Twenty-Year Trends in the Ohio Generalist Physician Workforce

P. Tennyson Williams, MD
Columbus, Ohio

BACKGROUND. Many factors contribute to the variations seen in physician workforce projections, including assumptions about attrition, new physician entry, and geographic requirements. Our study offers data for benchmarking future research into this complex issue.

METHOD. At 5-year intervals starting in 1975, data were collected for each Ohio county by local physician census takers.

RESULTS. Total Ohio family physician rates per population did not increase appreciably during the 20-year period. A decrease in the number of allopathic family physicians was balanced by an increase in the number of osteopathic family physicians, many of whom were graduates of the state's first osteopathic medical school, which graduated its first class in 1980. Rates of general internists and general pediatricians increased. In 1975, the percentage of physicians older than 59 years was higher for family physicians than for general internists and general pediatricians. By 1995, this disparity in age distribution had greatly decreased. Rural family physician rates per 100,000 population decreased, and urban rates increased, while both urban and rural rates increased for general internists and general pediatricians.

CONCLUSIONS. Variations in accounting for clinical time used for non-generalist clinical and nonclinical activities may explain a large part of the difference between generalist head count and full-time equivalency (FTE) study results; together these activities can be said to make up a "fourth compartment" contributing to improper specialty designation. The decrease in the percentage of family physicians older than 59 years indicates that the future supply of practicing family physicians is not in jeopardy. The rural family physician workforce is decreasing, while the general internist and general pediatrician rural workforce is increasing, but the total rural workforce is still well below the urban workforce. Neither component of the rural workforce appears to have stabilized.

KEY WORDS. Physicians, family; manpower; supply; distribution *(J Fam Pract 1998; 47:434-439)*

The criteria for assessing the generalist component of the physician workforce have been debated for years. In 1910, Flexner[1] was commissioned to study the quality of medical education, because a surplus of physicians was perceived to be related to large numbers of inadequately educated graduates of proprietary medical schools. At that time, there was 1 physician for every 586 citizens of Ohio (171 per 100,000 population). Early estimations of the adequate number of physicians were based on patient demand,[2] but the 1933 study by Lee and Jones[3] proposed basing that judgment on medical need. Knowles,[4] however, identified many problems in assessing need. The Graduate Medical Education National Advisory Committee (GMENAC) report[5] calculated physician workforce requirements by updating the needs assumptions of the Lee and Jones study and projected 1990 rates per 100,000 population to be 36.1 for family physicians, 30.0 for general internists, and 15.4 for general pediatricians—for a total of 81.5 generalists per 100,000 population.

Studies that followed the GMENAC report used demand-based assumptions to project future physician supply and need. Most supply-side assumptions are similar because they are quantitatively assessable and the data are available for calculation. Need-side assumptions, however, are subject to unknowns, such as the future health system choices of the American public and changes in medical technology and disease burden.

Schonfeld et al[6] and Mason[7] first introduced data from health maintenance organizations (HMOs) showing fewer physicians per 100,000 enrollees than the per capita numbers in the fee-for-service (FFS) system. HMO studies have found that GMENAC projections of need are excessive; they projected the need at 50 to 60 physicians per 100,000 enrollees.[8-11] Tarlov[12] recommended that lower rates of physicians need to be used for HMOs than for FFS systems and called the HMO system the third compartment.

The Eighth Report of the Council on Graduate Medical Education (COGME)[13] reviewed 5 major studies[11,14-17] and tested the recommendations of the

Submitted, revised, August 26, 1998.
From the Department of Family Medicine, College of Medicine and Public Health, Ohio State University. Requests for reprints should be addressed to P. Tennyson Williams, MD, 5117 Sansom Court, Columbus, OH 43220-2560.

TABLE 1

Varying Rates in US Generalist Physicians, by Study

	Steinle[9]	Lawton[2]	GMENAC[5]	COGME[18] Rural	COGME[18] Urban	Weiner[11]	AAFP[32]
Family physician	33.3	45	34.3	29.2	25.3		40.1
General internist	14.3	25	28.6	10.1	31.9		22.2
General pediatrician	8.3	10	12.4	4.8	16.5		11.1
Total	55.9	80	75.3	44.1	73.7	55.9	73.4

Note: Physicians per 100,000 population.
GMENAC denotes Graduate Medical Education National Advisory Committee; COGME, Council on Graduate Medical Education; AAFP, American Academy of Family Physicians.

