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ABSTRACT

This study has 3 primary goals: (1) The development of a manpower supply-demand model for medicine in Pennsylvania; (2) Utilization of the model to make projections of physician needs for Pennsylvania from 1971-1980; and (3) A general analysis of the data particularly with regard to the current dilemma in medical care for which Pennsylvania and other states are seeking solutions. The findings include the following: (1) Pennsylvania compares well with other states in regard to physician-population ratios and other general indices. (2) Despite this, Pennsylvania is far from meeting optimum care physician ratios. (3) Basic care specialists such as those in family medicine, general practice, and internal medicine are and will be in short supply unless a radical change in the rate of physician entry into these professions occurs. (4) Some sections of the state are seriously lacking in basic care physicians while others are close to the optimum figure. (5) The need for more physicians in Pennsylvania can be met by: (a) producing more physicians; (b) facilitating the use of paramedical personnel; (c) changing delivery systems to increase physician productivity; and (d) encouraging better geographic distribution to meet rural and urban area needs. (Author/PG)

# A Study of Physician Manpower Demand and Supply in Pennsylvania:

## Methodology and Findings



Pennsylvania Department of Education 1973

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# ERRATA

Due to circumstances beyond the control of all concerned, in order to meet the deadline for publication, certain discrepancies unfortunately appeared in this study. The reader's indulgence is solicited in using this errata sheet.

Page 2 Column one, Item 3, third line, "impact of rising costs in."

Page 44 Column two, end of the last paragraph, "430 of them in direct patient care (Table 8)."

Page 47 Column one, paragraph 4, line 11, "physicians 5.88 per cent of the Pennsylvania medical."

Page 57 Column one, paragraph 3, line 6, "The entry of 226 for."

Page 57 Column one, the next to last line in paragraph three, "from Table 4, i.e., 751 - 90 D.O. graduates = 661."

Page 84 Last sentence in column one, "1,200 in 1968 to 1,850 in 1980."

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# CHAPTER I

## SUMMARY

A study of physician manpower in Pennsylvania was undertaken in response to a request by the Office of Higher Education, Bureau of Planning. The study, as envisioned, was to have three primary goals:

1. The development of a manpower demand-supply model that would be used with the type of data that are most likely to be available for a given profession such as medicine.

2. Utilization of the model to make projections of physician needs for Pennsylvania from 1971 to 1980 suited to the needs of higher education planning.

3. A general analysis of the data particularly with regard to the current dilemmas in medical care for which Pennsylvania and other states are seeking solutions.

Although Chapter XIII presents a comprehensive statement of the findings of this study, a summary of the principal findings is given here.

Pennsylvania compares well with other states in regard to physician-population ratios and other general indices. Pennsylvania is a medical powerhouse. New York is the only state producing more physicians than Pennsylvania. It produces more physicians than would be proportionate to its share of the total U.S. population. For example, with less than 6 per cent of the population, it is producing approximately 10 per cent of the physicians graduated in a given year.

Nevertheless, despite our good overall showing, Pennsylvania is far from meeting the optimum care physician ratios published by the Journal of Medical Economics with the exception of some surgical specialties, e.g., general surgery, where we are nearing a physician surplus. Basic care specialists such as those in family medicine, general practice and internal medicine are, and will be, in short supply unless a radical change in the rate of physician entry into these professions in Pennsylvania occurs. The number of general practitioners is now rapidly dropping but will begin to rise in the late 1970s. This rise is primarily due to the projected increase in osteopaths.

Maldistribution, geographically and in terms of areas of specialization, is as much a harsh reality here in Pennsylvania as it is elsewhere. Some sections of the state are seriously lacking in basic care physicians while others are close to the optimum figure.

Foreign-trained physicians play an important part in meeting our physician demand. However, there are serious moral and ethical questions about their use since most are from underdeveloped nations that cannot afford to lose them. They are often less able to function effectively due to communication difficulties and cultural gap. The study finds 20 per cent of the Pennsylvania physicians who graduated during the period 1961-63 were foreign and foreign trained. Separate in-migration estimates for the year 1967 give a figure of 18 per cent. In many states today one-half of all new physicians are foreign trained.

Medicine to a large degree is the creator of its own demand and demand will vary as the delivery system and medical technology changes. Nevertheless, under our present delivery system there is evidence that Pennsylvania needs more physicians than it now plans to produce or can retain in the state, particularly in the basic care areas of specialization. This need can be met by: (a) producing more physicians (expensive!), (b) facilitating the use of paramedical personnel, (c) changing delivery systems to increase physician productivity and (d) encouraging better geographic distribution to meet rural and urban area needs.

## CHAPTER II

## AN EXAMINATION OF THE MEDICAL CARE CRISIS VIEWPOINT

The crisis in medical care issue has been the concern of many writers (See references 1 through 19 at end of chapter). Although most writers have taken a crisis oriented position, some dissenting or cautionary voices have been raised by Wanniski[18] and Schwartz[19]. Even so, they acknowledge that problems do exist and that a shortage of physicians is, for the present, a reality. Their concern is over the possibility of our overreacting and thus produce a surplus of physicians. Some are also fearful that we will create undesirable changes in the medical delivery system itself. In their opinion the supposed crisis in medical care does not exist.

There is little disagreement among the writers in the following areas:

1. *Physician Shortage* does exist to some degree. A shortage of 50,000 physicians as of 1969 is the most commonly quoted figure. This is actually a conservative estimate made by the U.S. Department of Health, Education and Welfare.[20] The method used by HEW is explained in a letter from HEW sent in response to an inquiry by the author (See Appendix E).

2. *Maldistribution* of physician manpower, both geographically and in specialized areas, is increasing. There are not enough physicians in basic care and not enough in rural and inner-city practice. The number of physicians in general practice, internal medicine and pediatrics has declined between 1959-67. In 1967, for example, the decline went from 76 such physicians per 100,000 population to 49 per 100,000 population or from one doctor for every 1,316 people to one doctor for every 2,041 people. These statistics are reported in the 1970 Manpower Report of the President.[21]

3. *Medical Costs* are rapidly rising (Table 1) but the largest proportion of this rise is due to the impact of rising in labor intensive, increasingly technology oriented hospital care.[22] Physicians in 1970 netted, before taxes and after expenses, more than four times the median 1970 family income listed in the Statistical Abstract of the United States-1971.[23] This represents a slight increase over the 1965 ratio of exactly four times the 1965 median family income.

While the net income of the practitioners has increased, it must be noted that they would have had to increase their 1965 net earnings from an approximate figure of $29,000 to more than $40,435 in 1972 in order to compensate for the increases in cost of living and federal taxation (excluding state and local taxes).

The increase in net income from $24,300 in 1962 to $41,000 in 1970[23,24] and the projected increase to around $44,000 by 1972 (extrapolation by the author) cannot, therefore, be considered as unduly large. It does represent, however, a further definite improvement in financial status for the physician in general. This data is cited by written permission of Medical Economics, Inc., Oradell, New Jersey, publishers of Medical Economics and is subject to the limitations inherent in all survey data. One cannot be certain that the physicians actually report all income, those not responding may differ in income, those not included (partnerships, corporations) may have markedly different net earnings.

Physician net earnings have leveled off due to government limitations on reimbursement, foregoing of fee increases due to fear of creeping socialized medicine, consideration of what patients can or are willing to pay coupled with little improvement in physician productivity.[24]

Recent increases in physician income seem to be, in large part, a function of the marked increase in fee collection due to the advent of the medi-plans. Ninety-two per cent of the fees are now collected where much charitable work was previously required for the poor and the elderly.[24]

In general, the medical cost picture seems to be as follows.[22] For all health related purposes we spent $67.2 billion in 1970 as compared with $12.1 billion in 1950 or $26.4 billion in 1960. The percentage of the Gross National Product thus involved has also risen steadily to a value of 7.0 per cent in 1970 as compared with 4.6 per cent in 1950 and 5.3 per cent in 1960. These expenditures include such nonpersonal health

Table 1

The Problem of Rising Medical Care Costs as Reflected by the Consumer Price Index (1957 - 59 = 100)[a]

| Year | All Commodities[c] | Average or Annual Change | Total Medical Care[b] | Average or Annual Change | Physicians' Fees | Average or Annual Change | Hospital Daily Charges | Average or Annual Change | Drugs and Prescriptions | Average or Annual Change |
|---|---|---|---|---|---|---|---|---|---|---|
| 1950 | 83.8 | - | 73.4 | - | 76.0 | - | 57.8 | - | 86.6 | - |
| 1955 | 93.3 | 1.9 | 88.6 | 3.0 | 90.0 | 2.8 | 83.0 | 5.0 | 92.7 | 1.2 |
| 1960 | 103.1 | 2.0 | 108.1 | 3.9 | 106.0 | 3.2 | 112.7 | 5.9 | 102.3 | 1.9 |
| 1965 | 109.9 | 1.4 | 122.3 | 2.8 | 121.5 | 3.1 | 153.3 | 8.1 | 98.1 | -0.8 |
| 1966 | 113.1 | 3.2 | 127.7 | 5.4 | 128.5 | 7.0 | 168.0 | 14.7 | 98.4 | 0.3 |
| 1967 | 116.3 | 3.2 | 136.7 | 9.0 | 137.6 | 9.1 | 200.1 | 32.1 | 97.9 | -0.5 |
| 1968 | 121.2 | 4.9 | 145.0 | 8.3 | 145.3 | 7.7 | 226.6 | 26.5 | 98.1 | 0.2 |
| 1969 | 127.7 | 6.5 | 155.0 | 10.0 | 155.4 | 10.1 | 256.0 | 29.4 | 99.2 | 1.1 |
| 1970[d] | (130.0) | 2.3 | (155.0) | 0.0 | (160.0) | 4.6 | (270.0) | 14.0 | N.A. | - |

[a] Prior to 1965 Alaska and Hawaii are excluded.

[b] From Table No. 79, Statistical Abstract of the United States--1970, p. 62.

[c] From Table No. 523, Statistical Abstract of the United States--1970, p. 344.

[d] Estimates made from Chart 6 of The Size and Shape of the Medical Care Dollar--Chart Book/1970, Office of Research and Statistics, U.S. Department of Health, Education and Welfare, 1971.

care items as research, disease control, construction of medical facilities, etc.

### Impact of Medicare and Medicaid Upon Public Funding

The rate of annual increase in the medical care dollar has been markedly influenced by the advent of Medicare and Medicaid in 1966 and 1967 with a concomitant change in the amounts provided from public funds as compared with private payment. Before Medicare, etc., public funds paid 26 per cent (1966) of medical costs, but in 1970 the figure had risen to 37 per cent.[22]

Before Medicare and Medicaid, the annual rate of increase[22] in the medical dollar was 7.9 per cent per year for private funding. During the period immediately following the advent of Medicare and Medicaid (1966-69), the annual rate of increase for private funding had slowed to 5.7 per cent per year. but the public funded medical dollar had risen sharply at an annual rate of 28 per cent per year. This dramatic rise in the public funding increase rate has by 1970 slowed to 9.7 per cent, which is slightly higher than the prior 9.2 per cent rise in Medicare and Medicaid; but the private medical care dollar had a 1970 growth rate of 13.8 per cent which may reflect inflationary trends.

### The Influence of Medicare and Medicaid Upon the Cost of Personal Medical Care

The personal medical care dollar has also grown sizably by an increment of some $47.5 billion in 20 years, i.e., $10.5 billion in 1950, $58.0 billion in 1970. Price increases (fees, etc.) account for 47 per cent of the $47.5 billion increase, population growth accounts for 17 per cent of the increase. Other factors, such as increased use of facilities, more hospitalization due to removal of financial barriers for the poor and aged and the advent of new expensive medical techniques and equipment (open heart surgery, kidney dialysis machines, pacemakers, miracle drugs, etc.) account for the remaining 36 per cent of the increase.[22] This figure of 36 per cent, of course, reflects, in part, the impact of Medicare and Medicaid.

### Medicare and Medicaid Influence on Medical Prices

Medical prices jumped about twice as fast as consumer items in general in the 1960s, e.g., 1960-66–all items, 1.4 per cent annual increase; medical care 2.6 per cent; 1966-69–all items, 3.8 per cent, medical care, 6.4 per cent.[22]

To gain perspective on why the advent of Medicare and Medicaid should so markedly affect the size of the medical care dollar, it might be noted that the 65 and over population (10 per cent of total population) requires one-fourth or 27 per cent of the medical care dollar. Those aged 19-64 (53 per cent of population) require 57 per cent of the dollar and the under 19 group (37 per cent of population) requires only 16 per cent of the medical care dollar.

### Anecdotal Evidence

Those calling for a drastic revision of the medical delivery system usually cite evidence that is either anecdotal in nature or is based on comparative data that are open to question. Even if such evidence is valid, there is always the question of: At what point can a situation be characterized by the terms *crisis* or *total failure*?

The anecdotal material usually takes the form of stories about how difficult it is to obtain an appointment, about long waiting room time, about difficulty in getting a physician to agree to accept you as a patient, about problems in getting medical attention at night and on weekends, about the problem of deficient emergency care facilities or mishandling and about the financial destruction of a family by medical bills in long-term chronic or terminal illness. While there seems to be little doubt that such conditions exist, the question still should be one of how often, where, to what degree. Unfortunately, little to delineate these problems precisely in quantitative terms has been done.

The second line of evidence seems to lie in the use of comparative statistics where the United States is compared with other countries with regard to various accepted yardsticks of national health, such as mortality rates, infant death rates, etc. Such measures reflect to some degree the quality of medical care since they have been improving over the last 50 years or more, but it is equally obvious that they are determined by many factors over which the physician and the medical delivery system has little or no direct control, e.g., cigarette smoking, overeating, air pollution, etc.

In addition, such statistics, when used comparatively, can only be accepted or regarded as valid where the nations or areas being compared are similar in their degree of population and socioeconomic heterogeneity. The fact that the United States ranked 14th in infant mortality, 13th in maternal mortality, 18th in male mortality, etc.[3], or 25th in male mortality and 14th in female mortality out of 33 countries in another study[27], does not necessarily mean that nations higher in these rankings have a superior medical system. For example, the United States ranks 14th, just above West Germany, in infant mortality while the top-ranking countries, in order of ranking, are Sweden, Netherlands, Finland, Norway, Japan, Denmark, Switzerland, New Zealand, Australia, Britain, France and East Germany. Canada ranks 13th just above the United States.[3] The top countries are certainly more homogeneous than the United States plus having nationalized medicine generally. We, therefore, cannot be certain how much of their superiority is due to a lack of cultural and socioeconomic diversity and how much is due to a better medical system per se with equality of delivery to all segments of the population. Our own high rate of violent death may also play a role in the low male mortality figures cited above. While it is indeed certain that factors such as smoking, pollution, poverty, etc., cannot be considered as the sole fault of the medical system or the physician as such, it should also be noted that one cannot ignore such data completely since the medical system does play some role in determining these figures.

Is it, for example, merely accidental that Sweden, which takes 20 per cent of its citizens' tax payments for comprehensive national health care but spends one per cent less of its GNP than the United States for such care, is the top-ranking?[3] Is it accidental that other countries with similar programs are also top-ranking with regard to all indices of health? Yet, these countries have fewer physicians per 100,000 population than does the United States.[28] Of the common market countries, only Italy (179 per 100,000 population) has more physicians per 100,000 than the United States (165 per 100,000 population) and only West Germany (155 per 100,000 population) and Belgium (154 per 100,000 population) even approach the U.S. figure. The possibility, therefore, does exist that these countries may generally give better care while using fewer physicians due to the nature of their nationalized plans, but it is certainly difficult to unequivocally substantiate this. It is, however, worth noting that other industrial nations have either a National Health Service or a National Health Insurance System, and that most of these 22 industrial nations rank above us in these indices.[9] Nevertheless, our medical care at its best is probably the finest in the world technically. It is not accidental that the Soviet Government chose to have an American surgeon do a breast operation on the President of the Soviet Academy of Science.

We have not developed any consensus as to what constitutes optimum care. The problem is that optimum physician ratios, even if they were agreed upon and considered accurate, would be valid only with regard to the medical delivery system involved and the level of technology and demand for services current at the time. As a consequence, all medical delivery system and other cross comparisons literally cannot be meaningfully made based on population to physician ratios.

It would seem that one can only state that the United States has a medical system that has been subjected to a rising volume of complaint due to its rapidly mounting cost; its failure to provide care to rural and inner-city populations that is equivalent to that received by urban residents generally; its apparent neglect of the emergency care aspect of medical practice; the apparent shortage of physicians relative to demand that is a product of the advent of new medical delivery innovations, such as Medicare and Medicaid and the failure, earlier in the century, to increase the production of physicians in proportion to population growth. The only question is, what are some of the possible solutions that have been suggested?

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# CHAPTER III

## SOME CURRENT STATE AND NATIONAL PROPOSALS FOR SOLUTION OF THE PROBLEM

A notable attempt to solve the health care problem has been made by the Carnegie Commission.[1,2]

The Commission has adopted the following goals.[1]

1. To provide more appropriately trained, health care personnel.

2. To achieve a better geographic distribution of personnel and educational facilities, particularly for the central city and rural areas.

3. To insure more opportunities for women and members of minority groups.

4. To provide more appropriate training for the work to be performed and, in doing so, to respond to the constructive suggestions of students.

5. To relate health care education more effectively to health care delivery.

6. To bring about a more equitable distribution of the financial burden between the federal government and the states, and between the states.

7. To limit costs to the greatest extent possible.

Implementation of these goals is seen as requiring:

1. A 50 per cent expansion in the number of physicians trained in the 1970s over the 1960s and a corresponding 20 per cent expansion in the production of dentists.

2. An increase in physician productivity by increasing the ratio of health care personnel per physician substantially better than the prevailing 10 to 1 ratio by training more nurses and other paraprofessional personnel especially physician's assistants. (Medex, etc.).

3. An improved geographic dispersion of health training centers throughout the country.

4. The creation of health education centers with local hospitals as the foci to be administered by one of 106 proposed health science centers (medical schools). These education centers would:

   a. Train medical residents (M.D. and D.D.S. on a rotational basis).

   b. Engage in continuing education for local physicians, dentists and other health care personnel.

   c. Advise local health authorities and hospitals.

   d. Assist community colleges and comprehensive colleges in training allied health personnel.

   e. Put most of the local advantages of a health science center into areas that do not warrant a full-scale medical school and health center, i.e., within one hour driving time of 95 per cent of all health care personnel.

In order to improve the situation with regard to shortages of personnel, the commission recommends the following reforms[1]:

1. Shortening the typical time required for the medical physician degree, internship, residency, etc., beyond the B.S. or B.A. to six years rather than the present seven to eight years.

2. Creating a degree between the B.A. and medical physician, i.e., Master of Philosophy in Human Biology, Bachelor of Medicine, M.S. in Human Biology, etc., in order to utilize those who do not go on as teachers, medical assistants or associates, etc.

3. Improving the medical curriculum by:

   a. Tying basic science and clinical instruction more closely together.

b. Using *garden variety* as well as *exotic* patients in clinical instruction.

c. Creating alternate curricular paths depending upon the students prior background and interests.

4. Improving the residency period by providing a wider variety of experiences and more of it under skilled supervision.

5. Creating a National Health Service Corps to meet acute rural and central city needs.

6. Creating an Educational Opportunity Bank for needy medical and dental students.

7. Improving the planning of health manpower requirements and supply.

8. Meeting more of the medical education costs by the federal government since physicians can and do move from state to state. Some states are training large numbers of physicians for practice elsewhere (Pennsylvania among them).

