Legislative Commission on the Interdisciplinary Primary Care Workforce

September 24, 2020 2:00-4:00pm – Zoom Conference

Call in information:

Join Zoom Meeting
https://nh-dhhs.zoom.us/j/93854387300?pwd=Mk5sL20vVVpRjMWU5VFICTEptOWR0QT09

Meeting ID: 938 5438 7300
Passcode: 080068
By phone: 1-646-558-8656

Dial *6 to mute or unmute if you connect by phone

Agenda

2:00 - 2:10 Read Emergency Order #12 Checklist and Take Roll Call Attendance

2:10 – 2:20 Meeting schedule for next year/H1B Rural Workforce Grant – Alisa Druzba

2:20 - 3:10 Rural Medical Student Matriculation - Scott Shipman, MD, MPH, Director of Clinical Innovations and Director of Primary Care Affairs at the Association of American Medical Colleges (AAMC)

3:10 – 3:40 Hospital Systems Update – Paula Minnehan, Senior Vice President, State Government Relations, New Hampshire Hospital Association


3:55 - 4:00 Adjourn

Next meeting: Thursday October 22, 2:00-4:00pm
State of New Hampshire  
COMMISSION ON PRIMARY CARE WORKFORCE ISSUES  

DATE: September 24, 2020  
TIME: 2:00 – 4:00pm  
LOCATION: Zoom Conferencing  

Meeting Notes  

TO: Members of the Commission and Guests  
FROM: Danielle Weiss  
MEETING DATE: September 24, 2020  

Members of the Commission:  
Rep. Polly Campion, NH House of Representatives  
Mary Bidgood-Wilson, ARNP – Chair  
Alisa Druzba, Administrator, Rural Health and Primary Care Section – Vice-Chair  
Stephanie Pagliuca, Director, Bi-State Primary Care Association  
Don Kolisch, MD, Geisel Medical School  
Jeanne Ryer, NH Citizens Health Initiative  
Scott Shipman, MD, Director, Primary Care Affairs and Workforce Analysis, AAMC  
Bill Gunn, NH Mental Health Coalition  
Tom Manion, CEO, New London Hospital  
Pamela Dinapoli, NH Nurses Association  
Dianne Castrucci, NH Alcohol and Drug Abuse Counselors Association  
Laurie Harding, Upper Valley Community Nursing Project  

Guests:  
Danielle Weiss, Health Professions Data Center Manager, Rural Health and Primary Care  
Paula Smith, SNH AHEC  
Paula Minnehan, NH Hospital Association  
Geoff Vercauteren, Director of Workforce Development, Catholic Medical Center  
Catrina Watson, NH Medical Society  
Peter Mason, Geisel School of Medicine, IDN region 1  
Phil Heywood, Executive Director, Northeast Osteopathic Medical Education Network, UNE  
Priscilla Marsicovetere, Franklin Pierce PA Program  
Lindy Keller, Behavioral Health  
Katrina DeShaney, PA, teaching at Franklin Pierce  

Meeting Discussion:  

2:00 - 2:10 Welcome and Introductions/Read EM #12 Checklist and Take Roll Call – Mary Bidgood-Wilson, ARNP – Chair  

2:10 – 2:20 Meeting schedule for next year/H1B Rural Workforce Grant – Alisa Druzba, Rural Health & Primary Care, NH DHHS  
- We meet on 4th Thursday of every month, from 2-4pm  
  o We will take July off instead of August  
    ▪ Many have missed July in past  
    ▪ In August, we will look at the legislative timeline
- H1B Rural Workforce Grant – DOL
  o Overview: [https://www.ruralhealthinfo.org/funding/5054](https://www.ruralhealthinfo.org/funding/5054)
  o Alisa hosted an information session call as the NH SORH Director
  o H1B is a visa status focused on bringing in workforce we don’t have enough of, medium to highly skilled
  o NH SORH will assist with definition of rural, HPSAs, other layers of application and points to get
  o Possible applicants – PCA, health systems, non-profits, points awarded if have done that type of work
    ▪ Bi-state is exploring

**2:20 - 3:10**  
**Rural Medical Student Matriculation** - Scott Shipman, MD, MPH, Director of Clinical Innovations and Director of Primary Care Affairs at the Association of American Medical Colleges (AAMC)

Refer to article and presentation attachments, “The Decline in Rural Medical Students.”