Council's 1992 Third Report[18] that residency positions be reduced to 110% of the total of all United States allopathic and osteopathic medical graduates and 50% of these enter generalist careers. This review found projected rates of physician need (per 100,000 population) of 60 to 80 for generalists and 85 to 105 for specialists, and confirmed the validity of the 1992 recommendations. All 5 studies agreed that without change there will be a future surplus of specialists, while the generalist physician workforce will be equal to the need. A specialist surplus will hinder the shift of the health care system toward primary care and prevention.[11]

Problems in interpreting physician workforce studies arise from the lack of uniform criteria for either the supply or the need side of the equation. Some studies do not segregate the generalist physician component of care or recognize a difference in requirements for urban and rural settings. Few researchers recognize that all physicians are not the same, regarding their clinical productivity. Feil and colleagues,[19] Goodman and coworkers,[20] Grumbach et al,[21] Kindig,[22] Rosenblatt and coworkers,[23] and Tarlov [24] all addressed these problems and made suggestions for achieving a consensus of definitions and methods for future studies. Schwartz and colleagues[25] observed that other occupations, such as sports medicine, occupational medicine, and health plan administration, occupy unencumbered physician time and reduce the actual full-time equivalency (FTE) of the clinical practice, especially of generalist physicians. In contrast, HMO data are reported in FTE terms. Grumbach et al[21] studied physician counts by using 4 different definitions of generalist physician and found that the conventional head-count method overestimates by as much as 25%, because specialty practices are included in generalist definitions. Table 1 characterizes differences in the generalist physician rates of several studies.

Our study reports trends found over a 20-year period from a census of generalist physicians in Ohio. These trends may serve as a benchmark for future studies, because the census segregates data for 3 of the major categories: (1) allopathic and osteopathic; (2) metropolitan and nonmetropolitan; and (3) family practice, general internal medicine, and general pediatrics.

METHODS

A census of office-based generalist physicians in Ohio was conducted every 5 years from 1975 through 1995.[26-28] The data were collected on a county basis by a physician residing in that county. Census takers were among the physicians most knowledgeable of the health care system of their county. The census takers amended the data of the previous census, using telephone directories, medical and specialty society directories, hospital staff lists, and information from colleagues. The Ohio State Medical Board masterfile was referred to if data were ambiguous. Physician categories included family/general physicians, general internists, and general pediatricians. Census takers identified specialty categories by the role the physician served in the county and from directories and hospital staff lists when necessary. Allopathic and osteopathic physicians were tabulated separately. Residents, fellows, faculty physicians, physicians primarily in administrative and nonprimary care roles (sports medicine, occupational medicine, and emergency medicine), and physicians in clinical generalist practices less than 4 half days a week were excluded. In 1995, residency productivity was accounted for by adding to the respective county 1 physician for every 6500 patient visits to each family practice residency training center. This equivalency was based on the 1996 *Medical Economics* survey of family physician productivity.[29] In 1995, physicians' years of birth, addresses, and medical schools of graduation were added to the database as determined by consulting Ohio Medical Board records.

Counties listed as metropolitan areas according to the metropolitan statistical area (MSA) classification of the US Office of Management and Budget[30] were designated as urban. Those counties classified as nonmetropolitan were designated as rural. US County Census data for census years and census projections prepared by the Office of Strategic Research of the Ohio Development Department for between-census years constituted the basis for calculating physician rates per 100,000 population.

RESULTS

The rate of family physicians per 100,000 population in 1995 exceeded that of 1975 by 4%, after having declined from 1975 through 1985 (Table 2). General internist rates remained relatively constant from 1975 through 1985, after which they increased, exceeding 1975 rates by 32%

TABLE 2

Rate of Generalist Physicians in Ohio, by Year

	1975	1980	1985	1990	1995
Family physicians	26.4	24.9	24.6	27.0	27.4
General internist	12.6	12.5	13.2	15.5	16.5
General pediatrician	4.9	6.0	6.5	8.4	8.5
All	43.9	43.5	44.4	51.0	52.4

Note: Physician rates per 100,000 population, rounded to the nearest tenth.

in 1995. General pediatrician rates increased in each of the census years to exceed the 1975 rates by 74% in 1995, then stabilized in 1990.