9. Greater support of private medical and dental schools by the state.

10. Equalizing levels of support among the several states since some states exploit the investment other states make.

11. Reducing from four to three years the time to complete medical school (See Brehman[36] for an analysis of this proposal).

12. Reducing the residency requirements from four to three years.

13. Combining science work on a campus with that required in medical school to reduce expensive and unnecessary duplication of facilities (See Brehman[36] for an analysis of this proposal).

14. Reducing the faculty-student ratio which is particularly high in medical school.

15. Entering two medical classes a year.

16. Initiating a year-round medical school approach similar to the year-round school concept in public schools.

17. Holding federal research expenditures steady as a percentage of GNP.

18. Increasing the number of allied health personnel by expanding programs and thus increasing physician productivity which would then reduce the need for physicians.

19. Raising the minimum size of a medical class to 100 for a greater economy of scale effect.

20. Using outside hospitals for clinical training rather than, or in addition to, subsidizing a university hospital.

The commission further notes that in the 1960s medical school costs rose twice as fast as higher education costs, but the number of students enrolled increased only half as fast for higher education. Such a finding makes cost control as well as increased productivity imperative if our medical schools are to function properly.

It seems obvious that the commission's proposals are directed to what they believe to be the critical problem, i.e., a physician shortage of at least 50,000,[2] uneven geographical distribution due to the physicians unwillingness to be professionally isolated and distant from opportunities for continuing education, rising expectations for universal access to care, inefficient use of and allocation of scarce physician resources, ineffective medical education financing and rapidly rising costs. Their proposals are, of course, not without their critics including the medical schools themselves.

Most writers on this topic have also tended to emphasize the need for increased output of graduates and/or paraprofessional personnel along with other reforms but some cautionary notes have been sounded by such individuals as Schwartz[3] and federal officials.[4]

Wanniski,[4] for example, points out that there is a fear on the part of some federal officials that we could well be putting too much emphasis on increasing our medical school outputs and thus are risking the creation of a physician surplus later, much as we created one for other professions through our Sputnik induced policies of the past decade.

Although President Nixon, in 1971, signed legislation providing $3.7 billion for health manpower, the administration, according to Wanniski, is reluctant to spend the amount authorized by Congress. The federal government's position seems to be that careful spending of less money can both end the shortage and prevent a surplus of doctors. The administration planners are attempting to create a safety valve that will permit them to level off production, as needed, after creating an initial increase in production.

According to Wanniski[4] their essential concept is one of using a very limited capitation grant of $1,800 per student enrolled rather than Congress's authorized $2,900 figure which was designed to leave only about 10 or less medical schools in financial distress. The Nixon approach is cited by Wanniski [4] as leaving about 20 schools in financial distress but these would then be aided by means of a special distress fund.

HEW estimates, according to Wanniski,[4] that it would thereby save about $60 million that would otherwise have gone to medical schools that were not financially distressed. HEW is indicated as believing that medical schools that are not distressed and do not want to expand, e.g., schools where costs are $50,000 or $60,000 per student because of high emphasis on specialized training and research, will pass up such low capitation grants but needy schools in the South and Midwest, where school costs range between $5,000 and $10,000, will seek such capitation grants.

These *low-budget* schools are seen as the administration's *safety valve* since their enrollments can be rapidly and economically built up by channeling additional special project federal funds to these schools. Since these schools tend to stress basic medicine, the nation will be able to offset its rapidly dwindling supply of general practitioners without producing large numbers of unneeded specialists in the process.

Wanniski[4] further points out that it is recognized by most of the individuals concerned with the medical care problem that a *surplus* would not necessarily mean better or more inexpensive medical care due to greater competition. HEW planners and Senator Kennedy's people as well are quoted by Wanniski as believing that physicians would simply then raise their fees in order to maintain their income and/or increase their discretionary use of surgery and other treatment techniques (e.g., more tonsillectomies), since physicians are to some degree the creators of their own demand.

Schwartz[3], on the other hand, argues forcefully that the proponents of alternative delivery systems exaggerate when they term our present medical care systems as a crisis situation or as a nonsystem that has failed. Schwartz does not deny that problems exist. He does question the uncritical use of comparative statistics for reasons similar to those cited earlier. His position, in its essence, is basically a philosophical one. Not only does Schwartz deny that a crisis in health care exists (problems yes, crisis no!)[3], but he also argues for the intrinsic value of *pluralistic* medicine as opposed to the uniform national health delivery system approach utilized by most of the other major industrial societies. Schwartz[3] sees medicine as thriving best under a competitive mix of private medicine, prepaid group medicine and medical health insurance plans with benefits to both patient and physician. The patient chooses either personal care from private physician or the economies and security of the prepaid group plan. The physician is free to choose between the regular hours and general freedom of group health plans versus the satisfactions and risks of private practice. He warns against the dangers of throwing out the present delivery system bodily and attempting to introduce a totally new approach in delivery systems (Kennedy Plan, the administration's Health Maintenance Organization Concept, etc.). He speaks of the inevitable disruptive effects revolutionary change would bring and the curtailment of physician and patient freedoms that it might or would entail.

Schwartz, in effect, argues forcefully for carefully tailored attempts to solve each of the various problems that beset medicine, e.g., incompetent or unnecessary surgery, malpractice costs, medical costs, shortages of physicians, maldistribution by geography and area of specialism, etc., rather than a let's *"throw the baby out with the bathwater"* approach.

The issue, really becomes one of how serious is the problem? Does it really constitute a breakdown of the medical delivery system necessitating a radical change in the nature of the system? Would the proposals of Senator Kennedy and others provide an adequate solution? Assuming that a major crisis does exist, what can we do now?

Greenberg[5] takes a more alarmist view in his book The Quality of Mercy! A Report on the Critical Conditions of American Hospital and Medical Care. In his book, Greenburg also points out various statistics such as these. We spend a larger proportion of our Gross National Product on medical care than any other nation. Twenty-one nations have a higher life expectancy than we have, although he admits the effects of urban life, excesses of smoking, etc., and poverty-neglect. We rank 15th in infant mortality which he says has long been considered as the best index of a country's health status. We would need 40 per cent fewer infant deaths to reach Sweden's status. In 49 of the states the white only mortality rate is higher than that for the highest province in Sweden. In the 1960s we dropped from 13th to 22nd place in male life expectancy and from 7th to 11th in female life expectancy. The U.S. death rate for ages 15-44 is higher (significantly) than that for England and Sweden who both have a lower physician to population ratio and spend proportionately less of their national budget on medical care. One-third of all draftees are rejected for medical or psychiatric reasons. Nearly one of every two Americans have one or more chronic diseases and a large proportion of them do not receive the care they require. The Blue Cross finds that in one out of every 10 American homes someone has an uncared for medical problem and this rises to three out of 10 in impoverished areas. By 1969 the hospital out-patient visit figure had doubled over that of 1963.

Greenberg[5] then makes a strong and forceful indictment of the present medical system and calls for a creative response by physicians, as follows:

> While medicine has moved from the horse-and-buggy to the jet and airplane phase (of medicine history), it has, unlike most other industries, failed to make the necessary readjustments.
>
> Basically, our health care system continues to operate primarily for the benefit of those who provide the service rather than for the consumers. Its principal features are fragmentation, a seller's monopoly with a virtually total lack of competition, the spur to efficiency and innovation in industry-ignorance on the part of the consumer about what he is buying and little, if any, accountability to the public.
>
> In industry, the high level of pay for the workers is generally offset by greater efficiency and higher productivity. This is precisely what is often lacking in the health care field, with its frequent duplication of facilities, the use of expensive facilities where much more economical services could do just as well, and the use of highly skilled personnel for tasks that the less skilled could do. The cost of medical care tends to become prohibitive when it is rendered piecemeal and each piece is paid for separately. There is evidence that when health care services are better planned and organized, costs can be contained and a better level of care can be provided for the same money.
>
> There is no question that we must reset our priorities and invest a greater share of our national income in the training of more doctors and other health personnel and in expanded and upgraded medical services. But the answer is no longer to be found in more money alone. Equally urgent are better ways of using it.
>
> We have barely begun to tackle the things which need to be done to expand group-practice units with their economy possibilities and potential for higher quality, to place greater emphasis on ambulatory services, and provide broad coverage health insurance for such services, to back up physicians to a greater extent with the less costly skills of auxiliary medical personnel, to establish meaningful quality controls, and to give a much higher priority to preventative services for the young, where the greatest payoff is, instead of pouring the bulk of our resources into the care of the elderly.
>
> Doctors must abandon the idea that technological and social change can occur without corresponding change in the organization of medical care. They must surrender some of their long standing prerogatives and examine soberly the impact of their professional conduct on escalating costs. They must become more responsive to the issues of productivity and quality. They must apply to the problems of devising a better health-care system the same objectivity and creative ingenuity, the same courage in discarding outdated concepts and striking out on new paths that have made possible the phenomenal scientific progress of the past two decades.

It may be said then that few writers deny that there are problems. Furthermore, it can be said that the solutions proposed are many and varied. Some of the proposed solutions are discussed below.

## Increased Medical School Output

Most writers call for this solution[1,2,6,7,8,9,10] and it would seem to be desirable in light of commonly accepted shortage figures. It is not, however, without its limitations. It could, for example, create a surplus of specialists and leave us with a continuing dearth of family practitioners. It takes a long time for an increase in medical school size to be translated into an increased supply of physicians (six or more years), but the need is here and now. Furthermore, physicians are expensive to train and educate making this solution an expensive long-term expedient.

## Increased Use of Paramedical Personnel

The use of physicians' assistants and other personnel to carry out those tasks that the physician can safely delegate and leave to the physician only those tasks that only he can so well do, would theoretically reduce the need to produce more physicians. Paramedical professionals, including nurses, etc., are potentially capable of markedly increasing the productivity of the physician, thus enabling existing and future physicians to treat more patients than before[11,12,13,14,15]

Such auxiliary personnel are (a) less expensive to train than a physician, (b) require shorter training than a physician, (c) can provide preventative care physicians are presently unable to provide and (d) potentially able to increase the physicians net earnings due to increased productivity in excess of expenses incurred[11]. However, there are implementation problems.

For example, licensure requirements will have to be defined. There is no presently accepted consensual definition of what a physician's assistant is for licensing purposes. The things in which a physician is uniquely trained and which cannot be delegated are relatively few, e.g., surgery, final diagnosis and the prescription of strong drugs. The physician's assistant could theoretically be asked to carry out tasks ranging from simple medical procedures to the complex tasks that are normally handled only by physicians. Licensure by competencies may be required since training programs for physicians' assistants now vary widely in the competencies taught.

The physician's logical fears about the effect of task delegation upon malpractice insurance must be resolved by appropriate legislation and licensing before such personnel can be fully utilized. Physicians will have to be educated as to what tasks they can reasonably delegate, as to the potential increase in productivity and net earnings such task delegation might entail, as to the resulting freedom from routine medical tasks made possible and as to the consequent freedom to concentrate upon the intrinsically more interesting activities for which he is uniquely trained.

## Loan Forgiveness and Other Plans to Redress Physician Maldistribution

On the surface the use of loans to medical students as a means of encouraging them to practice in areas of medical need seems to be a logical and forthright approach to the problem and is currently being proposed or implemented.[16,21,26]

The money required for a medical education is a large sum and the state's investment a sizeable one. It seems only natural to require or offer as an option the practice of medicine in areas of need within the state in lieu of a partial or total payment of the loan made to the students. Nevertheless, such *loan forgiveness* programs may not prove to be as efficacious as hoped.

The physician typically earns a great deal of money (highest paid of all professions) and the student could easily decide to repay the loan rather than take advantage of the forgiveness option. Some of the more able may opt for education in a state where no such loan repayment plan exists because of their ability to be competitive in seeking financial aid on the basis of scholarship. Some may well simply default on the loan by leaving the state and making no repayments. The American Medical Association has informed the author that default is a real issue in their loan program with the rate of default increasing rapidly. At one time, it was only one per cent of the monies loaned but the most recent figure is four per cent or more.

Let us assume, however, that the *loan forgiveness* approach does induce the fledgling physician to practice in a needy rural area for several years. The question becomes one of whether such a physician will choose to remain there. This is the essential aim of the *loan forgiveness* program.

It is assumed, tacitly, by the proponents of loan forgiveness, that a physician who practices in such a setting will put down roots and choose to remain when he discovers the satisfactions of family practice. This assumption, unfortunately, is open to question[31].

The experience of the Sears Foundation[26] does not indicate that such optimism is warranted. During the 14 years prior to 1971, the Sears Foundation attempted to identify communities in dire need of a physician. It then provided funds to these communities (largely rural) for the construction of a small well-equipped office for the use of a physician. Assistance in recruiting a physician was given, and the new physician was given financial aid in setting up practice. As of 1971, 162 of these offices had been built and 52 (32%) of them were standing idle due to the physician having departed or due to fruitless efforts in recruitment. As a consequence, the Sears Foundation has abandoned its program. The physicians themselves are reported to have left their practice in these communities for the following reasons.

(1) A lack of professional collegiality, i.e., isolation from other physicians.

(2) No time for or access to facilities for continued education.

(3) Dislike by wife or family of the limitations of small town life.

(4) Desire to specialize.

(5) Long distance to or lack of hospitals for intensive care with much time involved or a relinquishing of their more interesting cases to a colleague in a distant hospital.

(6) The sheer burden of night calls, lack of vacation time, etc., due to being the sole or relatively scarce provider of medical care for the area.

It would seem then that programs such as described in the article *$10 Million Student Aid Program to Increase Number of Future Doctors Likely to Enter Practice in Medically Underserved Areas* [16] will be of limited benefit in the long run unless we can also devise answers to the problem of making a rural physician's life more desirable.

For example, the rural physician's need for continuing education might well be met by either the Carnegie Commission's concept of the Health Education Center[1] or the concept of the Medical School Without Walls[31] which is a variant of the Open University.

The problem of a sense of isolation from other medical colleagues, i.e., lack of professional collegiality and peer review, might be met by the development of strategically located regional health centers. This would involve group practice by four or more physicians[17,20,23,25]. These physicians would be in basic care areas of specialization. This would enable them to provide basic care on a scale and a level of expertise that no single general practitioner could hope to provide. Economies of scale would optimize their incomes due to shared expenses, the use of paramedical personnel and the concommittant increased productivity.

This type of group practice would seem to eliminate many of the objections to rural practice. It provides professional collegiality; frees the physician for continued education with one's practice covered by a colleague; permits a sharing of the burdens of night calls, emergency calls, etc. and permits vacations without being forced to temporarily abandon one's patients.

Furthermore, the location of these centers near a hospital or the provision of fast, effective transportation (helicopter, ambulance, etc.) to the remote hospital for the physician as well as the emergency or critically ill patient would resolve the problem of ready access to a hospital and the continued care of the physician's patients who are severely ill.

If one assumes that the solo physician in a small isolated rural community is no longer a viable concept, and the evidence suggests that this is so, then some way of enabling these centers to serve isolated communities must also be devised. Satellite centers, staffed by paramedical personnel, seem to be one possible solution to this problem since the personnel could be supervised via telephone, teletype, closed circuit TV, etc.,from the regional center with emergency cases sent to the regional center or affiliated hospital(s) via helicopter ambulance, providing immediately necessary care by the satellite's paramedical personnel.

If these regional centers are located in the population center of the region served, then more adequate schools for the physicians' children and more varied social events for their families to participate in will result. Such population centers are also more likely to be close to major transportation routes and facilities.

Such centers (and satellites) might very well be tied in with a health science center (medical school and hospital) responsible for the region by means of remote computer terminals, closed circuit TV, etc. This could provide consultative help, peer review and continuing education comparable to that available to the urban physician.

A variety of other solutions have, of course, been proposed[18,22] including preceptorship programs which the medical schools are rapidly developing (Hershey Medical School, for example). The preceptor program is expressly designed to encourage new physicians to practice in rural settings and to specialize in basic medicine.

As part of his medical training, the fledgling physician is given the experience of working in the field for a given period of time with and under the supervision of a basic care physician. It is hoped that the physician who does this will later choose to practice in such an area. Of course, the question arises, as one writer puts it, *Can Doctors be Kept Down on the Farm* [32] in light of the natural desire of a physician to go where it is most advantageous for him or his family from a professional, educational and socioeconomic standpoint. Such a plan, however, certainly deserves to be tried and retained. It is a way of giving would-be physicians more varied experience and thus enable them to make a more informed choice as to location and type of practice. Only further experience will tell us if it does actually encourage rural or central city practice.

The major proposed reforms are, of course, those involving dramatic changes by legislation of the nature of the medical delivery system itself (e.g., Kennedy Bill) or by the method of payment (medicare, medicaid, medicredit, universal health insurance). Such proposals would go far beyond simple palliatives such as increased funding of medical schools, increased capitation growth based on the number of students being trained, etc. These proposals combine such concepts as the Health Maintenance Organization[27,28], prepaid group medicine[14,15,28,34,35] physicians assistants,[11,12,13] the issue of consumer representation, etc., in order to create a rational system of physician use, production, and allocation that will meet all of the dilemmas facing the present system and which will provide medical care that is measurably superior to that previously possible (e.g., preventative care). Much of the reformers efforts are aimed at achieving uniformly available, quality medical care at minimum cost through reforms directed at reducing unnecessary duplication of facilities, etc.

Such far reaching approaches would undoubtedly change the physician demand picture markedly. They would reduce or eliminate the physical and economic barriers to medical care that normally control or minimize demand for service. For example, the advent of medicare and medicaid and the increased availability of medical health insurance since 1965 has been responsible for a substantial part of the overall increase in the medical care dollar from 1950 to 1970, i.e., 37 per cent of the increase from 1950 to 1970 has been ascribed to the increased use of services.[33]

Some of the increased demand would no doubt be reduced in impact if the adopted approach involved an increased physician productivity due to the greater use of auxiliary personnel and to those economies of scale that are inherent in group practice. It is, however, likely that the increased demand caused by the treatment of conditions that should have been treated much earlier (backlog) plus a generally increased demand due to the availability of medical care without the previously existing financial limitations will initially substantially exceed the effects of any increase in productivity that may be achieved.

As Garfield[34,35] has pointed out, a basic deficiency in all proposals where the financial barriers have been reduced or eliminated, including the prepaid group (Kaiser-Permanente) plan of which he is a part, is an uncontrolled and partially unwarranted increase in the demand for physician services. It is Garfield's contention that the severe impact of medicare and medicaid on the profession during the 1960s is paralleled by what has been the Kaiser Permanente Prepaid Group experience, i.e., the elimination of the fee-for-service has resulted in the removal of the basic economic control over the demand for service.

The result has been a flood of the well, the near-well and the truly ill into the system. As a consequence, the physician is overwhelmed and overworked and the truly ill receive less time and attention than they would otherwise receive. It is a waste of the physician's skills to be dealing with patients who are well but fear they are not, or who need basic physical checkups, etc., let alone the near-well who may only require routine and supportive examination and treatment by auxiliary medical personnel.

Dr. Garfield points out that any system that abandons the check of demand imposed by financial considerations must, therefore, develop an alternative means whereby the well and near-well can be diverted from the physician for treatment, etc., by appropriate auxiliary medical personnel who can deal equally well with their difficulties and at less cost.

