

The Challenge of Defining and Counting Generalist Physicians: An Analysis of Physician Masterfile Data

ABSTRACT

Objectives. The study reviewed methods for measuring the specialty distribution of the US physician workforce. It was hypothesized that current databases and measurement conventions overestimate the number of generalist physicians.

Methods. A descriptive analysis of the American Medical Association (AMA) Physician Masterfile for California was done with different assumptions about the definition of generalists based on primary and secondary specialty information.

Results. A rigorous definition of generalist physician that excludes physicians with secondary practices in specialist fields resulted in an estimate of generalist physicians 25% lower than the number estimated by conventional workforce evaluation methods. Physicians who reported practicing in both generalist and specialist fields were more likely to be older, to be international medical school graduates, and to be in solo or duo practice compared with physicians who listed only generalist or specialist fields.

Conclusions. The actual number of generalist physicians in the United States may be less than previously believed. Although the exact magnitude of the "hidden system" of specialists providing primary care is difficult to measure, at least a portion appear to already be counted as generalist physicians by current conventions. (*Am J Public Health.* 1995; 85:1402-1407)

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Introduction

Policies addressing the number and specialty distribution of physicians in the United States moved to center stage in recent debates over health care reform. Several analyses have warned that the steadily increasing physician-to-population ratio poses problems for controlling the growth of health care expenditures.^{1,2} Other analyses have focused more on the specialty distribution of the physician workforce. Schroeder and Sandy have referred to the relative abundance of specialists in the United States as "the invisible driver of health care costs."³ Meanwhile, the relatively low proportion of physicians in generalist fields, estimated to be approximately one third of the total US physician supply, threatens to dwindle even further as fewer than 20% of 1993 medical school graduates expressed an intent to practice in generalist fields.⁴

Although government regulation of physician supply remains controversial, a wide spectrum of public and private organizations concurs on the need to shift the current 2:1 specialist-to-generalist physician ratio closer to a 1:1 distribution in the coming decades.^{2,5-9} Most health maintenance organizations (HMOs) currently operate with approximately a 1:1 ratio of generalists and specialists.¹⁰ Even without government regulation, increasing enrollment in HMOs in the coming decade will create a market for more generalists rather than specialists.

Essential to physician workforce planning and evaluation is accurate information about the number and specialty characteristics of the nation's physicians. In this report, we analyze the most commonly cited national reference on the US physician workforce, the American

Medical Association (AMA) Physician Masterfile, to illustrate how different assumptions about specialty definitions affect the enumeration of generalist physicians and can lead to an overestimation of their number. To set the stage for this empirical analysis, we begin with a brief definition of terms and an explanation of how the masterfile reports specialty assignments.

Who Are the Generalists?

The term *generalist physician* is typically used to denote physicians who have received training in the fields of general practice, family practice, general internal medicine, or general pediatrics without advanced training in subspecialty areas.¹¹ Physicians with subspecialty training in internal medicine or pediatrics, or with all of their training in specialties outside one of the four generalist fields, are commonly referred to as "specialists." The term *generalist* also usually implies that the physician's practice is primary care in nature, providing such elements as first contact, longitudinal, and comprehensive care.¹² These elements of primary care may be contrasted with those of secondary or tertiary care, performed by specialists who predominantly see patients on a

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referral basis for clinical problems limited to a particular organ system (e.g., neurologists), spectrum of disease (e.g., allergists), or procedural intervention (e.g., radiologists).

These definitions are complicated in the United States, however, by the fact that many patients appear to rely on specialists for their primary care needs. Although most nations other than the United States more clearly delegate the primary care role to generalists, with specialists serving mainly as consultants on a referral basis,¹³ Aiken and colleagues found that nearly 20% of Americans consider a specialist to be their source of principal care.¹⁴ Debate continues in the United States about the relative merits of generalists and specialists performing the primary care role. Recent studies comparing these two kinds of physicians in this role have demonstrated that generalists practice a less resource-intensive style of medicine.¹⁵⁻¹⁷ These studies suggest that, even if some specialists provide primary care services, being able to accurately distinguish between generalists and specialists has important implications for evaluating the relationship between physician supply and health care costs and related outcomes.

