

UNITED STATES MEDICAL WORKFORCE - CHARACTERISTICS AND POLICY UPDATE

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INTRODUCTION

Describing the physician workforce and medical education in the United States (US) is not a simple task. Any attempt to provide an overview of the USs' physician workforce invariably oversimplifies a Byzantine array of training and practice options. In the US there are two distinct types of undergraduate education in medicine. Graduate medical education is offered in over 100 different types of specialty and subspecialty programs. In addition, unlike in nations with national health insurance, there is no single dominant method of payment for physician services.

The US is also notable for its lack of a coherent and systematic national physician workforce policy. Americans generally prefer to allow the proverbial "market" to determine the appropriate number of physicians and trainees. Our proclivity to limit government's role in society constrains the federal government to addressing deficits in the distribution, characteristics and competencies of physicians. The largest source of federal funding for medical education, the Medicare program, is viewed primarily as a source of financial support for teaching hospitals and not as a vehicle for influencing the size and composition of the physician workforce. The popular press is often the source of the liveliest debates over physician workforce policy questions.

Even the collection of physician workforce data is largely a non-governmental activity. Much of the data presented in this paper were published by professional associations, such as the American Medical Association, the Association of American Medical Colleges, the American Osteopathic Association (AOA) and the American Association of Colleges of Osteopathic Medicine. In the US, these associations collect the most comprehensive data on the physician workforce and medical education. Indeed, the federal government relies primarily on data from these associations to assess physician workforce supply and characteristics.

This paper provides an overview of the physician workforce and medical education in the US. Section I describes the supply of physicians and their distribution. Section II reviews the organization and financing of physician practices. Section III summarizes trends in medical education. Section IV discusses the immigration of physicians to the US. Section V highlights several "hot" topics in physician workforce policy.

I. PHYSICIAN SUPPLY

There are two educational pathways for physician licensure in the US: allopathic education (MD) and osteopathic education (DO). Both allopathic and osteopathic physicians enter medical school after completing a four-year undergraduate degree and required prerequisite undergraduate courses in mathematics and the biological and physical sciences. Historically, osteopathic medical schools have generally placed greater emphasis than allopathic schools on preparing students for practice as primary care physicians. In addition, osteopathic medical students receive more extensive education regarding the musculoskeletal system and are trained to provide osteopathic manipulative treatment.¹ Graduates of allopathic medical schools complete allopathic post-graduate training programs (ie, residency programs). Graduates of osteopathic schools may complete either an osteopathic or an allopathic post-graduate training program.

Number of Physicians and Ratio to Population

The precise number of physicians in the US is difficult to determine because the most comprehensive source of data on US physicians – the American Medical Association's (AMA) Masterfile – does not include all physicians. The AMA Masterfile contains information for only those physicians who participate in allopathic post-graduate training programs. As a consequence, it excludes those osteopathic physicians who complete osteopathic post-graduate training programs. Despite this shortcoming, data from the AMA Masterfile are presented in this paper because this database is the most comprehensive source of data on trends in the US physician workforce over time.

1998 AMA Masterfile data indicate that there are approximately 615,000 allopathic physicians in the US excluding physicians in training (ie. residents, post-graduate trainees). According to the American Osteopathic Association, there are approximately 44,000 osteopathic physicians in the US.² Current data on the numbers of osteopathic physicians enrolled in allopathic and osteopathic post-graduate residency programs suggest that approximately one half of osteopathic physicians are included in the AMA Masterfile. (See Section III for further information about post-graduate training in the US.)

The AMA Masterfile data suggest that the US had a ratio of 226 physicians per 100,000 population in 1998 (excluding physicians in training).³ The number of US physicians rose by 17% between 1994 and 1998. During this period, growth in the US physician supply outstripped the rate of growth in the US population, resulting in an 12% increase in the ratio of physicians to population from 202 to 226 per 100,000 population.⁴ (See Table 1)

Table 1: Allopathic physicians (excluding trainees), number and ratio to population, United States, 1994 to 1998

	1994	1995	1996	1997	1998	% change
Total population (in thousands)	260341	262755	265284	267901	271815	4%
Physicians per 100,000 population (excluding residents)	202	210	214	219	226	12%
Total physicians (excluding residents)	525936	551647	568913	585569	614978	17%
Male physicians (excluding residents)	431482	443795	454915	465019	481561	12%
Female physicians (excluding residents)	94454	107852	114589	120550	133417	34%
Domestic medical graduates (excluding residents)	403155	419828	430689	438487	463073	15%
International medical graduates (excluding residents)	122781	131819	138224	147082	151905	24%

Source: American Medical Association. *Physician Characteristics and Distribution*. Chicago: American Medical Association, 1996, 1997, 1998, 1999, and 2000 editions.

Specialty distribution

One of the distinguishing characteristics of the US physician workforce is the large proportion of specialists. Only 13% of physicians who reported their specialty to the AMA were family practitioners/general practitioners.⁵ (See Table 2) Other primary care specialties (ie, general internal medicine and general paediatrics) accounted for only an additional 26% of physicians.⁶ Approximately 23% of allopathic physicians were in surgical specialties (including general surgery), 9% were in medical specialties and 3% in laboratory specialties. The remaining 26% were in a various other specialties such as anaesthesia, diagnostic radiology, emergency medicine and psychiatry. Between 1994 and 1998, the number of physicians in other primary care specialties grew more rapidly than then number of physicians in any other major specialty grouping, rising by 19% from 126,749 to 150,264 physicians. Laboratory specialties had the lowest rate of growth during this period, rising only 6% from 15,291 to 16,204 physicians. (See the Appendix for a listing of specialties in each major specialty grouping.)