Garfield himself is an advocate of the medical multiphasic screening approach for large group plans such as the one in which he is involved (Kaiser-Permanente). In this approach, patients are treated only at the level of expertise required and a preventative care program is made an automatic part of the system. The physicians see only those who need their unique skills.

There is no reason to believe, however, that a judicious physician use of paraprofessional personnel in more conventional solo or group practice cannot be utilized to produce a screening effect or, at least, to provide treatment at the appropriate level of expertise following diagnosis by the physician using data gathered partly by his aides.

In sum, the solutions proposed, and they have not all been described here, are many and varied and would undoubtedly affect physician demand and supply in as yet basically unpredictable ways. Nevertheless, the researcher who seeks to project manpower demand and supply must, in some manner, come to grips with the issue or at least must acknowledge that such proposals, if implemented, will condition any projection that he may make.

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# CHAPTER IV

## PENNSYLVANIA AND PHYSICIAN MANPOWER

From a purely superficial standpoint, Pennsylvania would seem to be in an enviable postion with regard to physician manpower. It ranked 11th among the states in 1970 with regard to population per physician ratios (Table 2). Historical data developed by Bucher, Cheever, Fay et al,[2] for the Joint State Government Commission (Table 3) indicates that in 1970 Pennsylvania had the most favorable population per physician ratio (660:1) in 64 years.

The 1970 figures given in these two tables do not agree with one another. This may well be due to use of a somewhat different data base in each case, although both are supposedly figures for Pennsylvania's nonfederal physicians of that year. The 1970 ratio in Table 3 for Pennsylvania is certainly the most accurate in that the author of the present study used 1970 census population data (final) and actual figures from the Distribution of Physicians in the United States--1970,[1] as published by the American Medical Association, in order to bring the commission findings up to 1970.

Correspondence with Mr. Star indicates that his data (Table 2) is based upon a composite of unpublished data obtained from the AMA and of data from the publication, Socioeconomic Issues of Health which is also a publication of the AMA. Such possibly tentative data may well differ from later officially published data due to corrections for death, etc. It is also possible that Mr. Star used estimates of the 1970 populations for the several states in lieu of unavailable figures from the 1970 census.

In any case, the general conclusion is the same, i.e., Pennsylvania has a relatively large number of physicians per capita when compared with other states, and it also has the most favorable population to physician ratio that it has had since around the turn of the century.

### Favorable Physician-Population Ratio not Equal to Optimum

There is really no way of being sure that the relatively favorable position of Pennsylvania regarding population to physician ratios means we have enough physicians for our needs. This is true for a variety of reasons. First of all, even New York State, which has the most favorable population to physician ratio (Washington, D.C. excepted), cannot be said to have enough or more than enough physicians. This is simply because we do not know how many physicians New York would actually need for optimum care under our present medical delivery system let alone any of the proposed alternatives.

Furthermore, we cannot be certain that the more favorable ratio of population to physicians actually reflects a highly favorable situation from the standpoint of the typical patient who may be seeking basic medical care. There can be no doubt that in 1904 basic care (general practice, etc.) physicians were the predominant type of physician, but today the specialist is the most predominant type of physician. If historical data were available to the author with regard to basic care physicians, which it is not, it is more than likely that we would find a deterioration in the basic care physician to population ratio over the past half century. In support of this, it should be noted that there has been a rapid fall in the number of general practice physicians since 1963 (see Appendix A).

Even if the basic care specialist ratio had not itself changed during the past 70 years, there would still be the problem of the increasing geographic maldistribution of our physicians due to their reluctance to practice in the rural and central city areas of the state. In this respect, they simply have paralleled the migration patterns of our population as a whole, i.e., they have left the rural areas to live in urban regions and have fled the decaying central portions of our major cities.

As the Pennsylvania Medical Society has found in its operation of a placement service for physicians, there are a number of rural areas in Pennsylvania where a physician is being anxiously sought but without any marked success. Newspaper articles are constantly being written about the difficulties of our more rural and sparsely settled areas in getting physicians. For example, an article[3] in the Harrisburg newspaper, The Patriot, of February 3, 1971, describes the plight of Tionesta, a small rural town nestled at the edge of one of Pennsylvania's national forests (Forest County), which had hung a banner *"We Need a Doctor"* over its main street. The closest hospital is 18 miles away. The volunteer firemen ambulance service is available only in emergencies and no doctor is available if someone is sick at home. In 1971, there had been no physician in Tionesta since 1969. The last one left to become

Table 2

Relative Population Per Physician Standing of Pennsylvania in 1970

| Rank | State | Ratio[b] |
|---|---|---|
| 0 | Washington, D. C. | 339 |
| 1 | New York | 518 |
| 2 | Massachusetts | 604 |
| 3 | California | 619 |
| 4 | Connecticut | 643 |
| 5 | Colorado | 667 |
| 6 | Vermont | 680 |
| 7 | Maryland | 682 |
| 8 | Rhode Island | 740 |
| 9 | Minnesota | 771 |
| 10 | Hawaii | 789 |
| 11 | Pennsylvania | 795 |
| 12 | Oregon | 816 |
| 13 | New Jersey | 821 |
| 14 | Washington | 823 |
| 15 | Florida | 840 |
| 16 | Arizona | 852 |
| 17 | Illinois | 853 |
| 18 | Utah | 871 |
| 19 | Delaware | 882 |
| 20 | New Hampshire | 889 |
| 21 | Ohio | 892 |
| 22 | Missouri | 932 |
| 23 | Michigan | 933 |
| 24 | Wisconsin | 952 |
| 25 | Virginia | 975 |
| 26 | Louisiana | 995 |
| 27 | Texas | 997 |
| 28 | Tennessee | 1,010 |
| 29 | Nevada | 1,014 |
| 30 | Nebraska | 1,018 |
| 31 | Kansas | 1,048 |
| 32 | Montana | 1,103 |
| 33 | Georgia | 1,104 |
| 34 | Maine | 1,112 |
| 35 | Iowa | 1,116 |
| 36 | North Carolina | 1,118 |
| 37 | Kentucky | 1,123 |
| 38 | New Mexico | 1,133 |
| 39 | West Virginia | 1,137 |
| 40 | Indiana | 1,140 |
| 41 | Oklahoma | 1,151 |
| 42 | Wyoming | 1,161 |
| 43 | North Dakota | 1,168 |
| 44 | Idaho | 1,234 |
| 45 | Alabama | 1,331 |
| 46 | Arkansas | 1,340 |
| 47 | South Carolina | 1,341 |
| 48 | South Dakota | 1,354 |
| 49 | Alaska | 1,376 |
| 50 | Mississippi | 1,448 |

[a] Derived from data given in article by Jack Star, "Where Have our Doctors Gone?" published by Look magazine, June 29, 1971. Figures based upon physicians who are not federally employed or in the Armed Services.

[b] The median state ratio is 985.

TABLE 3

Total Nonfederal Physicians for Pennsylvania in Relation to Population and Area from 1906 to 1970

| Year | Population[1] (000) | Physicians[2] | People Per Physician | Area (Sq.Mi.) Per Physician[3] |
|---|---|---|---|---|
| 1906 | 7,110 | 9,957 | 715 | 4.5 |
| 1909 | 7,546 | 11,056 | 681 | 4.1 |
| 1912 | 7,986 | 11,345 | 694 | 4.0 |
| 1914 | 8,276 | 11,611 | 696 | 3.9 |
| 1916 | 8,463 | 11,502 | 721 | 3.9 |
| 1918 | 8,524 | 11,495 | 740 | 3.9 |
| 1921 | 8,900 | 11,348 | 776 | 4.0 |
| 1923 | 9,148 | 11,241 | 800 | 4.0 |
| 1925 | 9,478 | 11,140 | 824 | 4.0 |
| 1927 | 9,745 | 11,405 | 821 | 3.9 |
| 1929 | 9,723 | 11,795 | 809 | 3.8 |
| 1931 | 9,707 | 12,051 | 801 | 3.7 |
| 1934 | 9,795 | 12,608 | 772 | 3.6 |
| 1936 | 9,767 | 12,889 | 760 | 3.5 |
| 1938 | 9,952 | 13,205 | 746 | 3.4 |
| 1940 | 9,900 | 13,529 | 732 | 3.3 |
| 1942 | 9,704 | 13,503 | 742 | 3.3 |
| 1949 | 10,390 | 14,207 | 735 | 3.2 |
| 1955 | 10,939 | 14,727 | 733 | 3.1 |
| 1957 | 10,954 | 14,507 | 753 | 3.1 |
| 1960 | 11,319 | 15,058 | 752 | 3.0 |
| 1963 | 11,408 | 16,030 | 712 | 2.8 |
| 1964 | 11,505 | 16,278 | 707 | 2.8 |
| 1965 | 11,618 | 16,602 | 698 | 2.7 |
| 1966 | 11,657 | 16,814 | 693 | 2.7 |
| 1967 | 11,672 | 17,163 | 680 | 2.7 |
| 1968 | 11,750 | 17,365 | 677 | 2.6 |
| 1969 | 11,772 | 17,584 | 669 | 2.6 |
| 1970 | 11,794 | 17,876 | 660 | 2.5 |

[1]Population estimates obtained from 1970 Pennsylvania Statistical Abstracts prepared by the Pennsylvania State Bureau of Statistics, Table 5, page 8, with the exception of the year 1969 which is an interpolation and the year 1970 which is the U.S. Census figure.

[2]Total nonfederal physicians in Pennsylvania figures for the years 1906 to 1960 were obtained from *Medical Education in Pennsylvania: Past, Present, Future* (1963) which were derived from AMA Medical Directories for 1958 and 1961. Figures for the years 1963 to 1970 were obtained from the *Distribution of Physicians* special statistical series published by the Department of Survey Research, Center for Health Services Research and Development of the American Medical Association.

[3]The area of the State of Pennsylvania (45,507 sq.mi.) was obtained from p. 11, Table 7, of the 1970 Pennsylvania Statistical Abstract.

a specialist. The town was willing to provide a building for the physician and give financial assistance but all contacts had *fizzled.*

Nearby towns were not much better off. Tidioute had just lost its physician who retired at age 76 after 45 years of practice in this town of 900 people. A young physician did settle in one community, but he was the only practicing doctor in Forest County at that time according to the article! There do, however, seem to be compensations for rural practice in an area such as this, i.e., low taxes, low rents, not one traffic light in the county, excellent hunting and fishing, and a respected and important position in the community.

An article[4] in the Beaver County Times of December 8, 1972, indicates that a similar situation exists in Beaver County despite its being adjacent to Allegheny County which contains Pittsburgh. Beaver County at the time of the article had only 159 physicians, including specialists, to serve more than 200,000 residents or roughly 1,258 people per physician. This may not seem too high a population to physician ratio in view of the generally accepted (but apparently unsupported) figure of 1,500 people per physician as acceptable, but 30 per cent (N-48) of these physicians were over 60 years of age (26 were 60-65 years of age, 12 were 65-70 years of age, 10 were 70-80 years of age) and 55 per cent (N-88) were over 50 years of age. This meant that 48 physicians would soon be needed but there had been little success in obtaining physicians in recent years. One factor, cited by the physician quoted in the article, is the lack of a nearby hospital which caused physicians to spend as much as two hours a day driving to three different hospitals in addition to four hours of patient visits at the hospitals. This, of course, left little time for office hours without undue hardship on the physician.

## Pennsylvania's Efforts to Solve Its Problem

A great deal of thought and effort has been devoted to the question of how to redress Pennsylvania's medical problems in terms of increased supply, efforts to encourage physicians to enter practice in needy areas, and the development of more effective emergency care facilities and personnel (see references 7-33).

Medical schools, such as the University of Pittsburgh, have developed various programs in response to the needs. Training of physicians' assistants has been undertaken, but currently the most well-developed program is the satellite concept which puts physicians and facilities into areas of critical need (rural and urban). These programs, because of their educative nature, require a hospital in the area and effective peer review procedures. Such programs may well have an impact, but they are new and relatively untried as to their effect on physician choice of location.

The legislators of the state of Pennsylvania have not, of course, been unaware of these problems and of public distress over medical costs and difficulties with obtaining a physician's service or effective emergency care in their respective areas. Bills to encourage physicians to practice in needy areas have been proposed, including one which would forgive the loan indebtedness of a physician who practiced for a given number of years in an area of need, as defined by the Secretary of Health. However, there is some doubt as to whether such an approach would be effective in the long run, i.e., failure of the Sears Foundation Plan after 14 years of effort with 52 of 162 centers built under the plan standing empty in 1972.[6]

Considerable concern has also been expressed by the Pennsylvania Legislature and the late Senator Donolow about Pennsylvania's position with regard to the number of Pennsylvania residents now trained by Pennsylvania's medical schools, the number of their graduates who remain to practice, etc. Answers to these questions have not been readily forthcoming. Some of the data obtained in this study are pertinent to these issues, and it is worth noting here that published data available for 1950-59 graduates has not proved to be markedly different from that of the graduates of the 1960s studied in this report.[34]

During the 1950s, Pennsylvania produced more than its share of the physicians graduated in the United States. The 6,117 graduates of Pennsylvania's medical schools constituted 9.6 per cent of all U.S. medical school graduates during 1950-59, while Pennsylvania's population dropped from seven to six per cent of the total population of the continental United States. Only New York produced a larger share (12.3 per cent) of the physicians produced in 1950-59 with a population that was 9.8 per cent of the U.S. population in 1950 and 9.4 per cent in 1960.[34]

Of the graduates produced by Pennsylvania during that period (1950-59), 68 per cent were residents of the state at the time they enrolled. Pennsylvania, however, ranked 25th out of the 34 states from whom data was available. Eleven states were above 90 per cent, 17 above 80 per cent and 23 above the figure of 70 per cent residents of their state when enrolled in the medical school(s) of that state.[34]

So far as our state's ability to retain its medical school graduates is concerned, Pennsylvania by 1967 had retained 41 per cent of its 1950-59 graduates. A figure that is somewhat higher than the 35 per cent obtained in the present study (Table 6, Section V). The state ranked 17th out of the 35 states for which data was available with 46 per cent of these states retaining a larger percentage of their graduates than did Pennsylvania.[34]

The opposite side of the coin is, of course, the question of what percentage of all graduates of United States medical schools does Pennsylvania attract and how do we stand on this measure relative to other states? The answer to this question can be derived from the same data source already cited[34] by multiplying the per cent of graduates from U.S. medical schools between 1950 and 1959 located in state in 1967 by the per cent of physician graduates (1950-59) located in the state in 1967 who were graduated from out-of-state schools. These latter figures were derived by subtracting the values of the column in Table 29 of reference 34 headed *Per cent of physicians (1950-59 graduates) located in state in 1967 who graduated from schools in state* from the value of 100 per cent. The findings were as follows: Pennsylvania ranked 5th or 6th (one state, Ohio, had the same percentage out-of-state graduate inmigration figures as Pennsylvania) with a percentage value of 2.1 per cent of all out-of-state trained physicians located in the state. California had the greatest attraction (10 per cent) for out-of state graduates with New York (3.7 per cent), Florida (3.4 per cent), New Jersey (2.8 per cent) and Texas (2.4 per cent) above Pennsylvania (2.1 per cent) and Ohio (2.1 per cent). Of the 11 states with the least attraction, only three, Vermont (0.1 per cent), Utah (0.3 per cent) and Nebraska (0.2 per cent) had medical schools of their own. The rest, New Hampshire (0.2 per cent), Delaware (0.2 per cent), Nevada (0.2 per cent), Idaho (0.3 per cent), North Dakota (0.2 per cent), South Dakota (0.2 per cent), Maine (0.3 per cent) and Rhode Island (0.3 per cent) produced no physicians themselves during this period but were generally low in population relative to the total U.S. population.

In addition to the above states with no medical schools during the 1950s, only Arizona (1.0 per cent) and New Jersey (2.8 per cent) attracted more than one per cent of the out-of-state trained graduates. Arizona is an attractive state due to its climate. New Jersey apparently depended upon New York and Pennsylvania or other surrounding states to supply its physicians despite the fact that it had a population base readily capable of sustaining a medical school. The average number of physicians imported by New Jersey per year during 1950-59 was approximately 179 based on Table 29 of reference 34. This figure is certainly large enough to warrant development of a medical school in that state.

It would seem that Pennsylvania has been competitive in producing, retaining and attracting physicians in comparison with most other states. This fact does not jusitify a rejection of efforts to improve Pennsylvania's ability to retain the physicians that we produce at so much cost. We should seek to make our share of the physicians trained and retained by Pennsylvania more commensurate with our share of the total population. This would involve raising the percentage of physicians retained from the 1967 figure of 41 per cent to 72 per cent.

This figure of 72 per cent was derived as follows. Since 5.5 per cent of all 1950-59 graduates of the medical schools were in Pennsylvania and 71 per cent of these were Pennsylvania trained, then 3.9 per cent of all physicians entering Pennsylvania practice (71 per cent of 5.5 per cent) were Pennsylvania trained graduates. The proportion of the total U.S. population (Continental United States) that Pennsylvania represents is about 6 per cent; therefore, 6 per cent divided by 3.9 per cent will give us the increase required to make the percentage of Pennsylvania trained medical graduates at least proportionate to the population, i.e., a correction factor of 1.765. Since 41 per cent of all Pennsylvania's 1950-59 graduates remained in the state as of 1967, 1.765 times 41 per cent should give the percentage required, i.e., 72 per cent. This would indicate that efforts to approximately double our retention rate, which has now fallen to 35 per cent (Table 6, Section V of this report), are justified if it can be shown that our physician manpower needs are high and not likely to be met by the projected supply.

The question becomes one of asking how can we estimate our physician needs? What manpower demand and supply model can we use?

## CHAPTER IV

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# CHAPTER V

## THE PHYSICIAN MANPOWER MODEL

Projection of need for any occupation or profession cannot be a haphazard process. What is sought is a reasoned estimate of future need based upon a defensible rationale. The basis for such estimates should be well defined and the best way of making the process explicable and clearly rational is through the use of a manpower model that specifies, by implication, the methodology to be used and the nature of the data to be sought. This chapter attempts to summarize the model and rationale behind the projections made for this study.

### Rejected Alternatives

Although it was concluded[6] that the approach used by Arnold[5] could be of real value in projecting those occupations for whom detailed census data was available and for whom the sampling size was not too small, this approach was rejected here for a variety of reasons. For example, if a 20 per cent sample is taken of all occupations, then an occupation that is rather rare percentage wise is quite likely to be under or over represented in the sample. Conclusions based on such data must of necessity be suspect.

Since medicine along with other professions has a relatively low number of practitioners in relation to the total population, projections from census data, at less than the state level become suspect. This is particularly so with regard to the rural areas of the state where the number of physicians may be less than ten. A further source of error in the use of census data lies in the fact that census figures are based upon place of residence. Border areas, such as Philadelphia County, may have many physicians who reside in suburban communities of other states but practice in Pennsylvania. Such physicians would not be included in the Pennsylvania count.

To the extent that this is true and is not counterbalanced by practitioners in other states who reside in Pennsylvania, the census estimates are likely to be, to some degree, in error.

