than 29%. The state expects a lot of growth in its older population. In 10 years, Colorado expects 39% growth in the population over 60. By 2040 it is projected that one in four are going to be over 60.⁴⁴ Colorado has the second-fastest growing population of people over 60 in the nation. The state has only 89 geriatricians for a current population of 1.3 million Coloradans over 60.⁴⁵

Changes in Colorado’s aging population also have important implications for the health-care workforce. The state’s elderly population will likely be the major recipients of health care in the future as seniors consume the most health-care services when compared to other age groups for multiple reasons. This

⁴² State Demography Office.

⁴³ Ibid.

⁴⁴ <https://denver.cbslocal.com/2021/07/07/colorados-aging-population-faces-shortages/>

⁴⁵ Ibid.

growth in the number of elderly Coloradans is expected to have an unprecedented impact on the overall demand for health-care services.

Current and Future Physician Workforce Shortages

There are 16,272 active physicians in Colorado, of which 5,433 are PCPs.⁴⁶ Colorado ranked 21st in active PCPs per 100,000 population compared to the nation. Colorado demonstrates high needs for physicians, reflected in the number of counties in the state that are full or partial HPSAs for primary-care physicians. Colorado has 116 primary-care HPSA designations, totaling a population of 1.1 million within the HPSAs, resulting in the need of an additional 262 practitioners to remove the HPSA designation label. Only 34.6% of the state’s need is met. The state would need 262 practitioners to remove the designations.

Table 1: Primary Care Health Professional Shortage Areas (HPSAs)⁴⁷

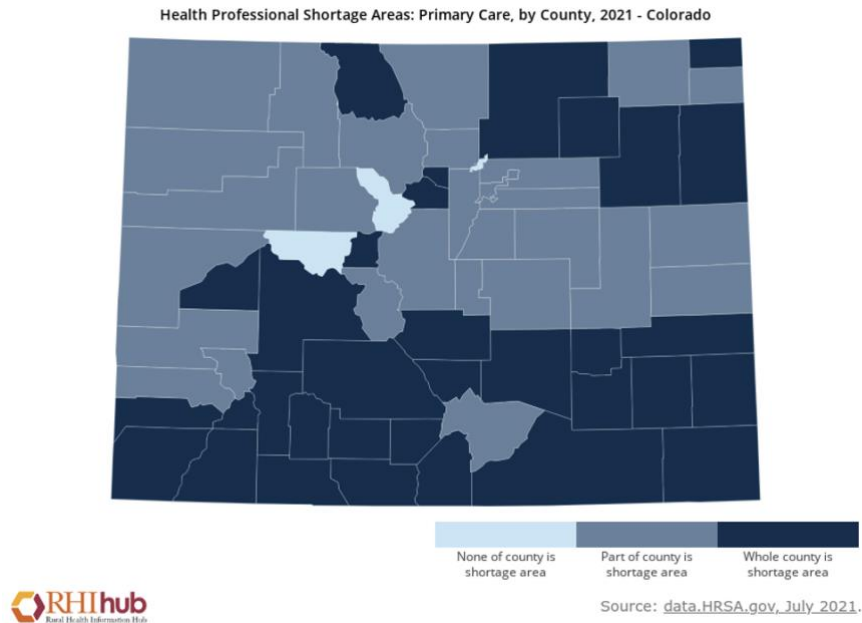
	Total Primary Care HPSA Designations	Population of Designated HPSAs	Percent of Need Met	Practitioners Needed to Remove HPSA Designation
U.S.	7,331	84,098,512	44.4%	15,444
Colorado	116	1,122,347	34.57%	262

Primary-care providers (including physicians, nurse practitioners, physician assistants, and certified nurse midwives) can develop sustained relationships with patients and practice in the context of family and community. Having a usual primary-care provider is associated with a higher likelihood of receiving appropriate care and lower mortality. Having greater access to primary-care providers of all kinds can save lives. Figure 7 shows the significant primary-care health-care shortage areas throughout the state of Colorado.

⁴⁶ AAMC. 2019 State Physician Workforce Data Report and Robert Graham Center.

⁴⁷ Bureau of Health Workforce Resources and Services Administration (HRSA) U.S. Department of Health & Human Services

Figure 7: Primary-Care Health Professional Shortage Areas in Colorado⁴⁸



Although insurance provides access to care, it does not ensure that everyone receives appropriate or high-quality care at the right time. An estimated 1.1 million Coloradans live in provider shortage areas, with shortfalls in access to primary, dental or mental health-care providers. The shortage of health professionals impacts access to care, causing a significant delay in obtaining timely health services and resulting in barriers that negatively affect health outcomes. Access to comprehensive and quality health-care services is important for physical, social, mental health, and overall quality of life. Access to care also promotes preventative measures, managing disease, and reducing unnecessary disability and premature death.

Aging Physicians

In 2019, Colorado reported 16.6% of the state’s physicians being younger than 40, while nearly one-third (29.5%) were 60 and older. Colorado shows the 10th-highest rate across the country of active physicians aged 60 or older, and their retirement within the next few years will leave a significant hole in the state’s physician workforce and further impact Coloradans’ ability to seek care. For a state with existing health-care issues and concerns, an aging workforce will pose significant problems for its community residents.

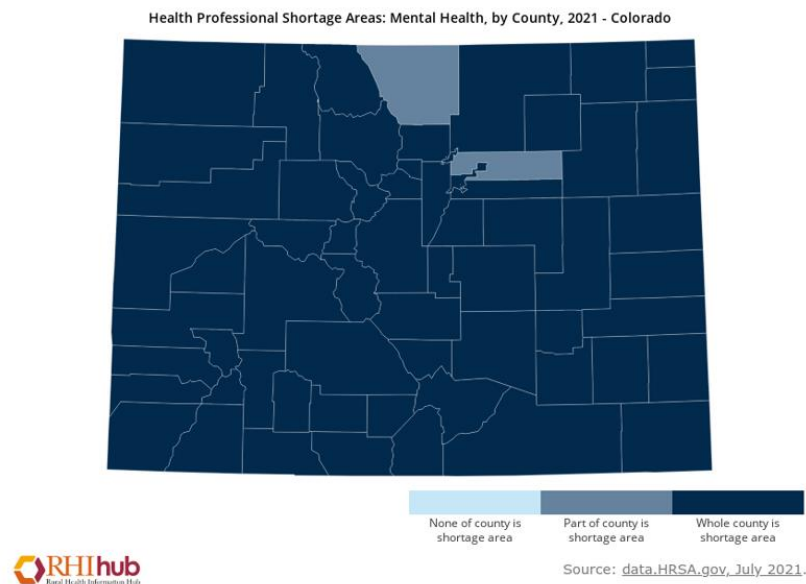
⁴⁸Data.HRSA.gov, 2021

The Robert Graham Center⁴⁹ forecasts that by 2030, Colorado will need an additional 1,773 primary-care physicians, a 49% increase compared to the state’s 2010 PCP workforce. Components of Colorado’s increased need for PCPs include 19% (338 PCPs) from increased utilization because of aging, 72% (1,283 PCPs) because of population growth, and 8% (152 PCPs) because of a greater insured population following the ACA.

Current Mental Health Shortages

As of September 2021, Colorado reported 65 mental health-care HPSA designations, resulting in the need of an additional 126 practitioners to remove the HPSA designation label.⁵⁰ Figure 8 shows the significant mental health-care shortage areas throughout Colorado.

Figure 8: Mental Health-Care Health Professional Shortage Areas in Colorado



Poor mental well-being affects thousands of Coloradans. Mental illnesses can be acute or chronic and are diagnosable conditions that affect an individual’s emotional, psychological, and social well-being and often their behavior. These conditions include depression, anxiety, schizophrenia, and mood or personality disorders, among others. According to the Kaiser Family Foundation (KFF), the share of adults in Colorado with any mental illness was 23.2% in 2018-2019, which was similar to the U.S. share (19.9%).

⁴⁹ Robert Graham Center.

⁵⁰ Bureau of Health Workforce; Health Resources and Services Administration; U.S. Department of Health and Human Services. Fourth Quarter of Fiscal Year 2021, Designated HPSA Quarterly Summary.

Mental health issues have increased during the COVID-19 pandemic. On average, more than one in three adults in the United States has reported symptoms of anxiety and/or depressive disorder since June 2021.⁵¹ According to the Kaiser Family Foundation, average biweekly data for September 2021 found that 29.1% of adults in Colorado reported symptoms of anxiety and/or depressive disorder, compared to 32.1% of adults in the United States. Among those adults in Colorado who reported experiencing symptoms of anxiety and/or depressive disorder, 30.5% reported needing counseling or therapy but not receiving it in the prior four weeks, compared to the U.S. average of 27.1%.