**3:10 – 3:40**  
**Hospital Systems Update** – Paula Minnehan, Senior Vice President, State Government Relations, New Hampshire Hospital Association

- A substantial shift to telemedicine
  o Trying to adjust and meet needs of providers and patients
    ▪ How much is patient driven v system?
      • Provider driven to an extent because providers need physical touch in some of the exams
      • Some patients wish for in-person too so it’s mixed

**3:40 - 3:55**  
**Legislative Update** – Rep. Polly Campion

Refer to the presentation “2020 Legislative Update.”

**3:55 - 4:00**  
**Adjourn**

Next meeting: Thursday October 22, 2:00-4:00pm
The Decline In Rural Medical Students: A Growing Gap In Geographic Diversity Threatens The Rural Physician Workforce

Scott A. Shipman, MD, MPH
Andrea Wendling, MD
Karen C. Jones, MApStat
Iris Kovar-Gough, MA, MLIS
Janis M. Orlowski, MD
Julie Phillips, MD

Health Affairs
Published: December 2019
Background

- Rural physician shortages are a longstanding problem, with significant implications for access to care for rural communities and maldistribution.
- Rural background is the strongest predictor of interest in rural practice and subsequent practice in a rural setting.
- Medical schools have expanded enrollment by >30% since 2002.
- Will this expansion provide an answer to longstanding workforce needs? This is what the article is trying to answer; in short, no.
Key methods

• Examined trends in rural and urban applicants and matriculants to all US MD-granting medical schools from 2002-2017
• Rural background defined using county of birth or high school graduation, based on Rural-Urban Continuum Codes (Rural codes 6 – 9)
• Explored the independent effect of rural background on likelihood of admission to medical school, for underrepresented racial/ethnic minorities in medicine (URM) and non-URM applicants

*citations available on request
Results

Orange is count of matriculants from rural backgrounds; declining over time. Even though med schools are opening more seats, absolute number from rural backgrounds are dropping.

**Source**: Authors’ analysis of data from the American Medical College Application Service for 2002–03 through 2017–18. **Note**: Rural or urban background could not be ascertained for 2.2 percent of the matriculants included in the study.
Regression analysis, controlled for factors we see: gender, MCAT score, GPA, and parental education
non-URM = non-underrepresented racial minority
Analysis found favoring rural and ethnic backgrounds

<table>
<thead>
<tr>
<th>Variable</th>
<th>Likelihood ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex (ref: male)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1.17</td>
<td>(1.17, 1.18)</td>
</tr>
<tr>
<td>MCAT score (ref: quintile 1 [lowest])</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quintile 2</td>
<td>2.98</td>
<td>(2.93, 3.03)</td>
</tr>
<tr>
<td>Quintile 3</td>
<td>4.85</td>
<td>(4.78, 4.93)</td>
</tr>
<tr>
<td>Quintile 4</td>
<td>6.33</td>
<td>(6.23, 6.43)</td>
</tr>
<tr>
<td>Quintile 5 (highest)</td>
<td>7.32</td>
<td>(7.20, 7.44)</td>
</tr>
<tr>
<td>Grade point average (GPA) (ref: median or below)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above median</td>
<td>1.69</td>
<td>(1.68, 1.70)</td>
</tr>
<tr>
<td>Urban/rural and URM/non-URM (ref: urban non-URM)</td>
<td></td>
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</tr>
<tr>
<td>Rural non-URM</td>
<td>1.13</td>
<td>(1.11, 1.14)</td>
</tr>
<tr>
<td>Rural URM</td>
<td>1.79</td>
<td>(1.72, 1.86)</td>
</tr>
<tr>
<td>Urban URM</td>
<td>1.70</td>
<td>(1.69, 1.72)</td>
</tr>
<tr>
<td>Highest parental education (ref: less than bachelor's degree)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than bachelor's degree but less than doctorate</td>
<td>1.67</td>
<td>(1.06, 1.08)</td>
</tr>
<tr>
<td>Doctorate or higher</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Why the decrease in rural med students?