For example, the AMA, which claims its physician records are about 95 per cent accurate, based on at least one study[9], indicates that there were 16,885 active medical physicians in Pennsylvania as of December 31, 1970[10] and the American Osteopathic Association lists 1,622 active Doctors of Osteopathy[11] for the same period making a total of 18,507 active physicians. This figure for active physicians is somewhat larger than the 1970 census estimate of 17,528 active physicians.[12] The difference of 979 can be readily accounted for by such factors as the residency based count problem cited above, as well as the possible inclusion by the AMA of recent and foreign medical graduates who have not yet received licenses and who are only temporarily in the state. The census figure is 94.7 per cent of the AMA-AOA figure of 18,507, i.e., a discrepancy of 5.3 per cent.

A study of physician manpower distribution made by George Tokuhata[13] of the Pennsylvania Department of Health used licensing data provided by the Bureau of Professional and Occupational Affairs of the Department of State. Estimates of the number of physicians in Pennsylvania were obtained by Dr. Tokuhata from routinely compiled and maintained computer tapes of the names and addresses of each physician licensed by Pennsylvania (as of July 1, 1970). Dr. Tokuhata's figure of 18,274 physicians in Pennsylvania is only slightly lower than that of the two medical associations (18,507) combined, but higher than the 1970 census estimate of 17,528. These differences could easily be due to differences in data base. The Tokuhata estimate is 98.7 per cent of the AMA-AOA based estimate. The census estimate is 94.7 per cent of the AMA-AOA estimate and 95.9 per cent of the Tokuhata estimate. This suggests that the census figure for Pennsylvania physicians in 1971 was not more than five to six per cent in error and that any projections from census data would have to be corrected by a factor of 1.05 to arrive at an approximation of the AMA-AOA figure or licensing based figure for that projection year.

There is no guarantee, of course, that census findings for other professions will be in such close agreement with data derived from other sources. When one examines data for other professions, such as law and dentistry, he finds similar patterns with the census figure lower than the data from other data sources. The 1970 census, for example, gives an active practice figure of 11,871 lawyers and judges in Pennsylvania[12] while the figure given by the American Bar Association (Martindale-Hubble[14] is 13,557. An independent survey of the Pennsylvania County Bar Association by Frank

Durkee of the Bureau of Information Systems of the Pennsylvania Department of Education[2] resulted in a value of 13,107 which is fairly close to the American Bar Assocaition figure of 13,557.

The picture for dentists seems to be very similar with a 1970 census estimate[12] of 5,575 dentists in active practice as compared with a licensure based figure of 6,525[13] and an American Dental Association estimate of 6,739.[15]

If we assume the licensure based and county bar association data for physicians, lawyers and dentists to be the most accurate, then the 1970 census data has been able to approximate the most accurate figures as follows: 85.4 per cent (dentistry), 90.6 per cent (law) and 95.9 per cent (medicine). Even using the figures provided by the national associations, these figures are 82.7 per cent, 87.6 per cent and 94.7 per cent for dentistry, law and medicine respectively. It is interesting to note here that the profession with the largest number of members in Pennsylvania (medicine) has the lowest percentage differential between the census figure and the other available figures, while the profession with the smallest number of members in Pennsylvania (dentistry) has the highest percentage differential. This, is, of course, what one would expect on the basis of the discussion of the effect of the proportion of individuals out of the total population in a given occupation upon sampling accuracy.

Basically, however, the methods used by Arnold[5,6] were not considered suitable for this study primarily for the following reasons.

Not only was the 1970 census (6th count) data not available when this study began, but medicine was seen as actually a constellation of professions rather than as a single occupation. The census itself does not break medicine down into speciality areas as it does with engineering. In fact, physicians, whether medical physician's or Doctors of Osteopathy, are often lumped together in the published tables.

Basically, the method used by Arnold,[5,6] and the methods outlined in Tomorrow's Manpower Needs are useful only when better local data is not available. The use of census data is an expedient, at best, in the absence of other data that is more accurate, i.e., data that is not based on only a 20 per cent sample of the general population. It was noted however that the general manpower model used by Arnold could be utilized to make projections with data from sources other than the census. It was also noted that national growth estimates developed for the occupations listed in the census could conceivably be used to estimate the overall growth of the profession in Pennsylvania in lieu of Pennsylvania data concerning growth, but could not help in projecting specialty growth.

The Manpower Model Used

This study is based upon a generalized version of that used in the Arnold report but expanded to cover variables with which he did not deal.

The generalized model may be expressed by the equation:

Need = Demand − Supply

Where

Demand = Withdrawals + Growth
Withdrawal = Deaths + Retirements + Disability + Job Mobility (Out-migration) + Change to Inactive status
Supply = Terminal degree recipient output from Pennsylvania schools multiplied by the Pennsylvania Graduate holding rate + In-migration + Re-entry into the profession.

The above model was considered as useful because it did not require that the data come from a given source. It was open as to the method of projection used in projecting growth (correlation, eyeballing historical data, federal or other percentage growth estimates for the nation as a whole, etc.). It did not require that data be obtained for every variable in order to be used.

This latter point regarding the possible lack of data, e.g., disability rates for the occupation, is an important consideration. An adequate data base is the most important and difficult problem facing any individual working in this area of manpower projections, particularly with regard to data in the state or local level. (See Chapter VI)

Other noncorrelative approaches to the problem of projecting the need for physicians can also be used if the required local data is available and the assumptions made are considered to be acceptable.

Thoughtful analyses of the problems in manpower projection are available[16] with regard to health manpower projection.[17,18] They make it clear that the state of the art is still relatively primitive and that projections can vary widely depending upon the methodological base and attendant assumptions. Nevertheless, once a model or projection method is selected, the basic issue or problem the researcher has to deal with is one of readily available, accurate data.

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# CHAPTER VI

## THE PROBLEM OF DATA

A persistent problem for manpower researchers is the lack of readily available and complete data suitable to their needs. State and federal governments, as well as other institutions, collect and compile data based solely upon their current needs. They often discard data when it is no longer current. The result is that manpower researchers not only find the data that they need are not being collected by the institution, they also find some of the needed data have been collected but have been irretrievably aggregated, archived, rather than put on magnetic tape, etc., or simply discarded if not current. This makes the analysis of historic trends difficult and the compilation of the needed data too expensive or time-consuming to undertake when available. What we need is to follow the principle, *"If it's worth collecting, it's worth recording in permanent and readily accessible form."* This would require: (1) careful thought about what we collect, and why, (2) force us to relate data to actual and potential need and (3) encourage the development of planning models that define the data needed.

As a result of the foregoing considerations, no current source of data regarding physicians is able to provide all of the necessary elements of the manpower model described earlier. The medical profession does have national professional associations that do maintain extensive records on physicians. It is this fact that made this study possible. Those professions for whom this is not done pose a real problem for the researcher in manpower. The basic impetus to the development of methods to estimate occupational demand from census data, such as described in Tomorrow's Manpower Needs[1,2] and utilized by Arnold[2] was a response to the general difficulty experienced in obtaining manpower data on the state and local level.

In addition, data on retirement rates, mortality rates, disability rates, migration patterns, job mobility and job entry patterns for the professions are difficult to locate or simply not available. What data is obtainable is usually based on occupations in general or the population in general. Professionals who are older may have different mortality and retirement rates than the general run of occupations. Physicians, for example, are 46 years of age on the average[4] nationally. The figures for Pennsylvania are in close agreement with a figure of 45.62 years for male medical physicians and 44.65 years for all Doctors of Osteopathy (Table 50).

The present study is itself based upon several sources. The basic data source concerning physicians (M.D.'s) was obtained from the American Medical Association in the form of a magnetic tape for computer analysis through the cooperation of the Pennsylvania Medical Society. This tape includes all physicians practicing in Pennsylvania on November 26, 1971. The Department of Education's computer analysis of the data has been the basis for not only the present study but also the *Physician Profile* study carried out by the Division of Program Audit, Bureau of the Budget, Commonwealth of Pennsylvania.[5]

Data regarding osteopathic physicians was not available on magnetic tape and was, therefore, obtained by direct analysis of the 1971 Directory of Osteopathic Physicians published by the American Osteopathic Association.[6] The Bureau of the Budget (Program Audit Division) of the Commonwealth of Pennsylvania[7] also used this directory. Where the Program Audit Division analysis resulted in data required for this study, their findings were utilized. This resulted in a considerable saving of time and effort on the researcher's part.

The above data sources have some flaws. However, they have the requisite advantage of being highly detailed about the location and specialty area of the physicians as well as their type of activity (retired, inactive, direct patient care, etc.).

Other data sources are not typically this informative although boards of licensure may be considered as potentially so. The 1970 census, for example, does not provide any detailed breakdown at all and was not available during this study.

The licensing bureau of the Commonwealth lists only the physician's name and address on its magnetic tape. However, these listings include all licensed physicians regardless of geographic location. Other data that is routinely collected during the licensure or renewal of license process is archived (original forms). The time and effort required to go through thousands of such archived forms in order to select data concerning those licensed physicians now practicing in Pennsylvania was considered as too prodigious to consider seriously.

The health manpower study by Tokuhata[9] is based upon such licensure tapes (name and address only). He also used American Medical Association data proportions (per cent pediatricians in direct patient care in Cambria County, etc.) in order to allocate the county, state and regional totals obtained from the licensure boards' tapes.

AMA tapes, although claimed by the AMA to be highly accurate[9], also present difficulties. These tapes, for example, include recent graduates who are not yet licensed. The tapes are based, of necessity, on a survey sampling approach since not all questionnaires are returned. Deaths are not promptly reported and deceased physicians are, therefore, still listed. Also, the data recorded are compiled from a variety of sources in order to follow up on the activity of all physicians. Physicians can and do mysteriously appear in the AMA Directory of a given year despite their having long records of medical service (Table 15, Section X). If this can happen, there is no reason to believe that physicians have not also been dropped from the record for a given year even though still practicing in the area.

Estimates of in- and out-migration for this study were obtained from a 10 per cent sample analysis of the 1967 and 1969 AMA directories listing physicians in Pennsylvania as of December 31 of each of these years. These data are subject to the same limitations as data from the AMA tapes described earlier. They are derived from AMA tapes for the years 1967 and 1969.

Physician supply data over a period of years is also required by the model. The only adequate source of such information proved to be the medical schools themselves. A survey was, therefore, carried out specifically for the present study (Appendix D). This survey data was considered to be highly accurate in that all of the medical schools responded to the questionnaire. However, not all of the medical schools were able to respond to every item due to individual variations as to what data they compile.

Some of the medical schools provided data that was at variance in some instances with that reported earlier to the PDE's Bureau of Educational Statistics. This was apparently due to differences in what students were counted (part-time, left out, full-time) or simply to the fact that such data were generally compiled upon request. Each request was handled as if it were a request for uniquely new data. The results of the survey were, however, treated as definitive for the purposes of this study and changes were made only after inquiry to the institution in question about obvious discrepancies.

The Ideal Data Base

The medical profession is fortunate in that it has national professional organizations that have attempted to compile records of the location, area of specialization, etc., of members and nonmembers alike. This fact is certainly not true for many of the professions for which the Bureau of Information Systems will have to make manpower analyses.

As pointed out earlier, the data that are compiled nationally are limited in nature. Some of the data essential to our model may not be compiled at all by these organizations. There can be no doubt, however, that the American Medical Association and the American Osteopathic Association could collect and compile all of the data required for the manpower model described earlier. The essential problem for the researcher would be one of the degree of accuracy under a voluntary survey approach and the use of multiple data sources for follow-up of new physicians. The question of financial and manpower resources cannot be ignored since these organizations are limited to the financial support of their members.

It should be emphasized that the state's right to license or certify the competence of professionals is the most ideal way to obtain badly needed data for manpower model implementation.

In order to achieve such an ideal data base via the licensing function, the state would have to implement the following requirements:

1. All members in a given profession would have to be subject to the licensing or certification (already true of physicians) requirement.

2. All necessary information for manpower purposes would have to be included on licensure applications and renewal forms.

3. Accurate and complete response to all items must be made mandatory if the license is to be granted or renewed (some states already do this).

4. The professionals in question must be required to renew their license or certification annually, or at least biannually, and to give such information as is necessary to update their current work status and professional location. This is needed for historical trend analysis and revision of existing projections.

5. All licensed professionals who do not renew their license must be followed up to ascertain the reason for nonrenewal. For example, death, retirement, disability, out-migration, simple oversight, etc.

6. All data must be placed in computer access format for analysis year by year. The present Pennsylvania licensure boards do not have the funds and personnel to do this. A great deal of data that could have been used in the present study was, therefore, for all practical purposes, not available to the author. The data required of the respondents remained largely on the original applications and renewal documents which are archived alphabetically by name rather than year. The hard labor required to abstract the needed data would require clerical work of incredible magnitude since the records of all physicians ever licensed are in the archives.

Obviously, full use of the tremendous potential of the licensure bureau for manpower projection would require some major changes in the operation and funding of a bureau and, possibly, legislation regarding such issues as mandatory response to items and requirements for renewal of license. Fortunately, professionals themselves may see accurate knowledge of the manpower demand-supply picture for their profession as highly desirable and thus be willing to support efforts to utilize the licensure function to this end. Those professions not so licensed or certified would require a different data base.

Other data sources such as college and placement offices (for supply and entry rate data), mailing list firms (for physician location and speciality), U.S. Government publications, and special surveys carried out specifically for a study are expensive and/or difficult to implement. All of these services tend to be incomplete with regard to the data needed. They would, at best, be expedient or, supplementary in their role.

To sum up, the best, most accurate, available sources of data on professionals are likely to be (1) licensure boards, if they are properly set up to provide such data; (2) professional associations, if they compile detailed data on members and nonmembers alike; (3) U.S. Census, if no other data are available and (4) universities and/or professional schools (especially if they follow-up their graduates to determine job entry trends and patterns, a badly needed type of research).

Due to the current limitations of these sources with regard to physician data, the findings of the present study may not be as accurate as more precise data would have permitted. Hopefully, however, this study will stimulate the states to reconsider the roles played by their licensing function, and to consider the need for developing a more systematic data base in general for professional manpower studies. Current concern about joblessness among the college trained strongly suggests a need for manpower studies let alone the restricted funds that the states must allocate according to perceived priorities.

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# CHAPTER VII

# PHYSICIAN SUPPLY

Although the in-migration of foreign doctors has been an important factor in determining the supply of physicians in the United States, the medical schools of the U.S.A. are the major potential source of physician manpower.

## National Medical School Supply Data

According to the National Center for Health Statistics,[1] the physician per 100,000 population ratio for the United States, its possessions, territories and military bases had remained relatively static at about 148 per 100,000 population until 1964. Since that time it has risen to a figure of 163 per 100,000 (see Table 81 of the reference).

This means that the number of active and inactive physicians of all types has been rising faster than the population of the United States and its possessions, territories and military bases. What role have our medical schools played in this increase? Does Pennsylvania itself also reflect such an increase?

According to this source (Table 87 of reference 1), in 1949-50 there were 85 medical schools in the United States and Puerto Rico with a total enrollment of 26,881 students. These medical schools graduated 5,926 Doctors of Medicine (M.D. and D.O.) during this period. By 1959-60, there were 91 medical schools (an increase of six) with 31,999 students (a 12 per cent increase for the decade or 1.2 per cent per year). These 91 medical schools graduated 7,508 physicians (a 27 per cent decade increase or 2.7 per cent per year). By 1968-69, there were 104 (an increase of 13) medical schools with 37,712 students (an 18 per cent increase in 9 years or 2 per cent per year). The number of 1968-69 graduates was 8,486 which represented a 13 per cent increase in 9 years or 1.4 per cent per year.

There has been a recent marked increase in the growth rate for student enrollments. This recent increase was preceded by a slackening of the rate during the late 1950s or early 1960s. The observed differences may be due to the existence of a number of new four-year and basic science (two-year) medical schools (eight four-year and six basic science) which had yet to graduate their first class or transfer their graduates to a four-year institution (Table 88 of reference 1).

From 1949-50 to 1959-60, the number of graduates increased by 27 per cent while the population itself increased by only 18.5 per cent. During the period 1959-60 to 1968-69, the number of graduates increased by about 13 per cent while the population increased by about 11.9 per cent.

This represents an overall increase in medical graduate output of 43 per cent during the 20 years from 1949 to 1969 in contrast to an overall 32.5 per cent in the resident U.S. population[2]. Nevertheless, there must have been a slackening of growth during the late 1950s or early 1960s, as indicated earlier, since the 1960-69 growth in graduate output exceeded population growth by only 1.1 per cent. This supposition is corroborated by the fact that the first year class size increased by 20 per cent during the same period (1960-69) as compared with the 12 per cent increase in graduates (Table 87 of reference 1).

Our medical schools have been or are increasing their graduate output at a faster rate than the U.S. population growth would indicate but the question still remains: Are we producing enough graduates to meet our present and future needs? That we may not be doing so is suggested by the marked influx of foreign trained physicians into the United States and the high proportion of foreign trained physicians practicing in the United States.

## Foreign Trained Physicians in the United States

According to a recent controversial study by the U.S. Department of Health, Education and Welfare[5], as described in United States News and World Report, July 2, 1973[3] and The Chronicle of Higher Education,[4] one out of every five to six physicians now practicing in the United States is foreign trained and this does not include those trained in Canada. The study also indicates that there is now one foreign trained physician for every two U.S. medical school graduates serving in approved hospital house staff positions (interns, residents). Over one-half of all candidates for state licensure are now foreign trained. As a nation, we are getting more foreign–trained physicians each year than we graduate from all of our medical schools. (In 1971, 10,540 entered the United States as in-migrant or as visitors to receive specialist medical training while we graduated 8,974 physicians.) The number entering is double that entering a decade earlier.

A large number of the foreign-trained physicians in the United States (63,000, including Canada) come from areas like Asia (21,000), notably the Philippines, India and Korea, South America (10,000) and Africa (1,000). None of these areas can afford to lose physicians that they have trained at such expense.

The report[5] indicates there is growing evidence that the foreign-trained physician does less well on standard licensure tests, are handicapped by a lack of fluent English and *"in some respects they are still treated as second class citizens"* with less pay than the U.S. trained physician.

Paradoxically, our American medical schools rejected 13,500 applicants in the year 1970-71. Many of them had a much *"better basic premedical education than many foreign medical graduates who are imported from abroad as interns."*[3]

In summary, the report[5] says: *"As a result of in-migration and educational exchange policies, foreign physicians have come to the United States in numbers that have benefited this country without much regard to the effect on the remainder of the world."*

In asking the question, *"Has the United States been training too few physicians to meet current needs?"* the report asserts,

> In comparative terms the United States is already one of the world's richest countries in terms of its production and supply of physicians.
>
> It is perhaps more accurate to say that the American health system encourages a relatively prodigal use of physicians, compared with the more tightly organized systems elsewhere, and that this, in turn, reflects the absence of goals and policies for physician-manpower distribution in America.

Foreign physician supply is an important consideration in any attempt to assess physician supply. Supply, once projected, may be considered as an element of physician demand if we choose to consider the possibility of our scaling down our dependence upon foreign-trained physicians. This may be seen as not only a desirable goal but may even be mandatory if foreign governments take steps to reduce their medical *Brain Drain* problems.

There are now, according to the report,[5] more graduates of Thailand's medical schools in New York State than there are in all of Thailand itself (population 38 million). India lost 821 physicians to the United States in 1971. This number is equivalent to the entire graduating classes of about eight United States medical schools. Korea has only 13,000 physicians and yet there were 2,000 Korean trained physicians in the United States as of 1971. These countries would seem to be well advised to take steps to prevent such losses. For that matter, can we continue to act as medical parasites upon the underdeveloped nations of the world? The authors of this report[5] are unequivocal in their condemnation of our use of foreign graduates.