According to Mental Health America, Colorado is ranked No. 48 of the 50 states for providing access to mental health services. In 2020, 12.3% of Colorado adult residents reported frequent mental distress with 14 or more days of poor mental or emotional health in the past 30 days. Suicide, a mental health crisis, continues to affect every Colorado community. In 2019, the suicide rate per 100,000 individuals in Colorado was 22.4.⁵²

Access to Care

It is crucial that an adequate number of physicians and physician specialists can serve the health-care needs of individuals within geographic areas; however, simply injecting more physicians into an area is not a health-care panacea. Access to health care is also influenced by other factors including economic. National surveys reveal that those who have health insurance have better access to health care than those who are uninsured, make better use of preventive services, and have better health outcomes.⁵³

Nationally, in 2020, 10.4% of Colorado's population was uninsured. Compound this with the fact that 1.1 million Coloradans live in an HPSA, and serious barriers limit access to care for a substantial number of residents. Colorado also has a rural population, with more than 715,485 living in rural regions.⁵⁴ Living in a rural region and being poor or unemployed are overwhelming challenges; in addition, residing in a region that is often overlooked compounds these accessibility issues. Rural areas tend to coincide with the HPSAs as well; physicians are less likely to practice in rural areas of the country.

⁵¹ Kaiser Family Foundation.

⁵² Ibid.

⁵³ Ibid.

⁵⁴ <https://www.ruralhealthinfo.org/states/colorado>

Rural Health

Colorado needs more doctors, specifically in underserved areas. A statewide focus is needed for the redistribution of doctors to rural areas. For Coloradans living in rural areas, access to primary care is much more limited than that of their counterparts in Colorado's urban centers. Particularly, residents living in rural areas face greater health challenges, as distance from health providers often creates disparities that are difficult to overcome. Access issues — such as lack of health insurance, lack of available providers, and health-care affordability — all lead to an increased risk of illness or death. Additionally, people who live in rural areas are more likely to be dependent on Medicaid. More than 26.6% of the adults in Colorado reported not having a personal doctor in 2019.⁵⁵

The closure of rural hospitals also makes it much more challenging for residents to obtain care, forcing residents to travel even farther in times of emergencies. A new report from the Chartis Center for Rural Health puts the situation in dire terms: 2019 was the worst year for rural hospital closures this decade, with 19 hospitals in rural America shutting their doors. Nearly one of every four open rural hospitals has early warning signs that indicate they are also at risk of closing in the near future.⁵⁶ Since 2010, 120 rural hospitals have closed, according to University of North Carolina researchers. And today, 453 of the 1,844 rural hospitals still operating across the country should be considered vulnerable for closure.⁵⁷ Another concern is that rural hospitals also serve as one of the largest employers and economic contributors in their communities.

Rural hospitals in Colorado face unique challenges, with patients experiencing barriers to their access to care including extensive transportation times, physician shortages, and facility closures caused by financial problems. Colorado has 32 identified as Critical Access Hospitals.⁵⁸ Critical access hospitals were designed to reduce the financial weakness of rural hospitals and improve access to health care by keeping essential services in rural communities. The increased accessibility to such services provides a medical home to populations who otherwise would not be able to obtain health-care services. Colorado has 61 Rural Health Clinics and 75 FQHCs along with 12 short-term hospitals that provide services outside of urbanized areas. Figure 9 below reveals the concentrated regions of health-care facilities in Colorado.

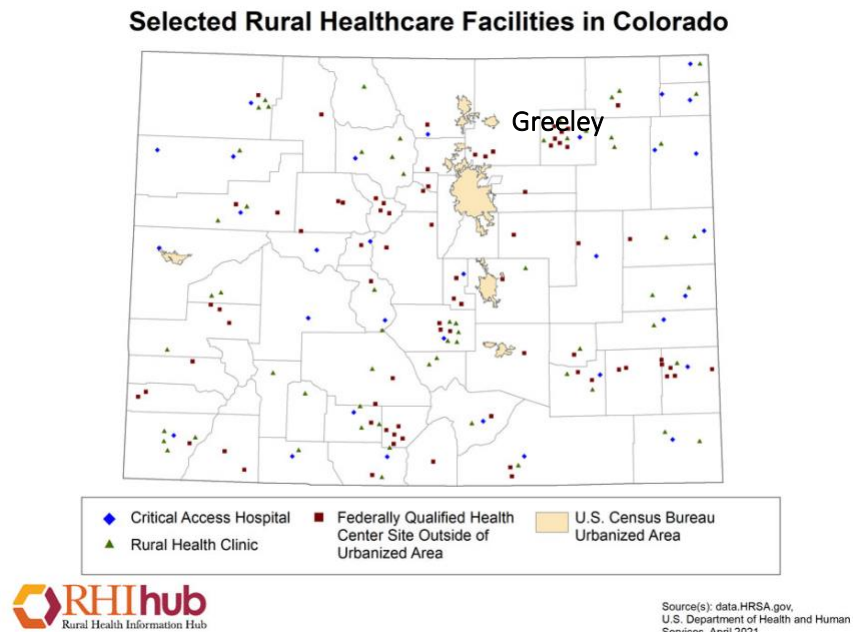
⁵⁵ Kaiser Family Foundation.

⁵⁶ Chartis Center for Rural Health.

⁵⁷ Ibid.

⁵⁸ <https://www.ruralhealthinfo.org/states/colorado>

Figure 9: Rural Health-Care Facilities in Colorado



One of the most effective strategies to recruit and retain physicians in rural areas is to expand existing and create new undergraduate medical education and GME training sites in these locations.⁵⁹ Osteopathic medical schools developed over the past 20 years have done an outstanding job attracting local students who were unable to matriculate into established medical schools. More than 60% of students at peer rural D.O. programs are from their home state and remain in the state to practice after graduation.

Poverty Status

In 2019, about 9.3% of Colorado’s population lived below the poverty line.⁶⁰ As of January 2020, Colorado had an estimated 9,846 experiencing homelessness on any given day, as reported by Continuums of Care to the U.S. Department of Housing and Urban Development (HUD). Research shows that economic conditions have a significant impact on population health and on differences in health among various groups.⁶¹ Studies have shown that low household income is often associated with poor physical and mental health status, less social support, more behavioral-risk factors, higher rates of obesity and uncontrolled blood pressure, and poor medical diagnoses. Health disparities emerge when some groups of people have more access to opportunities and resources over their lifetime and across generations. Further, strong evidence suggests that poverty in childhood has long-lasting effects, limiting life

⁵⁹ Preparing Physicians for Rural-Based Primary Care Practice. <http://jaoa.org/article.aspx?articleid=2625269>

⁶⁰ U.S. Census Bureau.

⁶¹ Institute of Medicine. *The Future of the Public’s Health in the 21st Century*. Washington, D.C.: National Academies Press. 2002.

expectancy and worsening health for the rest of the child's life, even if social conditions subsequently improve.⁶²

Health Status

Healthy eating, an active lifestyle, not engaging in overall unhealthy behaviors (smoking, drinking, drug use, etc.), and seeing a physician when sick influence our health. The conditions in which one lives are significant contributors to a person's overall health status. A person's social and financial state also add to the health status of why some Americans are healthier than others. Access to affordable, quality health care is critical to a healthy mind and body. Health insurance helps individuals access needed primary care; however, physicians must be available to treat patients and be relatively close to a patient population.

The United Health Foundation's Health Rankings depict how Colorado compares to other states in a variety of health measures. A ranking of No. 50 represents the worst state for residents reporting the highest levels of disparities in health status, income gap, underemployment rate, and unemployed rate. Overall, Colorado ranks No. 12 for social and economic factors, No. 4 for physical environment, No. 21 for clinical care, No. 3 in behaviors, and No. 15 in health outcomes. The report highlighted that Colorado has the following challenges: 1) high prevalence of illicit drug use among youth; 2) high racial gap in high school graduation rates; and 3) high prevalence of excessive drinking among women. It is important to note that Colorado ranked 24 out of 50 for the number of primary-care physicians. Please refer to Table 2.

If underserved populations were to experience the same health-care use patterns as populations with fewer barriers to access, current demand could rise by an additional 74,100 to 145,500 physicians.⁶³ This analysis underscores the systematic differences in annual use of health-care services by insured and uninsured individuals, individuals in urban and rural locations, and individuals of differing races and ethnicities.⁶⁴ These estimates, which are separate from the shortage-projection ranges, help illuminate the magnitude of current barriers to care and provide an additional reference point when gauging the adequacy of physician workforce supply.⁶⁵

⁶² Ratcliffe, C., and McKernan, S.M. *Childhood Poverty Persistence: Facts and Consequences*. Washington, D.C. The Urban Institute, Brief 14, June 2010.