The AMA Physician Masterfile

The federal Bureau of the Health Professions, the National Center for Health Statistics, state health departments, and academic researchers rely on the AMA Physician Masterfile as the main source of data on physician supply in the United States. The masterfile is a continuously updated list of all United States allopathic physicians, including those who are not AMA members.¹⁸ Data in the masterfile are collected directly from physicians through periodic surveys as well as from secondary sources such as medical schools. The masterfile provides a wide variety of information about each physician, including demographic data, practice setting, research and teaching activity, and, most relevant to this discussion, physician specialty. As a result, the masterfile is unequaled as a reference on individual physician-level data in the United States.¹⁹

Masterfile data on specialty derives from the physician survey, which asks physicians to report up to three specialty areas and the hours per week they spend practicing in each area. For physicians reporting more than one specialty, the AMA ranks the specialties based on practice hours, assigning the specialty

with the greatest number of hours as the primary specialty. The AMA issues masterfile data with the caveat that specialty characterizations are based entirely on self-reported practice information and are not intended to reflect specialty training or qualification. Although the AMA collects information on training history, it has yet to systematically merge this training data with the survey-based information to validate one method of defining specialty against the other.

Published data from the AMA include information only about primary specialty. Similarly, specialty information issued by federal agencies such as the Bureau of Health Professions typically includes only the primary specialty from the masterfile. In other words, commonly referenced data provide a portrait of specialty characteristics based on the plurality of individual physicians' practice hours. Since this plurality also serves as the basis for the oft-cited figure of one third of US physicians being generalists, a more accurate statement would be that one third of US physicians report that they spend more of their practice hours in generalist fields than in any other specialty area.

This convention of relying on the primary specialty area of practice may present particular difficulties, however, when trying to sort out the conundrum of generalists, specialists, and primary care provider. Take, for example, the case of a physician who reports to the AMA that she practices 30 hours per week in internal medicine and 25 hours per week in cardiology. Is this physician a specialist (i.e., someone with subspecialty training in cardiology) who spends a substantial amount of time practicing in a primary care role and therefore devotes more time to "general" internal medicine than to her subspecialty field? Is she a generalist (i.e., someone with training in only internal medicine) who has oriented her practice toward the care of patients with cardiac disease? Does ranking internal medicine ahead of cardiology mean that she should be counted as a generalist physician? How might she differ in training and practice from a colleague who reports practicing 30 hours per week in cardiology and 25 hours per week in internal medicine, or from one who reports practicing only internal medicine or only cardiology?

An Empirical Test of AMA Physician Masterfile Specialty Designations

Because of our concern that different assumptions about how to assign special-

ties and interpret specialty assignment in the AMA masterfile may lead to very different estimates of the specialty distribution of the physician workforce, we decided to analyze masterfile data in one state (California) in greater detail. Our objective was to test how the inclusion of information about secondary specialty might alter estimates of the number of generalist physicians. We hypothesized that the plurality of practice hours convention creates a bias that overestimates the true number of generalists in the United States because it enables many physicians who are actually specialists to be counted as generalists—for example, the cardiologist above who reported a plurality of her hours in internal medicine. It may also obscure the fact that some physicians who are generalists by training are not practicing exclusively primary care—for example, the family physician who spends a good deal of time working in an emergency department. The convention of reporting only primary specialty from the masterfile makes this latter physician indistinguishable from one who spends the entirety of practice hours in family medicine.

Our research objective was, therefore, to complement the body of evidence about specialists with a generalist component to their practices by examining the question on the other side of the coin: are the physicians now being counted as generalists truly generalist physicians? Do current counts of generalist physicians in the United States already include many specialists with primary care-oriented practices?

