Addressing Rural Workforce Shortages and Healthcare Disparities

An Annotated Bibliography

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Policy Studies in Family Medicine and Primary Care

TABLE OF CONTENTS

Introduction

This annotated bibliography will inform policy discussion and future publications regarding the widening gap of healthcare disparities and outcomes, the distribution of the physician workforce in rural America, and the current graduate medical education (GME) system financing. Specific areas of research include the disproportionate distribution of GME financing as well as innovative policies enacted to reduce these disparities. The bibliography was constructed from a focused literature review, inclusion of expert recommended articles, and a search of relevant white and grey literature. While not a comprehensive systematic review, this bibliography will serve as an entry point for policy makers and committee members seeking to increase knowledge and relationships between the U.S. GME enterprise and health in rural America.

This bibliography includes a two-part series; the first reviews the current state of rural healchare and the second reviews GME financing. Section one includes rural health needs, the mortality gap between urban and rural settings, and factors that contribute to this divergence. Section two includes an overview of the current GME financing structure, its impact on training, specific training programs financing, financing of safety net healthcare systems, and loan repayment programs. New policies regarding the structure of financing and physician workforce (rural and urban) are reviewed as possible solutions to financing complications. The analysis presented demonstrates a critical need for national strategy that addresses rural workforce shortages and innovative financing of rural healthcare systems that will improve the quality and value of the American healthcare system.

Part I: Rural Health Needs

The Rural-Urban Health Outcome Gap

Villapiano N, Iwashyna TJ, Davis MM. Worsening Rural-Urban Gap in Hospital Mortality. J Am Board Fam Med. 2017;30(6):816-823. doi:10.3122/jabfm.2017.06.170137

The authors conduct a retrospective observational study of hospitalizations in 2008 and 2013, reporting the association between rural versus urban location of residence and hospital mortality. The study finds that in 2013, patients living in rural areas of the U.S. had a greater probability of hospital mortality than their urban counterparts. Hospital mortality decreased from 2.51% to 2.27% from 2008 to 2013 for urban patients but did show such and improvement for rural patents, remaining steady at 2.66%.

Henning-Smith C, Kozhimannil K, Casey M, Prasad S, Moscovice I. Rural-Urban Differences in Medicare Quality Outcomes and the Impact of Risk Adjustment. Med Care. 2017;55(9):823-829. doi:10.1097/MLR.0000000000000761

Due to difficulty with adjusting quality measures based on risk of a population, the authors sought to discern quality outcomes in rural populations versus urban populations. The impact of sociodemographic characteristics was evaluated by adjusting for individual and community level characteristics in 2012. The study finds that adjusting for these sets of characteristics mediates outcomes, with the exception of blood pressure checked and cholesterol checked. To improve quality measurements, individual and community level characteristics should be accounted for.

Anderson TJ, Saman DM, Lipsky MS, Lutfiyya MN. A cross-sectional study on health differences between rural and non-rural U.S. counties using the County Health Rankings. BMC Health Serv Res. 2015;15:441. doi:10.1186/s12913-015-1053-3

The 2013 County Health Rankings were evaluated for differences across mortality, morbidity, health behaviors, clinical care, social and economic factors, and physical environment for rural and non-rural U.S. counties. The study finds that residents living in rural U.S. counties are more likely to have worse

health outcomes across most categories. Rural residents tended toward worse health behavior, higher morbidity factors, worse clinical care, and worse physical environment.

Ely, Danielle M., Anne K. Driscoll, and T. J. Matthews. "Infant Mortality Rates in Rural and Urban Areas in the United States, 2014." NCHS Data Brief, no. 285 (2017): 1–8.

The National Center for Health Statistics (NCHS) report describes differences in infant mortality among rural, small and medium urban, and large urban counties in the U.S. by infant's age at death, mother's age, and race and Hispanic origin in 2014. Infant mortality rates decreased as urbanization level increased, from 6.55 deaths per 1000 births in rural counties to 6.20 in small and medium urban counties and 5.44 in large urban counties. Neonatal mortality rates were higher in rural counties than in large urban counties; post-neonatal mortality rates decreased as urbanization level increased. Mortality rates decreased as urbanization level increased for infants of mothers aged 20-29, 30-39, and 40 and over. For infants of non-Hispanic white and non-Hispanic black mothers, mortality rates were lowest in large urban counties.

James WL. All rural places are not created equal: revisiting the rural mortality penalty in the United States. Am J Public Health. 2014;104(11):2122-2129. doi:10.2105/AJPH.2014.301989

A review of data from 1968 to 2007 was conducted to calculate age-adjusted mortality rates for all rural and urban regions by year. James finds that a "rural mortality penalty" exists for all rural classifications, first emerging in the mid-1980s, and rapidly growing higher in the subsequent decades. Over the 23-year duration of the "rural penalty", more than 448,000 excess deaths occurred in the rural United States. This report additional finds that the degree of disparity varies considerably depending on rural classification. Rural Urban Continuum (RUC) 5, defined as geographic regions not adjacent to an urban area, displays a consistently wide disparity from the urban U.S. throughout the time frame. RUC 6 (largely located in the southern U.S.) showed the highest level of disparity from urban regions.

Rural Workforce Shortages

Blanchard J, Petterson S, Bazemore A, Watkins K, Mullan F. Characteristics and Distribution of Graduate Medical Education Training Sites: Are We Missing Opportunities to Meet U.S. Health Workforce Needs? Acad Med. 2016;91(10):1416-1422. doi:10.1097/ACM.0000000000001184

Analysis completed by Blanchard, et al. evaluates 2012 ACGME data and 2010 Centers for Medicare & Medicaid Services (CMS) hospital cost reporting to describe costs associated with training sites. Most physician training occurs in private hospitals, while only 4% of family medicine training sites and 5% of internal medicine training sites were community-based health clinics. Additionally, only 6% of family medicine sites, 1% of internal medicine sites, and 2% of general surgery sites were located in rural settings. With relatively little training in rural or community-based settings, expanding training opportunities in these low-access areas could improve physician supply in rural areas.