The study's factual findings do not seem to be the basis for its being considered as controversial. The conclusions arrived at, however, contradict the position of the present administration which holds that we do not need to raise federal support of American medical schools in order to increase output because foreign physicians are coming here in large numbers (Casper Weinberger, Secretary of HEW). HEW has, therefore, disavowed the conclusions of the HEW report as not representing HEW's position.

So far as Pennsylvania is concerned, in 1968-69 the seven medical schools of the state (Hershey excluded) produced 8.97 per cent of all of the U.S. medical school graduates[1] while the state itself had but 5.8 per cent of the country's resident population[2]. This represents a comparable disparity to that in the 1950s (see Chapter IV) where the figures were 9.6 per cent of all graduates and 6 to 7 per cent of the population. However, it does reflect a downward trend in the proportion of U.S. graduates produced due to the emergence of new medical schools and increasing output in other states. We are still one of the nation's medical powerhouses when it comes to the education and postdoctoral training of physicians.

## Projected Pennsylvania Graduate Output

In order to obtain a detailed picture of present and anticipated Pennsylvania medical school graduate output, a survey instrument was sent to the eight Pennsylvania Medical schools (see Appendix D).

Data obtained from this survey varied in nature. An important item was the number of graduates from the institution during the 1960s and estimates of the number of graduates during the 1970s based upon the medical schools' current growth estimates or plans. Table 4 of this report summarizes the projected growth

Table 4

Actual and Projected Pennsylvania Medical School Graduates 1961-1980

| Year | Hahnemann | Hershey | Jefferson | Temple | Medical College of Pa. | Univ. of Penna. | Univ. of Pitts. | Phila. Col. of Osteopathic Medicine | Tota |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Actual Graduates[a] | | | | | |
| 1961 | 93 | | 167 | 125 | 40 | 130 | 91 | 79 | 725 |
| 1962 | 80 | | 146 | 126 | 46 | 134 | 78 | 67 | 677 |
| 1963 | 86 | | 148 | 124 | 40 | 130 | 88 | 61 | 677 |
| 1964 | 92 | | 154 | 131 | 43 | 120 | 87 | 82 | 709 |
| 1965 | 94 | | 157 | 124 | 46 | 124 | 84 | 73 | 702 |
| 1966 | 91 | | 154 | 132 | 48 | 124 | 90 | 83 | 722 |
| 1967 | 106 | | 161 | 129 | 38 | 122 | 82 | 83 | 721 |
| 1968 | 102 | | 157 | 143 | 37 | 129 | 93 | 90 | 751 |
| 1969 | 99 | | 167 | 134 | 57 | 128 | 88 | 90 | 763 |
| 1970 | 100 | | 165 | 136 | 50 | 125 | 95 | 81 | 752 |
| 1971 | 107 | 33 | 184 | 134 | 51 | 136 | 96 | 106 | 847 |
| | | | | Projected Graduates[b] | | | | | |
| 1972 | 116 | (42) | 188 | 145 | (68) | 146 | 105 | (125) | 935 |
| 1973 | 110 | 57 | 192 | 144 | 71 | 147 | 105 | 137 | 963 |
| 1974 | 117 | 59 | 207 | 159 | 69 | 152 | 120 | 148 | 1,031 |
| 1975 | 129 | 60 | 207 | 155 | 67 | 163 | 121 | 151 | 1,053 |
| 1976 | 148 | 69[c] | 218 | 175 | 74 | 163 | 126 | 170 | 1,143 |
| 1977 | 178 | 73 | 218 | 175 | 74 | 163 | 126 | 189 | 1,196 |
| 1978 | 218 | 78 | 218 | 175 | 74 | 163 | 126 | 212 | 1,264 |
| 1979 | 238 | 84 | 218 | 175 | 74 | 163 | 132 | 236 | 1,320 |
| 1980 | 247 | 88 | 218 | 175 | 74 | 163 | 139 | 236 | 1,340 |

[a]Based upon data obtained by a survey of the medical schools in 1971.

[b]Based upon projected first-year entrants from the survey returns of the schools including some revised data from the schools as their plans crystallized further and a cohorting of class size data (Appendix C). Actual rather than projected data is given in parentheses for some schools.

[c]Values for Hershey are based on projections of first year enrollment announced by Dr. Oswald of Penn State in The Patriot, Harrisburg, Pennsylvania, August 29, 1972.

findings for each of the eight medical schools and for all medical schools combined as developed in Appendix C of this report.

It is interesting to note that the overall projected growth from 1970 to 1980 represents a 78 per cent increase over the 1970 figure. The maximum growth institutions will be the Philadelphia College of Osteopathic Medicine (191 per cent), Hershey (167 per cent) and Hahnemann (147 per cent). The larger institutions, in terms of graduate output, foresee relatively modest increases, i.e., Jefferson (32 per cent), Temple (29 per cent), University of Pennsylvania (30 per cent). The Medical College of Pennsylvania and the University of Pittsburgh envision more substantial increases of 48 per cent and 46 per cent respectively.

### Retention of Graduates

The findings of the survey combined with the 1971 AMA data tapes provided by the Pennsylvania Medical Society and the 1971 physician directory of the American Osteopathic Association[6] give some indication as to the comparative tendency of the eight medical schools of Pennsylvania to produce graduates who remain in the state of Pennsylvania as practitioners.

Table 5 of this report gives findings for the eight medical schools, individually and combined, regarding the number of physicians retained in Pennsylvania as of 1971 who graduated during the years 1960 to 1971. Since those graduating recently are likely to be in internships. residency training here or in other states, it is likely that the figures for the classes of 1960 to 1963 or 1964 will best reflect Pennsylvania's capacity to retain its graduates. According to Table 5, we have retained over the long term around 36 per cent of our graduates. This is a figure that is somewhat lower than the 1950 graduate figure of 41 per cent cited earlier in Chapter IV. It is not likely that this is due to our using only those physicians who have been out of medical school for six or more years and who are, presumably, in active, independent practice. Even when one combines all of the graduating classes together, the overall percentage retention figure is still, at 36.8 per cent, lower than the 1950s figure of 41 per cent. This indicates that Pennsylvania's ability to retain its graduates may have eroded during the 1960s.

It is interesting to note that the institutions, had retention rates of about 40 per cent or more (1960-64). However, three schools, Jefferson, the University of Pennsylvania and the Medical College of Pennsylvania, were substantially lower in their median 1960-64 rates of retention. The finding for the first two are not unexpected since they are schools of especially high prestige and may have, during the 1960s, tended to accept a larger proportion of extremely able out-of-state students. These students are more likely to return or to seek practice elsewhere. Partial corroboration of this hypothesis may be found in Table 25 of this report where we find that 69.3 per cent of the University of Pennsylvania's 1970-71 first year class consisted of students who were nonresidents. Jefferson Medical College did not reflect this high nonresident pattern, however, since only 25.5 per cent of its beginning class was made up of nonresidents. This proportion actually represents an improvement over the class of 1960-61 in which Jefferson had 33 per cent nonresidents. A high degree of specialism may well be the significant factor here.

The Medical College of Pennsylvania, in contrast, may seem to have a disturbingly low retention rate. However, it must be remembered that this institution was previously, and avowedly, a medical school whose purpose was the training of women for careers as physicians. Three factors may play a role here. First, it is quite possible that the relatively low proportion of Pennsylvania residents in attendance (Table 25) predisposes the student body to migrate outside although it is not confirmable on the basis of the evidence available to the author. Second, a female physician may find openings for internship, residency and practice in Pennsylvania relatively difficult to obtain. Third, a study reported to the AMA on February 6, 1972 by Ethel Weinberg, M.D. and Edith Levit, M.D. indicates that only 45 per cent of females trained as physicians are in practice. This fact could alone account for the Medical College of Pennsylvania holding power being approximately one-half of the general value of 40 per cent (Table 5).

### Retention in Specialty Areas

Tables 4 and 5 do not give us the detailed data necessary to make estimates of supply for individual areas of specialization. Table 6 is, therefore, an attempt to determine the retention for family practice, general practice, internal medicine, pediatrics and general surgery along with other specialties combined as one.

Table 6 gives 1961-63 graduate figures for direct care medical physicians (Section 1), active medical physicians in other than direct patient care (Section II); all medical physicians entrants to Pennsylvania

Table 5

Commonwealth Holding Power (Percentage of Graduates) for
Pennsylvania Medical School Graduates (November 26, 1971)

| Year | HAHNEMANN | | | HERSHEY | | | JEFFERSON | | | PENNSYLVANIA MEDICAL COLLEGE | | | PHILADELPHIA OSTEOPATHIC | | | TEMPLE | | | UNIVERSITY OF PENNSYLVANIA | | | UNIVERSITY OF PITTSBURGH | | | ALL PA. MEDICAL SCHOOLS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. Grads. | No. in Pa. | Per Cent | No. Grads. | No. in Pa. | Per Cent | No. Grads. | No. in Pa. | Per Cent | No. Grads. | No. in Pa. | Per Cent | No. Grads. | No. in Pa. | Per Cent | No. Grads. | No. in Pa. | Per Cent | No. Grads. | No. in Pa. | Per Cent | No. Grads. | No. in Pa. | Per Cent | No. Grads. | No. in Pa. | Per Cent |
| 1960 | - | 41 | - | | | | - | 67 | - | - | 19 | - | - | 30 | - | - | 48 | - | - | 40 | - | - | 44 | - | - | 289 | - |
| 1961 | 93 | 38 | 41 | | | | 167 | 57 | 34 | 40 | 8 | 20 | 79 | 35 | 44 | 125 | 53 | 42 | 130 | 36 | 28 | 91 | 44 | 48 | 725 | 271 | 37 |
| 1962 | 80 | 32 | 40 | | | | 146 | 56 | 38 | 46 | 8 | 17 | 67 | 30 | 45 | 126 | 47 | 37 | 134 | 41 | 31 | 78 | 30 | 39 | 677 | 244 | 36 |
| 1963 | 86 | 37 | 43 | | | | 148 | 56 | 38 | 40 | 8 | 20 | 61 | 20 | 33 | 124 | 54 | 44 | 130 | 30 | 23 | 88 | 39 | 44 | 677 | 244 | 36 |
| 1964 | 92 | 37 | 40 | | | | 154 | 39 | 25 | 43 | 7 | 16 | 82 | 38 | 46 | 131 | 49 | 37 | 120 | 36 | 30 | 87 | 29 | 33 | 709 | 235 | 33 |
| 1965 | 94 | 35 | 37 | | | | 157 | 51 | 33 | 46 | 15 | 33 | 73 | 31 | 43 | 124 | 47 | 38 | 124 | 26 | 21 | 84 | 16 | 19 | 702 | 221 | 32 |
| 1966 | 91 | 27 | 30 | | | | 154 | 48 | 31 | 48 | 16 | 33 | 83 | 43 | 52 | 132 | 49 | 37 | 124 | 31 | 25 | 90 | 26 | 29 | 722 | 240 | 33 |
| 1967 | 106 | 45 | 42 | | | | 161 | 74 | 46 | 38 | 11 | 29 | 83 | 35 | 39 | 129 | 47 | 36 | 122 | 42 | 34 | 82 | 27 | 33 | 721 | 281 | 39 |
| 1968 | 102 | 41 | 40 | | | | 157 | 57 | 36 | 37 | 8 | 22 | 90 | 41 | 46 | 143 | 54 | 38 | 129 | 42 | 33 | 93 | 29 | 31 | 751 | 272 | 36 |
| 1969 | 99 | 29 | 29 | | | | 167 | 60 | 36 | 57 | 18 | 32 | 90 | 38 | 47 | 134 | 72 | 54 | 128 | 38 | 30 | 88 | 25 | 28 | 763 | 280 | 37 |
| 1970 | 100 | 51 | 51 | | | | 165 | 54 | 33 | 50 | 19 | 38 | 81 | 43 | 41 | 136 | 49 | 36 | 125 | 47 | 38 | 95 | 30 | 32 | 752 | 293 | 39 |
| 1971 | 107 | 53 | 50 | 33 | 14 | 42 | 184 | 83 | 45 | 51 | 20 | 39 | 106 | - | - | 134 | 68 | 51 | 134 | 51 | 38 | 96 | 53 | 55 | 739 (845)[b] | 342 | 46 |

[a]Graduates for a given year and institution obtained from survey of the institutions and the number retained from a given class was derived from our analysis of the November 26, 1971 data tapes provided by the Pennsylvania Medical Society and from the 1971 Directory of the American Osteopathic Association.

[b]This is the actual number of graduates if we include the graduates of the Philadelphia College of Osteopathic Medicine for which no class of 1971 retention data was available from the 1971 membership directory of the American Osteopathic Association.

Table 6

A Summary of the Number of Physicians in Pennsylvania as of 1970-71 Who Graduated During the Years 1961-63 With Percentage Figures to be Used in Calculating Future Physician Growth[a]

I. Direct Patient Care M.D.'s

| Where Trained | Family Practice | General Practice | Internal Medicine | Pediatrics | General Surgery | Other Direct Care | Total |
|---|---|---|---|---|---|---|---|
| Pennsylvania | 3 | 100 | 65 | 40 | 38 | 326 | 572 |
| % of Column Total | 60 | 71 | 58 | 51 | 51 | 50 | 53 |
| % of Row Total | 1 | 17 | 11 | 7 | 7 | 57 | 100 |
| % of Grand Total | 0 | 9 | 6 | 4 | 4 | 30 | 53 |
| % of 1961-63 Grads[b] | 1 | 5 | 3 | 2 | 2 | 17 | 30 |
| Other States | 1 | 29 | 28 | 21 | 14 | 154 | 247 |
| % of Column Total | 20 | 21 | 25 | 26 | 19 | 23 | 25 |
| % of Row Total | 1 | 12 | 11 | 8 | 6 | 62 | 100 |
| % of Grand Total | 0.1 | 3 | 3 | 2 | 1 | 14 | 23 |
| % of Pa. Entrants[c] | 33 | 29 | 43 | 53 | 37 | 47 | 43 |
| Foreign | 1 | 12 | 19 | 18 | 22 | 180 | 252 |
| % of Column Total | 20 | 8 | 17 | 23 | 30 | 27 | 24 |
| % of Row Total | 1 | 5 | 7 | 7 | 9 | 71 | 100 |
| % of Grand Total | 0.1 | 1 | 2 | 2 | 2 | 17 | 24 |
| % of Pa. Entrants[c] | 33 | 12 | 29 | 45 | 58 | 55 | 44 |
| Combined | 5 | 141 | 112 | 79 | 74 | 660 | 1,071 |
| % of Column Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| % of Row Total | 1 | 13 | 10 | 7 | 7 | 62 | 100 |
| % of Grand Total | 1 | 13 | 10 | 7 | 7 | 62 | 100 |

Table 6
(continued)

II. Active M.D.'s in Other Than Direct Patient Care

| Where Trained | Family Practice | General Practice | Internal Medicine | Pediatrics | General Surgery | Other Specialty | Total |
|---|---|---|---|---|---|---|---|
| Pennsylvania | 0 | 1 | 7 | 4 | 0 | 55 | 67 |
| % of Column Total | - | 33.33 | 30 | 40 | 0 | 32.5 | 32 |
| % of Row Total | 0 | 2 | 10 | 6 | 0 | 82 | 100 |
| % of Grand Total | 0 | 1 | 3 | 2 | 0 | 26 | 32 |
| % of 1961-63 Grads[b] | 0 | 0 | 0 | 0 | 0 | | 4 |
| Other States | 0 | 1 | 11 | 3 | 1 | 55 | 71 |
| % of Column Total | - | 33.33 | 48 | 30 | 25 | 32.5 | 34 |
| % of Row Total | 0 | 1 | 16 | 4 | 1 | 78 | 100 |
| % of Grand Total | 0 | 1 | 5 | 1 | 1 | 26 | 34 |
| % of Pa. Entrants[c] | - | 100 | 157 | 75 | - | 100 | 106 |
| Foreign | 0 | 1 | 5 | 3 | 3 | 60 | 72 |
| % of Column Total | - | 33.33 | 22 | 30 | 75 | 35 | 34 |
| % of Row Total | 0 | 2 | 7 | 4 | 4 | 83 | 100 |
| % of Grand Total | - | 1 | 2 | 1 | 1 | 29 | 34 |
| % of Pa. Entrants[c] | 0 | 100 | 71 | 75 | - | 109 | 107 |
| Combined | 0 | 3 | 23 | 10 | 4 | 170 | 210 |
| % of Column Total | - | 100 | 100 | 100 | 100 | 100 | 100 |
| % of Row Total | 0 | 1 | 11 | 5 | 2 | 81 | 100 |
| % of Grand Total | 0 | 1 | 11 | 5 | 2 | 81 | 100 |

Table 6
(continued)

III. All M.D. Entrants to Pennsylvania Practice

| Where Trained | Family Practice | General Practice | Internal Medicine | Pediatrics | General Surgery | Other Specialty | Total |
|---|---|---|---|---|---|---|---|
| Pennsylvania | 3 | 101 | 72 | 44 | 38 | 381 | 639 |
| % of Column Total | 60 | 70 | 53 | 49 | 49 | 46 | 50 |
| % of Row Total | 0 | 16 | 11 | 7 | 6 | 60 | 100 |
| % of Grand Total | 0 | 8 | 6 | 3 | 3 | 30 | 50 |
| % of 1961-63 Grads[b] | 1 | 5 | 4 | 2 | 2 | 20 | 34 |
| Other States | 1 | 30 | 39 | 24 | 15 | 209 | 318 |
| % of Column Total | 20 | 21 | 29 | 27 | 19 | 25 | 25 |
| % of Row Total | 0 | 9 | 12 | 8 | 5 | 66 | 100 |
| % of Grand Total | 0 | 2 | 3 | 2 | 1 | 16 | 25 |
| % of Pa. Entrants[c] | 33 | 30 | 54 | 55 | 39 | 55 | 50 |
| Foreign | 1 | 13 | 24 | 21 | 25 | 240 | 324 |
| % of Column Total | 20 | 9 | 18 | 24 | 32 | 29 | 25 |
| % of Row Total | 0 | 4 | 7 | 7 | 8 | 74 | 100 |
| % of Grand Total | 0 | 1 | 2 | 2 | 2 | 19 | 25 |
| % of Pa. Entrants[c] | 33 | 13 | 33 | 48 | 66 | 63 | 51 |
| Combined | 5 | 144 | 135 | 89 | 78 | 830 | 1,281 |
| % of Column Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| % of Row Total | 0 | 11 | 11 | 7 | 6 | 65 | 100 |
| % of Grand Total | 0 | 11 | 11 | 7 | 6 | 65 | 100 |

Table 6
(continued)