⁶³ AAMC.

⁶⁴ Ibid.

⁶⁵ Ibid.

Table 2: Health Rankings in Colorado, 2020⁶⁶

Topic	CO Rank	State Ranked No. 1	State Ranked No. 50
Overall State Ranking	4	Alaska	West Virginia
Behaviors			
Drug Deaths	21	South Dakota	West Virginia
Excessive Drinking	35	Utah	District of Columbia
High School Graduation	44	Iowa	New Mexico
Obesity	1	Colorado	Mississippi
Physical Activity	2	Utah	Mississippi
Smoking	11	Utah	West Virginia
Community & Environment			
Air Pollution	13	New Hampshire	California
Severe Housing Problems	33	West Virginia	Hawaii
Chlamydia	28	West Virginia	Alaska
Occupational Fatalities	6	California	Alaska
Violent Crime	30	Maine	Alaska
Policy			
Childhood Immunizations	30	Maine	Oregon
HPV Immunizations	7	Rhode Island	Mississippi
Public Health Funding	21	Alaska	Nevada
Uninsured	25	Massachusetts	Texas
Clinical Care			
Dentists	10	Alaska	Delaware
Low Birthweight	42	Alaska	Mississippi
Mental Health Providers	12	Massachusetts	Alabama
Preventable Hospitalizations	5	Hawaii	Minnesota
Primary-Care Physicians	24	Massachusetts	Nevada
Outcomes			
Cancer	9	Alaska	West Virginia
Cardiovascular Diseases	3	Alaska	West Virginia
Diabetes	1	Colorado	West Virginia
High Health Status	3	Massachusetts	West Virginia
Frequent Mental Distress	13	South Dakota	West Virginia
Frequent Physical Distress	5	North Dakota	West Virginia
Premature Death	10	Minnesota	West Virginia

⁶⁶ America’s Health Rankings, United Health Foundation: www.americashealthrankings.org

County Health Rankings⁶⁷

The Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute collaborate to conduct the County Health Rankings & Roadmaps program. The goals of the program are to:

- Build awareness of the multiple factors that influence health;
- Provide a reliable, sustainable source of local data to communities to help them identify opportunities to improve their health;
- Engage and activate local leaders from many sectors in creating sustainable community change; and
- Connect and empower community leaders working to improve health.

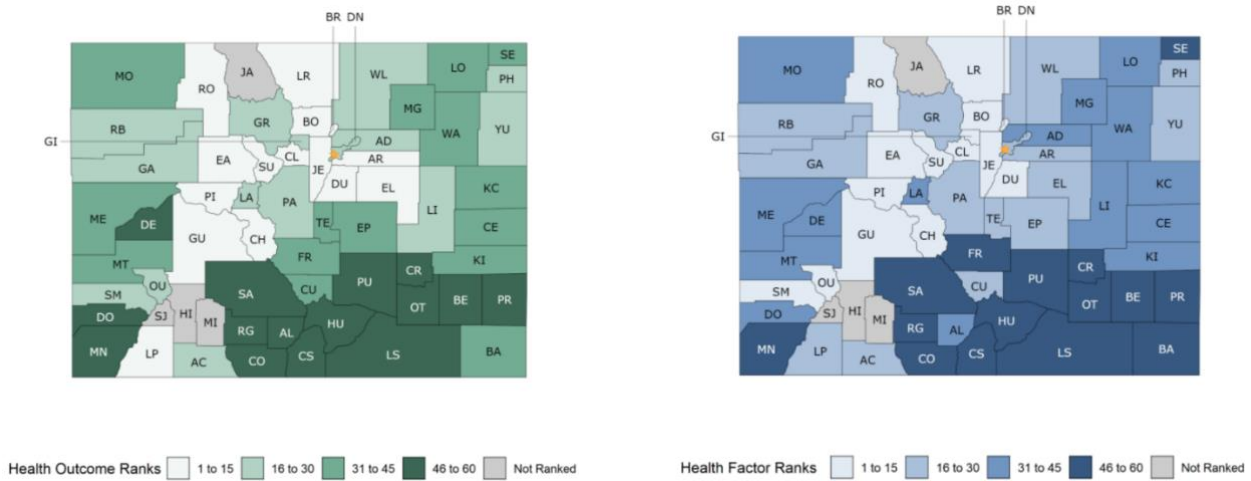
The rankings measure vital health factors in every county in America. They provide a snapshot of how where we live, learn, and work impact our health and offer a starting point for change in communities. Colorado has 64 counties, ranked on a scale from 1 (healthiest) to 64 (least healthy). Counties are ranked relative to the health of other counties in the same state on the following summary measures:

- **Health Outcomes:** Two types of health outcomes to represent the health of each county: length of life (premature death) and quality of life (physical health, mental health, and low birthweight). These outcomes are the result of a collection of health factors and are influenced by existing programs and policies at the local, state, and federal levels.
- **Health Factors:** A number of different health factors shape a community's health outcomes. The County Health Rankings are based on weighted scores of four types of factors:
 - o Health behaviors (nine measures)
 - o Clinical care (seven measures)
 - o Social and economic (nine measures)
 - o Physical environment (five measures)

⁶⁷ County Health Rankings & Roadmaps: www.countyhealthrankings.org

Figure 10 shows the overall health outcomes and the health factors in Colorado. Darker shades indicate areas with poor rankings. As both maps reveal, Colorado represents different clusters of counties with poor health ratings.⁶⁸ Reviewing the 2020 County Health Rankings, Weld County ranks 19 for Health Outcomes and 27 in Health Factors.

Figure 10: 2020 Colorado Health Outcomes and Health Factors



⁶⁸ County Health Rankings & Roadmaps, 2020, www.countyhealthrankings.org

Medical School Applicants (Demand) Exceed Available Medical School Seats (Supply)

Medical Education Landscape

Currently in the United States, there are 154 accredited medical schools (referred to as M.D. programs).⁶⁹ In addition to those M.D. programs, 37 colleges of osteopathic medicine teach at 58 locations.⁷⁰ Only three states do not have their own medical schools, and those are the states participating in the WWAMI program: Wyoming, Alaska, and Montana (Rocky Vista University College of Osteopathic Medicine is opening a branch campus in Billings, Montana, while Touro College is planning to build an osteopathic medical school in Great Falls). Those states have medical student representation through this program in a consortium model of medical education.

Stepping back to look at the medical education landscape from a broader view, two medical school programs are in Colorado: in Aurora (University of Colorado School of Medicine) and Parker (Rocky Vista University College of Osteopathic Medicine). The state's current medical education infrastructure does not produce enough physicians to meet current and future workforce needs.

Colorado receives a significant number of qualified applications for its available medical school seats. For the 2019 entering class, 379, or 1.8 percent, of the 21,584 D.O. program applicants claimed Colorado as their permanent residence.⁷¹ During the 2019-2020 academic year RVUCOM received 3,980 applications. Of that number, 665 were from in-state while 3,315 were from out-of-state.⁷² Applications to the University of Colorado School of Medicine had 14,094 applications for the 184 seats in the medical school class that began in August 2021, which was a 35% increase from the previous year.⁷³

Greeley is centrally located within the study region with access to an applicant pipeline from local colleges and universities, as well as hospitals, physicians, and other health-care institutions. The pipeline created by an osteopathic medical school will inspire and motivate local students to pursue a career in medicine and provide a community choice for those already committed to a medical career while providing an increase in the quality of life for the people of the northern Colorado region. It also should attract people to Colorado from other states and countries who are interested in becoming physicians.

⁶⁹ AAMC.

⁷⁰ 2020-21 AOA Osteopathic Medical Education Report.

⁷¹ American Association of Colleges of Osteopathic Medicine, AACOMAS Applicant Pool Profile Entering Class 2019.

⁷² AACOMAS.

⁷³ Ibid.

The Fauci Effect

Applicants to Colleges of Medicine (COMs) nationwide come from all 50 states and Puerto Rico. Every year more and more students apply to medical school (allopathic or osteopathic). Particularly, the ongoing coronavirus pandemic has directed a spotlight into the medical community. In 2020, medical schools reported the most interest they've seen in more than a decade. According to the AAMC, the number of applications to medical schools across the country increased 18% in 2020.

