

academic and demographic variables and interviewer characteristics. *Acad Med.* 1991;66(9 suppl):S13–S15.

4 Shaw DL, Martz DM, Lancaster CJ, Sade RM. Influence of medical school applicants' demographic and cognitive characteristics on interviewers' ratings of noncognitive traits. *Acad Med.* 1995;70:532–536.

### The Impact of Community-Based Undergraduate Medical Education on the Regional Physician Workforce

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**Purpose:** As medical schools in the United States expand, many are adopting community-based models, often with goals of graduating students who will practice primary care, serve local communities, and care for underserved populations. The study's purpose was to assess the impact of community-based medical education on the regional physician workforce. The Michigan State University College of Human Medicine (MSU-CHM) has immersed students in diverse communities across the state since its founding in 1966. The authors retrospectively evaluated the regional impact on the physician workforce in the six communities where centers of medical education were initially established.

**Method:** American Medical Association Masterfile data from 2011 were used to obtain practice locations and specialty data for all MSU-CHM graduates from 1972 to 2006. Physicians were classified as practicing primary care or practicing in

a high-need specialty. Using geographic information system software, practice locations were geocoded to the ZIP code level, evaluated for practice within a Health Professions Shortage Area (HPSA), and joined to Rural–Urban Commuting Area Code 2006 data to determine rurality. Fisher exact tests were used to compare the proportion of graduates from each campus practicing primary care, in high-need specialties, within 50 miles of their campus, in rural communities, in HPSAs, and in Michigan. Differences between campuses were further analyzed using binary logistic regression, to determine whether differences remained significant after controlling for pertinent demographics. Maps of the footprints of each campus were visually compared. Generalizability was assessed by comparing the footprints of all allopathic, nonmilitary U.S. medical schools with established regional campuses versus those without regional campuses, using Med School Mapper.<sup>1</sup>

**Results:** Three thousand one hundred seven (93.9%) graduates were analyzed. Twenty percent were practicing within 50 miles of their community-based campus in 2011. Saginaw and Flint graduates also clustered around Detroit and its surrounding suburbs, reflecting these communities' urban character. Grand Rapids, the community with the strongest tertiary medical care focus, had the lowest proportions of rural (13% vs. 16%,  $P = .0108$ ) and high-need specialty graduates, including primary care (52% vs. 57%,  $P < .0001$ ). Upper Peninsula graduates were significantly more likely to practice in rural communities (45% vs. 16%,  $P < .0001$ ) and high-need specialties (65% vs. 57%,  $P = .0449$ ), consistent with the regional campus' rural mission. Forty-

three percent of all studied graduates were practicing in Michigan in 2011; 49% were practicing in HPSAs; and 44% were practicing primary care. Taken together, the proportion of MSU-CHM graduates in each Michigan county grossly reflected the state's population. Nationally, U.S. medical schools with regional campuses had larger geographic footprints within their states or regions than single-campus schools (mean: 31 counties vs. 21 counties;  $P < .001$ ).

**Conclusions:** This case study suggests that distributed medical education campuses can have a significant impact on the long-term local and regional physician workforce. Students' long-term practice choices may also reflect the patient populations and specialty patterns of communities where they learn. The results augment previous research demonstrating that graduates of regionally dispersed medical schools are more likely to practice primary care and practice in rural communities.<sup>2–4</sup>

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### References

- 1 Med School Mapper. <http://www.medschoolmapper.org/index.cfm>. Accessed July 18, 2016.
- 2 Liaw W, Cheifetz C, Luangkhot S, Sheridan M, Bazemore A, Phillips RL. Match rates into family medicine among regional medical campus graduates, 2007–2009. *J Am Board Fam Med.* 2012;25:894–907.
- 3 Zink T, Center B, Finstad D, et al. Efforts to graduate more primary care physicians and physicians who will practice in rural areas: Examining outcomes from the University of Minnesota–Duluth and the Rural Physician Associate Program. *Acad Med.* 2010;85:599–604.
- 4 Barrett FA, Lipsky MS, Lutfiyya MN. The impact of rural training experiences on medical students: A critical review. *Acad Med.* 2011;86:259–263.