The time family practice residents devoted to generalist clinical office activity was 14% of that of a practicing family physician.

Age distribution differed between generalist groups. The Figure illustrates a consistently higher percentage of family physicians older than 59 years than that of general internists and general pediatricians. This percentage decreased throughout the 20-year period, approaching, but still exceeding, those of general internists and general pediatricians by 1995. The percentage of general internists and general pediatricians older than 59 years increased from 1975 through 1985, then decreased, but was always lower than the percentage for family physicians.

Table 3 shows rural and urban trends. Rural family physician rates were initially higher than urban rates, but fell as urban rates rose, becoming equal in 1995. In 1995, 21.2% of family physicians practiced in rural locations. This corresponds to the 21% of the Ohio population that was classified as rural. General internal medicine and pediatric rates, in contrast, both rose in rural areas, but remained lower than those in urban areas, which also rose. General internists and pediatricians were less likely than family physicians to be in rural locations (14.2% and 12.5% respectively).

Physicians who moved had a small influence on the rural generalist workforce. Those physicians who moved were more likely to go to urban areas, regardless of their pre-move location. Rural physicians who moved, however, were twice as likely to go to rural locations than were urban physicians who moved (31.7% vs 16.9%). Family physicians were more likely to move to rural locations (24.7%) than general internists and general pediatricians (14.2%). International medical school graduates constituted 15.2% of family physicians, 12.9% of those in rural areas and 15.8% of those in urban areas. In comparison, 29.8% of general internists and general pediatricians were graduated internationally, 42.7% of those in rural areas and 27.8% of those in urban areas.

Osteopaths made up 19.7% (579) of family physicians in 1975 and increased to 27% (827) in 1995 (Table 4), while the number of allopaths decreased by 131 physicians. The first osteopathic medical school in Ohio graduated its first class in 1980.

DISCUSSION

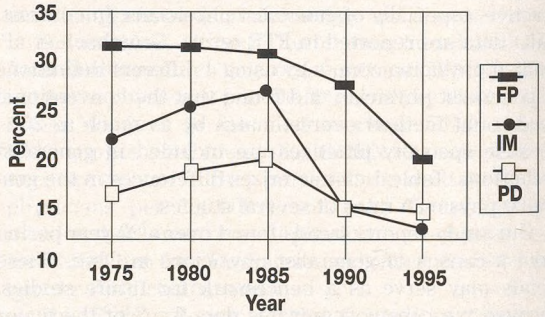
The census approach used in this study was originally designed to overcome some of the problems confronted when using physician databases constructed with questionnaire methods. These problems include (1) the lag time in adding or deleting names; (2) changing practice status (eg, family practice to emergency medicine); (3) improper specialty designation; and (4) discrepancies in practice location caused by inconsistent reporting of practice and home addresses.

By virtue of their broad training, generalist physicians are uniquely qualified to fulfill many nonclinical responsibilities. Faced with increasing competition and the constraints of managed care, they look for new niches, such as teaching, student health service, sports medicine, occupational medicine, and emergency medicine, to replace income diminished by HMO reimbursement levels.[23,25] Additional opportunities (auditing and management positions) are provided by HMOs.[31] These nongeneralist patient care and nonpatient care activities are embedded in the conventional head counts derived from questionnaires and directories. These activities constitute a fourth compartment of head count studies that improperly designate specialty. This is consistent with the contention of Schwartz[25] that head counts do not measure clinical FTEs. Therefore head count studies and FTE studies are not comparable.

In this study, an unknown level of the fourth compartment activity of generalist physicians has been deleted from the census takers' counts through the exclusion criteria described previously. The 52.4 generalist physicians per 100,000 population found in our study in Ohio approximates the 55.9 rate found by Weiner[11] in HMO

FIGURE

Percentage of Ohio Generalist Physicians Who Are Older than 59 Years, by Specialty



FP denotes family physicians; IM, general internists; PD, general pediatricians.