Admissions officers and industry professionals believe the surge in applications are due to the example set by medical workers and public health figures like Dr. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases.⁷⁴ Dr. Fauci sees the flood of medical school applicants as a sign that people are thinking about social justice — "that you have responsibility not only to yourself, but as an integral part of society."⁷⁵ Increases in the number of applications may also be chalked up to less-stringent requirements this year. Some schools dropped the Medical College Admission Test examination requirement or shifted back application deadlines. Whatever the reasoning, ballooning interest in the medical industry could prove vital in countering a growing physician shortage.⁷⁶

Student Data

For the 2019 entering class, 21,584 national applicants applied to osteopathic programs for 7,672 approved seats. There were 2.81 applicants for each COCA-approved seat in the first-year class. The mean number of osteopathic medical school applications per applicant was 8.9. Concurrently, for M.D. schools there were 52,777 applicants with only 21,622 matriculating into a program.⁷⁷ This represents an increase of 603 (2.8%) applicants and an increase of 11,159 (5.8%) applications compared to 2018. The profession has grown 63% in the past decade and nearly 300% in the past three decades.

Concurrently for M.D. schools, there were 53,371 applicants with only 21,869 matriculating into a program. There were 2.44 applicants for each M.D.-approved seat in the first-year class. The mean number of allopathic medical school applications per applicant was 17. The number of applicants for the first-year class at D.O. schools was more than 11% higher than for applicants at M.D. schools. Therefore, in 2019 (accounting for applicants across M.D. and D.O.), almost 45,400 students applied and did not

⁷⁴ <https://www.forbes.com/sites/jemimamcevoy/2020/12/07/the-fauci-effect-medical-school-applications-jump-18-during-pandemic/?sh=3ebd403263ca>

⁷⁵ Ibid.

⁷⁶ Ibid.

⁷⁷ AAMC: https://www.aamc.org/system/files/2020-10/2020_FACTS_Table_A-1.pdf

enroll into a medical education program for physicians. Those applicants who are not accepted at either an M.D. or D.O. medical school often enroll at offshore medical schools in the Caribbean that are not accredited by the COCA or the Liaison Committee on Medical Education (LCME). These schools often have higher acceptance rates, but they also have higher attrition rates and lower placement results into GME residency programs.⁷⁸

Diverse Student Population

Research has revealed the importance of not only providing affordable educational opportunities to attract and retain high-quality local students in the health-care profession, but also to retain and secure a diverse student population. Data shows the importance and the movement of medical schools focusing on diversifying their student body and increasing student interest in caring for the underserved populations.

Having a diverse medical workforce does not mean that every patient needs to see a provider just like him or her. It's about cultural competence, the awareness and ability of providers to respond to the sensibilities of patients whose cultures and values may be very different from their own. The idea of cultural competency is crucial when thinking about the makeup of a medical school class. It is important to have a diverse group of students in each class to promote cultural competency.

An essential tactic to meet UNC's goals for its medical school in Colorado is to have specific programs or policies to recruit a diverse student body. Policies should focus on underrepresented minorities in medicine and students from rural and underserved communities, as well as students from disadvantaged backgrounds. An array of approaches should be utilized, in particular a holistic admissions review process focusing on outreach at high schools and four-year colleges and universities.

⁷⁸ <https://www.medscape.com/viewarticle/897095>

Educating Local Physicians is Key to Retention

An essential part of increasing the number of physicians in Colorado is to educate local students. In 2018, Colorado ranked 17th in the United States in physicians retained in state from UME (indicating the best out of 50). The state also ranked 15th on physicians retained in state from GME. A ranking of 16 was reported for physicians retained in state from UME and GME combined.

Table 3: Colorado Physician Workforce Profile

Colorado 2018	CO	Rank
Physicians Retained in State from UME	42.9%	17
Physicians Retained in State from Public UME	44.4%	20
Physicians Retained in State from GME	48.7%	15
Physicians Retained in State from UME and GME Combined	73.5%	16
Colorado 2018	Number	Percent
State Where GME Was Completed for All Active Physicians in State	5,136	34%
Practice Location of Physicians Who Completed GME in State	5,136	49%

The proposed four-year osteopathic medical school campus in Greeley would capitalize on these standings in the future if students and residents are placed in residency slots within the state and, most importantly, regionally. National studies show that the combination of UME and GME in the same region has the greatest impact on future workforce. Specifically, when a student graduates from a local high school, college, and medical school and completes a residency in the same region/state, the likelihood to stay and practice medicine when he or she completes residency training is more than 60 percent (classic pipeline).

The proposed UNC osteopathic medical school has an opportunity to enhance both the pipeline and the need for physicians in rural and underserved areas by allowing the physicians to complete clerkships and residencies, which will embed the students into the community, increasing the likeliness of them being retained in the local area. Ultimately, strengthening the recruitment and retention of primary-care providers will increase access to care for at-risk and underserved populations and will provide a broader array of services to patients in regions of need throughout the state.

Clinical Training

Clinical Landscape

Colorado is home to 114 hospitals. The state has 32 hospitals identified as Critical Access Hospitals (2021), 61 Rural Health Clinics (2021), 75 Federally Qualified Health Centers located outside of urbanized areas (2021), and 12 short-term hospitals located outside of urbanized areas (2021).⁷⁹

Spanning only 150 miles out from Greeley are cities and towns that have numerous hospitals and health systems, which are favorable for clinical partnerships and collaborations locally. Table 11 in Appendix F identify these hospitals and health systems within a 150-mile radius of Greeley. These sites may have potential for additional opportunities for students to obtain clerkships as well as residency training. In addition, Banner Health has hospital facilities outside of Colorado in neighboring states, providing significant clinical training capacity for the proposed osteopathic medical school (Please refer to Table 12 in Appendix F).

Clerkship Planning

An important aspect in determining the feasibility of a new medical school is the number of clinical encounters at nearby hospitals and within the outpatient environment at private practices and community health centers. The availability of clinical positions is imperative to the success of the school. The feasibility of the school relies on student placement in a clinical setting, and the proposed new osteopathic medical school is well-positioned to establish and arrange formal relationships with partners in the community. To support the educational training needs of third- and fourth-year medical students and to ensure a feasible project, a high degree of commitment to education must be present among a consortium of all hospitals within the region.

The proposed osteopathic medical school will leverage the strengths of multiple clinical partners throughout the region to train physicians to provide team-based, interprofessional patient care to prevent and treat complex and chronic diseases. Besides the ability to provide learning experiences with clinical partners in Weld County, the new medical school will have access to clinical partners throughout the state. Tripp Umbach's analysis of hospitals across the Colorado as well as in contiguous states indicates that clinical activity is adequate to support the education of 150 medical students per class.

⁷⁹ Rural Health Information Hub.

GME Planning

In addition to clerkship training during medical school, before becoming a board-certified practicing physician, medical students must complete a residency training program after graduating medical school. As the rate of medical school enrollment increases, it is important to also monitor and support GME initiatives as both components are intertwined. As previously mentioned, individuals are most likely to stay in the area in which they complete their residency training to practice.

Data from the AAMC Medical School Enrollment reported that half of medical schools are concerned about their incoming students' ability to find a residency training position of their choice upon completion of medical school, and federal caps on Medicare-funded residency training positions remain effectively frozen at 1996 levels. In response to these concerns, the AAMC, working with the nation's medical schools, teaching hospitals, and health systems, is undertaking a five-year plan to optimize GME in the United States.⁸⁰ To help address the physician shortage, the bipartisan Resident Physician Shortage Reduction Act of 2019 (S. 348, H.R. 1763) was introduced in the U.S. Congress to provide increased Medicare support for 3,000 new residency positions each year over the next five years.⁸¹

To meet the demand for residency slots, UNC's academic leadership team is working with health-care providers to plan and develop additional GME opportunities in Colorado, but also into nearby states such as Wyoming, Kansas, and Nebraska. The COCA's accreditation Standard 10 specifically addresses GME development by stating that "the faculty of a COM must ensure that the curriculum provides content of sufficient breadth and depth to prepare students for entry into a GME program for the subsequent practice of medicine."⁸²

UNC's ability to work with health-care institutions and organizations for GME is strongly supported. Key stakeholders from well-known health-care establishments say the opportunity to provide training to medical students is available and well-received. UNC's leadership team will continue to visit hospitals, physician groups, and health-care institutions throughout the state to broaden and deepen a collaboration for medical education.

As the rate of medical school enrollment increases, it is important to also monitor and support GME initiatives as both components are intertwined. The advantages and benefits GME brings to communities

⁸⁰ <https://www.aamc.org/news-insights/gme>

⁸¹ Ibid.

⁸² Accreditation standards for new and developing colleges of osteopathic medicine are available at: <https://osteopathic.org/wp-content/uploads/2018/02/com-new-and-developing-accreditation-standards.pdf>

are noteworthy. They include recruitment cost savings; revenue generation from increase in physicians and residents; workforce alignment; and community-based training sites that can improve health status, decrease costs, and facilitate inter-professional care.