Methods

Computerized AMA masterfile data were examined for the state of California; such data included information about both primary and secondary specialty fields. Four different definitions of generalist physicians were developed (models A to D; see Table 1, footnote), each definition more inclusive than the preceding one. Common to all four definitions is the presence of general practice, family practice, internal medicine, or pediatrics as primary specialty. Model A uses the most rigorous criteria and includes physicians who either list a generalist specialty and no other specialty or, if two specialties are listed, list both specialties in generalist fields. Model B adds physicians who have a secondary specialty in non-subspecialty fields such as obstetrics-gynecology and general surgery. Model C adds physicians

TABLE 1—Number of Generalist Physicians in California, by Type and Definition of Generalist: American Medical Association (AMA) Physician Masterfile, 1990

	Model A ^a		Model B ^a		Model C ^a		Model D ^a
	No.	% of D	No.	% of D	No.	% of D	No.
Family practice	4 437	83%	4 988	93%	5 114	95%	5 363
General practice	2 302	66%	2 885	83%	3 035	87%	3 476
General internal medicine	6 497	73%	6 817	77%	8 563	96%	8 883
General pediatrics	3 768	78%	3 953	82%	4 485	93%	4 816
Total primary care	17 004	75%	18 643	83%	21 197	94%	22 538

Note. Figures in the “% of D” column are number of physicians in each specialty as a percentage of physicians in each specialty in model D. These figures include all active physicians, including those not in patient care.

^aModels for defining generalist physicians according to self-designated primary and secondary specialty^b:

- Model A—Exclusively generalist practice (most rigorous criteria). Primary specialty—family practice, general practice, internal medicine, or pediatrics; secondary specialty—family practice, general practice, internal medicine, pediatrics, or blank.

- Model B—Criteria in model A, or primary generalist practice plus secondary practice in nonspecialist field. Primary specialty—family practice, general practice, internal medicine, or pediatrics; secondary specialty—secondary specialties in model A plus adolescent medicine, geriatrics, general preventive medicine, public health, emergency medicine, gynecology, obstetrics and gynecology, obstetrics, gynecology, nutrition, general surgery.

- Model C—Criteria in model B, or primary generalist practice plus secondary practice in medical or pediatric subspecialty or related field. Primary specialty—family practice, general practice, internal medicine, or pediatrics; secondary specialty—secondary specialties in model B plus allergy, allergy and immunology, cardiovascular disease, critical care medicine, dermatology, diabetes, endocrinology, gastroenterology, hematology, immunology, infectious disease, medical microbiology, nephrology, neurology, occupational medicine, physical medicine and rehabilitation, pulmonary diseases, rheumatology, child neurology, oncology, pediatric allergy, pediatric cardiology, pediatric endocrinology, pediatric hematology—oncology, pediatric nephrology, pediatric pulmonology.

- Model D—Generalist practice defined on basis of primary specialty field irrespective of secondary specialty (AMA definition, least rigorous criteria). Primary specialty—family practice, general practice, internal medicine, or pediatrics; secondary specialty—any specialty or blank.

^bThe AMA assigns primary and secondary status to physician self-designated specialties on the basis of the number of working hours per week the physician reports spending in each specialty area.

with secondary specialties in areas related to pediatric and internal medicine subspecialties. Model D includes all physicians with a primary generalist specialty irrespective of their secondary specialty. The most inclusive generalist care criteria of model D are the ones typically used to measure generalist supply in published analyses of masterfile data. The number of generalist physicians in California was thus calculated by using each of these definitional models.