Goodfellow A, Ulloa JG, Dowling PT, et al. Predictors of Primary Care Physician Practice Location in Underserved Urban or Rural Areas in the United States: A Systematic Literature Review. Acad Med. 2016;91(9):1313-1321. doi:10.1097/ACM.0000000000001203

A review of the volume of PCPs in rural area completed by Goodfellow, et al. demonstrates a significant difference in the number of PCPs in rural vs urban settings (68/100,000 rural vs 84/100,000 urban). The Association of American Medical Colleges (AAMC) estimates a shortage of 40,000 to 90,000 physicians by 2025, secondary to workforce aging, population growth, and an increased demand for healthcare services. A higher concentration of PCPs is independently associated with better health outcomes in multiple domains, including cancer, management of chronic disease, self-rated health, and overall mortality. Geography and ethnicity play a significant role in predicting practice location: 56% of family medicine residents practice within 100 miles of where they complete their training; physicians who self-identify as belonging to an URM group were more likely than their colleagues to locate in high-need practice areas.

HRSA, Bureau of Health Workforce, Health Workforce Analysis. Projecting the Supply and Demand for Primary Care Practitioners Through 2020: In Brief.; 2013. https://bhw.hrsa.gov/health-workforce-analysis/primary-care-2020.

Projections determined by the National Center for Health Workforce Analysis show that there will be a primary care physician shortage in 2020, however, the magnitude of shortage will vary depending on assumptions made regarding the role of non-physician providers. Specifically, it is projected that the number of PCPs will grow by 8% between 2010 and 2020, while demand for PCPs will increase by 14%. These projections assume that all states will expand Medicaid under the ACA, and that the individual mandate will remain. Policy changes surrounding the ACA, healthcare insurance requirements, and practice scope increases for advanced practice providers may result in a incorrect projection for 2020.

Bodenheimer TS, Smith MD. Primary care: proposed solutions to the physician shortage without training more physicians. Health Aff (Millwood). 2013;32(11):1881-1886. doi:10.1377/hlthaff.2013.0234

Bodenheimer and Smith assert that the physician shortage is accurately described as a gap between the adult populations demand for primary care services and the capacity of primary care, as currently delivered, to meet that demand. The article proposes that primary cares capacity may be greatly increased by using licensed personnel, including RNs and pharmacists, to provide greater care, up to the extent of their licensure. In addition, medical assistants may function as panel managers and health coaches, allowing them to address many preventive and chronic care needs.

Rural Hospital Closures

Scotti S. Tracking rural hospital closures. NCSL Legisbrief. 2017;25(21):1-2.

Scotti finds that, as of November 2016, over 50 percent of primary care HPSAs are in rural areas. Rural hospitals tend to have a lower patient volume, a higher proportion of dual-eligible patients, and a higher number of uninsured patients. Accordingly, rural hospitals frequently face financial challenges and struggle to ensure financial security and continued operations. Over 75 rural hospitals closed between 2010 and 2017, likely due to these financial constraints. Many states have pursued strategies in payment reform, telehealth, and coordinated care in order to ensure that rural residents can receive critical health services despite closure of local hospitals.

Kaufman BG, Thomas SR, Randolph RK, et al. The Rising Rate of Rural Hospital Closures. J Rural Health. 2016;32(1):35-43. doi:10.1111/jrh.12128

Kaufman, et al. compared the 2009 financial performance and market characteristics of rural hospitals that closed from 2010 through 2014 to rural hospitals that remained open during the same time period. Critical access hospitals (CAHs) that closed from 2010-14 had lower levels of profitability, liquidity, equity, patient volume, and staffing. Other rural hospitals (ORHs) that closed had smaller market shares and operated in markets with smaller populations compared to ORHs that remained open. Odds of unprofitability were associated with both market and utilization factors. While half of the closed hospitals ceased to provide health services altogether, the remainder converted to alternative healthcare delivery models.

The Impact of Race, Ethnicity, and Social Determinants

James CV, Moonesinghe R, Wilson-Frederick SM, Hall JE, Penman-Aguilar A, Bouye K. Racial/Ethnic Health Disparities Among Rural Adults - United States, 2012-2015. MMWR Surveill Summ. 2017;66(23):1-9. doi:10.15585/mmwr.ss6623a1

James, et al. conducted an analysis of self-reported data from the 2012-15 Behavioral Risk Factor Surveillance System (BRFSS), focusing on adults living in rural counties. Those living in rural communities often have worse health outcomes and less access to healthcare than those in urban communities. Further, rural racial and ethnic minority populations have substantial health, access to care, and lifestyle challenges that are often overlooked by providers. Self-reported health status of "poor", "obese" and "inability to see a primary care provider in the past 12 months because of cost" are higher in rural racial and ethnic minorities as compared to non-Hispanic whites.

Caldwell JT, Ford CL, Wallace SP, Wang MC, Takahashi LM. Intersection of Living in a Rural Versus Urban Area and Race/Ethnicity in Explaining Access to Health Care in the United States. Am J Public Health. 2016;106(8):1463-1469. doi:10.2105/AJPH.2016.303212

The objective of Caldwell, et al. was to determine if populations living in different geographic areas (rural vs urban) had exposure to social characteristics which lead to disparities in access to care. Using Medical Expenditure Panel Survey (MEPS) data from 2005-2010 and the American Community Survey (2005-2009), the authors linked health care expenditures and geographic location. The outcomes of interest were healthcare access, cholesterol screening, cervical cancer screening, and dental visit completion. The authors find that African Americans and Hispanics in rural areas had fewer cholesterol screening than rural Whites. After controlling for covariates, the authors find that African Americans in rural areas had lower odds of cholesterol screening (OR = 0.37) and cervical cancer screening (OR = 0.48) than African Americans in urban areas. Hispanics had similar disparities in healthcare access in rural and urban areas after controlling for covariates.