TABLE 3

Rural and Urban Rates of Generalist Physicians in Ohio, by Year

	1975	1980	1985	1990	1995
Rural					
Family physicians	30.8	27.6	27.3	27.1	27.4
General internists	6.0	6.5	8.7	9.2	11.0
General pediatricians	2.7	3.3	4.0	5.0	5.0
All	39.6	37.4	40.0	41.3	43.4
Urban					
Family physicians	25.4	24.2	23.9	27.0	27.3
General internists	14.1	14.1	14.5	17.2	18.0
General pediatricians	5.4	6.8	7.2	9.3	9.5
All	45.0	45.1	45.6	53.6	54.9

Note: Physicians per 100,000 population, rounded to the nearest tenth.

settings (as opposed to the 75.3 rate of the 1980 GMENAC study and the 73.5 rate proposed by an American Academy of Family Physicians study[32]). The major component of this difference is the fourth compartment of improper specialty designations, rather than the presumed increased efficiency of practice in the HMO setting. This component merits study to determine its magnitude, to allow adjustment for past and future workforce studies.

A small part of the fourth compartment improper specialty designation concerns the productivity of family practice residents. Most head count sources include residents and academic faculty, whom Kindig[22] suggests should be excluded. Productivity of residents was counted at 35% of that of practitioners by the GMENAC report[5] and 66% by Cooper,[15] who did not segregate generalists. In this study, family practice residents showed 14% of the office productivity of community family practitioners. The eighth report of COGME,[13] by comparison, assumed generalist resident productivity at 50% of community physicians and divided that productivity equally between generalists and specialists, contributing to the overcounting of family physicians.

When making physician projections, we must consider the age distribution of physicians in the baseline cohort, since advancing age is responsible for a large portion of attrition. The lack of a significant increase in the percentage of family physicians over the 20-year period of this study can be attributed to a high percentage of family physicians older than 59 years. The large decrease in this age component between 1975 and 1995 will produce an increase in both family physicians per capita rate and the family physician percentage of the generalist workforce. A surplus of family physicians is a possibility. Fortunately for the generalist workforce, the US health care system is believed to have a greater capacity to productively employ generalist physicians than specialists.

An Institute of Medicine study[33] found that the geographic maldistribution of physicians is continuing to worsen. A better understanding of the rural component is obtained by segregating data for the 3 groups of generalists. The rural family physician workforce continued to decline from 30.8 physicians per 100,000 population in 1975 to 27.4 in 1995, while the urban rates increased from 25.4 to 27.3 (Table 3). These trends have yet to stabilize. Despite prevailing wisdom that rural family physicians are older than their urban colleagues, the same age distribution and decreasing percentage of physicians older than 59 years was found for both rural and urban family physicians. Higher numbers of general internists and general pediatricians selected rural practice locations, accounting for increasing total generalist rates in rural locations between 1975 and 1995. Rural rates for both internists and pediatricians remain far below their urban rates, with total generalist physician rural rates remain 20% below those for urban Ohio. When projecting the future adequacy of the rural generalist workforce, additional considerations should include the overwhelming preference of physicians to move to urban locations and the high percentage of internationally graduated internists and pediatricians who show a preference for rural locations.

Most projections of physician need consider rural areas to have the same or less need for family physicians than urban areas. For example, COGME projects 44.1 generalists per 100,000 rural population and 73.7 for urban populations. However, nonmetropolitan practices require different skills,[34] are faster paced and demand more time,[35] and must deal with higher burdens of illness[36] compared with urban practices. The higher level of hospital intensive care and obstetrical privileges and greater use of procedures by rural family physicians support these observations.[37] Further studies must address these differences. Additionally, family physicians, general internists, and general pediatricians are recognized as having different practice styles, and their percent mix is changing in both rural and urban practice settings. Each of these considerations has impli-

TABLE 4

Osteopathic Physician Component of Ohio Generalist Physician Workforce

	1975	1980	1985	1990	1995
Family physicians	19.7	20.8	22.9	27.7	27.1
General internists	3.4	3.1	3.8	6.5	7.3
General pediatricians	0.6	1.3	3.0	4.1	4.1
Overall	12.9	13.0	14.2	17.4	17.1

Note: Percent by generalist specialty.

cations for generalist workforce projections, as well as for the design of those graduate medical education programs intended to address rural health care needs.