There was also an interest in determining how physicians might differ, depending on how they ranked their generalist and specialist fields. For example, how did physicians who reported a generalist primary specialty and a specialist secondary specialty differ from those who reversed the order of their generalist and nongeneralist fields (i.e., reported more hours in the specialist area than in the generalist field) or from those who reported exclusively generalist or exclusively specialist fields? These groups of physicians were compared on the basis of the

additional demographic and practice variables that were included in the masterfile tapes. Such variables included medical school and year of graduation, age, office zip code, type of professional activity, and one major specialty board certification. An additional variable was created to measure local physician supply, assigning physicians to geographic areas based on the zip codes of their office addresses as listed on the masterfile. Areas consisted of contiguous zip codes corresponding to medical service study areas defined by the California Department of Health²⁰; census files were used to calculate physician supply per 100 000 population in the zip code clusters. Ideally, it would have been good to compare these groups of physicians on such items as their type of training and the extent to which their practices were primary care in orientation. However, the masterfile contains data on neither specialty training nor content of practice.

To compare the characteristics of physicians in different specialty category

ries, our analysis focused on those physicians with combinations of generalist and medical and pediatric subspecialty areas of practice (those specialties referenced in model C), and was restricted to patient care physicians who were no longer in training. Our analysis of nongeneralist specialties was limited to these fields for this section because a preponderance of physicians who list both generalist and nongeneralist fields cite these pediatric and medical subspecialties as their nongeneralist field. Additionally, much of the controversy around nongeneralists serving as primary care physicians relates to physicians with training in these subspecialty areas.^{15,16} Comparison was made of four categories of physicians: those with only generalist fields, those with a primary generalist and a secondary subspecialist field, those with a primary subspecialist and a secondary generalist field, and those with only pediatric or internal medicine subspecialty fields.

Results

The number of generalist physicians in California differs considerably depending on the stringency of the practice-based criteria used to define generalist physicians (Table 1). The total number of generalist physicians based on the most rigorous “pure generalist” criteria (model A) is 25% lower than the number based on the conventional method of examining primary specialty alone (model D).

The pattern of generalist and nongeneralist specialties differs according to the specific type of primary practice (Table 1). Physicians with a primary specialty of family practice were the least likely to have a secondary specialty in a nongeneralist field (17%). Physicians with a primary specialty of general practice were the most likely to have a nongeneralist secondary specialty (34%), with internists (27%) and pediatricians (22%) falling between the family and general practitioners. Physicians with a primary specialty of general practice tended to list secondary specialties in the fields of obstetrics, general surgery, and emergency medicine. By contrast, physicians with primary specialties in internal medicine and pediatrics were more likely to have secondary specialties in subspecialty areas such as cardiology and gastroenterology.

The results of the analysis comparing characteristics of physicians according to the reported pattern of generalist specialties and internal medicine and pediatric subspecialties are shown in Table 2.

Certain patterns are noteworthy. For two characteristics, board certification and local physician supply, there is an ordered progression from physicians reporting generalist-only specialties to those reporting specialist-only practices. As the pure generalist nature of a physician's practice was progressively modified by specialist practice, both the likelihood of board certification and the physician-to-population ratio increased. Several other characteristics were similar for three of the four categories of physicians—generalists only, primary specialist–secondary generalist, and specialists only—and differed only for physicians in the primary generalist–secondary specialist category. This latter category of physicians tended to be older and were more likely to have graduated from a non-US medical school and to work in a practice of only one or two physicians. California physicians in the generalist-only category were more likely than physicians in the other groups to have graduated from California medical schools.

Discussion

Our analysis reflects the challenges of trying to measure accurately the specialty distribution of the US physician workforce. Lack of specificity about terms such as *primary care* and *generalist physicians* translates into imprecision of measurement. Our analysis suggests that if the US adopted stricter criteria for defining generalists on the basis of data in the AMA masterfile, the number of true generalists (i.e., physicians practicing only in generalist fields) might be 25% lower than the number estimated under current classification conventions, in which case the proportion of generalists would be closer to one quarter of all active US physicians than to the widely cited figure of one third. For those decrying the low number of generalists in the nation and seeking to reverse the historical decline of generalism, the news may be even worse than had been thought. Kindig and colleagues recently estimated that even if one half of all medical school graduates began entering generalist fields in 1993, the United States would not attain a 50:50 generalist:specialist mix until the year 2040.¹⁹ What these authors refer to as the "elusive 50% goal" may be even more of a remote objective if the baseline proportion of generalists is substantially lower than the 33% used in their analysis.