- 18% decrease in number of rural applicants (while urban applicants increased by 59%)
- Rural applicants appear to be less competitive for admission, given medical school admissions’ priorities (% of rural applicants admitted dropped during study period)

Net drop is greater than 18%
Less competitive; what they’re looking for in rural applicants disadvantages rural applicants compared to others even though being rural gives points
Conclusions

To overcome the ‘geographic diversity gap,’ need to QUADRUPLE the number of medical students from rural backgrounds.

Minority rural populations are growing & have disproportionate chronic disease burden, yet only 1 in 200 entering medical students are rural students from an underrepresented minority group.

Need policies to strengthen rural pipeline into medicine, or be prepared to target a worsening rural workforce shortage through other means.
2020 Legislative Update

Rep. Polly Campion
Timeline

• Session Disrupted – March 13, 2020
  • Majority of House bills had been heard; no Senate bills had “crossed over”
• Remote Senate hearings over summer for omnibus bills
• House and Senate convened in June for concurrence on bills from other body
• House and Senate convened September 16 - to vote on Governor Sununu’s vetoes
What bills became law?

Thirty-nine bills signed into law
Interdisciplinary Primary Care Workforce

- Commission on the Interdisciplinary Primary Care Workforce (HB 1249 - Originally SB 567)
  - Updated name
  - Extended life – 2024
  - Updated duties – telehealth, workforce retention
Prescription Drug Legislation

• Prescription drug access and affordability – HB 1280
  • Importation of drugs from Canada (SB 685)
  • Reduce and cap cost of insulin (HB 1280)
  • Drug affordability board (SB 687)
  • Insurance coverage for epi-pens (HB 1281)
  • Timely prior authorization (SB 691)
  • Requires notice of introduction of new high-cost drugs (HB 703)
Telehealth (HB 1623)

- Ensures reimbursement parity, expands site of service, and enables all providers to provide services through telehealth for Medicaid and commercial health coverage.
- Enables access to medication assisted treatment (MAT) in specific settings by means of telehealth services.
- Amends the Physicians and Surgeons Practice Act to expand the definition of telemedicine.
- Amends the relevant practice acts to expand the definition of telemedicine, which is increasingly important during this pandemic.
- Enables the use of telehealth services to deliver Medicaid reimbursed services to schools.
Healthcare Omnibus (HB 1639)

- Requires DHHS to amend the income standard used for eligibility for the "in and out" medical assistance policy.
- Requires DHHS to develop a state health assessment and a state health improvement plan and establishes the state health assessment and state health improvement plan advisory council to assist the commissioner with the plan.
- Requires that boards regulating practitioners prescribing, administering, and dispensing controlled substances adopt rules for management of chronic pain.
- Requires insurance coverage for long-term antibiotic therapy for tick-borne illness.
- Clarifies the licensure of physician assistants and provides for biennial renewal of physician assistant licenses.
- Establishes the New Hampshire drug overdose fatality review commission.
- Establishes an opioid abatement trust fund.
- Authorizes pharmacists to administer a COVID-19 vaccine if one is available.
• Requires the superintendent of a county correctional facility to provide a prisoner with medication-assisted treatment for substance use disorders where medically appropriate.

• Clarifies the patients' bill of rights.