The specialty distribution of osteopathic physicians is quite different from that of allopathic physicians. Over one half of osteopathic physicians practice in general practice, internal medicine, paediatrics and obstetrics/gynaecology.⁷ This difference may be attributed to the higher priority osteopathic medical schools place on preparing students for careers as primary care physicians. Some allopathic schools emphasize primary care, but others focus on preparing students for careers in specialty practice and research.

Table 2: Physicians, by major specialty group (excluding trainees), United States, 1994 to 1998

Physicians (excluding residents)	1994	1995	1996	1997	1998	% change
<i>Persons</i>						
Family Practice/General Practice	66230	67933	70363	71330	73902	12%
Other Primary Care Specialties	126749	134007	141998	148502	150264	19%
Laboratory Specialties	15291	15378	15732	16454	16204	6%
Medical Specialties	42702	44457	45499	47046	48443	13%
Surgical Specialties	122504	124621	122808	131415	132692	8%
Other Specialties	133932	139041	141983	146388	148358	11%
<i>Males</i>						
Family Practice/General Practice	55074	55125	56487	57009	58290	6%
Other Primary Care Specialties	93518	96573	101402	105451	105384	13%
Laboratory Specialties	11744	11600	11777	12140	11942	2%
Medical Specialties	38185	39349	40119	41298	42308	11%
Surgical Specialties	110493	111114	113883	116234	116558	5%
Other Specialties	108262	111171	112960	115567	117077	8%
<i>Females</i>						
Family Practice/General Practice	11156	12808	13876	14321	15612	40%
Other Primary Care Specialties	33231	37434	40596	43051	44880	35%
Laboratory Specialties	3547	3778	3955	4314	4262	20%
Medical Specialties	4517	5108	5380	5748	6135	36%
Surgical Specialties	12011	13507	8925	15181	16134	34%
Other Specialties	25670	27870	29023	30821	31281	22%
<i>Domestic Medical Graduates</i>						
Family Practice/General Practice	51165	52056	53790	55482	57920	13%
Other Primary Care Specialties	80155	84154	88788	102169	104604	31%
Laboratory Specialties	9727	9782	10134	11287	11223	15%
Medical Specialties	32144	33292	34279	36453	37855	18%
Surgical Specialties	98905	101427	99614	109027	110485	12%
Other Specialties	98777	102788	105546	112360	114328	16%
<i>International Medical Graduates</i>						
Family Practice/General Practice	15065	15877	16573	15848	15982	6%
Other Primary Care Specialties	46594	49853	53210	46333	45660	-2%
Laboratory Specialties	5564	5596	5598	5167	4981	-10%
Medical Specialties	10558	11165	11220	10593	10588	0%
Surgical Specialties	23599	23194	23194	22388	22207	-6%
Other Specialties	35155	36253	36437	34028	34030	-3%

Source: American Medical Association. *Physician Characteristics and Distribution*. Chicago: American Medical Association, 1996, 1997, 1998, 1999, and 2000 editions.

Gender

Although the number of women entering medical school in the US has increased dramatically over the past 30 years, men continue to constitute the majority of physicians. According to the AMA Masterfile, in 1998 approximately 78% of US physicians were men (481,561) and 21% were women (133,417).⁸ The specialty distribution of male and female physicians varies significantly. Women physicians were more likely than men physicians to specialize in general internal medicine or general paediatrics (38% versus 23%). Women were less likely to be in surgical specialties (14% versus 26%). The majority of women surgeons specialize in obstetrics/gynaecology, whereas men are more evenly distributed across surgical specialties.⁹ Between 1994 and 1998, family practice/general practice experienced the highest rate of growth in the number of female physicians (40%) and laboratory specialties the lowest rate of growth (20%).

International medical graduates

Graduates of international medical schools (IMGs) comprise a significant component of the US physician workforce. In 1998, approximately 25% of US physicians (excluding residents) graduated from international medical schools (151,905) and 75% graduated from US medical schools (463,073). International medical graduates were more likely to specialize in general internal medicine or general paediatrics than domestic medical graduates (34% versus 24%) and less likely to be in surgical specialties (17% versus 25%).¹⁰

Geographic distribution

Physicians are not distributed evenly across the US. Urban areas generally have higher ratios of physicians to population than rural areas. In 1995, the ratio of active physicians per 100,000 population ranged from a high of 304 per 100,000 population in large metropolitan areas to a low of 53 per 100,000 population in rural areas with less than 2,500 persons that are not adjacent to metropolitan areas.¹¹

Inactive physicians

The US does not systematically collect information about rates of unemployment among physicians. The labour market for physicians is strong. Virtually all physicians who are interested in working are able to secure employment, although not always at their desired rate of compensation or in their preferred location.