Osteopathic generalists have become a greater part of the physician workforce in Ohio since the establishment of the osteopathic college of medicine at Ohio University (Table 4). These data should be useful for those states establishing new osteopathic medical schools.

LIMITATIONS

Data from a single state is not necessarily generalizable. Other limitations include the rapidly changing pace of health care reform, patients' choices of new alternatives, and the changing career choices of medical graduates. The design of this study attempted to delete from counts physicians who were not practicing primary care, though this study does not claim equivalency to FTE studies of HMOs, despite the similarity in rates. The existence of a new osteopathic medical school in Ohio limits the generalization of this study to other states, though the segregation of data into allopathic and osteopathic components should be helpful. State differences in the number of medical school graduates (Ohio increased from 4.6 to 8.1 per 100,000 population during the 20 years of this study) and residency positions (per 100,000 population and per graduate) may produce different retention rates.[38] Changes in technology and physician productivity will continue to confound medical workforce projections. The 20-year period of this study provides a benchmark that other researchers should find useful.

Changes in workforce policy should be introduced as soon as new benchmarks are determined, because low physician attrition and the prolonged training pipeline require up to 50 years for new workforce policies to effectively stabilize the physician-to-population rates at target levels. For example, if 50% of medical school graduates entered generalist practices from today forward, it would take 46 years before generalist physicians constituted nearly 50% of the total physician workforce.[39]

CONCLUSIONS

The inclusion of the fourth compartment of nonclinical and nongeneralist activities causes overestimation of generalists by the headcount strategy. Family physician numbers and rates per population will rise because of the decrease in attrition resulting from the decline in older family physicians and has the potential to produce a surplus of family physicians. The rate of decline of rural family physicians and the increase in selecting rural practice by general internists and general pediatricians is yet to stabilize.

ACKNOWLEDGMENTS

The studies of 1990 and 1995 were partially funded by the Ohio Department of Health and the Ohio Academy of Family Physicians. The studies of 1975, 1980, and 1985 were funded by the Department of Family Medicine of the Ohio State University College of Medicine.

The author is grateful for the helpful suggestions of the faculty of the Department of Family Medicine of Ohio State University and for the suggestions of Steve Zyzanski, PhD, from the Department of Family Medicine of Case Western Reserve University.

REFERENCES

1. Flexner A. The Flexner report on medical education in the United States and Canada, 1910. Reprinted by Science and Health Publications, 1960.
2. Lawton R. A report on the physician distribution in Florida. Sarasota, Fla: Florida Regional Medical Program, Office of Manpower and Continuing Education; 1973.
3. Lee RI, Jones LW. The fundamentals of good medical care. Chicago, Ill: University of Chicago Press, 1933.
4. Knowles JH. The quantity and quality of medical manpower: a review of medicine's current efforts. J Med Educ 1969; 44:81-118.
5. Graduate Medical Education National Advisory Committee. Report of the Graduate Medical Education National Advisory Committee. Washington, DC, 1980.
6. Schonfeld HK, Heston JF, Falk IS. Numbers of physicians required for primary medical care. N Engl J Med 1972; 286:571-6.
7. Mason HR. Manpower needs by specialty. JAMA 1972; 219:1621-6.
8. Mulhausen R, McGee J. Physician need. An alternative projection from a study of large, prepaid group practices. JAMA 1989; 261:1930-4.
9. Steinle JG. Suggested ratio of physicians to population. Hosp Top 1971; 9:44.
10. Steinwachs DM, Weiner JP, Shapiro S, Batalden P, Coltin K, Wasserman F. A comparison of the requirements for primary care physicians in HMOs with projections made by the GMENAC. N Engl J Med 1986; 312:217-22.
11. Weiner JP. Forecasting the effects of health reform on US physician workforce requirement. Evidence from HMO staffing patterns. JAMA 1994; 272:222-30.
12. Tarlov AR. HMO enrollment growth and physicians: the third compartment. Health Aff 1986; 5:23-35.
13. Council on Graduate Medical Education. Eighth Report. Patient care physician supply and requirements. Testing COGME recommendations. Rockville, Md: Bureau of Health Professions, Health Resource and Services Administration, US Public Health Service; 1996.
14. Bowman MA, Katzoff JM, Garrison LP, Wills J. Estimates of physician requirements for 1990 for the specialties of neurology, anesthesiology, nuclear medicine, pathology, physical medicine and rehabilitation, and radiology: a further application of the GMENAC methodology. JAMA 1983; 250:2623-7.
15. Cooper R. Seeking a balanced physician workforce for the 21st century. JAMA 1994; 272:680-7.
16. Gamliel S, Politzer R, Rivo M, Mullan F. Managed care on the march: will the physician workforce meet the challenge? Health Aff 1995; 14:131-42.
17. Bureau of Health Professions, Health Resources and Services Administration. Refinements to BHPr requirements forecasting model, vol II: data and methodology. Rockville, Md: Bureau of Health Professions, Health Resources and Services Administration; 1993.
18. Council on Graduate Medical Education. Third Report. Improving access to health care through physician workforce reform: directions for the 21st century. Rockville, Md: Bureau of Health Professions, Health Resource and Services Administration, US Public Health Service; 1992.
19. Feil EC, Welch HG, Fisher ES. Why estimates of physician supply and requirements disagree. JAMA 1993; 269:2659-63.
20. Goodman DC, Fisher ES, Bubolz TA, Mohr JE, Poage JF, Wennberg JE. Benchmarking the US physician workforce. An alternative to needs-based or demand-based planning.