• Prohibits a physician, surgeon, nurse, physician assistant, APRN, or student undertaking a course of professional instruction from performing certain examinations on an anesthetized or unconscious patient without consent unless such examination meets certain specific criteria.
Miscellaneous

• Funded Health Professionals Program (HB 1520)
• Broadband Access (HB 1111)
  • allows municipalities to determine locations within the municipality unserved by a broadband provider
  • provides for the establishment of communication districts.
• Funded Nashua Safe Stations (HB 1230)
• Tick-borne Illness Commission Established (HB 490)
• Omnibus Education Bill (HB 1558)
  • Requires “Return to learning” policy for head injury
Long-term Care (HB 578)

• Established committee to study safety of residents and employees
• Eliminated cost caps for community based care relative to nursing home care
• Requires HHS to adopt rules for reimbursement of costs of training LNAs
Healthcare Bills Vetoed 2020

• Dental coverage for Medicaid recipients, came out of 2019 commission (HB 250)
• Independent review of nursing homes and long term care needs (HB 1246)
• Transparency in Reporting Healthcare Associated Infections (HB 1246)
• Enabling vulnerable adults to seek a protective order (HB 1660)
Vetoes

Twenty-two bills vetoed in 2020
Vetoes

• Paid Family Leave
• Minimum Wage Increase
• Increased access to mental health care and SUD treatment (SB 5)
• Firearm safety legislation (ERPO)
• Dental benefit for Medicaid beneficiaries
• Protective order for vulnerable adults
VOTE
The Decline In Rural Medical Students: A Growing Gap In Geographic Diversity Threatens The Rural Physician Workforce

ABSTRACT Growing up in a rural setting is a strong predictor of future rural practice for physicians. This study reports on the fifteen-year decline in the number of rural medical students, culminating in rural students’ representing less than 5 percent of all incoming medical students in 2017. Furthermore, students from underrepresented racial/ethnic minority groups in medicine (URM) with rural backgrounds made up less than 0.5 percent of new medical students in 2017. Both URM and non-URM students with rural backgrounds are substantially and increasingly underrepresented in medical school. If the number of rural students entering medical school were to become proportional to the share of rural residents in the US population, the number would have to quadruple. To date, medical schools’ efforts to recognize and value a rural background have been insufficient to stem the decline in the number of rural medical students. Policy makers and other stakeholders should recognize the exacerbated risk to rural access created by this trend. Efforts to reinforce the rural pipeline into medicine warrant further investment and ongoing evaluation.

As of the 2010 census nearly sixty million people lived in rural communities in the US, and almost one in five people in the US were rural residents.1 Although popular media often highlight compelling narratives of a specific region or rural community in decline and seek to make broad generalizations about rural depopulation, the overall size of the US rural population has been stable for several decades.

Rural populations have higher rates of many chronic illnesses and have not enjoyed the same gains in life expectancy that urban populations have in recent decades.2,3 People living in rural communities are less likely to receive recommended preventive services than their urban counterparts are.4 Compared to urban hospitals, rural hospitals have higher rates of maternal morbidity5 and infant mortality.6 Recent losses of obstetric services have also disproportionately affected rural counties that have high percentages of minority women of reproductive age.7

More than 15 percent of rural residents are members of racial/ethnic minority groups, and this percentage is increasing.8,9 Research has demonstrated that members of rural minority groups—particularly black, Hispanic, and American Indian/Alaska Native populations—face higher chronic disease burdens and worse access to care than non-Hispanic white rural residents.10

Physician shortages in rural settings, which are magnified by the disproportionate health care needs of rural communities, have been a widespread and perennial challenge. Only 11 percent of the physician workforce practices in rural communities,11 and as of 2019 over 62 percent of all federally designated primary care Health Pro-
The recent significant growth in the number of new US medical schools and the increase in size of existing ones presents an opportunity to train a workforce better suited to meeting the needs of rural communities. Unfortunately, that growth has been accompanied by a decrease in the percentage of students who report an interest in practicing in small towns and rural communities. This decline in interest in rural practice may be because medical education, most of which is based in metropolitan areas, disproportionately exposes future physicians to medical practice in urban and suburban settings. It may also be driven by a paucity of incoming students who have experienced a rural lifestyle, including being familiar with the distinct cultural aspects of small-town life. This is important because multiple studies have demonstrated that students from rural backgrounds are much more likely to decide to practice in rural settings.