Hartley D. Rural health disparities, population health, and rural culture. Am J Public Health. 2004;94(10):1675-1678.

Rural health disparities are explored in the context of policy affecting rural health systems. Previous studies have observed a pattern of risky health behaviors among rural populations, suggestive of a "rural culture" health determinant. This pattern indicates that there may be unique rural environmental or cultural factors which affect health behavior. Rural health has been an established field since the 1980s, with its own journal (*The Journal of Rural Health*) and the establishment of the federal Office of Rural Health Policy in response to significant closures of rural hospitals in the mid-1980s. Rural areas rank poorly on most population health indicators, including health behaviors, mortality, morbidity, and maternal and child health measures. Most experts agree that these disparities demonstrate a need for federal funding directed at provider shortages, Medicare reimbursement, and other policy interventions.

Part II: Financing Strategies to Bolster the Rural Workforce

GME Financing

United States Government Accountability Office. Physician Workforce: HHS Needs Better Information to Comprehensively Evaluation Graduate Medical Education Funding. Washington, D.C.; 2018. https://www.gao.gov/assets/700/690581.pdf . Accessed February 22, 2019.

Two primary recommendations are made in this report by the GAO to HHS. First, there should be significant new research into the evaluation and performance of federal funding to GME; specifically, efforts should be made the evaluate the cost-effective models of GME delivery. Second, HHS should coordinate across federal programs to standardize how data is collected, thereby ensuring quality and consistency of data to allow for improvements and GME reform.

Butkus R, Lane S, Steinmann AF, et al. Financing U.S. Graduate Medical Education: A Policy Position Paper of the Alliance for Academic Internal Medicine and the American College of Physicians. Ann Intern Med. 2016;165(2):134-137. doi:10.7326/M15-2917

In this position paper, the American Academy of Internal Medicine (AAIM) and American College of Physicians (ACP) present funding reform options for GME. Specifically, they propose continued federal support for GME to meet adequate supply, specialty mix, and training location access; other insurers should also financially support the above goals; the true cost of training physicians should be assessed; DME and IME payments should be redesigned to fulfill a more functional role; GME dollars should be directed towards residents and fellows with financial transparency; GME caps should be lifted; and performance based GME programs should be considered.

Committee on Pediatric Workforce. Financing Graduate Medical Education to Meet the Needs of Children and the Future Pediatrician Workforce. Pediatrics. 2016;137(4). doi:10.1542/peds.2016-0211

Like other primary care specialties, there is a shortage of pediatricians in the U.S. The primary source of GME funding for pediatric training programs that are based at a children's hospital comes from the Children's Hospital Graduate Medical Education (CHGME) Payment Program. However, current GME funding does not support pediatricians, or subspecialty pediatricians, given the growing need of chronic care for children. The committee recommends increased funding from public and private entities,

specifically those that financially benefit from pediatric specialties. The funding should be easily traceable, with clear delivery to residency and fellowship programs.

Iglehart JK. Institute of Medicine report on GME--a call for reform. N Engl J Med. 2015;372(4):376-381. doi:10.1056/NEJMhpr1413236

Stakeholders favors closer alignment of GME investment by Medicare with the healthcare needs of the total population, citing the shift of funding away from the legacy hospital-based system to more community-based training. Similarly, studies conducted by HHS and MedPAC finds that IME payments are almost twice as large as could be justified to cover the higher patient care costs of Medicare inpatients, as compared with Medicare patients who are treated at nonteaching hospitals. MedPAC proposed that $3.5 billion of Medicare IME payments be reallocated to support the development of performance measures on which Medicare payments would be partially based, and other innovations.

Nuss MA, Robinson B, Buckley PF. A Statewide Strategy for Expanding Graduate Medical Education by Establishing New Teaching Hospitals and Residency Programs. Acad Med. 2015;90(9):1264-1268. doi:10.1097/ACM.0000000000000803

Due to physician shortages, Georgia undertook an innovated approach for GME expansion. Prior to intervention, GA had 214.7 physicians/100,000 people, 12% fewer than national average. GA used the GME cap exception, placing residents at “new teaching hospitals” while still receiving DME and IME; however, building the structure of the Accrediting Council for GME (ACGME) requirements is inherently expensive. Based on recommendations of GME experts at the Medical College of Georgia, a funding model to provide start-up funds for hospitals was begun, and 11 hospitals have established approximately 415 new GME positions.

Salsberg ES. Is the Physician Shortage Real? Implications for the Recommendations of the Institute of Medicine Committee on the Governance and Financing of Graduate Medical Education. Acad Med. 2015;90(9):1210-1214. doi:10.1097/ACM.0000000000000837

Expanding Medicare support, unless done in a way that is directive (e.g. by explicitly allowing positions to hospitals in specific geographic areas or requiring hospitals to fund residency positions in certain specialties) would not address identified workforce issues, such as too few physicians in certain areas or practicing primary care. The author concludes that the approach recommended by the IOM committee – steady funding but improved targeting to meet documented needs – may be the best strategy for maintaining GME funds and meeting the nation's physician workforce needs.

Wynn B. Opening the "Black Box" of GME Costs and Benefits: A Conceptual Model and a Call for Systematic Studies. J Grad Med Educ. 2015;7(1):125-127. doi:10.4300/JGME-D-14-00751.1

An assessment of the financial impact of operating residency programs should consider the costs and financial benefits of operating a residency program. Direct GME costs are higher for smaller specialty programs with high faculty compensation and malpractice costs. At the same time, the value of services provided by residents in these programs may offset these higher costs. With indirect costs, the current IME adjustment is at least 50% above the empirically justified level. Primary care residency programs are disadvantaged relative to other specialties, because attending physician revenues are lower, and a higher proportion of training occurs in ambulatory clinics. If further studies lend support towards reducing IME funding, the money saved could be used to promote GME performance and innovation.