Residency Match Rate

The 2021 Match included a record-high 48,700 registrants (an 8% increase over 2020) and 38,106 positions (a 2% increase). When the matching algorithm was processed, 36,179 positions were filled. There were 1,892 positions offered through the 2021 Match Week Supplemental Offer and Acceptance Program® (SOAP®), of which 1,773 were filled. Only 119 positions remained unfilled at the conclusion of SOAP, resulting in a 99.6 percent fill rate overall for all positions placed in the 2021 Match.⁸³

⁸³ <https://www.nrmp.org/main-residency-match-data-and-results-2021/>

Financial Model

Tripp Umbach developed a standard financial pro forma based on the experience of previous successful osteopathic medical education programs. The pro forma was inclusive of all assumptions, operating and capital expenditures, projected revenues, and financing scenarios. UNC will continue to update the financial pro forma as the Founding Dean finalizes facility plans and other aspects of the medical school. The financial plans will continue to be updated to reflect additional information on construction costs, operating expenses, and COCA requirements related to accreditation.

Construction Budget

Tripp Umbach estimates total physical plant costs including design and construction for the development of an osteopathic medical school will be approximately **\$50 million** to accommodate a medical school class size of 150 students per year.

Start-Up Costs

Tripp Umbach estimates that total start-up costs over the three planning years and first two years of operations equal approximately **\$29.6 million**.

Operating Budget

Tripp Umbach estimates that an equivalent of approximately **72 full-time employees** will be required at the medical school's full maturity to support an annual class size of 150 students. The annual cost of faculty and staff required to deliver educational programs once the proposed osteopathic medical school is at full maturity in 2029 is estimated to equal approximately **\$11.1 million**. The total operating budget for the proposed osteopathic medical school at full maturity (including the cost of faculty and staff) will be approximately **\$19.6 million** annually.

Cash Operating Margin

Tripp Umbach estimates from previous experience that the annual cash-operating margin (defined as earnings before interest, tax, depreciation, and amortization, or EBITDA) becomes positive after the third year of operations. EBITDA is estimated at **\$10.9 million** when all four years are in place. Operating margin grows to **\$19 million** by 2030.

Escrowed Teach Out and Operating Reserve Funds

As previously noted in this report, the COCA-required escrowed funds are calculated with the corresponding progressive matriculation (i.e., 50 percent for Y-1, 75 percent for Y-2, 100 percent for Y-3 and Y-4) as it relates to the “tuition multiplied by the approved number of students for the COM multiplied by four years.” The reserve is intended to provide the COCA with resources to fund teach-out agreements for the matriculated students in the event that the proposed COM fails during its initial years of operation prior to graduation of its first class of students. Tripp Umbach estimates that the escrowed teach out and operating reserve funds will equal approximately **\$52.7 million**.⁸⁴

Summary

Tripp Umbach estimates the total cost to develop the proposed osteopathic medical school is estimated at **\$132.3 million**.

Table 4: Financial Summary

Osteopathic Medical School Budget	Cost
Escrow	\$52,686,388
Escrow Reserve	\$33,000,000
Escrow Operating	\$19,686,388
Capital	\$50,000,000
Facility Capital (100,000 sq ft x \$400)	\$40,000,000
Equipment/Furnishings	\$10,000,000
Start-Up	\$29,590,180
Total	\$132,276,568

⁸⁴Tripp Umbach estimated the annual tuition to equal \$55,000.

Economic Impact

Tripp Umbach's national studies estimate that medical schools and teaching hospitals generate more than \$600 billion annually in the U.S. economy. Academic medicine is clearly a significant driver of the national, statewide, and local economies.

The proposed osteopathic medical school will bring economic benefits directly and indirectly to the regional and statewide economies. The direct benefits will come from the direct spending of the proposed medical school on capital improvements, goods, and services to businesses in the region; through the hiring of new faculty and staff; and through student spending. The indirect impact is derived from these direct, first-round expenditures, which are received as income by other businesses in the region and state and circulated through the economy in successive rounds of spending.

The proposed osteopathic medical school will provide a large number of new employment opportunities that will also come with benefits (i.e., health insurance coverage). The proportionate rise of employment caused by the presence of the new medical school is expected to greatly increase the number of insured workers. This should remove access barriers for many who are currently underinsured or have no insurance. The development of the medical school will be beneficial to individuals who may be unemployed or uninsured as a means of employment and health coverage.

Economic Impact

- By 2030, upon full operation, the proposed medical school will generate **\$66.7 million** in total economic impact per year (direct, indirect, and induced impacts), support directly and indirectly **420 jobs** in the region, and add **\$2.7 million** in state and local government revenue.

Direct Benefits of GME to Hospitals and their Communities

GME is a critical resource for the future of health care in the United States. Studies have shown that increases in the primary health-care delivery model are tied to better health outcomes in patients, lower costs for health providers, and greater equity in health. To increase the primary-care delivery model in both the underserved and rural areas in California, physicians must be trained in primary-care disciplines and select shortage specialties such as family practice, general community-based internal medicine, pediatrics, and psychiatry.

Colorado can increase its primary-care physician pool by expanding and developing new postgraduate residency positions in rural and underserved regions statewide. Throughout the country, as more students

are trained in primary-care fields, their impacts on the communities in which they serve can be felt in a multitude of ways.

Hospitals with residency programs are stronger financially, provide significantly more free care, have higher-quality scores, and offer a broader range of services than similarly sized hospitals without residency programs.

- **More Doctors:** Residency programs can lead to the recruitment of additional sub-specialty physicians who not only train medical students but also provide sub-specialty clinical services that were not available in the community before the formation of the residency program.
- **Cost Savings to Taxpayers:** The typical hospital with a residency program in internal medicine saves approximately \$3 million each year in uncompensated care.
- **Strong Hospitals:** Hospitals save \$75,000 on average in recruitment costs for every resident they hire – allowing these dollars to be invested in patient care and community health programs. Hospitals with primary-care residency programs have lower utilization of emergency departments as a result of clinics that are staffed by residents.
- **Patient Care Quality:** Outpatient services provided by residency programs include school-based programs, screenings, community-based education programs, nursing home support, medical home health-care support, emergency department follow-up, and support for public health departments.
- **Partner Benefits:** Academic medical centers benefit from funding associated with primary-care access-related research.
- **Resident Benefits:** Residents who remain in the community have a strong working knowledge of the local and regional health-care environment and are better able to direct the care for their patients.

Family physicians are significant generators of economic activity in local communities on top of the health-care services they provide. Family physicians employ staff, purchase goods and services, and generate income to other health-care organizations in their community (e.g., hospitals, nursing homes).

Physician Graduates

- The economic value of a physician is a complex area of study. The economic impact is different within each state and is measured based upon the number of practicing doctors in addition to other factors including the economy of the state, the health-care needs of the individual residents, and the access-to-care conditions. In a national study of the impact of physicians conducted by the AMA, as of 2018, there were 736,873 patient care physicians within the 50 states and District of Columbia. These physicians provided what was measured to be an economic impact of **\$2.3 trillion** in direct and indirect economic output. On average, each physician supported **\$3.2 million** in economic output and **17.1 additional jobs**. Additionally, on average across the nation, each physician supported **\$126,129** in state and local tax revenues.⁸⁵
- According to this same research, Colorado physicians created **\$31.1 billion** in economic activity. On average in Colorado, each physician supported **\$2.4 million** in economic impact. These physicians also supported **13.6 jobs** throughout the state and on average **\$88,867** in additional state and local tax revenue.
- The proposed osteopathic medical school will graduate 150 physicians annually, and an additional **\$216.0 million** will be added to the state economy every year if 60% of the students complete residencies and stay in Colorado to practice. If the school can increase the retention with the pipeline programs and retain more physicians for GME and beyond, this impact will increase as the retention increases. These same retained physicians also will create and sustain **1,224 additional jobs** within Colorado and generate **\$8.0 million** in state and local tax revenue.

⁸⁵ Ibid.

Additional Economic and Societal Benefits

Developing a medical school in Northern Colorado, could have a positive impact on health care and the regional economy. The proposed osteopathic medical school could be a major driver of the economy, creating jobs and generating millions in annual net impact to the region. The proposed osteopathic medical school could also:

- Expand health-care access for underserved populations.
- Address workforce needs by expanding numbers of highly qualified doctors who have regional connections and interests.
- Accelerate expansion of an innovation economy whereby biomedical companies are launched in and attracted to the region; new jobs are created; and research sparks technology transfer, commercialization, and economic value through improvements in prevention, treatment, and practice.
- Grow the health-care delivery system in Colorado as a priority. As a result, the quality of life for community residents improves as well as the ability to leverage health-care cost savings.