Research has similarly shown that physicians from racial/ethnic minority groups that are traditionally underrepresented in medicine (URM) are more likely to practice in underserved communities and provide care to minority populations. Important research and coordinated efforts have focused attention on strengthening the pipeline of URM students and on the importance of racial/ethnic diversity in medical school and the physician workforce.

Despite widespread recognition of the need for more rural physicians, we are aware of no longitudinal national studies that have examined the proportion of rural students who apply, are admitted, and matriculate to medical school. Given the importance of ensuring equitable access to care for rural populations, we sought to better understand these trends over time for MD-granting schools in the US.

**Study Data And Methods**

**DATA SOURCES AND ANALYTIC APPROACH** We obtained data on applicants and matriculants from the American Medical College Application Service for the period 2002–03 through 2017–18 (hereafter, academic years are referenced by the first year, so the two year ranges above are presented as 2002 and 2017). Only people who were born in the US or were permanent residents who graduated from high school in the US were included in our sample. Because of data limitations, people from any of the US territories could not have a rural status assigned to them, except those who were born or graduated from high school in a county in one of the fifty states or in the District of Columbia.

This study was approved by the American Institute of Research Institutional Review Board.

We used the 2013 Rural-Urban Continuum Codes of each applicant’s birth and high school graduation counties to identify rural background. Applicants were considered to be from a rural background if either their birth or high school graduation county had a code of 6 (meaning that the county had an urban population of 2,500–19,999 and was adjacent to a metropolitan area) through 9 (meaning that the county was completely rural or had an urban population of fewer than 2,500 people and was not adjacent to a metropolitan area). All others were considered to be from an urban background. Applicants who applied in multiple years were counted in each year, and the data include the outcome for each year (accepted or not accepted)—with the exception that only one accepted record was included for those who deferred admission.

We examined the trend in numbers of applicants and matriculants from rural and urban backgrounds and compared rural and urban counterparts on key demographic and academic factors, including age, sex, URM status, Medical College Admission Test (MCAT) score quintile, grade point average (GPA), and highest parental education.

We used the MCAT score quintile rather than the actual score because of changes in MCAT scoring over the study period. The Association of American Medical Colleges administers the MCAT. The version used from 1991 to January 2015 (MCAT91) was revised, and a new version was implemented after January 2015 (MCAT15). These versions are scored differently and on different scales. Thus, for all applicants who took the MCAT91, we calculated score quintiles and assigned them to a quintile group, and we applied the same method to assign applicants who took the MCAT15 to a quintile group. This approach allowed us to combine data from individuals throughout the study period. For each person in a given year, we assigned a quintile based on the most recent MCAT score.

We then used a logistic regression model to examine the likelihood of acceptance to any medical school for rural and urban applicants, controlling for age, sex, MCAT quintile, GPA, URM status, highest parental education, and application year (additional information on the details of the regression model is available from the authors on request). For applicants who were accepted, we also employed a logistic regression model to evaluate the likelihood of matriculating for rural and urban students, controlling for the same demographic and academic characteris-
tics. Poisson regression was used to obtain the relative risk estimates for each of these models.

**Limitations**
The study had important limitations that should be acknowledged. First, rural identity and experience can be assessed in a variety of ways and are unlikely to be fully captured by the traditional measures used in medical school applications and in this study. A more in-depth, qualitative assessment of rural background might have yielded different results, but using such an assessment would be impractical in a longitudinal national study such as this one. We anticipate that the trends identified in this study would be likely to be correlated over time with other measures of rural background.

Second, we were unable to consider in our regression analyses all applicant characteristics that might have influenced acceptance to medical school.

Third, the study focused on students at MD-granting medical schools who had rural backgrounds, using metrics consistent with those available to medical school admission committees. Doctor of osteopathy students, students at international medical schools, and non-physician clinicians were beyond the scope of this analysis, though each of these groups contributes meaningfully to the rural workforce. Like MD-granting schools, osteopathic medical schools and training programs for physician assistants and nurse practitioners have grown dramatically in number as well as in aggregate size of graduating classes. Future research should explore the degree to which the trends reported here are generalizable across these different clinician groups.