Chen C, Petterson S, Phillips RL, Mullan F, Bazemore A, O'Donnell SD. Toward graduate medical education (GME) accountability: measuring the outcomes of GME institutions. Acad Med. 2013;88(9):1267-1280. doi:10.1097/ACM.0b013e31829a3ce9

This article identifies 759 sponsoring GME institutions; 158 produced no primary care graduates, while 184 produced more than 80%. 198 institutions produced no rural physicians, and 10 institutions had all graduates go to rural areas. The average percentage of graduates providing direct patient care in rural areas was 4.8%. Among the 161 institutions producing more than 200 graduates per year, the top 20 primary care producing sites graduated 41% primary care and received $292.1 million in total Medicare GME payments, while the bottom 20 graduated 6.3% primary care and received $842.4 million.

Ultimately, the increasing rurality of a sponsoring institution was associated with increasing rural output. The authors conclude that PCP production of 25.2% and rural physician production of 4.8% will not sustain the current workforce, solve problems of maldistribution, or address shortages.

Chen C, Xierali I, Piwnica-Worms K, Phillips R. The redistribution of graduate medical education positions in 2005 failed to boost primary care or rural training. Health Aff (Millwood). 2013;32(1):102-110. doi:10.1377/hlthaff.2012.0032

Despite government funding for GME, there is no oversight for workforce development, distribution of positions, or type of residency slots offered. Due to the DME/IME payment system, smaller hospitals and rural hospitals are at an economic disadvantage, and have more challenges sustaining residency programs. The ACA distributed some unfilled residency positions to other hospitals, proposing that primary care positions would be increased. However, the GME distribution outcome was unclear. Of the 304 hospitals that welcomed new residents, 12 were rural, and only 3% of positions were redistributed there. Primary care underwent a small growth during this time, however, nonprimary care specialties grew by twice as much. GME funding and oversight should analyze public need and distribute residency positions accordingly.

Goodman DC, Robertson RG. Accelerating physician workforce transformation through competitive graduate medical education funding. Health Aff (Millwood). 2013;32(11):1887-1892. doi:10.1377/hlthaff.2013.0451

Goodman, et al. propose a new funding mechanism that links teaching program performance with funding in an attempt to hold GME accountable for societal need. The plan proposes a coupled competitive peer-review process and publicly set priorities for specialty trainee volume and training content to reward GME programs that are aligned with public priorities and meet peer review metrics. The program would include new programs as well as standing programs; over the course of ten years, all programs would undergo peer review. Low scores on peer review, reflecting poor alignment with public need and priorities, would sustain partial, but meaningful, decreases in funding. Funding, in this program, would not be solely based in a trainee's time caring for acute care Medicare patients.

Mullan F, Chen C, Steinmetz E. The geography of graduate medical education: imbalances signal need for new distribution policies. Health Aff (Millwood). 2013;32(11):1914-1921. doi:10.1377/hlthaff.2013.0545

There are large state-level differences in the number of Medicare-sponsored residents per 100,000 (1.63 in Montana versus 77.13 in New York), total Medicare GME payments ($1.64 million in Wyoming versus $2 billion in New York), payments per person ($1.94 in Montana versus $103.63 in New York) and average payments per resident ($63,811 in Louisiana versus $155,135 in Connecticut). The vast differences in payments should be revised; Medicare's GME funding formula should account for state support and prioritize these locations in the event of decreased funding. To effectively redistribute funds, an oversight body should be seated with the ability to discuss and prioritize funding through policy.

Wynn BO, Smalley R, Cordasco KM. Does It Cost More to Train Residents or to Replace Them?: A Look at the Costs and Benefits of Operating Graduate Medical Education Programs. Rand Health Q. 2013;3(3):7.

Wynn and colleagues explored the financial considerations of operating residency training programs, by specialty. Given that hospital costs are increased in locations which support GME training, the factors that influence decisions on which training programs are offered may be the offset of loss by income generated by a residency program. Analysis from literature review, interviews, and administrative data was completed. Factors that are taken into consideration include resident compensation in postgraduate years of training, compensation of attending physicians, malpractice insurance, non-hospital training site requirement, as well as multiple other indirect and direct GME impacts. The study shows that family medicine and internal medicine programs are likely to operate at a net loss, while urology operates at the highest per-resident profit. Cardiology and general surgery operate at a the lowest per-resident profit. Based on these characteristics, it is possible that host facilities will be disincentivized from training primary care physicians.

Hackbarth G, Boccuti C. Transforming graduate medical education to improve health care value. N Engl J Med. 2011;364(8):693-695. doi:10.1056/NEJMp1012691

In a perspective article, written by members of the Medicare Payment Advisor Commission (MedPAC), concern is expressed for the declining proportion of U.S. medical students choosing careers in primary care. The authors assert that GME programs could help address this problem by expanding primary care

programs and shrinking subspecialty programs or by investing sufficient resources in primary care programs to ensure that medical trainees have high quality experiences. Medicare and private insurers also have control over the most important potential lever: the significant gap between the level of payments for primary care services and that for subspecialty procedures. Public insurers, private insurers, and the GME community should come together with the single message of encouraging medical students to pursue a career in primary care.