Community Support

As part of the feasibility study, Tripp Umbach completed 16 in-depth interviews (IDIs) with a sample of regional stakeholders throughout Colorado and internal stakeholders across UNC regarding the opportunities and potential challenges for the development of a four-year osteopathic medical school in Greeley, Colorado. Interviews were conducted and input and feedback were gathered in September 2021 and October 2021. The 16 key stakeholders offer a diverse representation of leaders from the health-care sector, education sector, and community.

- **Health-Care Sector:** Banner Health and UCHealth.
- **Education Sector:** University of Northern Colorado, University of Colorado SOM, Rocky Vista COM, and Greeley School District.
- **Community Leaders:** United Way, Weld County Department of Public Health and Environment, Greeley Downtown Development Authority, Greeley Area Chamber of Commerce, and Richmark Companies.

The information collected provided a better understanding of the vision, mission, and overall impact that the proposed school would have on the local community. UNC is unique in many ways and the potential to create a new medical school is promising; thus, it was imperative to collect regional input related to Northern Colorado's opportunities and challenges regarding the ability to open a new medical school. The information collected in the interviews would be kept confidential other than being reported in the aggregate.

Overall, stakeholders supported Colorado's need for additional primary care. Interviewees were quick to cite the low number of primary-care providers in the area as well as the growth of the Greeley community. By creating a greater supply of physicians in the region, respondents felt that the citizens could begin living healthier lives.

Overall Key Findings of the Qualitative Research

1. Strengths:

The need for a four-year osteopathic medical school was viewed positively by all stakeholders. Key stakeholders believe there is a need for a new kind of medical education program rooted in partnerships to expand access to quality care and improve population health. Community stakeholders interviewed by Tripp Umbach unanimously believe that UNC is uniquely positioned to develop a transformative medical education program in Colorado.

Community stakeholders strongly encourage UNC to focus the proposed medical school at the intersection of multicultural competency and population health research as it prepares physicians with the training and tools to improve the health status of communities in which they practice. Stakeholders interviewed believe that the ability for students to work shoulder-to-shoulder with other health science students at UNC and faculty to help manage and improve health status of individuals and populations will be unique among U.S. medical schools. The key to collaborations among health-care providers, government, and industry is showing mutual economic and societal benefits.

2. Opportunities:

Stakeholders identified many opportunities for the proposed osteopathic medical school, such as drawing more affluent populations that would widen the scope of the populations being serviced. This would build upon all assets in the community, specifically diversity, equity, and inclusion.

The proposed osteopathic medical school will have the capability to enhance collaborative efforts of multiple clinical partners within the region. The area is home to multiple hospitals, and all would benefit from a partnership with an osteopathic medical school.

Stakeholders also mentioned that the community's potential for increased economic activity would be an indirect effect of the development of the proposed osteopathic medical school, attracting businesses and drawing more people into the region to spend money. Community representatives and leaders offer strong connections; support for the medical school is welcomed.

3. Challenges:

A concern among the number of key stakeholders was whether UNC would be able to maintain a high-quality medical school while not taking away from existing successful medical/health professional education in the future, rather than the development of one.

A common concern raised by stakeholders was the difficulty of raising funding for the new medical school. Concerns also were expressed internally regarding considerations associated with the costs of maintaining a medical school; the associated liability insurance, health and safety training, and costs of such things as supplies, faculty/staff, accreditation requirements, and participating in AACOMAS; and the personnel needed to process and interview the thousands of potential applicants for this program, etc. Although, several stakeholders concerned with the cost said that if a compelling case is made, money in the region could support this vision. Other challenges recognized were capacity and bandwidth for physicians to be able to train, identifying faculty, and securing students.

Other questions raised through the process include:

- Will there be a sufficient number of residencies in the future to accommodate the medical students from UNC?
- Will the increased need/presence of additional medical students from UNC take away not only those spots that would have gone to the PA students but also potentially take away from such opportunities as surgery or other health observations by the PT or AT students? There is concern that if these opportunities cannot be guaranteed, then there may be risk of having health professional programs go on probation and potentially losing national accreditations, thereby losing those programs and their undergrad and graduate student enrollments.

Conclusion

The community stakeholders believe that the development of the proposed osteopathic medical school is in the very best interest of everyone involved. The benefits are visible, as well as recognized, and multiple stakeholders in the region offer this initiative full support. Interviewees were virtually unanimous in their view that UNC has the experience required to develop a next-generation medical school in collaboration with health systems, community health organizations, research directed at understanding best practices for population health improvement, with the goal of enabling people from diverse backgrounds to improve and maintain better health. The ability to build on UNC's existing infrastructure is extremely appealing to most of the stakeholders.

The internal stakeholders believe that if UNC were to move forward with the development of the proposed osteopathic medical school, a business plan should fully support the current programs and not put them at risk. Also, a detailed plan should be developed to address the clinical concerns.

Appendix A. Project Overview

In July 2021, UNC contracted with Tripp Umbach to complete a feasibility study to assess the opportunities and benefits of expanding medical education in the state of Colorado, specifically examining the development of an osteopathic medical school in Greeley, Colorado. The Tripp Umbach team gathered feedback from the UNC leadership team and assessed the primary care and statewide/regional markets to provide key findings and recommendations of the proposed medical school.

To complete the study, Tripp Umbach conducted the following:

- Project Planning and Work Sessions: Worked primarily with leadership from UNC to lay out the goals of the study and to gain an understanding of vision for the proposed medical school. Discussions with leadership allowed the consulting team to identify opportunities and challenges associated with the development of an osteopathic medical school in Northern Colorado.
- Statewide Analysis: Completed all necessary research to assess the need and feasibility of the proposed medical school. Specifically, Tripp Umbach collected and analyzed primary and secondary data as appropriate to evaluate the need and feasibility of the development of an osteopathic medical school in Northern Colorado.
- Environmental Scan: Conducted a detailed analysis of demographic, population health, and physician workforce data in the region and throughout the state based on available data. The team conducted a review of community needs and projections of needs within the context of federal health-care reform as necessary.
- Key Stakeholder Interviews: Completed interviews with local and regional key stakeholders identified by UNC and recommended by Tripp Umbach. Stakeholders included representatives of health-care, economic development, education, and business organizations across Colorado. The interviews determined unique aspects of the market that need to be considered in developing a new medical school, suggested potential opportunities, and identified potential issues impacting market feasibility.
- Budget Review: Reviewed budgets identifying projected expenses and revenues for the start-up years and the first full years of operation of the proposed medical school, identifying all costs for both start-up funding and ongoing operations.
- Economic Impact Statement: Completed economic impact analyses for the proposed medical school. The analyses provide quantified findings of the potential economic impact attributed to the development of a new medical school.
- Development of Final Report and Recommendations: The consulting team developed a final independent report to be used by UNC to guide further evaluation and planning efforts. The final report includes recommendations to continue to explore the development of an osteopathic medical school.

Appendix B. Overview of Osteopathic Medicine

Medical Education Overview

The typical path to become a physician, both allopathic and osteopathic, is to complete a traditional four-year undergraduate degree, preferably in one of the sciences (i.e., life, social, physical, pre-med, etc.). Due to the nature of a focused undergraduate degree in the sciences, for those entering the medical field, this degree is designated as the UME. The student must then apply and be accepted to medical school. The student then attends the first two years of medical school in a classroom setting. Years three and four of medical school are typically spent conducting clinical clerkships outside of the classroom in settings such as hospitals, clinics, health centers, etc. Finally, the student must complete GME and a residency program for three to seven years. Residency positions are held by local hospitals, health centers, and/or FQHCs.

Figure 11: Flowchart of Educational Phases of the Medical Education Pipeline



While the basic curriculum of the allopathic and osteopathic colleges is the same, there are some important differences. The basic sciences and hospital training are taught from an osteopathic viewpoint, with a heavy emphasis on anatomy. Osteopathic medicine provides all of the benefits of modern medicine including prescription drugs, surgery, and the use of technology to diagnose disease and evaluate injury. It also offers the added benefit of hands-on diagnosis and treatment through osteopathic manipulative medicine, which emphasizes helping each person achieve a high level of wellness by focusing on health promotion and disease prevention.⁸⁶ Additional hours are spent learning the techniques of osteopathic manipulative medicine and focusing on preventive health care and nutrition.

⁸⁶ AACOM.

Osteopathic Medical Schools Train Physicians to Meet a Well-Documented Need

Colleges of osteopathic medicine continue to expand to meet the needs for America's physician workforce. This past year, the number of osteopathic physicians in the United States climbed to nearly 135,000, an 80% increase over the past decade.⁸⁷ The nation's 134,901 fully licensed active and practicing osteopathic physicians cover the entire scope of modern medicine, bringing a patient-centered, holistic, hands-on approach to diagnosing and treating illness and injury.