The AMA does track the number of “inactive” physicians, which it defines as physicians who practice medicine less than 20 hours per week. In 1998, approximately 9% of US physicians (69,889 physicians) were “inactive” per the AMA definition. The percentage of US physicians who were “inactive” was stable between 1994 and 1998.¹² Most US physicians who are classified as “inactive” (85%) are over age 65 years, the customary age of retirement in the US. Male physicians were almost twice as likely to be “inactive” as female physicians (10% versus 5%). This finding most likely reflects differences in the age distribution of male and female physicians. A much larger percentage of male physicians are at or above age 65 years. Approximately 21% of male physicians are age 65 or older, whereas only 6% of female physicians are in this age cohort. Domestic medical graduates are less likely to be active than international medical graduates (10% versus 6%).¹³

II. ORGANIZATION AND FINANCING OF PHYSICIAN PRACTICES

Physicians in the US receive compensation from a wider variety of sources than physicians in most other nations because the US does not have universal health insurance. The majority of working Americans receive commercial health insurance coverage through their employers. Many employers provide coverage to workers' spouses and children as well. Other Americans have individual commercial health insurance policies. Government programs are also a major source of health insurance. Virtually all Americans age 65 years or older participate in the Medicare program. Many low-income persons are enrolled in the Medicaid program and other government health insurance programs (eg., the Children's Health Insurance Program). Approximately 18% of Americans are uninsured.¹⁴

Table 3 displays the mean and median percentage of revenue that physicians derive from various sources. Actual revenues from each payor vary considerably among US physicians. For example, some physicians in private practice treat very few Medicaid recipients, whereas physicians practicing in community health centers or public hospitals usually treat large numbers of them.

Table 3: Mean and median percentage of revenue, by type of payment, United States, 1998

Type of Revenue	Mean	Median
Commercial Insurance	43%	40%
Medicare	29%	25%
Medicaid	12%	5%
Patient (eg., copayments, deductibles, sliding fee scale for uninsured patients)	12%	9%

Source: American Medical Association. *Physician Socioeconomic Statistics, 1999-2000*. Chicago: American Medical Association, 2000, p. 99, Table 46.

Practice arrangements

Until recently, physician practice in the US was predominantly a "cottage industry" of independent small businesses. Most physicians owned their practices and worked in solo practice or small groups of a few physicians. Physicians were their own bosses, with considerable autonomy in the conduct of their clinical work.¹⁵

Perhaps the most sustained and noteworthy trend in physician practice arrangements has been the steady growth in the number of physicians working as employees. The proportion of practicing physicians who indicated that they are employees nearly doubled between 1983 and 1994, rising from 24% to 42%.¹⁶ The most current data available, indicate that 36% of physicians practicing in 1998 were employees.¹⁷ (See Table 4) Female physicians are much more likely to practice as employees than male physicians. New physicians (ie. those who recently completed post-graduate training) are also more likely to practice as employees.¹⁸

Table 4: Distribution of physicians, by employment type, United States, 1998

Employment Type	Percentage
Self-employed Solo Practice	26%
Self-employed Group Practice	37%
Employee	36%
Independent Contractor	2%

Source: American Medical Association. *Physician Socioeconomic Statistics, 1999-2000*. Chicago: American Medical Association, 2000, p. 34, Figures 7 and 8.

US physicians are employed by a wide variety of organizations. (See Table 5) Group practices and freestanding centers account for the largest proportion of employee physicians. They employ over one quarter of all employee physicians. State and local governments are the second largest employer of physicians.

Table 5: Distribution of employee physicians, by type of employer, United States, 1998

Type of Employer	Percentage
Group Practice or Freestanding Center	29%
Health Maintenance Organization	5%
Medical Schools, Universities, or Colleges	20%
Private Hospital	17%
State or Local Government	26%
Unknown	3%

Source: American Medical Association. *Physician Socioeconomic Statistics, 1999-2000*. Chicago: American Medical Association, 2000, p. 127, Table 64.

Although many physicians remain in solo or small group practice, over the past decade physicians in the US increasingly organized themselves into larger practice structures. In 1996, the US had approximately 400 large medical groups that included 50 or more physicians. Approximately 10% of all practicing physicians in the US worked in these groups.¹⁹

Many other physicians who remain in small practices belong to networks of practices that negotiate collectively with health insurance plans for contracts. These physician networks are often referred to as Independent Physician Associations (IPAs). IPAs serve as a contractual intermediary between health plans and physicians in private practices.

Some of these practice arrangements evolved from earlier alternatives. The most noteworthy of these are the multi-specialty group practice and the large medical group practice affiliated with a single health plan. In multi-specialty group practices, physicians from different specialties work together as partners or employees of a large, geographically centralized organization. The Mayo Clinic is a prestigious exemplar of the multi-specialty group model. Kaiser Permanente is the largest and most well known example of a large medical group affiliated with a single health maintenance organization (HMO). The

Permanente Medical Group contracts with the Kaiser Health Plan to be the exclusive provider of medical services to persons enrolled in the Kaiser Health Maintenance Organization.²⁰

Most health plans formed during the 1990s do not contract exclusively with a single medical group as Kaiser does. Nor do they directly employ physicians, as some older HMOs did. Instead, most of the newer health plans contract with multi-specialty medical groups or with IPAs. The extent to which health plans contract with multi-specialty groups relative to IPAs and independent physicians varies significantly across the US. In California, most HMOs contract with multi-specialty groups or IPAs. In other parts of the US, many HMOs contract directly with individual physicians.²¹

