Which Medical Schools Are High Producers of Rural Primary Care Physicians and What Factors Explain Their Success?

Davis Patterson, PhD

Collaborative for Rural Primary care Research, Education, and Practice (Rural PREP)

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Background

- Educating physicians for rural and/or primary care practice - a stated mission of many medical schools
- A body of research identifies various predictors of rural or primary care practice (person, program, place)
- Study purpose: explore indicators of medical school commitment to rural primary care by identifying:
  1) schools’ output of rural primary care physicians
  2) organizational and educational factors that predict rural primary care output

  Compare multiple factors with statistical controls
Methods

✓ Determine rural primary care output
  • 146 schools (osteopathic and allopathic)
  • 2001-10 graduates in AMA Physician Masterfile
  • Rural-Urban Commuting Area codes

✓ Identify rurally relevant school characteristics from Web searches, literature, other public sources (e.g., mission, faculty, rural programs, scholarly output, etc.)

✓ Conduct multivariate analysis (logistic regression) of relationships between school characteristics and output
  • Outcome: proportion of graduates in rural primary care practice (top 20% of schools vs. bottom 80%)
% of Graduates in Rural Primary Care Practice

Top 20% of schools: 3.5% to 11.4% of graduates
Significant associations with rural primary care output

<table>
<thead>
<tr>
<th>Potential predictors of % of grads in rural primary care practice</th>
<th>Value (all schools)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(significant <strong>bivariate</strong> associations shaded in green)</td>
<td></td>
</tr>
<tr>
<td>+ Publicly funded</td>
<td>55.8%</td>
</tr>
<tr>
<td>Multiple campuses</td>
<td>34.0%</td>
</tr>
<tr>
<td>+ Rural program†</td>
<td>24.5%</td>
</tr>
<tr>
<td>Rural curricula</td>
<td>23.8%</td>
</tr>
<tr>
<td>+ Rural faculty titles</td>
<td>20.4%</td>
</tr>
<tr>
<td>+ Rural leadership titles</td>
<td>20.4%</td>
</tr>
<tr>
<td>+ Osteopathic</td>
<td>17.0%</td>
</tr>
<tr>
<td>+ Rural clinical experiences</td>
<td>17.0%</td>
</tr>
<tr>
<td>Admissions preference - rural interest/intent</td>
<td>10.1%</td>
</tr>
<tr>
<td>Admissions preference - rural background</td>
<td>8.2%</td>
</tr>
<tr>
<td>+ Stated rural mission</td>
<td>6.8%</td>
</tr>
<tr>
<td>Pipeline program - rural students/interest</td>
<td>6.1%</td>
</tr>
<tr>
<td>+ Rural location (RUCAs)</td>
<td>4.1%</td>
</tr>
<tr>
<td>In-state matriculants</td>
<td>61.5% (median)</td>
</tr>
<tr>
<td>- NIH research funding, annual</td>
<td>$7.4 million (median)</td>
</tr>
<tr>
<td>+ Rural scholarly output, papers 2000-17‡</td>
<td>1 (median)</td>
</tr>
</tbody>
</table>

†E.g., track, pathway, certificate, longitudinal integrated clerkship, campus

‡Peer-reviewed papers on U.S. **rural** primary care, health professions, or population health
4 significant predictors correctly classified **84.8%** of schools (top 20% production or not)

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Relative risk (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osteopathic</td>
<td>4.79 (2.68-5.82)</td>
</tr>
<tr>
<td>Rural location</td>
<td>5.82</td>
</tr>
<tr>
<td>Public</td>
<td>4.18 (1.30-5.18)</td>
</tr>
<tr>
<td>Rural scholarly output</td>
<td>2.68 (1.06-4.59)</td>
</tr>
</tbody>
</table>

*Concordant: 84.8%; Tied: 4.5%; Discordant: 10.7%

1.29 (OR) (1.11-1.49)
First thoughts....

- To produce more rural primary care physicians, must we...
  - ...build more schools that are osteopathic, rural, and public? (long-term investment)
  - ...publish more rurally relevant papers? (intermediate-term investment)

► What about rurally-oriented infrastructure within the control of the school?
What characteristics are associated with these 4 predictors?