IV. Doctor of Osteopathy Entrants[d]

| Where Trained | Family Practice | General Practice | Internal Medicine | Pediatrics | General Surgery | Other Specialty | Total |
|---|---|---|---|---|---|---|---|
| Pennsylvania | 0 | 62 | 1 | 2 | 4 | 17 | 86 |
| % of Column Total | - | 68 | 25 | 50 | 57 | 55 | 63 |
| % of Row Total | 0 | 72 | 1 | 2 | 5 | 20 | 100 |
| % of Grand Total | 0 | 45 | 1 | 2 | 3 | 12 | 63 |
| % of 1961-63 Grads[e] | 0 | 30 | 1 | 1 | 2 | 8 | 42 |
| Other States | 0 | 29 | 3 | 2 | 3 | 14 | 51 |
| % of Column Total | - | 32 | 75 | 50 | 43 | 45 | 37 |
| % of Row Total | 0 | 57 | 6 | 4 | 6 | 27 | 100 |
| % of Grand Total | 0 | 21 | 2 | 2 | 2 | 10 | 37 |
| % of Pa. Entrants[f] | 0 | 47 | 300 | 100 | 75 | 82 | 59 |
| Combined | 0 | 91 | 4 | 4 | 7 | 31 | 137 |
| % of Column Total | - | 100 | 100 | 100 | 100 | 100 | 100 |
| % of Row Total | 0 | 66 | 3 | 3 | 5 | 23 | 100 |
| % of Grand Total | 0 | 66 | 3 | 3 | 5 | 23 | 100 |

V. All Physicians Who Entered Practice in Pennsylvania[g]

| Where Trained | Family Practice | General Practice | Internal Medicine | Pediatrics | General Surgery | Other Specialty | Total |
|---|---|---|---|---|---|---|---|
| Pennsylvania | 3 | 163 | 73 | 46 | 42 | 398 | 725 |
| % of Column Total | 60 | 69 | 53 | 49 | 50 | 46 | 51 |
| % of Row Total | 1 | 22 | 10 | 6 | 6 | 55 | 100 |
| % of Grand Total | 0 | 12 | 5 | 3 | 3 | 28 | 51 |
| % of 1961-63 Grads[b] | 0 | 8 | 4 | 2 | 2 | 19 | 35 |

Table 6
(continued)

V. All Physicians Who Entered Practice in Pennsylvania[g] (continued)

| Where Trained | Family Practice | General Practice | Internal Medicine | Pediatrics | General Surgery | Other Specialty | Total |
|---|---|---|---|---|---|---|---|
| Other States | 1 | 59 | 42 | 26 | 18 | 223 | 369 |
| % of Column Total | 20 | 25 | 30 | 28 | 21 | 26 | 26 |
| % of Row Total | 1 | 16 | 11 | 7 | 5 | 60 | 100 |
| % of Grand Total | 0 | 4 | 3 | 2 | 1 | 16 | 26 |
| % of Pa. Entrants[c] | 33 | 36 | 58 | 57 | 43 | 56 | 51 |
| Foreign | 1 | 13 | 24 | 21 | 25 | 240 | 324 |
| % of Column Total | 20 | 6 | 17 | 23 | 29 | 28 | 23 |
| % of Row Total | 0 | 4 | 7 | 7 | 8 | 74 | 100 |
| % of Grand Total | 0 | 1 | 2 | 1 | 2 | 17 | 23 |
| % of Pa. Entrants[c] | 33 | 8 | 33 | 46 | 60 | 60 | 45 |
| Combined | 5 | 235 | 139 | 93 | 85 | 861 | 1,418 |
| % of Column Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| % of Row Total | 0 | 17 | 10 | 6 | 6 | 61 | 100 |
| % of Grand Total | 0 | 17 | 10 | 6 | 6 | 61 | 100 |

[a]All numerical data in the table is based upon AMA tape records, circa Nov. 26, 1971, or upon the 1971 Directory of the American Osteopathic Association (Appendix B).

[b]During the years 1961-63, 2,079 degrees were awarded by the medical schools of Pennsylvania, 1,872 M.D. and 207 D.O. degrees. These figures are used throughout this table.

[c]Figures obtained by dividing the figure for this section by the number of 1961-63 Pennsylvania entrants in the first section to get a ratio estimate in percentage terms.

[d]Based upon data from the 1971 Directory of the American Osteopathic Association.

[e]During the years 1961-63, 2,079 degrees were awarded by the medical schools of Pennsylvania of which 207 were doctor of osteopathy degrees.

[f]The figures here are obtained by dividing the number of Pennsylvania entrants above (line 1) into the number of entrants from out-of-state medical schools in the United States.

[g]Derived by summation of data in preceding tables.

(Section III), doctors of osteopathy entrants (Section IV) and all physician entrants combined (Section V). Table 6 also contains data on graduates of 1961-63 from Pennsylvania medical schools, out-of-state medical schools, foreign medical schools and all medical schools combined.

The per cent of column total figure indicates the proportion in that speciality among the 1961-63 categories coming from Pennsylvania medical schools, out-of-state medical schools or foreign medical schools, e.g., 69 per cent of the general practitioners either retained or imported were Pennsylvania trained, 25 per cent were trained in other states and 6 per cent were trained by a foreign medical school (Section V of Table 6). The per cent of row total gives the proportion of all physicians from the medical schools of a given region (Pennsylvania, out-of-state, foreign), e.g., of the Pennsylvania trained 1961-63 graduates 1 per cent entered family practice, 22 per cent entered general practice, 10 per cent became practitioners of internal medicine, 6 per cent became pediatricians, 6 per cent became general surgeons and 55 per cent entered into other areas of specialization. The per cent of the grand total figure, on the other hand, represents the overall proportion of all 1961-63 graduates in the state as of November 26, 1971 approximately, e.g., 12 per cent of all 1961-63 graduates practicing in the State of Pennsylvania in 1971 were in general practice.

Obviously, the numbers in the state and the proportions cited above will not give us the retention rates needed. What is required is a comparison between the number of Pennsylvania graduates (1961-63) retained and the number of graduates produced during this period. The row *per cent of 1961-63 grads* therefore, reflects Pennsylvania's ability to retain graduates in each specialty area given in Table 6.

Overall, Table 6 indicates that we retained 35 per cent of our graduates of 1961-63, 8 per cent in general or family practice, 4 per cent in internal medicine, 2 per cent in pediatrics, 2 per cent in general surgery and 19 per cent in other specialty areas. If this data is generalizable, then 8 per cent, for example, of our 1970 graduates could be expected to remain or return to Pennsylvania as independent practitioners of family medicine or as general practitioners.

Information on the number of 1961-63 out-of-state graduates attracted to the state by 1971 is likewise of no value of itself. Records indicate that the 22,656 U.S. medical school graduates (Table 83 of reference 1) minus the 2,079 Pennsylvania graduates (Appendix D) of 1961-63 give us a total graduate out-of-state 1961-63 output of 20,577 physicians. Of this total, for example, one or 0.005 per cent became practitioners of family medicine in Pennsylvania by 1971, 0.29 per cent became general practitioners, 0.27 became internists, 0.13 per cent pediatricians, 0.09 per cent general surgeons and 1.08 per cent entered other specialties. Overall, Pennsylvania had attracted 1.79 per cent of all out-of-state 1961-63 graduates (based on data from Section V of Table 6).

Such percentage figures could be derived for all of the sections of Table 6 simply by dividing the numerical *other states* entry by 20,577. Unfortunately, projections of other state graduate output growth were not available. As a result, a different approach had to be adopted in Table 6. This consisted of determining the ratio (in percentage terms) of the Pennsylvania retainees to the out-of-state trained entrants (per cent of Pennsylvania entrants), e.g., the one family practice out-of-state trained entrant (Section V, Table 6) was 33 per cent of the number of Pennsylvania trained retainees[3]. Similarly, the number of general practice entrants from out-of-state medical schools was 36 per cent. The same principle was used with regard to the foreign trained entrants. Use of these ratios for projection purposes will, of course, require an assumption of no change in the relative proportion of Pennsylvania trained to out-of-state or foreign trained entrants.

Projections of Pennsylvania Trained Supply

Tables 7 and 8 are an attempt to project the supply of Pennsylvania trained physicians under one or two conditions. Table 7 projects the supply based upon the historical trend of the 1960s using linear correlation as the basis of the projection. Table 8, on the other hand, projects the supply of Pennsylvania trained physicians based upon the proposed or projected growth made by the eight medical schools in response to the survey (Appendix D) made by the author. Both tables assume that the rates of retention found in Table 6 will be equally true of the 1970s.

Based on historical trend only (Table 7), we would be producing 835 graduates in 1980 and would retain 293 of these as practicing physicians with 264 in direct patient care. If the medical schools are able to grow as anticipated (Table 4), they will be graduating some 1,340 graduates in 1980, 474 of whom will remain as practicing physicians and 430 of them in direct patient care.

Table 7

Projected Supply of Pennsylvania Medical School Graduates Who Will Remain to Practice in the State of Pennsylvania if the Medical Schools Expand Only at Their Historic Rate and No Change in Retention of Graduates Occurs

| Year | Projected M.D. Graduates[a] | Projected M.D. Supply[b] | Projected D.O. Graduates[c] | Projected D.O. Supply[d] | Total Projected Pa. Supply[e] | Cumulated Total Pa. Supply[e] |
|---|---|---|---|---|---|---|
| 1971 | 673 | 229(202) | 90 | 38 | 267(240) | 267( 240) |
| 1972 | 679 | 231(204) | 92 | 39 | 270(243) | 537( 483) |
| 1973 | 685 | 233(206) | 94 | 39 | 272(245) | 809( 728) |
| 1974 | 691 | 235(207) | 96 | 40 | 275(247) | 1,084( 975) |
| 1975 | 696 | 237(209) | 98 | 41 | 278(250) | 1,362(1,225) |
| 1976 | 702 | 239(211) | 100 | 42 | 281(253) | 1,643(1,478) |
| 1977 | 708 | 241(212) | 102 | 43 | 284(255) | 1,927(1,733) |
| 1978 | 714 | 243(214) | 104 | 44 | 287(258) | 2,214(1,991) |
| 1979 | 720 | 245(216) | 107 | 45 | 290(261) | 2,504(2,252) |
| 1980 | 726 | 247(218) | 109 | 46 | 293(264) | 2,797(2,516) |

[a] A linear projection based upon the 1961-1971 historical data found in Table 4.

[b] Based upon the finding in Table 6 that 34 per cent of those graduating as M.D.'s during the years 1961-63 remained in Pennsylvania as practicing physicians (30 per cent as direct care physicians, i.e., see figures in parentheses).

[c] A linear projection based upon the 1961-1971 osteopathic graduate data found in Table 4.

[d] Based upon the finding in Table 6 that 42 per cent of those graduating as doctors of osteopathy from the Philadelphia College of Osteopathic Medicine during the years 1961-63 remained in Pennsylvania as practicing direct care physicians. Total remaining is virtually identical with those in direct care.

[e] Direct patient care supply from Pennsylvania's medical schools in parentheses.

Table 8

Projected Supply of Pennsylvania Medical School Graduates Who Will Remain to Practice in the State of Pennsylvania if the Medical Schools Expand as Planned and Retention Rates Remain Unchanged

| Year | Projected M.D. Graduates[a] | Projected M.D. Supply[b] | Projected D.O. Graduates[c] | Projected D.O. Supply[d] | Total Projected Pa. Supply[e] | Cumulated Total Pa. Supply[e] |
|---|---|---|---|---|---|---|
| 1971 | 741 | 252 (222) | 106 | 45 | 297 (267) | 297 (267) |
| 1972 | 810 | 275 (243) | 125 | 53 | 328 (296) | 625 (563) |
| 1973 | 826 | 281 (248) | 137 | 58 | 339 (306) | 964 (869) |
| 1974 | 883 | 300 (265) | 148 | 62 | 362 (327) | 1,326,(1,196) |
| 1975 | 902 | 307 (271) | 151 | 63 | 370 (334) | 1,696 (1,530) |
| 1976 | 973 | 331 (292) | 170 | 71 | 402 (363) | 2,098 (1,893) |
| 1977 | 1,007 | 342 (302) | 189 | 79 | 421 (381) | 2,519 (2,274) |
| 1978 | 1,052 | 358 (316) | 212 | 89 | 447 (405) | 2,966 (2,679) |
| 1979 | 1,084 | 369 (325) | 236 | 99 | 468 (424) | 3,434 (3,105) |
| 1980 | 1,104 | 375 (331) | 236 | 99 | 474 (430) | 3,908 (3,533) |

[a]See survey based projections by Pennsylvania's medical schools in Table 4.

[b]Based upon the finding in Table 6 that 34 per cent of those graduating as M.D.'s during the years 1961-63 remained in Pennsylvania as practicing physicians (30 per cent as direct care physicians, i.e., see figures in parentheses).

[c]See survey based projections by the Philadelphia College of Osteopathic Medicine in Table 4.

[d]Based upon the finding in Table 6 that 42 per cent of those graduating as doctors of osteopathy from the Philadelphia College of Osteopathic Medicine during the years 1961-63 remained in Pennsylvania as practicing direct care physicians. Total remaining is virtually identical with those in direct care.

[e]Direct patient care supply from Pennsylvania's medical schools in parentheses.

Table 9 through 13 represent similar projections of supply for the speciality areas of general practice, internal medicine, pediatrics, general surgery and other specialty areas combined. The methodology used here is exactly the same as for Tables 7 and 8.

Taken as a whole, Tables 8 through 13 indicate that from 1971 to 1980 Pennsylvania will have produced and retained 3,908 practicing physicians. Of these, 1,076 will be in general practice, 390 in internal medicine, 204 in pediatrics, 223 in general surgery and 2,116 in other specialties. The detailed figures for the specialties add up to a figure of 4,009 which is higher than the general projection of 3,908 by a figure of 101. This discrepancy is due to the rounding of percentage figures in Table 6 and represents a discrepancy of some 10 physicians per year which may be considered as negligible for the purposes of this study.

Medical Origin of Pennsylvania M.D.'s

Table 14 is based upon the data found in the AMA roster tapes for Pennsylvania as of November 26, 1971 and summarizes the medical education origins of Pennsylvania's physicians. Looking at the data we see that of the 19,205 Pennsylvania physicians listed by the AMA as of November 26, 1971, 15,925 were trained in the United States (82.92 per cent), 14 were trained in Puerto Rico (0.07 per cent) and 3,266 were trained in foreign medical schools (17.01 per cent).

Furthermore, we see in Table 14 that 58.31 per cent of Pennsylvania's physicians were trained in Pennsylvania (a much higher figure than the retention rate of 35 per cent for the 1960s). Of Pennsylvania's medical physicians trained in the medical schools of the United States, 70.32 per cent were trained in Pennsylvania. The states or areas that have provided the most physicians are New York State and the District of Columbia. New York trained physicians represent 4.87 per cent, of all of Pennsylvania's medical physicians 5,88 per cent of the Pennsylvania medical physicians trained in the United States and 19.8 per cent of the in-migrating medical physicians trained in other states of the Union.

Of the foreign-trained medical physicians, the largest number came from Asia (1,285) with Europe (952) running second. Of the Pennsylvania medical physicians 6.69 per cent are Asian trained and 4.96 per cent are European trained. Asia contributed 39.18 per cent and Europe 29.02 per cent of the foreign-trained medical physicians in Pennsylvania. All told, the undeveloped nations of Asia, Africa, the Middle East and South America have provided Pennsylvania with 10.64 per cent of the state's medical physicians and 62.84 per cent of all of the foreign-trained medical physicians residing in the state as of November 26, 1971. Pennsylvania, furthermore, had at that time approximately one foreign-trained physician out of every six (17.01 per cent). This figure matches exactly with the findings of the HEW report[5] mentioned earlier in which one out of six (16.67 per cent) U.S. physicians was trained in a foreign medical school.

In-migration

Obviously, there is a substantial influx of physicians from outside of the state. The problem is how to determine the amount of in-migration and derive a rate figure that can be used to project the supply due to in-migration.

Ideally the licensure boards could provide precise figures on physicians newly located as practitioners in Pennsylvania but, the current data recording process used by the boards makes such data difficult to obtain. (See Chapter VI)

As a consequence, an alternative approach was used. It consisted of taking a 10 per cent sample (every 10th medical physician) of the physicians listed in the **1969 Director of Physicians**, published annually by the AMA, and then determining how many of them were not in the state in 1967 using the 1967 director of the AMA. The numbers arrived at were corrected to estimate the total number that in-migrated by multiplying the sample figure by 10. These estimates were further corrected to arrive at a yearly in-migration figure by dividing by two–the interval between directories. The resulting figures are somewhat low since doctors of osteopathy are not included. They can, however, be used as a basis for estimates of the impact of in-migration upon supply.

The findings are summarized in Table 15 where we see, for example, that 70 general practice medical physicians are estimated to have entered the state each year based upon a sample count of 14, i.e., 14 x 20 ÷ 2 = 70. Ten of the general practitioners were Pennsylvania-trained medical physicians who returned from another state. Fifteen were Pennsylvania-trained general practitioners who returned from the armed forces, 10 medical physicians entered the state following training in another state, 10 came both from military service to practice in Pennsylvania even though trained

Table 9

Projected Supply of Pennsylvania Medical School Graduates Who Will Remain in the State of Pennsylvania as General or Family Practitioners if the Medical Schools Expand as Planned and Retention Rates Remain Unchanged

| Year | Projected M.D. Graduates[a] | Projected M.D. Supply[b] | Projected D.O. Graduates[c] | Projected D.O. Supply[d] | Total Projected Pa. Supply | Cumulated Total Pa. Supply |
|---|---|---|---|---|---|---|
| 1971 | 741 | 44 | 106 | 32 | 76 | 76 |
| 1972 | 810 | 49 | 125 | 38 | 87 | 163 |
| 1973 | 826 | 50 | 137 | 41 | 91 | 254 |
| 1974 | 883 | 53 | 148 | 44 | 97 | 351 |
| 1975 | 902 | 54 | 151 | 45 | 99 | 450 |
| 1976 | 973 | 58 | 170 | 51 | 109 | 559 |
| 1977 | 1,007 | 60 | 189 | 57 | 117 | 676 |
| 1978 | 1,052 | 63 | 212 | 64 | 127 | 803 |
| 1979 | 1,084 | 65 | 236 | 71 | 136 | 939 |
| 1980 | 1,104 | 66 | 236 | 71 | 137 | 1,076 |

[a]See survey based projections by Pennsylvania's medical schools in Table 4.

[b]Based upon the finding in Table 6 that six per cent of those graduating as M.D.'s during the years 1961-63 remained in Pennsylvania as general or family practitioners.

[c]See survey based projections by the Philadelphia College of Osteopathic Medicine in Table 4.

[d]Based upon the finding in Table 6 that 30 per cent of those graduating as doctors of osteopathy from the Philadelphia College of Osteopathic Medicine during the years 1961-63 remained in Pennsylvania as general or family practitioners. Total remaining is virtually identical with those in direct care.

Table 10

Projected Supply of Pennsylvania Medical School Graduates Who Will Remain in the State of Pennsylvania as Practitioners of Internal Medicine if the Medical Schools Expand as Planned and Retention Rates Remain Unchanged

| Year | Projected M.D. Graduates[a] | Projected M.D. Supply[b] | Projected D.O. Graduates[c] | Projected D.O. Supply[d] | Total Projected Pa. Supply[e] | Cumulated Total Pa. Supply[e] |
|---|---|---|---|---|---|---|
| 1971 | 741 | 30 (22) | 106 | 1 | 31 (23) | 31 (23) |
| 1972 | 810 | 32 (24) | 125 | 1 | 33 (25) | 64 (48) |
| 1973 | 826 | 33 (25) | 137 | 1 | 34 (26) | 98 (74) |
| 1974 | 883 | 35 (26) | 148 | 1 | 36 (27) | 134 (101) |
| 1975 | 902 | 36 (27) | 151 | 2 | 38 (29) | 172 (130) |
| 1976 | 973 | 39 (29) | 170 | 2 | 41 (31) | 213 (161) |
| 1977 | 1,007 | 40 (30) | 189 | 2 | 42 (32) | 255 (193) |
| 1978 | 1,052 | 42 (32) | 212 | 2 | 44 (34) | 299 (227) |
| 1979 | 1,084 | 43 (33) | 236 | 2 | 45 (35) | 344 (262) |
| 1980 | 1,104 | 44 (33) | 236 | 2 | 46 (35) | 390 (297) |

[a]See survey based projections by Pennsylvania's medical schools in Table 4.