Two additional types of physician organizations emerged in the mid-1990s: physician-hospital organizations (PHOs) and physician-practice management companies (PPMs). PHOs are entities formed by hospitals to contract with health plans on behalf of participating hospitals and affiliated physicians. Some physician practices that participate in PHOs are owned by hospitals; others remain independent businesses that affiliate with hospitals only for contracting purposes. Approximately one third of physician practices with three or more physicians participate in a PHO for a portion of their patients.²²

PPMs are for-profit companies that own or manage physician practices and typically operate in multiple markets. Some PPMs manage practices in multiple specialties, whereas others focus on a single specialty. They directly employ some physicians and contract with others through IPAs and medical groups. In 1996, approximately 26,000 physicians were affiliated with the three largest multi-specialty PPMs.²³ PPMs have generally been unsuccessful in providing investors with anticipated returns. Two of the three largest PPMs collapsed in 1998, leaving many physicians scrambling to reorganize their practices.²⁴

Forms of payment

Prior to the 1990s, most self-employed physicians received fee-for-service payments based on “reasonable and customary” charges for their services. Over the past decade, two other payment methods have become the most common forms of physician compensation: discounted fee-for-service and capitation. Under discounted fee-for-service, physicians agree to accept discounted payments for providing services to enrollees of health plans with which they contract. Under capitation, physicians are paid a set fee for each enrollee regardless of the number and type of services provided. Physicians may receive capitated payments solely for their own services, or they may be “capitated” for specialty physician services, ancillary services (eg, laboratory), and pharmaceuticals. Historically, health plans have provided capitated payments primarily to primary care physicians and discounted fee-for-service payments to specialists.²⁵ During the late 1990s a number of HMOs and IPAs reversed their compensation arrangements and began to pay primary care physicians on a discounted fee-for-service basis and to pay specialists by capitation.²⁶

As indicated previously, in some parts of the US health plans contract primarily with IPAs and multi-specialty groups rather than with individual physicians. In some cases, an IPA

may receive capitation payments from health plans but pay its members on a discounted fee-for-service basis. Similarly, a multi-specialty group might receive capitation payments but pay its physicians salaries plus bonuses.

III. MEDICAL EDUCATION

Undergraduate medical education

In the US, physicians enter medical school after completing four years of college that must include certain required courses in mathematics and the biological and physical sciences. US medical schools generally have a four year curriculum, although some also offer a decelerated five year curriculum. As noted in Section I, persons interested in becoming physicians may enrol in either an allopathic or an osteopathic medical school.

The US has 125 allopathic medical schools. As is typical of higher education in the US, US medical schools include both public (ie., supported by state government) and private institutions. Approximately 60% of US medical schools are public and 40% are private. Medical schools are distributed unevenly across the US. Many are located in large cities in Eastern and Midwestern states. Six states have no medical schools.²⁷

During the 1999-2000 academic year, a total of 66,550 persons were enrolled in US allopathic medical schools.²⁸ The number of first-year students in allopathic medical schools has been stable over the past 20 years, generally fluctuating by less than 1,000 students from year to year. As shown in Table 6, the number of applicants to allopathic medical schools declined by 15% between 1994-1995 and 1999-2000, from 45,365 to 38,529 persons. The number of applicants declined an additional 3.6% between 1999-2000 and 2000-2001.²⁹ However, the number of applicants to allopathic schools is still much greater than the number of places available for first-year medical students. Only 45% of persons who applied to an allopathic medical school in 1999-2000 were admitted.

Table 6: United States allopathic medical schools: applicants, acceptances, and 1st year enrolment, 1994-1995 and 1999-2000

	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	% change
Persons							
Applicants	45365	46591	46968	43020	41004	38529	-15%
Accepted Applicants	17317	17357	17385	17313	17379	17445	1%
First-Year Enrolment	17048	17024	16904	16844	16790	16856	-1%
Males							
Applicants	26397	26812	26937	24747	23217	21096	-20%
First-Year Enrolment	9857	9673	9636	9519	9340	9131	-7%
Females							
Applicants	18968	19779	20031	18273	17787	17433	-8%
First-Year Enrolment	7191	7351	7268	7325	7450	7725	7%

Source: B Barzansky, HS Jonas, SI Etzel, Educational Programs in US Medical Schools, 1999-2000. *Journal of the American Medical Association*, 2000; 284:1114-1120, Tables 3 and 4.

Over the past 30 years, the number of women completing medical school in the US has increased dramatically. In the 1999-2000 academic year, approximately 46% of first-year students enrolled at allopathic medical schools were women (7,725). The number of female first-year students increased by 7% between 1994-1995 and 1999-2000.³⁰

Medical schools have made less progress toward producing a physician workforce that reflects the racial/ethnic composition of the US population. (See Table 7) Several racial/ethnic groups are underrepresented among physicians. African-Americans comprise an estimated 13% of the US population but only 8% of allopathic medical students. Similarly, Hispanics account for 11% of the US population but only 7% of students.^{31,32} The number of underrepresented minority students in US medical schools declined significantly during the latter half of the 1990s. This trend is associated with prohibitions on the use of race as a criterion for admission to professional schools in California, Louisiana, Mississippi and Texas.³³

Table 7: Race and ethnic background of United States allopathic medical students, 1999-2000

Racial/Ethnic Group	1 st Year Enrollees	Graduates	Total Enrollees
Black (Non-Hispanic)	8%	7%	8%
Native American*	1%	1%	1%
Mexican American	3%	3%	3%
Mainland Puerto Rican	1%	1%	1%
Other Puerto Rican	1%	1%	1%
Other Hispanic	2%	2%	2%
Asian/Pacific Islander	19%	18%	19%
All Other Students**	65%	67%	66%

* Includes Native American, Native Alaskan and Native Hawaiian.