**Study Results**
There were 618,856 applicant records and 281,845 matriculants who satisfied our inclusion criteria. Compared to urban applicants, rural applicants were more likely to be men and were slightly older (exhibit 1). While rural appli-

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**Exhibit 1**

<table>
<thead>
<tr>
<th>Applicants and matriculants to US MD-granting medical schools for academic years beginning 2002–17, by rural or urban background</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Applicants</strong></td>
</tr>
<tr>
<td>Rural</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Underrepresented in medicine</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>MCAT score (quintile)</td>
</tr>
<tr>
<td>1 (lowest)</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5 (highest)</td>
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<tr>
<td>Grade point average</td>
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<tr>
<td>Median or below</td>
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<tr>
<td>Above median</td>
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<tr>
<td>Highest parental education</td>
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<tr>
<td>Less than bachelor's degree</td>
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<tr>
<td>Bachelor's degree</td>
</tr>
<tr>
<td>More than bachelor's degree but less than doctorate</td>
</tr>
<tr>
<td>Doctorate or higher</td>
</tr>
<tr>
<td>Mean age, years (SD)</td>
</tr>
</tbody>
</table>

**Source**
Authors' analysis of data from the American Medical College Application Service for 2002–03 through 2017–18.

**Notes**
To identify rural background consistently, the sample was limited to people born in or permanent residents of the US who graduated from high school in the US. Applicants who applied in multiple years were counted in each year, and the data include the outcome for each year (accepted or not accepted)—with the exception that only one accepted record was included for people who deferred admission. Total counts may vary across some variables because of occasional missing data within student applications. MCAT is Medical College Admission Test. SD is standard deviation. *Black, Hispanic, American Indian/Alaska Native, or Pacific Islander. **Not applicable.

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cants had higher GPAs, their MCAT scores were lower than those of their urban peers, and, on average, they came from households with lower parental educational attainment, as measured by postsecondary and professional degrees. There was no noticeable change in the relative performance of rural and nonrural applicants on the MCAT or in terms of cumulative GPA over time (data available from the authors). Only 10.7 percent of rural applicants were from groups considered to be underrepresented in medicine.

The number of applicants from a rural background declined 18 percent during the study period, from 2,479 in 2002 to 2,032 in 2017 (exhibit 2). During this same period the number of urban applicants increased by 59 percent, from 27,023 to 42,894.

The number of matriculants from a rural background also declined during this period, from 1,186 in 2002 to 852 in 2017 (exhibit 3)—a decrease of 28 percent. Concurrently, the number of urban matriculants increased by 35 percent, from 13,871 to 18,745. Students from rural backgrounds made up only 4.3 percent of the total incoming medical student body in both 2016 and 2017—a smaller share than that in any previous years in the study period.

Among urban matriculants, both non-URM and URM groups increased in number over the study period, by 3,008 students, to 14,756 (a 25 percent increase), and by 1,541 students, to 3,436 (an 81 percent increase), respectively.

In contrast, there was a decline among rural non-URM matriculants, from 1,090 in 2002 to 748 in 2017 (a 31 percent decrease). In the same period, rural URM matriculants experienced limited growth overall (an 11.5 percent increase), though only 97 students in this category entered medical school in 2017. In that academic year 1 in 8 incoming rural students was from a URM group. Rural URM students accounted for just 1 in 200 incoming medical students overall.

Regression analyses examined the likelihood of acceptance for rural URM, rural non-URM, and urban URM students, compared to urban non-URM applicants (the most prevalent group). Results showed that rural URM, urban URM, and rural non-URM applicants had an increased likelihood of acceptance to medical school: 79 percent, 70 percent, and 13 percent higher, respectively (exhibit 4).

We used the same covariates in a regression model to estimate the likelihood of matriculation for rural accepted applicants, compared to their urban counterparts. Given the very high probability of matriculating for any admitted student (over 98 percent), there was no difference between rural and urban applicants in terms of the probability of matriculation once they were accepted.