Osteopathic physicians can choose any specialty, prescribe drugs, perform surgeries, and practice medicine anywhere in the United States. Osteopathic physicians bring the additional benefits of osteopathic manipulative techniques to diagnose and treat patients. Osteopathic physicians work in partnership with patients to help them achieve a high level of wellness by focusing on health education, injury prevention, and disease prevention.

- Most D.O.s (56.5%) go into primary care, with 30.0% landing in family medicine, 19.0% in internal medicine, and 7.5% in pediatrics.⁸⁸
- In 2020-2021 the top five non-primary-care specialties for D.O.s were emergency medicine (10.0%), followed by obstetrics and gynecology (5.0%), anesthesiology (4.0%), general surgery (4.0%), and psychiatry (4.0 %).

Even though many new colleges of osteopathic medicine and regional campuses have opened or been approved by the COCA during the past five years, Tripp Umbach believes that demand for osteopathic physicians will continue to grow faster during the next 20 years than the supply of medical school graduates.

⁸⁷ 2020-21-OMP Report.

⁸⁸ 2020-21 AOA: Osteopathic Medical Education Report.

Appendix C: Applicants to Osteopathic Medical Schools

Table 5 below shows the number of applications for the 2021 academic year for each osteopathic medical school. In 2021, not one school had fewer than 1,000 applicants.⁸⁹

Table 5: 2021 Applicants to Osteopathic Medical Schools

Colleges of Osteopathic Medicine/Schools of Osteopathic Medicine	Total
ACOM (AL)	5,925
ARCOM (AR)	3,511
ATSU-KCOM (MO)	5,383
ATSU-SOMA (AZ)	7,988
AZCOM (AZ)	7,499
BCOM (NM)	4,691
CCOM (IL)	8,633
CHSU-COM (CA)	3,989
CUSOM (NC)	4,879
DMU-COM (IA)	4,739
ICOM (ID)	3,564
KCU-Kansas (MO)	6,038
LECOM & Elmira (PA/NY)	11,957
LECOM Bradenton (FL)	9,184
LMU-DCOM (TN)	7,139
LUCOM (VA)	4,421
MSUCOM (MI)	8,237
MU-COM (IN)	5,754
Noorda-COM (UT)	1,295
NSU-KPCOM (FL)	8,288
NYITCOM Long Island (NY)	10,069
OSU-COM (OK)	4,782
OU-HCOM (OH)	5,741
PCOM & S. Georgia (PA & GA)	10,041
PCOM Georgia (GA)	4,443
PNWU-COM (WA)	5,239
RowanSOM (NJ)	7,010
RVUCOM Colorado/Utah (CO/UT)	3,980
TouroCOM-NY (NY)	8,037
TUCOM-CA (CA)	6,134
TUNCOM (NV)	4,269
UIWSOM (TX)	5,411
UNE COM (ME)	4,059
UP-KYCOM (KY)	4,552
VCOM-Auburn (AL)	4,025
VCOM-Carolinas (SC)	5,157
VCOM-Louisiana (LA)	2,717
VCOM-Virginia (VA)	6,579
WCUCOM (MS)	3,887
WesternU/COMP (CA)	7,123
WesternU/COMP-Northwest (OR)	4,571
WVSOM (WV)	5,316
Total	246,256

⁸⁹ 2021 AACOM Report on Applicant Designations.

Appendix D. Regional Profile Colorado

Colorado Population Data

Colorado covers 103,718 square miles and was home to an estimated population of more than 5.7 million in 2019, including more than 715,485 citizens living in rural parts of the state.⁹⁰ The state projected an estimated population growth of 14.5% from 2010 to 2019. According to the U.S. Census Bureau, 86.9% of Colorado's population is white, 4.6% is African American/Black, 3.5% is Asian, 1.6% is American Indian/Alaska Native, 0.2% is Native Hawaiian or other Pacific Islander, and 21.8% is of Hispanic/Latino origin.⁹¹

A total of 7.8% of Colorado residents lack health insurance.⁹² According to the USDA Economic Research Service (ERS), the average per-capita income for Coloradans in 2019 was \$61,157, although rural per-capita income lagged at \$54,932. The ERS reports, based on 2019 ACS data, that the poverty rate in rural Colorado is 12.7%, compared with 9.0% in urban areas. A total of 9.8% of the rural population has not completed high school, and 8.0% of the urban population lacks a high school diploma, according to 2015-2019 ACS data reported by ERS. The unemployment rates are 2.8% in rural Colorado and 2.7% in urban Colorado (USDA-ERS, 2019).

Demographics⁹³

- The 2019 population estimate for Greeley was 108,649. This population has increased 16.9% since the 2010 census.
- The 2019 population estimate for Weld County was 324,492. This population has increased 28.3% since the 2010 census.⁹⁴
- The 2019 population estimate for the state of Colorado was 5.7 million residents. This population has increased 14.5% since the 2010 census.⁹⁵

⁹⁰ <https://www.ruralhealthinfo.org/states/colorado>

⁹¹ Ibid.

⁹² Ibid.

⁹³ U.S. Census Bureau.

⁹⁴ Ibid.

⁹⁵ Ibid.

Table 6: Demographics in Colorado

	Population, 2019 estimate	Population, 2010 estimate	Population, % change	Persons < 5 years, 2018	Persons <18 years, 2018	Persons 65+, 2018
Colorado	5,758,736	5,029,319	14.5%	5.8%	21.9%	14.6%
Greeley	108,649	92,950	16.9%	6.5%	24.8%	11.9%
Weld County	324,492	252,827	28.3	7.1%	25.9%	12.4%

Race⁹⁶

- In 2019, 88.3% of the population in Greeley identified as white, while 38.6% identified as Hispanic.
- Of residents in Weld County, 92.4% identified as white, while 30.0% identified as Hispanic.
- In the state of Colorado, 86.9% of the population identified as white in the 2019 census, while 21.8% identified as Hispanic.

Table 7: Race in the Colorado Region⁹⁷

2019	White (alone) %	African American %	American Indian and Alaska Native %	Asian %	Native Hawaiian and Other Pacific Islander %	Two or More Races %	Hispanic %
Colorado	86.9%	4.6%	1.6%	3.5%	0.2%	3.1%	21.8%
Greeley	88.3%	2.4%	1.2%	1.4%	0.2%	2.8%	38.6%
Weld County	92.4%	1.6%	1.7%	1.8%	0.2%	2.3%	30.0%

Education⁹⁸

Within the Weld County region, 88.1% of all residents attain a high school diploma. This number is lower than the overall state percentage of 91.7%. Colorado reports 40.9% of its residents having a bachelor’s degree or higher.

Table 8: Education in the Colorado Region

	High school graduate or higher age 25 years+ 2015-2019 %	Bachelor's degree or higher, age 25 years+ 2015-2019 %
Colorado	91.7%	40.9%
Greeley	84.5%	24.8%
Weld County	88.1%	27.5%

⁹⁶ Ibid.

⁹⁷ Ibid.

⁹⁸ Ibid.

Income⁹⁹

Median household income in the city of Greeley for 2019 was \$57,586. For Colorado, the median household income was \$72,331.

Unemployment

In August 2021, the unemployment rate for Colorado was 5.9%.¹⁰⁰

Table 9: Colorado's Economy at a Glance

Colorado	August
	2021
Labor Force Data	CO
Civilian Labor Force ¹⁰¹	3,193.2
Employment ¹⁰²	3,004.2
Unemployment ¹⁰³	189.0
Unemployment Rate %	5.9
Nonfarm Wage and Salary Employment ¹⁰⁴	
Total Nonfarm	2,736.6
Mining and Logging	20.0
Construction	170.5
Manufacturing	145.4
Trade, Transportation, and Utilities	487.3
Information	73.9
Financial Activities	173.0
Professional & Business Services	449.1
Education & Health Services	343.7
Leisure & Hospitality	314.0
Other Services	111.7
Government	448.0

Poverty Status

Studies have shown that low household income often is associated with poor physical and mental health status, less social support, more behavioral risk factors, higher rates of obesity and uncontrolled blood pressure, and poor medical diagnoses.

In 2019, the state of Colorado reported 9.3% of its residents lived below the federal poverty level, compared to a rate of 10.5% nationally. According to County Health Rankings, in 2021, 11% of Colorado's

⁹⁹ Ibid.

¹⁰⁰ U.S. Bureau of Labor Statistics, www.bls.gov

¹⁰¹ Number of persons, in thousands, seasonally adjusted.

¹⁰² Ibid.