Are the differences between the generalist criteria (Table 1) used in our

TABLE 2—Selected Characteristics of California Physicians,^a by Self-Reported Specialties: American Medical Association (AMA) Physician Masterfile, 1990

	Generalist Only ^b (n = 12 668)	Primary Generalist Secondary Specialist ^c (n = 2 180)	Primary Specialist ^c Secondary Generalist (n = 6 188)	Specialist Only ^c (n = 710)
Mean year of medical school graduation (SD)	1971 (12)	1964 (11)	1970 (10)	1970 (10)
Mean age, y (SD)	46 (13)	52 (12)	46 (10)	46 (10)
Medical school of graduation, %				
California	29	20	21	22
Other US school	48	52	55	55
International	24	28	24	22
Board certified, %	61	71	82	88
Activity, %				
Office practice	93	92	91	89
Hospital practice	7	8	9	11
Employment, %				
Solo-duo practice	38	50	43	43
Group practice	29	32	30	33
Hospital	4	5	6	7
Federal	4	3	4	4
Other	24	10	16	13
Local physician supply				
Total physicians/100 000 population, mean no. (SD)	351 (273)	426 (317)	439 (309)	459 (312)
Generalist physicians/100 000 population, mean no. (SD)	95 (59)	108 (66)	108 (64)	112 (62)

Note. Differences across physician groups for all variables are significant at the level of $p < .001$, using group chi-square tests for categorical variables and analysis of variance for continuous variables.

^aIncludes only post-residency physicians in active patient care.

^bGeneralist specialties include family practice, general practice, general internal medicine, and general pediatrics.

^cSpecialists include subspecialties of internal medicine and pediatrics listed under model C in Table 1.

analysis meaningful? Some of the distinctions between categorizations may be minor and imply only subtle differences in the scope of generalist practice. For example, a physician with a majority of practice hours in family practice and a minority of hours in geriatrics (a combination included in model B) almost certainly serves a generalist–primary care rather than a specialist role. Many analysts would not hesitate to count such physicians as generalists for purposes of workforce planning. Other categories of physicians reporting mixed generalist–specialist practices may, however, signify more meaningful differences in the nature of specialty training and clinical practice. This may be especially true for physicians who report practicing in medical and pediatric subspecialty areas in addition to

generalist fields. Studies showing that specialists practice a more resource-intensive style of medicine than generalists have focused particularly on specialists in the subspecialty areas of internal medicine.^{15–17}

Are the physicians who report both generalist and specialist practices to the masterfile more akin to generalists or to specialists? Based on our analysis of characteristics available in the masterfile, physicians with a primary specialty in a generalist field and a secondary specialty in a specialist field look different from both pure generalists and pure specialists. On some features, such as board certification, they appear more specialist in character than the pure generalists. On other features, such as the tendency to graduate from international medical

schools and to practice in solo or duo physician settings, these physicians differ from both the generalist and the specialist polarities of the specialty spectrum. We speculate that the primary generalist–secondary specialist physician group may consist of many older, foreign-trained physicians who are unable to maintain a full practice in a subspecialty field and who thus supplement their practice with generalist activities. The most important conclusion from this comparison, however, is simply that physicians reporting only generalist practice “look different” from those reporting both generalist and specialist practices, suggesting that caution should be exercised before lumping both groups of physicians together under the generalist banner.