[b]Based upon the finding in Table 6 that four per cent of those graduating as M.D.'s during the years 1961-63 remained in Pennsylvania as internists (three per cent as direct care physicians, i.e., see figures in parentheses).

[c]See survey based projections by the Philadelphia College of Osteopathic Medicine in Table 4.

[d]Based upon the finding in Table 6 that one per cent of those graduating as doctors of osteopathy from the Philadelphia College of Osteopathic Medicine during the years 1961-63 remained in Pennsylvania as internists. Total remaining is virtually identical with those in direct care.

[e]Direct patient care supply from Pennsylvania's medical schools in parentheses.

Table 11

Projected Supply of Pennsylvania Medical School Graduates Who Will Remain in the State of Pennsylvania as Pediatricians if the Medical Schools Expand as Planned and Retention Rates Remain Unchanged

| Year | Projected M.D. Graduates[a] | Projected M.D. Supply[b] | Projected D.O. Graduates[c] | Projected D.O. Supply[d] | Total Projected Pa. Supply | Cumulated Total Pa. Supply |
|---|---|---|---|---|---|---|
| 1971 | 741 | 15 | 106 | 1 | 16 | 16 |
| 1972 | 810 | 16 | 125 | 1 | 17 | 33 |
| 1973 | 826 | 17 | 137 | 1 | 18 | 51 |
| 1974 | 883 | 18 | 148 | 1 | 19 | 70 |
| 1975 | 902 | 18 | 151 | 2 | 20 | 90 |
| 1976 | 973 | 19 | 170 | 2 | 21 | 111 |
| 1977 | 1,007 | 20 | 189 | 2 | 22 | 133 |
| 1978 | 1,052 | 21 | 212 | 2 | 23 | 156 |
| 1979 | 1,084 | 22 | 236 | 2 | 24 | 180 |
| 1980 | 1,104 | 22 | 236 | 2 | 24 | 204 |

[a] See survey based projections by Pennsylvania's medical schools in Table 4.

[b] Based upon the finding in Table 6 that two per cent of those graduating as M.D.'s during the years 1961-63 remained in Pennsylvania as pediatricians.

[c] See survey based projections by the Philadelphia College of Osteopathic Medicine in Table 4.

[d] Based upon the finding in Table 6 that one per cent of those graduating as doctors of osteopathy from the Philadelphia College of Osteopathic Medicine during the years 1961-63 remained in Pennsylvania as pediatricians. Total remaining is virtually identical with those in direct care.

Table 12

Projected Supply of Pennsylvania Medical School Graduates Who Will Remain in the State of Pennsylvania as General Surgeons if the Medical Schools Expand as Planned and Retention Rates Remain Unchanged

| Year | Projected M.D. Graduates[a] | Projected M.D. Supply[b] | Projected D.O. Graduates[c] | Projected D.O. Supply[d] | Total Projected Pa. Supply | Cumulated Total Pa. Supply |
|---|---|---|---|---|---|---|
| 1971 | 741 | 15 | 106 | 2 | 17 | 17 |
| 1972 | 810 | 16 | 125 | 3 | 19 | 36 |
| 1973 | 826 | 17 | 137 | 3 | 20 | 56 |
| 1974 | 883 | 18 | 148 | 3 | 21 | 77 |
| 1975 | 902 | 18 | 151 | 3 | 21 | 98 |
| 1976 | 973 | 19 | 170 | 3 | 22 | 120 |
| 1977 | 1,007 | 20 | 189 | 4 | 24 | 144 |
| 1978 | 1,052 | 21 | 212 | 4 | 25 | 169 |
| 1979 | 1,084 | 22 | 236 | 5 | 27 | 196 |
| 1980 | 1,104 | 22 | 236 | 5 | 27 | 223 |

[a]See survey based projections by Pennsylvania's medical schools in Table 4.

[b]Based upon the finding in Table 6 that two per cent of those graduating as M.D.'s during the years 1961-63 remained in Pennsylvania as general surgeons.

[c]See survey based projections by the Philadelphia College of Osteopathic Medicine in Table 4.

[d]Based upon the finding in Table 6 that two per cent of those graduating as doctors of osteopathy from the Philadelphia College of Osteopathic Medicine during the years 1961-63 remained in Pennsylvania as general surgeons. Total remaining is virtually identical with those in direct care.

Table 13

Projected Supply of Pennsylvania Medical School Graduates Who Will Remain in the State of Pennsylvania as Specialists in Areas Other Than General Practice, Family Practice, Internal Medicine, Pediatrics or General Surgery if the Medical Schools Expand as Planned and Retention Rates Remain Unchanged

| Year | Projected M.D. Graduates[a] | Projected M.D. Supply[b] | Projected D.O. Graduates[c] | Projected D.O. Supply[d] | Total Projected Pa. Supply[e] | Cumulated Total Pa. Supply[e] |
|---|---|---|---|---|---|---|
| 1971 | 741 | 148 (126) | 106 | 15 | 163 (141) | 163 (141) |
| 1972 | 810 | 162 (138) | 125 | 18 | 180 (156) | 343 (297 |
| 1973 | 826 | 165 (140) | 137 | 19 | 184 (159) | 527 (456) |
| 1974 | 883 | 177 (150) | 148 | 21 | 198 (171) | 725 (627) |
| 1975 | 902 | 180 (153) | 151 | 21 | 201 (174) | 926 (807) |
| 1976 | 973 | 195 (165) | 170 | 24 | 219 (189) | 1,145 (990) |
| 1977 | 1,007 | 201 (171) | 189 | 26 | 227 (197) | 1,372 (1,187) |
| 1978 | 1,052 | 210 (179) | 212 | 30 | 240 (209) | 1,612 (1,396) |
| 1979 | 1,084 | 217 (184) | 236 | 33 | 250 (217) | 1,862 (1,613) |
| 1980 | 1,104 | 221 (188) | 236 | 33 | 254 (221) | 2,116 (1,834) |

[a]See survey based projections by Pennsylvania's medical schools in Table 4.

[b]Based upon finding in Table 6 that 20 per cent of those graduating as M.D.'s during the years 1961-63 remained in Pennsylvania as practicing physicians in other specialties (17 per cent as direct care physicians, i.e., see figures in parentheses).

[c]See survey based projections by the Philadelphia College of Osteopathic Medicine in Table 4.

[d]Based upon the finding in Table 6 that 14 per cent of those graduating as doctors of osteopathy from the Philadelphia College of Osteopathic Medicine during the years 1961-63 remained in Pennsylvania as specialists in other areas than those tabled.

[e]Direct patient care supply from Pennsylvania's medical schools in parentheses.

Table 14

Location of Medical Education for 19,205 Pennsylvania (M.D.) Physicians (November 26, 1971)[a]

| Location | Number | Percentage of All Pennsylvania M.D.'s | Percentage of U.S. Trained Pa.M.D.'s | Percentage M.D.'s Trained in Other States Than Pa. |
|---|---|---|---|---|
| I. U.S. Trained Pennsylvania M.D.'s | | | | |
| Alabama | 12 | 0.06 | 0.08 | 0.25 |
| *Alaska | - | - | - | - |
| Arizona | - | - | - | - |
| Arkansas | 15 | 0.08 | 0.09 | 0.32 |
| California | 97 | 0.50 | 0.61 | 2.05 |
| Colorado | 12 | 0.06 | 0.08 | 0.25 |
| Connecticut | 80 | 0.42 | 0.50 | 1.69 |
| Delaware | - | - | - | - |
| District of Columbia | 632 | 3.29 | 3.97 | 13.37 |
| Florida | 21 | 0.11 | 0.13 | 0.44 |
| Georgia | 40 | 0.21 | 0.25 | 0.85 |
| *Hawaii | - | - | - | - |
| *Idaho | - | - | - | - |
| Illinois | 384 | 2.00 | 2.41 | 8.13 |
| Indiana | 55 | 0.29 | 0.34 | 1.16 |
| Iowa | 55 | 0.29 | 0.34 | 1.16 |
| Kansas | 21 | 0.11 | 0.13 | 0.44 |
| Kentucky | 54 | 0.28 | 0.34 | 1.14 |
| Louisiana | 57 | 0.30 | 0.36 | 1.21 |
| Maine | - | 0.00 | 0.00 | 0.00 |
| Maryland | 448 | 2.33 | 2.81 | 9.48 |
| Massachusetts | 357 | 1.86 | 2.24 | 7.55 |
| Michigan | 138 | 0.72 | 0.87 | 2.92 |
| Minnesota | 49 | 0.25 | 0.31 | 1.04 |
| Mississippi | 2 | 0.01 | 0.01 | 0.04 |
| Missouri | 188 | 0.98 | 1.18 | 3.98 |
| *Montana | - | 0.00 | 0.00 | 0.00 |
| Nebraska | 62 | 0.32 | 0.39 | 1.31 |
| Nevada | - | 0.00 | 0.00 | 0.00 |
| New Hampshire | - | 0.00 | 0.00 | 0.00 |
| New Jersey | 50 | 0.26 | 0.31 | 1.06 |
| New Mexico | 1 | 0.01 | 0.01 | 0.02 |
| New York | 936 | 4.87 | 5.88 | 19.80 |
| North Carolina | 113 | 0.59 | 0.71 | 2.39 |
| North Dakota | - | - | 0.00 | 0.00 |
| Ohio | 244 | 1.27 | 1.53 | 5.16 |
| Oklahoma | 21 | 0.11 | 0.13 | 0.44 |
| Oregon | 13 | 0.07 | 0.08 | 0.27 |
| Pennsylvania | 11,199 | 58.31 | 70.32 | - |
| Rhode Island | - | - | 0.00 | 0.00 |
| South Carolina | 17 | 0.09 | 0.11 | 0.36 |
| South Dakota | - | - | 0.00 | 0.00 |
| Tennessee | 148 | 0.77 | 0.93 | 3.13 |
| Texas | 50 | 0.26 | 0.31 | 1.06 |
| Utah | 11 | 0.06 | 0.07 | 0.23 |
| Vermont | 54 | 0.28 | 0.34 | 1.14 |
| Virginia | 134 | 0.70 | 0.84 | 2.83 |
| Washington | 13 | 0.07 | 0.08 | 0.27 |
| West Virginia | 42 | 0.22 | 0.26 | 0.89 |
| Wisconsin | 100 | 0.52 | 0.63 | 2.12 |
| *Wyoming | - | - | 0.00 | 0.00 |
| U.S.A. | 15,925 | 82.92 | 100.00 | - |

Table 14
(contd.)

| Location | Number | Percentage of All Pennsylvania M.D.'s | Percentage of 3,280 Foreign & U.S. Possession Trained M.D.'s |
|---|---|---|---|
| II. Pennsylvania M.D.'s Trained in U.S. Possessions and Territories | | | |
| *Canal Zone | - | | 0.00 |
| *Guam | - | | 0.00 |
| Puerto Rico | 14 | 0.07 | 0.43 |
| *Samoa | - | - | 0.00 |
| *Virgin Islands | - | - | 0.00 |
| Total | 14 | 0.07 | 0.43 |
| III. Pennsylvania M.D.'s Trained in Foreign Medical Schools | | | |
| A. Europe | 952 | 4.96 | 29.02 |
| B. Middle East | 347 | 1.81 | 10.58 |
| C. Asia | 1,285 | 6.69 | 39.18 |
| D. Canada | 230 | 1.20 | 7.01 |
| E. South America | 412 | 2.14 | 12.56 |
| F. Africa (S. Africa) | 17 | 0.09 | 0.52 |
| G. Other (Australia & New Zealand) | 23 | 0.12 | 0.70 |
| Total | 3,266 | 17.01 | 99.57 |

[a]Data compiled from AMA tapes dated November 26, 1971.

*Indicates no medical school in this state.

Table 15

A Summary of In-migration Estimates Derived From Original Counts Based on a 10 Per Cent Sample of All M.D.'s in the 1969 Directory of the American Medical Association[a]

| Source | Place Received Medical Education | | | |
|---|---|---|---|---|
| | Pennsylvania | Other States | Foreign | Total |
| I. General Practice | | | | |
| Another State | 10(2)[b] | 10(2) | 10(2) | 30(6) |
| Armed Forces | 15(3) | 10(2) | | 25(5) |
| Another Country | | | 15(3) | 15(3) |
| All Sources | 25(5) | 20(4) | 25(5) | 70(14) |
| II. Internal Medicine | | | | |
| Another State | 10(2)[b] | 5(1) | | 15(3) |
| Armed Forces | 10(2) | 5(1) | | 15(3) |
| Government Service | 10(2) | | | 10(2) |
| Another Country | | | 15(3) | 15(3) |
| All Sources | 30(6) | 10(2) | 15(3) | 55(11) |
| III. Pediatrics | | | | |
| Another State | 15(3)[b] | | | 15(3) |
| Armed Forces | 10(2) | | | 10(2) |
| All Sources | 25(5) | | | 25(5) |
| IV. General Surgery | | | | |
| Another State | 10(2)[b] | 10(2) | 5(1) | 25(5) |
| Armed Forces | 10(2) | 5(1) | | 15(3) |
| Government Service | 5(1) | | | 5(1) |
| Another Country | | | 10(2) | 10(2) |
| All Sources | 25(5) | 15(3) | 15(3) | 55(11) |
| V. Other Specialties | | | | |
| Another State | 50(10)[b] | 35(7) | 25( 2) | 110(22) |
| Armed Forces | 40( 8) | 10(2) | | 50(10) |
| Temp. Foreign Residence | 5( 1) | | | 5( 1) |
| Government Service | 10( 2) | 10(2) | | 20( 4) |
| Another Country | | | 40( 8) | 40( 8) |
| All Sources | 105(21) | 55(11) | 65(13) | 225(45) |
| VI. All Active Direct Care M.D.'s Combined | | | | |
| Another State | 95(19)[b] | 60(12) | 40( 8) | 195(39) |
| Armed Forces | 85(17) | 30( 6) | | 115(23) |
| Temp. Foreign Res. | 5( 1) | | | 5( 1) |
| Government Service | 25( 5) | 10( 2) | | 35( 7) |
| Another Country | | | 80(16) | 80(16) |
| All Sources | 210(42) | 100(20) | 120(24) | 430(86) |

Table 15

(Continued)

| Source | Place Received Medical Education Pennsylvania | Other States | Foreign | Total |
|---|---|---|---|---|
| VII. Active M.D.'s Not in Direct Patient Care | | | | |
| Another State | 5(1)[b] | 45( 9) | 5(1) | 55(11) |
| Armed Forces | | 10( 2) | | 10( 2) |
| Temp. Foreign Res. | | 5( 1) | | 5( 1) |
| Government Service | 5(1) | 15( 3) | | 20( 4) |
| Another Country | | | 15(3) | 15( 3) |
| All Sources | 10(2) | 75(15) | 20(4) | 105(21) |
| VIII. All Active M.D.'s Combined | | | | |
| Another State | 100(20)[b] | 105(21) | 45( 9) | 250(50) |
| Armed Forces | 85(17) | 40( 8) | | 125(25) |
| Temp. Foreign Res. | 5( 1) | 5( 1) | | 10( 2) |
| Government Service | 30( 6) | 25( 5) | | 55(11) |
| Another Country | | | 95(19) | 95(19) |
| All Sources | 220(44) | 175(35) | 140(28) | 535(107) |
| IX. Residents[c] | | | | |
| Another State | 55(11)[b] | 20( 4) | 75(15) | 150(30) |
| Armed Forces | 60(12) | 60(12) | | 120(24) |
| Temp. Foreign Res. | 5( 1) | | 5( 1) | 10( 2) |
| Government Service | 10( 2) | 5( 1) | | 15( 3) |
| Another Country | | | 220(44) | 220(44) |
| All Sources | 130(26) | 85(17) | 300(60) | 515(103) |

X. Not Previously Listed But U.S. Trained

| Category | Pennsylvania | Other States | Total |
|---|---|---|---|
| Active | 105(21) | 35( 7) | 140(28) |
| Residents | 160(32) | 105(21) | 265(53) |
| Total | 265(53) | 140(28) | 405(81) |

[a]Names from a 10 per cent sample of the physicians listed in the 1969 AMA Directory were compared against the 1967 AMA Directory listings. Those listed as residing elsewhere or not listed in 1967 were recorded as possible in-migrants.

[b]The number in parentheses represents the sample count, while the number in front represents the estimated number if the total population had been studied. The figure is further corrected to give an estimate of the number entering in 1968 only, i.e., if the entry were 25(5), the number 25 was obtained as follows: (5) x 10 ÷ 2.

[c]No attempt has been made to summarize the data for interns since they are largely not listed in 1967. Resident data is given as a matter of interest but is not used as a basis for estimating replacement.

in another state, 10 foreign-trained medical physicians came from another state of the Union and 15 foreign-trained medical physicians came directly from a foreign country. The data in Table 15 represents practicing physicians only and does not list interns. Residents are separately analyzed.

Correction Factors for Out-of-State Supply

Since medical schools are expanding and the numbers in-migrating must, of necessity, grow larger with time, these figures (Table 15) cannot be used as they are without a resulting underestimation of future supply due to in-migration. Rough correction factors based upon data in Tables 4, 6 and 15 were, therefore, developed. These correction factors are to be found in Tables 16 to 21 of this report.

In these tables, we have two separate estimates of physician entry (medical physician) from medical schools of Pennsylvania, other states and foreign countries. The first estimate is an estimate of physician retention and in-migration from the percentage retained and percentage ratios of Table 6. The entry of 225 for the column *Estimated 1968 Pennsylvania Trained Supply* is derived from the figure of 34 per cent retention of medical physicians in Section III of Table 6 times the number of medical physician graduates in 1968 from Table 4,i.e., 751 - 900 D.O. graduates = 661 medical physician graduates.

The entry of 113 for the second column (*Other State Trained Supply*) is also derived from Tables 6 by using the ratio (in percentage terms) of other state trained entrants to Pennsylvania retainees and multiplying it times the figure in column 1, i.e., .50 times 225 = 113 (Table 6, Section III). The same procedure was used to estimate the *Foreign-Trained Supply* figure of Tables 16-21, e.g., .51 times 225 - 115 (Table 6, Section III). The second (Table 15 based) row of data consists of figures taken directly from Table 15 concerning active and direct care physician in-migration estimates for 1968 (halfway between 1967 and 1969).

The estimation factors are based upon simple assumptions that the larger of the two estimates will tend to be correct. Also, that the *Pennsylvania Trained* figures will be very similar while the Table 6 based retention figures will be an underestimate due to the restriction of Table 6 to 1961-63 graduates only. Obviously, graduates of other years than 1961-63 are likely to enter the state as active full-time practitioners rather than residents or interns which are not included here.

Final Projections of Physician Supply

Tables 22a and 22b contain the final estimates of active and direct care physician supply based upon the foregoing tables of this chapter.