** All Other Students includes white (not of Hispanic origin) students and students of unknown race and ethnic backgrounds.

Source: B Barzansky, HS Jonas, SI Etzel, Educational Programs in US Medical Schools, 1999-2000. *Journal of the American Medical Association*, 2000; 284:1114-1120, Table 5.

The US also has 19 colleges of osteopathic medicine. These colleges enrolled 9,882 students in 1998.³⁴ One of the most striking differences between allopathic and osteopathic medical education concerns rates of growth in the number of medical schools. The number of allopathic medical schools decreased by one when two medical schools consolidated in the mid-1990s. In contrast, the number of osteopathic medical schools has grown from 14 to 19 schools over the past 20 years. The annual number of graduates of osteopathic schools doubled between 1979 and 1998 and is projected to increase by approximately 25% between 1998 and 2002.^{35,36} Nevertheless, the number of osteopathic medical students remains much smaller than the number of allopathic medical students. There are approximately 8 allopathic students for each osteopathic student.

Graduate medical education

Once a US physician has completed medical school, s/he must complete one or more years of post-graduate training (ie, residency, graduate medical education) to be eligible for licensure for practice. In the US, licensure of physicians and other health professionals is a responsibility of state governments. All states require at least one year of post-graduate training for licensure and some states require additional years.³⁷ Most states require allopathic physicians to be trained in an allopathic post-graduate training program accredited by the Accrediting Council of Graduate Medical Education. Five states require osteopathic physicians to complete an osteopathic internship approved by the American Osteopathic Association.³⁸ In other states osteopathic physicians may complete either an osteopathic or an allopathic residency program.

Most US physicians complete more years of post-graduate training than the minimum required by state law because most wish to be eligible for certification in a particular specialty. The minimum number of years of post-graduate training required for certification is determined by individual specialties and ranges from three years (family practice and other primary care specialties) to seven years (several surgical specialties).³⁹ Osteopathic

residency programs generally require trainees to first complete a one-year internship that encompasses rotations in a wide range of specialties. Upon completion of the minimum requirements for certification in a specialty, some physicians elect to complete additional training in a subspecialty (eg., cardiology, paediatric surgery).

The AMA's Medical Education Database is the most comprehensive source of data on allopathic post-graduate trainees and training programs. According to the AMA, there were a total of 97,989 postgraduate trainees enrolled in allopathic residency programs during the 1999-2000 academic year. As Table 8 illustrates, the total number of allopathic residents was stable between 1994-1995 and 1999-2000. The number of entry level postgraduate trainees (ie, residents with no prior US GME) in allopathic residency programs increased only slightly during the period from 1994-1995 to 1999-2000, rising by 2% from 21,949 to 22,320 trainees.⁴⁰ This stability contrasts markedly with the preceding five years, which witnessed rapid growth in the number of postgraduate trainees.

Table 8: Postgraduate-trainees, United States, 1994-1995 to 1999-2000

Year	1994- 1995	1995- 1996	1996- 1997	1997- 1998	1998- 1999	1999- 2000	% change
Entry Level Trainees*	21949	21372	21394	21808	21732	22320	2.00%
Total Trainees	97832	98035	98076	98143	97383	97989	0.05%

* includes all residents in graduate year 1 positions with no prior GME.

Source: S Brotherton, F Simon, S Tomany, US Graduate Medical Education, 1999-2000, *Journal of the American Medical Association*, 2000; 284:1121-1126.

Post-graduate trainees are enrolled in over 100 different types of training programs. Only eleven percent of trainees were in family practice. (See Table 9) Thirty-one percent were in other primary care specialties (ie, general internal medicine, general paediatrics, and internal medicine/family practice, internal medicine/paediatrics).⁴¹ Trainees in other primary care specialties include both trainees who plan to practice as primary care physicians and those who plan to pursue subspecialty training in medical and paediatric specialties. Fifty-eight percent of trainees were in non-primary care specialties. (See the Appendix for a listing of specialties in each major specialty grouping.)

Table 9: Postgraduate trainees, by major specialty group, United States, 1999

	Persons	Males	Females	Domestic	International
Family Practice	10533	5584	4949	8882	1622
Other Primary Care Specialties	30622	16475	14147	20864	9623
Laboratory Specialties	2622	1411	1211	1333	1269
Medical Specialties	11134	7563	3571	6322	4773
Surgical Specialties	20952	14920	6032	18899	1998
Other Specialties	22126	14654	7472	14885	7129
Total	97989	60607	37382	71185	26414

Source: Graduate Medical Education, *Journal of the American Medical Association*, 2000;284(9): 1159-1172, Appendix II, Table 1.