These data in the masterfile give only a superficial glimpse of potential differences among physicians. The crux of the matter is how these different groups of physicians vary in terms of specialty training and style of clinical practice. Unfortunately, existing references such as the AMA masterfile provide only a limited ability to probe these more substantive questions. Alternative data bases exist that measure specialty training; these include files maintained by the American Association of Medical Colleges, by the American Board of Medical Specialties, and even by a different division of the AMA.^{5,21,22} However, each of these files has its drawbacks. Most report information only in aggregate form (e.g., at the residency program level) rather than at the individual physician level. Using board certification as an indicator of physician specialty is limited by the fact that only 79% of all practicing physicians who have completed residency training are board certified.²² The ideal database would integrate information about training experience, scope of practice, and related practice characteristics at the individual physician level.

Our study is limited by the fact that we analyzed masterfile data for California, so our results may not be entirely generalizable to the rest of the nation. However, the proportion of physicians listing generalist fields as a primary specialty is similar for California and for the United States as a whole. Additional limitations derive from the nature of the AMA masterfile. Doctors of osteopathy are not included in this data set even though osteopaths are more likely than allopathic physicians to practice in generalist fields. However, because osteopaths constitute only approximately 5% of the

total physician pool in the United States, their inclusion would not substantially alter our findings. The self-reported determinations of work hours by specialty used in the masterfile rely on the subjective judgment of respondents; the validity and precision of these reports have not been systematically scrutinized. Kindig has elsewhere reviewed many of the other inherent limitations of physician workforce databases, including the AMA masterfile.²³

On the basis of our analysis, we believe that current conventions for measuring generalists—using only the masterfile primary specialty—may be counting as generalists many specialists with primary care-oriented practices. In other words, the 33% estimate of the proportion of physicians who are generalists appears to incorporate much of the “hidden system” of specialist-provided primary care detected by Aiken et al.¹⁴ At the same time, both conventional approaches to interpreting the masterfile and our own analysis cannot precisely measure the other component of this hidden system—namely, specialists who practice a minority of their time in generalist areas. This component is even more difficult to assess since, in reviewing the masterfile data, we found that almost all physicians listing a subspecialty in internal medicine as their primary specialty also list general internal medicine or another specialty as their secondary field. It is difficult to know what threshold for hours practiced in a generalist field constitutes a significant contribution to the primary care workforce.

Earlier in this article, we suggested that questions about the number of physicians who contribute to the primary care workforce and the number of generalist physicians overall may be viewed as two sides of the same coin. But although the questions are related, they have different implications for workforce policies. Because generalists and specialists appear to differ in their manner of practicing primary care, workforce planning requires measurement not only of the total pool of physicians contributing to primary care but also of the specific types of physicians providing these primary care services. For example, most managed care plans allow generalists but not specialists to serve as primary care physicians. If projections of the future need for primary care physicians are to be based on the staffing requirements of a system dominated by HMOs,¹⁰ accurate counts of the current number of generalist physicians in

the workforce assume increasing importance.

The AMA Physician Masterfile remains an invaluable source of comprehensive information about allopathic physicians in the United States. However, in its current form, the masterfile lacks sufficient detail about specialty training and scope of practice to reconcile many of the ambiguities about the number of generalist physicians in the United States. We plan to collaborate with the AMA Department of Physician Data Services to analyze the actual hours worked in primary and secondary specialty areas to better clarify the distribution of work in generalist and specialist areas, as well as to integrate data on individual physician training experience into the masterfile database. Learning that clarification of the muddled nature of physician classification depends on better investigation into physician databases tends to be no more satisfying than hearing from a clinician that more tests are needed before a diagnosis can be made and treatment rendered. Unfortunately, simply devising new classification algorithms without improving the quality of the data entered into these algorithms is unlikely to advance the state of workforce planning. In the meantime, our four models for defining generalists are useful for highlighting the potential margins of error in assigning specialty classifications solely on the primary specialty reported. Current tallies of generalist physicians in the United States may need to append an asterisk, denoting the potential inclusion of many specialists in the generalist domain. If the number of generalist physicians in the United States is indeed as low as some of our estimates suggest, measures to reverse the diminishing proportion of generalists are all the more urgently needed. □

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