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**EXHIBIT 2**

Applicants to medical school for academic years beginning 2002–17, by rural or urban background

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**SOURCE** Authors’ analysis of data from the American Medical College Application Service, for 2002–03 through 2017–18. **NOTE** Rural or urban background could not be ascertained for 2.2 percent of the applicants included in the study.
Physician workforce shortages in rural and remote areas of the US are persistent and growing. The shortage of rural physicians contributes to rural-urban health disparities, including a widening disparity in life expectancy.\textsuperscript{2,3} To date, health care workforce policy solutions have been inadequate to meet the challenge. Given that a

\begin{exhibit}
\textbf{EXHIBIT 3}

Matriculants to medical school for academic years beginning 2002-17, by rural or urban background

\begin{tikzpicture}[scale=0.8]
\begin{axis}[
    title=MATRICULANTS,
    xlabel=Year,
    ylabel=Matriculants,
    ytick={0,200,400,600,800,1000,1200,1400,1600,1800,2000},
    y tick label style={/pgf/number format/1000 sep=,}
]
\addplot[blue,mark=*,line width=1pt] table [x=Year,y=Matriculants] {data.csv};
\addplot[red,mark=x,line width=1pt] table [x=Year,y=Matriculants] {data.csv};
\end{axis}
\end{tikzpicture}

\textit{Source:} Authors’ analysis of data from the American Medical College Application Service for 2002-03 through 2017-18. \textit{Note:} Rural or urban background could not be ascertained for 2.2 percent of the matriculants included in the study.

\begin{exhibit}
\textbf{EXHIBIT 4}

Likelihood ratios for acceptance to medical school for academic years beginning 2002-17, by selected variables

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|}
\hline
\textbf{Variable} & \textbf{Likelihood ratio} & \textbf{95\% CI} \\
\hline
Sex (ref: male) & & \\
Female & 1.17 & (1.17, 1.18) \\
MCAT score (ref: quintile 1 [lowest]) & & \\
Quintile 2 & 2.98 & (2.93, 3.03) \\
Quintile 3 & 4.85 & (4.78, 4.93) \\
Quintile 4 & 6.33 & (6.23, 6.43) \\
Quintile 5 (highest) & 7.32 & (7.20, 7.44) \\
Grade point average (GPA) (ref: median or below) & & \\
Above median & 1.69 & (1.68, 1.70) \\
Urban/rural and URM/non-URM (ref: urban non-URM) & & \\
Rural non-URM & 1.13 & (1.11, 1.14) \\
Rural URM & 1.79 & (1.72, 1.86) \\
Urban URM & 1.70 & (1.69, 1.72) \\
Highest parental education (ref: less than bachelor’s degree) & & \\
Bachelor’s degree & 0.97 & (0.96, 0.98) \\
More than bachelor’s degree but less than doctorate & 1.02 & (1.01, 1.02) \\
Doctorate or higher & 1.07 & (1.06, 1.08) \\
\hline
\end{tabular}
\end{table}

\textit{Source:} Authors’ analysis of data from the American Medical College Application Service for 2002-03 through 2017-18. \textit{Notes:} The exhibit shows the risk ratios and associated confidence intervals obtained from a Poisson regression with a robust error variance estimate (\(N = 563,871\)). Analyses controlled for age, sex, Medical College Admission Test (MCAT) score, GPA, parental education, and application year. CI is confidence interval. URM is underrepresented racial/ethnic minority group in medicine.
rural background is a strong predictor of practicing in a rural community, policies and programs that support the rural pipeline into medicine may warrant prioritization. Understanding recent trends in rural student application, admission, and matriculation is an important precursor to considering policies and later evaluating them to determine which are the most effective.

The declining pool of rural applicants suggests that more needs to be done to help rural children and young adults identify a pathway to becoming a physician. Support for premedical pipeline programs for people from rural backgrounds may help bridge gaps in achievement and readiness for medical school, helping rural students overcome educational disparities that prevent them from seeking careers in medicine. For example, pipeline programs can make high school students aware of medical career opportunities and help them prepare college applications. At the college level, these programs can offer MCAT preparation courses, medical school application assistance, financial aid education, and opportunities to shadow physicians. As a group, rural students’ parents have lower levels of educational attainment, and they may be less likely to have the means to independently provide these opportunities and resources to their children.