¹⁰³ Ibid.

¹⁰⁴ Ibid.

children lived in poverty, which is lower than the national average of 17%. Rates of children living in poverty range from 2% to 39% across Colorado counties.

Rates for children living in poverty differ among different ethnic groups in Colorado and the nation. In Colorado, state values range from 7% for white children to 24% for African American children, 24% for AI/AN children, and 21% for Hispanic children.

Health Overview¹⁰⁵

- Overall, 9% of Colorado's population under age 65 did not have health insurance in 2021.
- In 2021, the ratio of population to primary-care physicians in Colorado was 1,210:1.¹⁰⁶
- In 2021, the number of hospital discharges for ambulatory-care sensitive conditions per 100,000 Medicare enrollees was 2,617.

Challenges in Colorado¹⁰⁷

- Low high school graduation rate
- High prevalence of low birthweight
- High prevalence of non-medical drug use

Strengths in Colorado¹⁰⁸

- Low economic hardship index score
- Low prevalence of multiple chronic conditions
- Low prevalence of physical inactivity

Highlights in Colorado¹⁰⁹

- Food insecurity decreased 25% from 2013-2015 to 2016-2018, from 12.1% to 9.1% of households
- Per capita income increased 13% from 2017 to 2019, from \$36,345 to \$41,053
- Flu vaccination coverage increased 27% from 2018 to 2019, from 36.6% to 46.4% of adults
- Chlamydia increased 34% from 2008 to 2018, from 388.3 to 519.4 cases per 100,000 population
- Frequent mental distress increased 34% from 2014 to 2019, from 9.2% to 12.3% of adults
- Low birthweight increased 8% from 2011 to 2018, from 8.7% to 9.4% of live births

¹⁰⁵ County Health Rankings & Roadmaps, 2021.

¹⁰⁶ Ibid.

¹⁰⁷ America's Health Rankings, 2020.

¹⁰⁸ Ibid.

¹⁰⁹ Ibid.

Health Rankings

Health is influenced by every aspect of how and where we live. Access to secure and affordable housing, safe neighborhoods, good-paying jobs and quality early childhood education are examples of important factors that can put people on a path to a healthier life.¹¹⁰ But access to these opportunities often looks different based on where you live, the color of your skin, or the circumstances into which you were born.¹¹¹ Data show a persistent pattern in barriers to opportunity for people with lower incomes and for communities of color across the United States.¹¹² Patterned differences in a range of health factors emerge from unfair policies and practices at many levels and over many decades.

Medical education programs anchored in communities have great potential to address both present and future needs for physicians who provide care to the region. Maintaining strong ties to the community improves clinical outcomes. As hospitals become responsible for health outcomes, strong community partnerships through medical education will become increasingly critical.

The below table shows the county health rankings of Weld County.

Table 10: County Health Rankings of Weld County ¹¹³

Riverside County	2021 Ranking (of 60)
Health Outcomes	19
Length of Life	20
Quality of Life	22
Health Factors	27
Health Behaviors	28
Clinical Care	20
Social and Economic Factors	28
Physical Environment	59

¹¹⁰ County Health Rankings & Roadmaps, 2021.

¹¹¹ Ibid.

¹¹² Ibid.

¹¹³ Ibid.

Appendix F. Clinical Landscape¹¹⁴

Spanning only 150 miles out from Greeley are cities and towns with several hospitals and health systems, which are favorable for clinical partnerships and collaborations locally. Table 11 identifies these hospitals and medical centers, totaling more than 8,500 beds, within a 150-mile radius of Greeley. These sites are available for additional opportunities for students to obtain clerkships as well as residency training.¹¹⁵ Clinical opportunities for partnership also exist throughout the Banner Health Network (Please refer to Table 12) and at FQHCs as well as physician offices, community centers, and clinics.

Table 11: Hospitals and Medical Centers within 150 miles of Greeley, CO – 2021

Hospital Name	City	Staffed Beds
Avista Adventist Hospital	Louisville	108
Cedar Springs Hospital	Colorado Springs	86
Centennial Peaks Hospital	Louisville	104
Cheyenne Regional Medical Center	Cheyenne	222
Children’s Hospital Colorado	Aurora	432
Craig Hospital	Englewood	93
Denver Health	Denver	452
Denver Springs	Englewood	96
Estes Park Medical Center	Estes Park	85
Foothills Hospital	Boulder	157
Good Samaritan Medical Center	Lafayette	183
Invinson Memorial Hospital	Laramie	86
Littleton Adventist Hospital	Littleton	159
Longmont United Hospital	Longmont	116
Lutheran Medical Center	Wheat Ridge	282
McKee Medical Center	Loveland	115
North Colorado Medical Center	Greeley	222
North Suburban Medical Center	Thornton	139
Parker Adventist Hospital	Parker	165
Parkview Medical Center	Pueblo	318
Penrose Hospital	Colorado Springs	474
Platt Valley Medical Center	Brighton	89
Presbyterian St. Luke’s Medical Center	Denver	317
Regional West Medical Center	Scottsbluff	158
Rose Medical Center	Denver	226
Saint Anthony Hospital	Lakewood	237
Saint Anthony North Hospital	Westminster	132
Saint Joseph Hospital	Denver	361
Sidney Regional Health Center	Sidney	80
Sky Ridge Medical Center	Lone Tree	272

¹¹⁴ Definitive Healthcare.

¹¹⁵ Tripp Umbach only listed hospitals and health systems with a bed size of 75 or more.

Hospital Name	City	Staffed Beds
St. Thomas More Hospital	Canon City	93
Swedish Medical Center	Englewood	382
The Medical Center of Aurora	Aurora	326
UCHealth Highlands Ranch Hospital	Highlands Ranch	87
UCHealth Medical Center of the Rockies	Loveland	174
UCHealth Memorial Hospital Central	Colorado Springs	485
UCHealth Poudre Valley Hospital	Fort Collins	263
UCHealth University of Colorado Hospital	Aurora	679
Vibra Hospital of Denver	Thornton	79

Table 12: Hospitals and Medical Centers within the Banner Health Network – 2021

Hospital Name	City/State	Staffed Beds
Banner University Medical Center – Tucson	Tucson, AZ	625
Banner University Medical Center – Phoenix	Phoenix, AZ	746
Banner University Medical Center – South Campus	Tucson, AZ	162
Banner Baywood Medical Center	Mesa, AZ	340
Banner Behavioral Health Hospital	Scottsdale, AZ	156
Banner Boswell Medical Center	Sun City, AZ	525
Banner Casa Grande Medical Center	Casa Grande, AZ	141
Banner Churchill Community Hospital	Fallon, NV	25
Banner Del E. Webb Medical Center	Sun City West, AZ	394
Banner Desert Medical Center	Mesa, AZ	615
Banner Estralla Medical Center	Phoenix, AZ	317
Banner Fort Collins Medical Center	Fort Collins, CO	23
Banner Gateway Medical Center	Gilbert, AZ	165
Banner Goldfield Medical Center	Apache Junction, AZ	20
Banner Heart Hospital	Mesa, AZ	111
Banner Ironwood Medical Center	Queen Creek, AZ	53
Banner Lassen Medical Center	Susanville, CA	25
Banner Payson Medical Center	Payson, AZ	25
Banner Thunderbird Medical Center	Glendale, AZ	555
Community Medical Center	Torrington, AZ	26
East Morgan County Hospital	Brush, CO	25
McKee Medical Center	Loveland, CO	115
North Colorado Medical Center	Greeley, CO	222
Ogallala Community Hospital	Ogallala, NE	18
Page Hospital	Page, AZ	25
Platte County Memorial Hospital	Wheatland, WY	25
Sterling Regional Medical Center	Sterling, CO	25
Wahsachie Medical Center	Worland, WY	18
Wyoming Medical Center	Casper, WY	226

Appendix G. Consultant Qualifications

Since 1990, Tripp Umbach has consulted with more than 100 academic medical centers. Tripp Umbach is an established national leader in providing feasibility studies and business plans for health science universities, academic medical centers, health systems, new and/or expanding medical schools, and communities that wish to develop and expand both undergraduate (UME) and graduate medical education (GME).

Tripp Umbach has conducted in-depth feasibility analyses for a wide variety of institutions and clients throughout the United States and internationally. Clients have included more than 30 new or expanding medical schools (both allopathic and osteopathic); numerous statewide partnerships; statewide and regional business plans for expanding GME; and feasibility studies for establishing physician assistant, physical therapy, pharmacy, optometry, and dental programs.

Tripp Umbach is the leading firm in conducting economic impact studies for health care and higher education institutions, having measured the economic impact of every U.S. medical school and major teaching hospital since 1995.