Similar to practicing physicians, the distribution of male and female post-graduate trainees across specialties differs significantly. Female trainees are much more likely than males to be in family practice or other primary care specialties (51% vs. 36%) and less likely to be in surgical specialties (16% vs. 25%) with the exception of obstetrics/gynaecology. The distribution of domestic and international medical graduates also differs. Domestic medical graduates (ie, graduates of US allopathic and osteopathic schools) are much more likely than international medical graduates to be in surgical specialties (27% vs. 8%) and much less likely to be in other primary care specialties or medical specialties (38% vs. 54%).⁴²

Graduates of both allopathic and osteopathic medical schools are eligible to apply for admission to allopathic residency training programs. As Table 10 indicates, 67,316 graduates of US allopathic medical schools and 3,869 graduates of US osteopathic schools were enrolled in allopathic post-graduate training programs in 1999-2000.⁴³ During that year, an additional 3,941 osteopathic physicians were enrolled in osteopathic postgraduate training programs approved by the AOA.⁴⁴ Thus, approximately one half of osteopathic post-graduate trainees are in osteopathic programs and approximately one half are in allopathic programs. The number of osteopathic physicians enrolled in allopathic post-graduate training programs increased by 18.5% between 1994-1995 and 1999-2000.

International medical graduates (IMGs - ie. foreign nationals) comprise a significant fraction of postgraduate trainees in the US. In 1999-2000, approximately 1% of allopathic postgraduate trainees were graduates of Canadian medical schools and 26% were graduates of medical schools in other nations. (The AMA reports data on graduates of Canadian schools separately from data on other IMGs, because Canadian schools are accredited by the same organization that accredits US medical schools.) The number of non-Canadian IMG trainees increased by 10% between 1994-1995 and 1999-2000.

Table 10: Postgraduate trainees, by type of medical school attended, United States, 1994-1995 to 1999-2000

Number of Trainees (Residents)	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	% change
US Allopathic Graduates (MDs)	67524	68647	66893	67111	67085	67316	-0.3%
US Osteopathic Graduates (DOs)	3264	3333	3288	3367	3678	3869	18.5%
Canadian Medical Graduates	580	619	554	571	566	534	-7.9%
International Medical Graduates	23499	24982	24703	25531	25415	25880	10.1%
Unknown	2965	454	2638	1563	639	390	-86.8%
Total	97832	98035	98076	98143	97383	97989	0.2%

Source: S Brotherton, F Simon, S Tomany, US Graduate Medical Education, 1999-2000, *Journal of the American Medical Association*, 2000; 284:1121-1126.

IV. IMMIGRATION

Post-graduate training (ie. residency) is the portal of entry for all international medical graduates (IMGs) who practice in the US. As noted in Section III, all states require physicians to complete at least one year of post-graduate training in the US. All IMGs enrolled in US post-graduate training programs are enrolled in allopathic programs because osteopathic post-graduate training programs limit admission to graduates of US osteopathic medical schools.

To obtain entry into allopathic post-graduate training programs, an IMG must be certified by the Educational Commission for Foreign Medical Graduates (ECFMG). This organization was established in 1956 to validate the educational credentials of IMGs and ensure that IMG trainees are prepared to complete US post-graduate training⁴⁵. To obtain ECFMG certification, IMGs must pass the Test of English as a Foreign Language (TOEFL) and must pass Steps 1 and 2 of the three-step United States Medical Licensing Examination (USMLE). (Passage of all three parts of this examination is required for licensure for both domestic and international graduates. Step 3 is typically completed during residency.) Since 1998, IMGs have also been required to complete a Clinical Skills Assessment (CSA) examination, which tests clinical skills, interpersonal skills and proficiency in spoken English.⁴⁶ Unlike the TOEFL and USMLE, which can be taken at testing centers around the world, the CSA is administered only in one city in the US (Philadelphia, Pennsylvania). Some experts have speculated that the addition of the CSA requirement may reduce the number of IMGs pursuing post-graduate training in the US because some IMGs may be unable to pass the examination or may be unwilling to travel to Philadelphia to complete it.⁴⁷

The US has a complicated array of immigration laws aimed at achieving a variety of policy goals. This complexity is most evident in the wide range of immigration statuses among IMG post-graduate trainees. There are three major categories of IMG trainees. The first

category is composed of US citizens who complete medical school in another country, primarily in Mexico or Caribbean nations. Permanent residents and refugees comprise the second category. Permanent residents are granted entry to the US primarily based on their familial relationships with US citizens and permanent immigrants.⁴⁸ A small number of IMG trainees are admitted as refugees from countries experiencing political strife. Permanent residents and refugees are legally entitled to remain in the US after they complete residency training and may apply for US citizenship.

The third category of IMG trainees is comprised of IMGs with temporary visas for education or work in the US. Most IMG trainees with temporary visas participate in the J-1 exchange visitor programs, which was established in 1949. IMG trainees with J-1 visas are required to return to their home countries for a minimum of two years upon completion of post-graduate training, unless they obtain a waiver from a federal or state government agency. Such waivers are contingent upon practice in a federally designated Health Professions Shortage Area for at least three years. The number of J-1 waivers sought annually rose dramatically during the 1990s, from 70 in 1990 to 1,746 in 1996.⁴⁹ The second most common non-immigrant visa category for IMG trainees is the H-1B visa. Unlike IMG trainees with J-1 or J-2 visas, those with H-1B visas are not required to return to their home countries before petitioning to become permanent residents.⁵⁰ Other non-immigrant visa categories include B-1, B-2, F-1, H-1, H-2, and H-3.