Iglehart JK. The uncertain future of Medicare and graduate medical education. N Engl J Med. 2011;365(14):1340-1345. doi:10.1056/NEJMhpr1107519

In 2011, there was concern that the appointed bipartisan Joint Select Committee on Deficit Reduction would reduce payments made by Medicare to support GME. Simultaneously, the ACA was enacted, giving healthcare access to Americans not previously ensured. The imbalance of providers to patients could cause poor health outcomes and stress the system further. The author reviews the recommendation of the Bowles-Simpson Commission (reduction of federal deficit by $4 trillion in 10 years reducing payment to direct GME and indirect GME), the physician shortage concerns (at the time, an estimate of 62,900 physicians by 2015), and congressional focus on primary care shortage (a deficit between 4300-7400 physicians, with decreasing medical student proportional entrance into primary care). The author proposes changes to the GME cap, and team based care as remedies to provider shortage.

Nguyen NX, Sheingold SH. Indirect medical education and disproportionate share adjustments to Medicare inpatient payment rates. Medicare Medicaid Res Rev. 2011;1(4). doi:10.5600/mmrr.001.04.a01

Indirect medical education (IME) and disproportionate share hospital (DSH) adjustments to Medicare's prospective payment rate for inpatient services are intended to compensate hospitals for patient care costs related to teaching activities and care of a disproportionate percentage of low-income patients. These adjustments have changed over time from the "empirically justified levels" originally established based on hospital costs**.** This paper reevaluates the "empirical levels" of IME and DSH using 2006 hospital data and 2009 Medicare final payment rules. The analysis estimates an increase in IME by 1.88% for each 10% increase in teaching intensity and an increase in DSH by 0.52% for each 10% increase in low-income patient share.

Salsberg E, Rockey PH, Rivers KL, Brotherton SE, Jackson GR. U.S. residency training before and after the 1997 Balanced Budget Act. JAMA. 2008;300(10):1174-1180. doi:10.1001/jama.300.10.1174

This is a descriptive study using the AAMC GME census on physicians in ACGME accredited programs to examine changes in the number and characteristics of residents before and after the Balanced Budget Act (BBA). The authors find that when hospitals expand residency training, they tend to do so in specialties where the benefits derived from residents' labor exceed the cost of their training (i.e. it is profitable for the hospital to train additional residents). U.S. MD growth from 1997 to 2007 largely resulted from selection of specialties with longer training periods. From 2002 to 2007, U.S. MDs training in primary care decreased by 2641, while international medical graduates (IMGs) increased by 3286. The change in characteristics of residency expansion has led to fewer physicians entering primary care.

GME Oversight

Council on Graduate Medical Education. Towards the Development of a National Strategic Plan for Graduate Medical Education. Rockville, MD; 2017. https://hrsa.gov/advisorycommittees/bhpradvisory/cogme/Reports/twentythirdreport.pdf.

COGME concluded that a national strategic plan for GME is needed to build a dynamic and agile GME system that better addresses the nation's physician workforce needs. They propose the formation of an independent, non-partisan Committee, appointed for a limited period of time, which would reside within the HHS but work with the National Center for Health Workforce Analysis (NCHWA). The committee must recommend a plan to address geographic maldistribution of medical specialists, workforce diversity, and curriculum innovation consistent with securing public and private funding, as well as a plan for public/private GME funding options. The Committee could be funded either publicly through HHS, privately through philanthropic support, or jointly through a consortium of public and private stakeholders.

Weinstein DF. Optimizing GME by Measuring Its Outcomes. N Engl J Med. 2017;377(21):2007-2009. Doi:10.1056/NEJMp1711483

Dr. Weinstein provides directive on measuring GME output in an evidence-based manner. She describes a series of steps that will help achieve GME redesign and overhaul. Specifically, she states expected outcomes should be standardized, including alignment with societal needs of specialty mix, geographic distribution and provider diversity. Metrics for these principles must be identified; while ACGME requirements for graduation are outlined, it is difficult to discern whether the specific competencies of a resident equip them for tailored practice in the future. Data from programs should be made public and national measures should be considered, while maintaining privacy of specific individuals and programs.

Nasca TJ, Carlson D. Graduate Medical Education Specialty Mix and Geographic Residency Program Maldistribution: Is There a Role for the ACGME? AMA J Ethics. 2016;18(3):258-263. doi:10.1001/journalofethics.2016.18.3.pfor1-1603

Nasca, et al. discusses the risk of ACGME oversight of healthcare workforce distribution as the ACGME is an independent private accrediting body at risk for antitrust allegations. The authors note that many countries use their ministry of healthcare to determine GME policies. However, the ACGME does not hold the same power in the U.S. The authors propose three initiatives: a long-term map for the development of healthcare delivery, a long-term plan for the distribution of the physician workforce, and lastly, for the ACGME to be involved in policy making with support and protection from antitrust law.

Chen FM, Phillips RL, Schneeweiss R, et al. Accounting for graduate medical education funding in family practice training. Fam Med. 2002;34(9):663-668.

Chen, et al. evaluate on-the-ground knowledge of residency program providers regarding their GME funding. Family Medicine residency programs were surveyed regarding their knowledge of actual amounts paid to the sponsoring institution (verified by hospital cost reports). At a 72% response rate, 51% of programs did not know much about GME funding. Community based and unopposed residency programs knew more about their GME allocation. Further, opposed residency programs received fewer direct funds then unopposed programs.

Rural Training Track (RTT) Residency Programs

U.S. Government Accountability Office. Locations and Types of Graduate Training Were Largely Unchanged, and Federal Efforts May Not Be Sufficient to Meet Needs; 2017.

In FY2019 HRSA received appropriations to support two GME related programs. Under the first, the agency receives $25 million to provide grants to public institutions of higher education in states with primary care provider shortages to expand or support GME. Under the second program, HRSA receives $10 million to support the Rural Residency Development program, which provides funds to award to entities, such as rural hospitals or FQHCs to develop rural training tracks. The grant program provides start-up funds for entities to develop the GME programs. GAO notes that Medicare GME funding is disbursed based on historical patterns, which has led to a high concentration of Medicare-supported residency slots in northeastern states. Despite uneven geographic population growth over the past two decades, the locations of residency slots remained largely unchanged.