In many states Area Health Education Centers have been an important source of programming for the health care pipeline. However, the centers receive highly variable support at the state level, and federal funding is continually in jeopardy. Providing secure and robust funding for the centers—along with requirements for evidence-based programming that both meaningfully exposes rural youth to relatable mentors and provides longitudinal support to promote confidence and competitiveness for the pursuit of a career in medicine—could be an effective way to build on existing infrastructure. Research would be needed to ensure that these funds led to desired outcomes.

This study suggests that on the whole, medical schools’ admission processes recognize and value applicant diversity, including rural background and underrepresented racial/ethnic groups. Transparency about recent trends may aid medical schools’ future efforts. Over a period in which there has been incremental progress in representation of URM students in medical school (although significant additional progress is needed), there has been a 28 percent decrease in the number of matriculants from rural backgrounds. This decline has occurred even in the context of substantial medical school expansion. Many new medical schools appear to focus on typically serving rural students more extensively than the applicant pool over time suggests that there is a growing mismatch between the qualifications of rural applicants and medical schools’ admissions priorities. The somewhat higher likelihood that non-URM applicants with rural backgrounds will be accepted, compared to their urban peers—after other factors that are independently influential in gaining admission are controlled for—is not enough to offset this discrepancy. There has not been a noticeable change in rural applicants’ qualifications, compared to those of urban applicants: Rural applicants perform less well on the MCAT, although their GPAs are higher (data available from the authors). However, a number of other factors that influence admission decisions were not included in our analyses. For instance, studies have shown that rural applicants tend to perform worse than urban applicants on multiple mini-interviews.

While overall gains have been made in terms of minority students entering medicine, they have largely excluded rural minorities.
Describing the composition of rural communities using national aggregate data masks significant heterogeneity in the racial/ethnic makeup across different rural regions of the country. This study highlighted the deeper disparities that exist at the intersection of rural and underrepresented racial/ethnic groups in medicine. In particular, while overall gains have been made in terms of minority students entering medicine, those gains have largely excluded rural minorities.

Efforts to increase the number of medical students from rural backgrounds can be augmented by additional efforts during training. For instance, rural medical school programs that are housed in rural communities have demonstrated success in attracting rural applicants and graduating students who eventually practice in rural communities. These models allow students to learn in rural health care systems, helping students build skills necessary for rural practice. By placing medical school campuses in rural communities, these institutions also provide academic role models in medicine to high school and college students in these communities.

Creating rural campuses in proximity to high-need rural populations is limited by cost and complexity. Exposure to rural life and rural practice can occur more readily, if not as comprehensively, through clinical rotations in rural settings, especially longitudinal integrated clerkships. Offering rural training experiences and other opportunities to interact with rural physicians should be a priority for medical schools that care about the problem of insufficient rural capacity in their region or across the nation.

Conclusion
From a workforce pipeline perspective, this study has made it clear that students from a rural background are an increasingly underrepresented group in medical school. Four times the number of rural medical students would be required for these students to be proportional to rural representation in the overall US population. Given that trends over time have been in the opposite direction, we believe that efforts to enhance the rural pipeline warrant consideration.

Policy makers and other stakeholders should recognize the growing risk created by the decline in medical students with rural backgrounds, particularly in the absence of robust options to enhance the rural workforce. Rural background is strongly associated with service to rural and underserved populations, as well as entry into primary care. These represent two of the most persistent areas of unmet health care workforce needs in the United States. Thus, rural background should be included in any consideration of adequate medical student diversity, along with a recognition that both URM and non-URM rural students are increasingly underrepresented relative to the nation’s population. While solutions will require sustained, multifaceted efforts, increased awareness and ongoing measurement of this disparity are crucial first steps.

NOTES