Table 11 displays IMG post-graduate trainees by immigration status. Nineteen percent of IMGs in postgraduate training posts in 1999 were US citizens (native or naturalized). Thirty-six percent were permanent residents, and 39% had a temporary visa for education or employment. The five-year period from 1995 to 1999, witnessed a significant increase in the number of IMG trainees who are US citizens, permanent residents and refugees and a decrease in the number of IMG trainees with temporary visas. During this period, the number of IMG post-graduate trainees who were US citizens, permanent residents or refugees increased by 19% and the number of IMG trainees with temporary visas decreased by 16%.

Table 11: Postgraduate trainees from international medical schools, by citizenship/visa status, United States, 1995-1999

Category	1995	1996	1997	1998	1999	% change
Native US citizen	2057	1926	1958	2256	2556	24%
Naturalized US citizen	1973	1891	2021	2094	2359	20%
Permanent resident	6985	7782	8450	8907	9196	32%
B-1, B-2 temporary visitor	146	94	83	66	50	-66%
F-1 student	86	73	53	55	52	-40%
H-1, H-1B, H-2, H-3 temporary worker	2363	2435	2354	1972	2001	-15%
J-1, J-2 exchange visitor	9183	8986	8887	8337	7812	-15%
Refugee/asylum/displaced person	862	116	106	83	77	-91%
Other	347	363	375	411	446	29%
Unknown	1221	1037	1244	1234	1331	9%
Total IMG Trainees (Residents)	25223	24703	25531	25415	25880	3%

Source: Appendix II. Graduate Medical Education. *Journal of the American Medical Association*, Medical education issues, 1996, 1997, 1998, 1999 and 2000.

Physicians may immigrate to the US regardless of whether they are able to meet the ECFMG's requirements for entry into post-graduate training programs. An estimated 100,000 unlicensed IMGs live in the US.⁵¹ Anecdotal reports suggest some unlicensed IMG physicians are working in health care in non-physician positions in clinical care and research. Several states have experimented with training and licensing IMG physicians for practice as physician assistants.⁵²

V. HOT TOPICS AND TRENDS

Workforce policy seldom makes the list of top 10 topics in health policy in the US. These debates tend to focus primarily on the financing and organization of health care services. Policymakers and the media generally explore health workforce issues only when shortages of health professionals are perceived to exist. For example, over the past several years, journalists have focused primarily on difficulties hospitals are experiencing in recruiting and retaining registered nurses. Current federal health policy initiatives are not focused on physicians and, instead emphasize oral health and mental/behavioural health. Nevertheless, a few physician workforce topics are currently garnering a modicum of attention from policymakers and the media.

National physician workforce policy (or lack thereof)

Unlike many countries, the US has no national physician workforce policy. The federal government monitors physician workforce and education through the US Bureau of Health Professions and the Council on Graduate Medical Education but does not establish policies regarding the number of physicians trained in the US or their specialty distribution. The single most noteworthy change in federal funding for medical education over the past five years -- the cap on the number of post-graduate (ie. residency) positions funded by the Medicare program established as part of the Balanced Budget Act of 1997 -- was enacted to constrain expenditures in the Medicare program rather than to limit the number of post-

graduate trainees.⁵³ Calls by the Council on Graduate Medical Education,^{54,55} the Institute of Medicine,⁵⁶ the Pew Health Professions Commission,⁵⁷ the Physician Payment Review Commission⁵⁸ and other organizations to establish a national physician workforce planning process to allocate funding on the basis of national workforce priorities were largely unheeded. Federal physician workforce policy is limited primarily to modestly funded programs that seek to increase the number of primary care physicians, improve the geographic distribution of physicians and increase the number of physicians from disadvantaged backgrounds (including racial/ethnic minorities).

Organizational models/funding

As described in Section II, the numbers of US physicians who practiced as employees or were affiliated with large medical groups or IPAs grew dramatically during the 1990s. Many of these organizations are now experiencing financial distress. Medical groups' and IPAs' financial difficulties stem from several sources, including inability to obtain adequate and timely payments from health plans and inexperience in managing financial risks associated with capitated contracts. These financial straits are most evident in California, where a number of medical groups and IPAs have become insolvent over the past year, resulting in long delays in payments to physicians for their services.^{59,60}

US physicians are also being affected by major changes in health plan enrolment and health plans' physician payment policies. Growth in enrolment in HMOs has plateaued in recent years. Enrolment in preferred provider organizations (PPOs) and other looser forms of managed care are growing more rapidly. PPOs typically pay physicians on a discounted fee-for-service basis. In addition, some reports suggest that HMOs are moving away from capitated payments to discounted fee-for-service largely because physicians are no longer so willing to accept the financial risks associated with capitation.⁶¹

Quality of medical care

Over the past year, US policymakers have become increasingly concerned about the quality of medical care. These concerns were sparked by a report on medical errors released by the Institute of Medicine.⁶² This report cited alarming statistics about the prevalence of medical errors and called for major, systemic changes in the reporting and correction of errors. The report prompted some Members of Congress to call for public release of information about malpractice claims contained in the National Practitioner Databank. In addition, policymakers continue to pursue piecemeal legislation that seeks to improve access to high-quality medical care by limiting the restrictions that health plans can impose on coverage for specific medical services. Finally, there are numerous ongoing efforts to measure the quality of care provided by physicians, hospitals and health plans, some of which are funded by grants from federal health research programs.