Longenecker RL, Schmitz D. Building a community of practice in rural medical education: growing our own together. Rural Remote Health. 2017;17(1):4195.

Longenecker and Schmitz evaluate rural training track residency programs (RTTs) in the U.S. The highpoint of RTT programs was 35 in the U.S. in 2000, however that number dropped by 2010 to 25. This concerning fall was addressed by improving technical support to rural tracts via a new RTT Technical Assistance Program, offering education, in person meetings, consults, and assistance with recruitment. To instill a presence in the community, the program reached out to rural leaders in education as well as local and national governmental agencies engaged in rural healthcare. In 2012, the program grew to 32 programs, with 68 residency positions. An essential aspect of this success was noted to be community relationships.

Evans DV, Patterson DG, A Andrilla CH, Schmitz D, Longenecker R. Do Residencies That Aim to Produce Rural Family Physicians Offer Relevant Training? Fam Med. 2016;48(8):596-602.

The authors identified family medicine residencies offering RTTs or in rural locations, who completed a survey in 2013 about training locations and educational content. The survey shows that 44% of programs required at least 8 weeks of rural training. Programs reported an average of 43.6 weeks of

required rural block rotations. Ultimately, while family medicine residencies seek to produce rural physicians, most programs required fewer than eight weeks of rural training. There is substantial variation between programs in rurally located training and rurally located content.

Patterson DG, Andrilla CHA, Larson, Eric H. Graduates of Rural-Centric Family Medicine Residencies: Determinants of Rural and Urban Practice. Rural Health Research & Policy Centers; 2016.

Patterson, et al. determined that about two out of five graduates of family medicine residency programs requiring at least eight weeks of rural training chose rural practice, one to six years after completion of residency. Positive perception of the rural residency training experience was more closely associated with choosing rural practice than the amount of time spent in rural training. Physicians practicing in smaller rural communities were more likely to have rural experience before medical school, a partner or spouse from a rural area who was considered when choosing practice location, or post-residency obligations to provide care in shortage/underserved communities.

Patterson, Davis G., Andrilla, C. Holly A., Schmitz, David, Longenecker, Randall, Evans, David V. Outcomes of Rural-Centric Residency Training to Prepare Family Medicine Physicians for Rural Practice. Rural Health Research & Policy Centers; 2016.

In this policy brief, the authors find that family medicine residents who graduate from residency programs that actively recruit medical students with an interest in rural practice tend to work in rural areas during the first five years after graduation at much higher rates than other family medicine residency graduates. These graduates also tend to practice in HPSAs at high rates, up to 54% three years post-graduation. Rural training opportunities are distributed unevenly relative to rural population, with shortages in the West and South regions of the country.

Allen SM, Ballweg RA, Cosgrove EM, et al. Challenges and opportunities in building a sustainable rural primary care workforce in alignment with the Affordable Care Act: the WWAMI program as a case study. Acad Med. 2013;88(12):1862-1869. doi:10.1097/ACM.0000000000000008

The WWAMI program is hosted by University of Washington School of Medicine and serves a predominantly rural region covering approximately 27% of U.S. land mass but only 3.5% of U.S. population. For clinical training, students can choose from 180 locations across the five states, and students are required to complete at least 24 rotations away from Seattle. The Family Medicine Residency Network consists of 24 independent training programs, all accredited by ACGME; 12 are in communities serving rural underserved populations; 3 are rural training tracks; overall, the program trains 537 residents per year. 53% of UWSOM students enter a primary care specialty (compared with national average of 41.9%); 58.4% of UWSOM senior students plan to practice in an underserved area (national average 30.9%); of those, 47.5 cited rural communities as their likely location (national mean 30.2%).

Ross R. Fifteen-year outcomes of a rural residency: aligning policy with national needs. Fam Med. 2013;45(2):122-127.

A survey was sent to all graduates of Cascades East Family Medicine Residency through 2009. The study finds that following graduation, most physicians are located in demonstrated areas of need. Ross argues that in order to produce PCPs who enter isolated rural practice in areas of greatest need, there must be training incentives, federal funding, and ACGME flexibility to support and accommodate the needs of training programs that demonstrate clear outcomes that are congruent with the needs of the rural American population and produce physicians who enter rural practice.

Maudlin RK, Newkirk GR. Family Medicine Spokane Rural Training Track: 24 years of rural-based graduate medical education. Fam Med. 2010;42(10):723-728.

Family physicians are critical to the rural healthcare workforce, comprising the largest single source of physicians in rural areas. In Rural Training Tracks, the first year of residency is completed in an urban setting and the final two at a rural site. The goals of training residents in RTTs include producing physicians who will practice in rural areas and preparing those physicians for the personal and professional demands of rural practice. This method has been highly successful in placing and maintaining more than 70% of graduates in rural communities.

Slifkin RT, Popkin B, Dalton K. Medicare graduate medical education funding and rural hospitals. J Health Care Poor Underserved. 2000;11(2):231-242.

The authors conducted an analysis of Medicare hospital cost reports and a telephone survey of rural hospitals with residency programs. The presence of rural training tracks resulted in improved staff physician recruitment and retention, and also led to increased numbers of physicians living in communities surrounding the facilities following completion of residency training. Most respondents stated that decreases in GME funding would result in downsizing or elimination of their training programs.

The Healthcare Safety Net: CHCs, THCs, FQHCs, and CAHs

Regenstein M, Snyder JE, Jewers MM, Nocella K, Mullan F. Comprehensive Revenue and Expense Data Collection Methodology for Teaching Health Centers: A Model for Accountable Graduate Medical Education Financing. J Grad Med Educ. 2018;10(2):157-164. doi:10.4300/JGME-D-17-00542.1

Regenstein, et al. develop a standardized methodology for quantifying the necessary investment to train primary care physicians in high-need communities. The Teaching Health Center Graduate Medical Education (THCGME) Costing Instrument provides a model for calculating evidence-based costs and revenues of community-based residency programs. The authors designed this tool using financial documentation and expert review. This instrument enhances accountability by offering an approach that estimates residency costs and revenues in a range of settings, ensuring that GME financing more effectively produces a physician workforce that matches the nation's needs.