JAMA 1996; 276:1811-17.

21. Grumbach K, Becker SH, Osborn EHS, Bindman AB. The challenge of defining and counting generalist physicians: an analysis of physician masterfile data. Am J Public Health 1995; 85:1402-7.
22. Kindig DA. Counting generalist physicians. JAMA 1994; 271:1505-7.
23. Rosenblatt RA, Lishner DM. Surplus or shortage? Unraveling the physician supply conundrum. West J Med 1991; 154:43-50.
24. Tarlov AR. Estimating physician workforce requirements. The devil is in the assumptions. JAMA 1995; 274:1558-60.
25. Schwartz WB, Sloan FA, Mendelson DN. Why there will be little or no physician surplus between now and the year 2000. N Engl J Med 1988; 318:892-7.
26. Brown LM, Williams T. Survey of Ohio primary physicians. A projection of future needs to the year 2000. J Ohio State Med Assn. 1978; 74:29-33.
27. Brown LM, Williams T. A resurvey of Ohio family physicians. A projection of future needs to the year 2000. J Ohio State Med Assn. 1982; 78:117-23.
28. Williams PT, Whitcomb M, Harris R. Generalist physicians in nonmetropolitan counties in Ohio. Arch Fam Med. 1994; 3:425-8.
29. Guglielmo WJ. Are doctors working smarter? Med Econ 1996; 23:84-96.
30. Randolph L, Seidman B, Pasko T. Physician characteristics and distribution in the US. 1995/96 ed. Chicago, Ill: Department of Data Survey and Planning, Division of Survey and Data Resources, American Medical Association; 1996.
31. Barnett PG, Midtling JE. Public policy and the supply of primary care physicians. JAMA 1989; 262:2864-968.
32. Family physician workforce reform: recommendations of the American Academy of Family Physicians. American Academy of Family Physicians. Kansas City, Mo: 1995.
33. Committee on the Future of Primary Care. Primary care: America's health in a new era. Washington, DC: National Academy Press; 1996.
34. D'Elia GM, Folse R. Medical education for practice in nonmetropolitan areas. J Med Educ 1978; 53:301-9.
35. Pathman DE. When 1+2 does not equal 3 for hard-working rural physicians. Arch Fam Med 1994; 3:757-9.
36. Rabinowitz H. Recruitment and retention of rural physicians: how much progress have we made? J Am Board Fam Pract 1995; 8:496-9.
37. Facts about: family practice. American Academy of Family Physicians. Kansas City, Mo: 1994.
38. Seifer SD, Vrasian MA, Grumbach K. Graduate medical education and physician practice location. Implications for physician workforce policy. JAMA 1995; 274:685-91.
39. Kindig DA, Cultice JM, Mullan F. The elusive generalist physician. Can we reach a 50% goal? JAMA 1993; 270: 1069-73.