Supply and production

Over the past year, physician workforce experts and policymakers in rapidly growing states have begun to question the conventional wisdom that the US is training a sufficient number of medical students. Fitzhugh Mullan, MD, former Director of the US Bureau of Health Professions, made a provocative case for expanding medical school enrolment in an

editorial that appeared in the *New England Journal of Medicine* in July 2000.⁶³ In the editorial, Dr. Mullan observed that the US demands significantly more physicians than the current capacity of US medical schools. Dr. Mullan argued that enrolment in US medical schools should be expanded to provide more opportunities for young Americans to pursue careers in medicine and to reduce the “brain drain” of IMGs away from their homelands. State legislators in Florida most likely had more parochial interests in mind when they voted earlier this year to establish a new medical school. Florida is one of the fastest growing states in the US and has a large proportion of elderly residents.

Specialty mix

During the 1990s, the Council on Graduate Medical Education,⁶⁴ the Pew Health Professions Commission⁶⁵ and other organizations argued that the US physician workforce should be composed of equal number of generalists and specialists. Some physician workforce experts have begun to question the appropriateness of the 50:50 goal. These experts argue that despite the seeming overabundance of specialists, there are few reports of unemployment. They also believe the US is likely to demand more specialists than 1990s prognosticators anticipated, due to the stagnation of enrolment in HMOs, the rapid growth in the number of elderly Americans, and dramatic advances in biomedical research, such as the mapping of the Human Genome.

Racial/ethnic diversity

The lack of racial/ethnic diversity in the US physician workforce is an ongoing concern. During the 1990s, the Association of American Medical Colleges (AAMC) launched an ambitious initiative to increase the number of underrepresented minority students in US medical schools to 3,000 by the Year 2000. (AAMC considers African-Americans, Mainland Puerto Ricans, Mexican-Americans and Native Americans to be underrepresented in medicine.) The success of the “3000 by 2000” initiative has been constrained by the repeal of affirmative action in medical school admissions in several states with high underrepresented minority populations (California, Louisiana, Mississippi, Texas, and Washington). The number of underrepresented minority applicants to allopathic medical schools fell by 15% between 1994 and 2000, a rate of decrease significantly sharper than the decrease in applicants from other racial/ethnic groups. The only bright spot on the horizon is a modest increase in the number of underrepresented minority applicants between 1999 and 2000.⁶⁶ The US will have to wait until spring 2001 to learn whether this increase in underrepresented minority applicants will translate into an increase in the number admitted to medical school.

Geographic distribution

The geographic maldistribution of physicians is another perennial concern in the US. The states and the federal government have established a wide variety of policies and programs aimed at increasing the number of physicians practicing in medically underserved areas.^{67,68} Service-contingent scholarship and loan repayment programs are among the most popular approaches. Under these programs, physicians and other health professionals receive assistance in paying for their education in exchange for practice in a medically underserved area for a specific period of time. The oldest and most well-known of these programs is the

National Health Service Corps. A front-page article in the *New York Times* recently called attention to the program's inability to provide assistance to all eligible clinicians due to budget constraints.⁶⁹

APPENDIX: United States specialty groupings

Family Practice/General Practice

Family Practice
General Practice

Other Primary Care Specialties

General Internal Medicine
General Paediatrics

Laboratory Specialties

Pathology-Anatomical/Clinical
Cytopathology
Forensic Pathology
Other Subspecialties of Pathology

Medical Specialties

Allergy & Immunology
Cardiovascular Disease
Critical Care Medicine (Internal Medicine)
Dermatology
Endocrinology
Gastroenterology
Geriatric Medicine
Haematology
Infectious Disease
Neonatal-Perinatal Medicine
Nephrology
Oncology
Paediatric Cardiology
Paediatric Critical Care Medicine
Paediatric Haematology/Oncology
Pulmonary Disease
Rheumatology
Other Medical Specialties
Other Paediatric Specialties

Surgical Specialties

General Surgery
Colon/Rectal Surgery
Neurological Surgery
Obstetrics/Gynaecology
Ophthalmology
Orthopaedic Surgery
Otolaryngology
Paediatric Surgery
Plastic Surgery
Urological Surgery
Other Surgical Specialties

Other Specialties

Aerospace Medicine
Anaesthesiology
Anaesthesiology Subspecialties
Diagnostic Radiology
Emergency Medicine
General Preventive Medicine
Medical Genetics
Neurology
Nuclear Medicine
Occupational Medicine
Physical Medicine/Rehabilitation
Psychiatry
Psychiatric Specialties
Public Health
Radiology
Radiology Subspecialties
Radiation Oncology

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- ⁵ Family practitioners are physicians who have completed a post-graduate training program (ie., residency program) in the specialty of family practice (sometimes referred to as family and community medicine). Family practice training programs are usually of three years duration. General practitioners are physicians who have completed the minimum amount of post-graduate training required for licensure in the states in which they practice but have not completed the requirements for training in any particular specialty. The number of general practitioners has declined significantly since the specialty of family practice was established in the late 1960s.
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