<table>
<thead>
<tr>
<th>Variable</th>
<th>Osteopathic</th>
<th>Rural location</th>
<th>Publicly funded</th>
<th>Rural scholarly output‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural program†</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Rural faculty titles</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Rural leadership titles</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Stated rural mission</td>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Publicly funded</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple campuses</td>
<td></td>
<td></td>
<td>+</td>
<td>+</td>
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<tr>
<td>Rural pipeline program</td>
<td></td>
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</tbody>
</table>

†E.g., track, pathway, certificate, longitudinal integrated clerkship, campus
‡Peer-reviewed papers 2000-17 on U.S. *rural* primary care, health professions, or population health
What predicts rural scholarly output?

- Osteopathic
- Rural
- Public
- Rural scholarly output

Rural primary care physicians
What predicts rural scholarly output?

- Rural faculty titles
- Rural program
- NIH funding
- Multiple campuses

Osteopathic
Public
Rural scholarly output
Rural primary care physicians
Limitations

- Imprecise measures of content of practice and rural location (AMA Physician Masterfile)
- Information gathered from the Web may be incomplete.
- Timing: used 2017 school characteristics to explain practice choices of 2001-10 graduates.
  - Our 4 key predictors are contemporaneous with the 2001-10 period.
    - Note: we ensured that schools actually had a rural program in 2001-10.
  - Other characteristics may have changed over time: could that explain why they were less predictive of rural primary care practice?
Implications

- Key predictors of rural primary care practice include
  - fixed characteristics of medical schools (osteopathic, rural, public)
  - factors within a school’s control to change
- Educational investments to support production of rural primary care physicians could be effectively tailored to region/state/local/school constraints and opportunities:
  - Invest in new osteopathic, public, and rural schools. $$$$$
  - Expand class sizes in top producers. $$$
  - Target existing schools to invest in rurally-oriented infrastructure. $ - $$$$
Candidates for intervention?  
(schools just below the top 20%)

- Osteopathic, rural, public (1):
  - Ohio U Heritage College of Osteopathic Medicine

- Osteopathic, urban, public (2):
  - E.g., U of North Texas Health Science Center, Texas College of Osteopathic Medicine

- Allopathic, urban, high rural scholarly output (18):
  - U of Wisconsin
  - U of Missouri
  - West Virginia U
  - etc.

- Newer schools

- American Association of Colleges of Osteopathic Medicine
- Association of American Medical Colleges
Discussion question

- How can we engage stakeholders in conversations about these findings for maximum impact?
  (i.e., target audiences, goals, messages, and formats/channels/methods)
  - How could/would you use this information in your states?
Thank you!

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What is a Rural Program?

Definition for the purpose of this study:
An organized and deliberate medical school strategy to produce physicians to rural practice. Must include:
- A name
- A director or co-directors [e.g. “director,” “assistant or associate dean”]
- A program-specific goal or objective to recruit, nurture, educate, train, or encourage students toward rural practice
What is a Rural Program?

- A description that explicitly articulates a rural focus
- A structured sequence or group of activities, courses, electives, selectives, or clerkships [e.g. “track,” “pathway,” “certificate,” “area of concentration” or “longitudinal integrated clerkship in a rural community (rural LIC),” even a rural “campus”]
What is a Rural Program?

Exclusions:

- A scholarship program without a structured sequence or group of activities
- Rural clerkships, even required clerkships, if they are not organized into a program

A rurally located medical school is a “rural school,” not a rural program. A rurally located medical school campus that reports its graduates separately to the AAMC or AOA is a rural school, not a rural program of the larger school.
What if we look only at factors within the school’s control?

- Omitting *osteopathic, rural location, public* yields:
  - Rural scholarly output +
  - NIH funding –
    ➢ Correctly classifies 82% of programs

- Omitting *osteopathic, rural location, public, and rural scholarly output* yields:
  - Rural programs +
  - Admissions preference: rural interest/intent +
  ➢ Correctly classifies 49% of programs, 40% tied
What predicts rural scholarly output?

- Rural faculty titles +
- NIH funding +
- Multiple campuses +
- Admissions preference: rural interest/intent + (n.s., .06)

- Omitting *rural faculty titles*:
  - Rural program +
  - NIH funding +
  - Multiple campuses +
Primary care coding

'FMP' Family Medicine/Preventive Medicine
'FSM' Family Prac/sports Medicine
'FP' Family Practice
'FPG' Family Practice/geriatric Med
'GP' General Practice
'IM' Internal Medicine
'IMG' Internal Medicine - Geriatrics
'IPM' Internal Medicine - Preventive Medicine
'ISM' Internal Medicine - Sports Med
'MPD' Internal Medicine - Pediatrics
'PD’ Pediatrics