Ashkin EA, Newton WP, Toomey B, Lingley R, Page CP. Cost of Incremental Expansion of an Existing Family Medicine Residency Program. Fam Med. 2017;49(7):544-547.

Teaching health centers (THCs) are proposed as one mechanism to increase rurally trained physicians who remain in underserved areas. To ensure that educational needs are met, training opportunities are increased, and knowledge of training programs is shared, community health centers and academic medical partnerships (CHAMPs) have been proposed to create THCs. The authors state that, in attempt to start THC, no funding from HRSA was available; the fiscal cost of this training program had to be directly known to ensure success. A CHAMP was started in 2011, a collaboration of Piedmont Health Services and a local North Carolina FQHC. A residency was started with 10 residents, two of which trained at THC. The cost of expansion was determined by a comprehensive financial model capturing actual expenses and expenditures. The incremental expansion required an additional $72,126 annually per resident, with $61,000 of that used for resident salary and benefits. This cost was less than previously reported by HRSA and supports an effective mechanism for training residents at THCs.

Barclift SC, Brown EJ, Finnegan SC, Cohen ER, Klink K. Teaching Health Center Graduate Medical Education Locations Predominantly Located in Federally Designated Underserved Areas. J Grad Med Educ. 2016;8(2):241-243. doi:10.4300/JGME-D-15-00274.1

This study quantifies the federally designated clinical continuity training sites of the THCGME program established by the ACA. Current THCGME policy recommends that training occur in underserved settings, however, does not require this. The study aimed to evaluate the geographic areas, health professional shortage area, medically underserved area, population and rural areas that were served by TCHGME programs. The majority of the 109 clinical training sites of the 60 funded programs in 2014-15 are located in federally designated underserved locations. Based on the high proportion of medical care in shortage areas, the THCGME program should provide a model for how to scale policy, increasing primary care provider presence in underserved communities.

Rieselbach RE, Crouse BJ, Neuhausen K, Nasca TJ, Frohna JG. Academic medicine: a key partner in strengthening the primary care infrastructure via teaching health centers. Acad Med. 2013;88(12):1835-1843. doi:10.1097/ACM.0000000000000035

Another analysis on CHAMPs supports that the community health center- academic center affiliation is key to expansion and training of rural PCPs. The authors assert that by training three primary care specialties (family medicine, pediatrics, and internal medicine) at THCs would increase interprofessional development and provide to the team model that is foundational for PCMH. The authors outline the educational needs of THCs and how to meet these needs; further the funding of CHAMPs could be fulfilled by CMS in the frame of DME and GME if residency caps were removed.

Xierali IM, Sweeney SA, Phillips RL, Bazemore AW, Petterson SM. Increasing graduate medical education (GME) in critical access hospitals (CAH) could enhance physician recruitment and retention in rural America. J Am Board Fam Med. 2012;25(1):7-8. doi:10.3122/jabfm.2012.01.110188

CAHs are geographically isolated, small rural hospitals that often serve as the sole source of care for their community. CAH designations increased from 50 in 1998 to 1,310 in 2009. Evidence shows that residents trained in a rural setting are far more likely to continue to serve in rural or underserved settings. Analysis of Medicare hospital cost report data suggests that very few CAHs have ever reported

intern and resident training. CAHs are eligible to start GME programs or receive funding for partial training of residents.

Regan J, Schempf AH, Yoon J, Politzer RM. The role of federally funded health centers in serving the rural population. J Rural Health. 2003;19(2):117-124; discussion 115-116.

To assess the preventive services provided for patients receiving care at rural clinics, the authors undertook an evaluation of data from the 1999 Uniform Data System which provided characteristics of the patients served by rural community health centers. It is notable that patients in rural areas are more likely to be racial minorities, live in poverty, or be uninsured. Despite health care disparities due to these factors in other analysis, the authors show that patients had a higher rate of preventive services, and experience lower rates of adverse outcomes such as low birth weight infants. Rural community health centers should be expanded to provide necessary care to at-risk populations.

Council on Graduate Medical Education. Financing Graduate Medical Education in a Changing Health Care Environment.; 2000. https://www.hrsa.gov/advisorycommittees/bhpradvisory/cogme/Reports/fifteenthreport.pdf.

COGME's 2000 report evaluates resident rotations at community-based settings and why these rotations are disincentivized. Due to the balanced budget act's GME CAP, hospitals currently training residents in communities are unable to provide teaching to outside residents due to financial burden. The hospital demands, additionally, make training and educational requirements cumbersome. COGME concludes that empirical data is needed to adjust IME for outpatient rotations and community health center settings. By reducing or eliminating the weight of caring for Medicare patients into the financial reimbursement algorithm, these programs would be poised to financially succeed. Further, COGME recommends an all-payer system for financing a well-balanced, goal directed workforce.

Loan Repayment Programs

Kamerow DB. Is the National Health Service Corps the Answer? (for Placing Family Doctors in Underserved Areas). J Am Board Fam Med. 2018;31(4):499-500. doi:10.3122/jabfm.2018.04.180153

The newer, less restrictive Public Service Loan Forgiveness (PSLF) program requires only that recipients work for any public or nonprofit entity (75% of U.S. hospitals fall into these categories). Funding for the NHSC has held steady at $300 million in recent years, supporting about 9,000 to 10,000 assignees, but there are approximately 50% more unfilled slots for NHSC clinicians annually. It appears that the PSLF is competing with the NHSC, but not delivering clinicians to medically underserved areas. Conversely, studies show that half of NHSC loan reimbursement and scholarship recipients remain in an HPSA 10 years after completing their commitment. Emphasis on and financial appropriations to loan forgiveness programs which incentive providers to care for underserved should be considered.

Nagaraj M, Coffman M, Bazemore A. 30% of Recent Family Medicine Graduates Report Participation in Loan Repayment Programs. J Am Board Fam Med. 2018;31(4):501-502. doi:10.3122/jabfm.2018.04.180002

Nagaraj, et al. use data from the 2016 Family Medicine National Graduates Survey to identify participants in loan repayment programs. Among the 30% of respondents who reported participation in loan repayment programs, 50% received repayment sponsored by hospitals, employers, or the federal government through Public Service Loan Forgiveness (PSLF). However, only 13% of respondents reported participation in the NHSC. PSLF programs are unlikely to alter workforce maldistribution. Policies that alter maldistribution of the U.S. healthcare workforce would benefit from further understanding of factors that influence the distribution of family physicians in loan repayment programs.

Phillips J, Peterson LE, Fang B, Kovar-Gough I, Phillips RL. Debt and The Emerging Physician Workforce: The Relationship Between Educational Debt and Family Medicine Residents' Practice and Fellowship Intentions. Acad Med. September 2018. doi:10.1097/ACM.0000000000002468

A cross-sectional analysis of 2014 and 2015 American Board of Family Medicine (ABFM) data was used to determine whether educational debt was associated with graduating residents' practice intentions. Residents with high debt ($150,000 - $250,000) had lower odds of intending to work for a government

organization. Those with very high debt (>$250,000) had lower odds of choosing academic practice. Existing NHSC loan repayment opportunities may not offer adequate incentives to PCPs with high debt.

Phillips J, Peterson LE, Fang B, Kovar-Gough I, Phillips RL. How Many Graduating Family Medicine Residents Have Chosen Financial Support for Service Commitments? Fam Med. 2017;49(8):626-629.

A cross sectional analysis of 2014 and 2015 American Board of Family Medicine examination registration questionnaire to analyze the numbers of respondents who indicated NHSC financial support. While the NHSC loan repayment program has expanded, scholarship support has not increased, and demand for medical students far exceeds supply. Of 1,725 students who applied for new NHSC scholarships between 2013 and 2016, only 283 (16.4%) received awards. The authors argue that primary care programs should advocate for expansion of the NHSC program, which could recruit more students with additional federal support.

Goodfellow A, Ulloa JG, Dowling PT, et al. Predictors of Primary Care Physician Practice Location in Underserved Urban or Rural Areas in the United States: A Systematic Literature Review. Acad Med. 2016;91(9):1313-1321. doi:10.1097/ACM.0000000000001203

Goodfellow, et al. conducted a systematic review of literature up to 2016 to evaluate the characteristics of physicians that serve in high need areas, including underserved urban and rural areas.72 observational studies were reviewed, and showed that common characteristics of providers servicing these areas were: race/ethnicity concordance with patients, no language barriers with patient population, IMG graduation status, and low to no debt. NHSC was positively associated with underserved practice, as well as CAH training.

Chandra A, Khullar D, Wilensky GR. The economics of graduate medical education. N Engl J Med. 2014;370(25):2357-2360. doi:10.1056/NEJMp1402468

This perspective article asserts that residents bear the cost of their own training, meaning that GME funds are treated as general money received by institutions, and that these funds are difficult to trace, assess, and justify. Specifically, residents' salaries have not changed in correlation with the changes in GME funding, but rather, have been on steady but slow upward trend. If the policy goal of federal funding for GME training is to alleviate physicians' indebtedness or to encourage more medical school graduates to go into primary care, other strategies might be more effective. Specifically, offering selective loan forgiveness or vouchers to offset tuition for trainees who opt into careers in primary care may increase this workforce. These shift in funding would benefit the trainee rather than the training institution.

Pathman DE, Konrad TR. Growth and changes in the National Health Service Corps (NHSC) workforce with the American Recovery and Reinvestment Act. J Am Board Fam Med. 2012;25(5):723-733. doi:10.3122/jabfm.2012.05.110261

Between March, 2009 and February, 2011, the NHSC received a $300m supplement through the ARRA to grant more loan repayment awards. During this period, the NHSC's workforce increased by 156%, from 3017 to 7713 clinicians. Primary care clinicians demonstrated the least volume of growth and decreased proportionally; in 2011, primary composed 58.9% of the NHSC's total workforce. Mental health clinicians grew most numerically (210%) and as a proportion of the NHSC workforce. Among individual disciplines, physicians decreased most as a component of the NHSC's overall workforce, from 38.6% to 28.6%, while NPs grew most, from 10.1% to 16.0%. Proportions of the NHSC's workforce serving in rural areas changed only modestly. NHSC clinician numbers grew most in states with the lowest NHSC clinician to poverty population ratios before the Recovery Act.

Pathman DE, Morgan JC, Konrad TR, Goldberg L. States' experiences with loan repayment programs for health care professionals in a time of state budget cuts and NHSC expansion. J Rural Health. 2012;28(4):408-415. doi:10.1111/j.1748-0361.2012.00409.x

The authors created a qualitative summary of telephone interviews with staff of state offices from rural health areas in 28 states to answer questions regarding perceived changes among solely state-funded loan repayment programs, joint state-federal programs, and the NHSC federal program. Informants report that budgets for state programs have been threatened, reduced, or in many cases, eliminated. All informants positively perceived the NHSC's recent growth. However, the large NHSC federal program competes with some states' programs for clinicians and service sites, which forces states' programs to adjust their operations in order to maintain a unique niche. Better coordination is needed to minimize competition and maximize complementarity functions between state and federal programs.