Projections of graduates from Tables 7 and 8 are found in columns 1 and 2. Uncorrected estimates of the supply of medical physicians and doctors of osteopathy using the retention and ratio figures of Table 6 times the values in columns 1 and 2 are found in columns 3 through 6, i.e., the appropriate retention figure on Table 6 times the appropriate graduate output figure in this table or the uncorrected supply estimate of columns 3 or 4 times the appropriate ratio figure of Table 6.

Since these figures in columns 3 to 6 are based on the 1961-63 graduate data figures of Table 6 they must then be converted to figures comparable to those of Table 15. This has been done by taking the estimation factors of Tables 16 to 21 times the appropriate values in columns 2 to 6 which give estimates of the yearly supply of physicians (medical physician or doctor of osteopathy) from medical schools in Pennsylvania and from all out-of-state sources. Active and direct patient care, in parentheses, estimates are given for each category of physician. The final column is a summation or total of the supply from all sources for a given year, e.g., in 1980 approximately 1,056 active physicians, other than residents or interns, will have begun practice in Pennsylvania and between 1971 and 1980 8,793 physicians will have done so.

The net migration effect is likely to be a relatively small figure since Pennsylvania also exports many physicians. This out-migration is an aspect of the demand side of the equation and will be dealt with later. Suffice it to say here that the data of Tables 15 and 61 of this report indicate a net physician migration pattern that favors Pennsylvania by a margin of 120 (Table 63) active physicians per year.

No discussion of Table 22b is required since it uses the same procedure but starts with the historical past (1963-1970) based linear projection of graduates in Table 7. The result is a projected supply lower than that obtained in Table 22a where cohorted class estimate procedures and first year projections by the medical schools were the basis of the projections.

The supply projections from Table 22a will be used later to interface estimates of supply with estimates of physician demand in order to make projections of physician need.

Table 16

Computation of 1968 Based Correction (Per Cent) Factors for Estimating the Other State Trained and Foreign Trained Medical School Supply of All M.D.'s in Active or Direct Care

| Data Base | Estimated 1968 Pennsylvania Trained Supply | Estimated 1968 Other State Trained Supply | Estimated Foreign Trained Supply |
|---|---|---|---|
| Table 6 | 226 (198)[a] | 113 ( 85)[c] | 115 ( 87)[e] |
| Table 15 | 220 (210)[b] | 175 (100)[d] | 140 (120)[f] |
| Estimation Factor | 100%(106%)[g] | 155%(118%) | 122%(138%) |

[a]Represents the finding of Table 6 that 34 per cent of the 1961-63 M.D. graduates (N - 1,872) of Pennsylvania's medical schools remained in the state in 1971 as active physicians and that 30 per cent remained as direct care physicians, i.e., 0.34 x the 661 graduates of 1968 = 225 and 0.30 x 661 = 198.

[b]The figures are taken directly from Table 15 with the figures in parentheses representing direct care physicians and the first figure representing the in-migration of active physicians in 1968.

[c]Computed from Table 6 using 50 per cent and 43 per cent of the Pennsylvania entrants for the active and direct care estimates, i.e., 0.50 x 225 = 113 and 0.43 x 198 = 85.

[d]The figures are taken directly from Table 15 with the figure in parentheses representing direct care physicians and the first figure representing the in-migration of active physicians in 1968.

[e]Computed from Table 6 using 51 per cent and 44 per cent of the Pennsylvania supply of active and direct care M.D.'s, i.e., 0.51 x 225 = 115 and 0.44 x 198 = 87.

[f]Figures taken directly from the direct and active care data of Table 15.

[g]Assumes the larger of the estimates to be correct, i.e., 225 over 220 or 210 over 198.

Table 17

Computation of 1968 Based Correction (Per Cent) Factors for Estimating the Other State Trained and Foreign Trained Medical School Supply of All M.D.'s in General and Family Practice

| Data Base | Estimated 1968 Pennsylvania Trained Supply | Estimated 1968 Other State Trained Supply | Estimated 1968 Foreign Trained Supply |
|---|---|---|---|
| Table 6 | 40 ( 40)[a] | 12 ( 12)[c] | 6 ( 5)[e] |
| Table 15 | 25 ( 25)[b] | 20 ( 20)[d] | 25 ( 25)[f] |
| Estimation Factor | 100%(100%)[g] | 167%(167%) | 417%(500%) |

[a]Represents the finding of Table 6 that six per cent of the 1961-63 M.D. graduates (N - 1,872) of Pennsylvania's medical schools remained in the state as active physicians and that the figure of six per cent applies also to those in direct care, i.e., all active general practitioners were in direct care. The proportion 0.06 times the 661 students who graduated in 1968 therefore equals 40 for both direct and active general practitioners.

[b]The figure in parentheses represents the Table 15 direct care estimate of in-migrating general practitioners in 1968 and since the total number of in-migrating active physicians not in direct care was 10, as compared with 210 in direct care (Table 15), it is assumed that the same pattern as for Table 6 holds here, i.e., all active general practitioners are in fact direct care practitioners.

[c]Computed from Table 6 using 30 per cent and 29 per cent of the Pennsylvania supply for the active and direct care estimates, i.e., 0.30 times 40 equals 12 and 0.29 times 40 equals 12.

[d]Assumes that all active general practitioners are direct care general practitioners and takes the direct care figure directly from Table 15.

[e]Computed from Table 6 using 14 per cent and 13 per cent of the Pennsylvania supply for the active and direct care estimates, i.e., 0.14 times 40 equals 6 and 0.13 times 40 equals 5.

[f]The direct care estimate is taken directly from Table 15 with all active general practitioners assumed to be direct care M.D.'s.

[g]The larger of the two estimates is assumed to be correct, e.g., 40 over 25.

Table 18

Computation of 1968 Based Correction (Per Cent) Factors for Estimating the Other State Trained and Foreign Trained Medical School Supply of M.D.'s in Internal Medicine

| Data Base | Estimated 1968 Pennsylvania Trained Supply | Estimated 1968 Other State Trained Supply | Estimated 1968 Foreign Trained Supply |
|---|---|---|---|
| Table 6 | 26 ( 20)[a] | 14 ( 9)[c] | 9 ( 5)[e] |
| Table 15 | 31 ( 30)[b] | 18 ( 10)[d] | 18 ( 15)[f] |
| Estimation Factor | 115%(150%) | 129%(111%) | 200%(300%) |

[a]Represents the finding of Table 6 that four per cent of the 1961-63 M.D. graduates (N - 1,872) of Pennsylvania's medical schools remained in the state as active physicians, e.g., for 1968, 4 per cent of the 661 M.D. graduates of 1968 would be 26. The figure in parentheses represents direct care and is based on a figure of three per cent, e.g., 661 x 0.03 = 20.

[b]The figure in parentheses is taken directly from Table 15 and represents the 1968 estimate of the in-migration of Pennsylvania trained M.D.'s in direct care practice. The active physician in-migration estimate is 31 and is arrived at by using the ratio of all active physicians to all direct care physicians times the number of direct care physicians in internal medicine, i.e., 220 ÷ 210 = 1.0476 and 30 x 1.0476 = 31.

[c]Computed from Table 6 but using percentage figures of 54 per cent and (43 per cent) for active and direct care internists, respectively, i.e., 0.54 times 26 equals 14 and 0.43 x 20 = 9.

[d]Figure in parentheses taken directly from the direct care 1968 in-migration estimate of Table 15. The active physician estimate is computed from Table 15 as in note b, above, i.e., 175 ÷ 100 = 1.75 and 1.75 x 10 direct care in-migrants is 18.

[e]Computed from Table 6 as in note c, above, but using percentages of 33 per cent and 26 per cent to compute the active and direct care figures, respectively.

[f]The figure in the parentheses is taken directly form the direct care 1968 in-migration estimate of Table 15. The active physician estimate is computed from Table 15 as in notes b and d, above, i.e., 140 ÷ 120 = 1.1667 and 1.1667 x 15 = 18.

Table 19

Computation of 1968 Based Correction (Per Cent) Factors for Estimating the Other State Trained and Foreign Trained Medical School Supply of M.D.'s in Pediatrics

| Data Base | Estimated 1968 Pennsylvania Trained Supply | Estimated 1968 Other State Trained Supply | Estimated 1968 Foreign Trained Supply |
|---|---|---|---|
| Table 6 | 16 ( 14)[a] | 9(( 7)[c] | 8 ( 6)[e] |
| Table 15 | 26 ( 25)[b] | 0 ( 0)[d] | 0 ( 0)[f] |
| Estimation Factor | 163%(179%) | 100%(100%)[g] | 100%(100%)[g] |

[a]Represents the finding of Table 6 that 2.35 per cent of the 1961-63 M.D. graduates (N - 1,872) of Pennsylvania's medical schools remained in the state as active physicians and 2.14 per cent as direct care physicians. e.g., for 1968, 2.35 per cent of the 661 M.D. graduates would be 16 and 2.14 per cent of 661 would be 14.

[b]The figure in the parentheses is taken directly from Table 15 and represents the 1968 estimate of the in-migration of Pennsylvania trained pediatricians (M.D.) in direct care. The active physician estimate is based upon the use of the overall ratio of active to direct care physicians from Table 15, i.e., 220 active ÷ 210 direct care = 1.0476 x 1.0476 = 26.

[c]Computed from Table 6 using percentage figures of 55 per cent and 53 per cent for active and direct care pediatricians, respectively, e.g., 0.55 x 16 = 9 and 0.53 x 14 = 7.

[d]Figure in parentheses taken directly from the 1968 direct care in-migration estimate of Table 14. The active physician estimate is computed from Table 15 as in note b, above, but cannot have any value other than zero since the number of direct care physicians is estimated as zero.

[e]Computed from Table 6 as in note c, above, but using 47.7 per cent and 45.0 per cent for active and direct care physicians, respectively.

[f]The figure in parentheses is taken directly from the direct care 1968 in-migration estimates of Table 15 and the value of the active care value is therefore zero since the direct care estimate was zero.

[g]The larger of the two estimates is assumed to be correct.

Table 20

Computation of 1968 Based Correction (Per Cent) Factors for Estimating the Other State Trained and Foreign Trained Medical School Supply of All M.D.'s in General Surgery

| Data Base | Estimated 1968 Pennsylvania Trained Supply | Estimated 1968 Other State Trained Supply | Estimated 1968 Foreign Trained Supply |
|---|---|---|---|
| Table 6 | 13 ( 13)[a] | 5 ( 5)[c] | 9 ( 8)[e] |
| Table 15 | 26 ( 25)[b] | 16 ( 15)[d] | 18 ( 15)[f] |
| Estimation Factor | 200%(192%) | 320%(300%) | 200%(188%) |

[a]Represents the finding of Table 6 that two per cent of the 1961-63 M.D. graduates (N - 1,872) of Pennsylvania medical schools remained in the state as active physicians and these two per cent were all direct care physicians, e.g., that two per cent of the 661 graduates of 1968 equals 13.

[b]The figure in parentheses is taken directly from Table 15 and represents the 1968 estimate of the in-migration of Pennsylvania's trained general surgeons (M.D.) in direct care. The active physician estimate is based upon the ratio of active to direct care physicians in the state, i.e., 220 active ÷ 210 direct care = 1.0476 and 1.0476 x 15 is 26.

[c]Computed from Table 6 using 39 per cent and 37 per cent for the active and direct care estimates, e.g., 0.39 x 13 = 5 and 0.37 x 13 = 5.

[d]Figure in parentheses taken directly from the 1968 direct care in-migration estimate of Table 15. The active physician estimate is computed from Table 15 as in note b, above, i.e., 175 ÷ 100 = 1.75 and 1.75 x 15 = 26.

[e]Computed from Table 6 as in note c, above, but using 65.8 per cent and 57.9 per cent for active and direct care estimates, respectively, e.g., 0.658 x 13 = 9 and 0.579 x 13 = 8.

[f]The direct care figure in parentheses is taken from Table 15. The active care figure is obtained from Table 15 as in notes b and d, above, i.e., 140 ÷ 120 = 1.1667 and 1.1667 x 15 = 18.

Table 21

Computation of 1968 Based Correction (Per Cent) Factors for Estimating the Other State Trained and Foreign Trained Medical School Supply of All M.D.'s in Other Specialties

| Data Base | Estimated 1968 Pennsylvania Trained Supply | Estimated 1968 Other State Trained Supply | Estimated 1968 Foreign Trained Supply |
|---|---|---|---|
| Table 6 | 132(112)[a] | 73 ( 53)[c] | 83 ( 62)[e] |
| Table 15 | 110(105)[b] | 96 ( 55)[d] | 76 ( 65)[f] |
| Estimation Factor | 100%(100%)[g] | 132%(104%) | 100%(105%)[g] |

[a]Represents the finding of Table 6 that 20 per cent of the 1961-63 M.D. graduates (N - 1,872) of Pennsylvania's medical schools remained in the state as active physicians and that 17 per cent of the graduates remained as direct care physicians, i.e., 0.20 x 661 = 132.

[b]The figure in parentheses represents direct care in-migration from Table 15. The active care count is obtained by use of the ratio between active and direct care physicians overall, i.e., 220 ÷ 210 = 1.0476 and 1.0476 x 105 = 110.

[c]Computed from Table 6 using 55 per cent and 47 per cent of the Pennsylvania supply for the active and direct care estimates, e.g., 0.55 x 132 = 73 and 0.47 x 112 = 53.

[d]The direct care figure in parentheses is taken from Table 15. The active physician (1968) in-migration estimate is computed from Table 15 as in note b, above, i.e, 175 active M.D.'s ÷ 100 direct care M.D.'s = 1.75 and 1.75 x 55 = 96.

[e]Computed from Table 6 as in note c, above, but using 63 per cent and 55 per cent for the active and direct care estimates, respectively, e.g., 0.63 x 132 = 83 and 0.55 x 112 = 62.

[f]The direct care figure in parentheses is taken directly from Table 15. The active care figure is obtained from Table 15 as in notes b and d, above, i.e., 140 ÷ 120 = 1.1667 and 1.1667 x 65 = 76.

[g]Assumes the larger of the two estimates to be correct, ie., 83 over 76 and 65 over 62.

Table 22a

Survey Based Projections of Active and Direct Care Physician Supply

All Active or Direct Care Physicians

| Year | Projected Medical School M.D. Grads.[a] | Projected Medical School D.O. Grads.[a] | Uncorrected Estimates of Pa. Trained M.D. Supply[b] | Uncorrected Estimates of Pa. Trained D.O. Supply[b] | Uncorrected Estimates of Other State Trained M.D. Supply[c] | Uncorrected Estimates of Other State Trained D.O. Supply[c] | Uncorrected Estimates of Foreign Trained M.D. Supply[d] | Final Estimate of Pa. Trained M.D. Supply[e] | Final Estimate of Pa. Trained D.O. Supply[f] | Final Estimate of Other State Trained M.D. Supply[e] | Final Estimate of Other State Trained D.O. Supply[f] | Final Estimate of Foreign Trained M.D. Supply[e] | Projected Yearly Supply of Active Physicians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 741 | 106 | 252( 222) | 45 | 126( 86) | 27 | 129( 98) | 252( 235) | 45 | 195( 102) | 27 | 157( 135) | 676( 544) |
| 1972 | 810 | 125 | 275( 243) | 53 | 138( 105) | 31 | 140( 107) | 275( 258) | 53 | 214( 124) | 31 | 171( 148) | 744( 614) |
| 1973 | 826 | 137 | 281( 248) | 58 | 141( 107) | 34 | 143( 109) | 281( 263) | 58 | 219( 126) | 34 | 174( 150) | 766( 631) |
| 1974 | 883 | 148 | 300( 265) | 62 | 150( 114) | 37 | 153( 117) | 300( 281) | 62 | 233( 135) | 37 | 187( 161) | 819( 676) |
| 1975 | 902 | 151 | 307( 271) | 63 | 154( 117) | 37 | 157( 119) | 307( 287) | 63 | 239( 138) | 37 | 192( 164) | 838( 689) |
| 1976 | 973 | 170 | 331( 292) | 71 | 166( 126) | 42 | 169( 129) | 331( 310) | 71 | 257( 149) | 42 | 206( 178) | 907( 750) |
| 1977 | 1,007 | 189 | 342( 302) | 79 | 171( 130) | 47 | 174( 133) | 342( 320) | 79 | 265( 153) | 47 | 212( 194) | 945( 783) |
| 1978 | 1,052 | 212 | 358( 316) | 89 | 179( 136) | 53 | 183( 139) | 358( 335) | 89 | 277( 160) | 53 | 223( 192) | 1,000( 829) |
| 1979 | 1,084 | 236 | 369( 325) | 99 | 185( 140) | 58 | 188( 143) | 369( 345) | 99 | 287( 165) | 58 | 229( 197) | 1,042( 864) |
| 1980 | 1,104 | 236 | 375( 331) | 99 | 188( 142) | 58 | 191( 146) | 375( 351) | 99 | 292( 168) | 58 | 233( 201) | 1,056( 877) |
| Total | 9,382 | 1,710 | 3,190(2,815) | 718 | 1,598(1,203) | 424 | 1,627(1,240) | 3,190(2,985) | 718 | 2,477(1,420) | 424 | 1,984(1,710) | 8,793(7,257) |

General or Family Practice

| Year | Projected Medical School M.D. Grads. | Projected Medical School D.O. Grads. | Uncorrected Pa. Trained M.D. | Uncorrected Pa. Trained D.O. | Uncorrected Other State M.D. | Uncorrected Other State D.O. | Uncorrected Foreign M.D. | Final Pa. Trained M.D. | Final Pa. Trained D.O. | Final Other State M.D. | Final Other State D.O. | Final Foreign M.D. | Projected Yearly Supply |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 741 | 106 | 44( 44) | 32 | 13( 13) | 15 | 6( 6) | 44( 44) | 32 | 22( 22) | 15 | 25( 25)* | 138( 138) |
| 1972 | 810 | 125 | 49( 49) | 38 | 15( 14) | 18 | 6( 6) | 49( 49) | 38 | 25( 23) | 18 | 25( 25) | 155( 153) |
| 1973 | 826 | 137 | 50( 50) | 41 | 15( 15) | 19 | 7( 7) | 50( 50) | 41 | 25( 25) | 19 | 29( 29) | 164( 164) |
| 1974 | 883 | 148 | 53( 53) | 44 | 16( 15) | 21 | 7( 7) | 53( 53) | 44 | 27( 25) | 21 | 29( 29) | 174( 172) |
| 1975 | 902 | 151 | 54( 54) | 45 | 16( 16) | 21 | 7( 7) | 54( 54) | 45 | 27( 27) | 21 | 29( 29) | 176( 176) |
| 1976 | 973 | 170 | 58( 58) | 51 | 17( 17) | 24 | 8( 8) | 58( 58) | 51 | 28( 28) | 24 | 33( 33) | 194( 194) |
| 1977 | 1,007 | 189 | 60( 60) | 57 | 18( 17) | 27 | 8( 8) | 60( 60) | 57 | 30( 28) | 27 | 33( 33) | 207( 205) |
| 1978 | 1,052 | 212 | 63( 63) | 64 | 19( 18) | 30 | 8( 8) | 63( 63) | 64 | 32( 30) | 30 | 33( 33) | 222( 220) |
| 1979 | 1,084 | 236 | 65( 65) | 71 | 20( 19) | 33 | 8( 8) | 65( 65) | 71 | 33( 32) | 33 | 33( 33) | 235( 234) |
| 1980 | 1,104 | 236 | 66( 66) | 71 | 20( 19) | 33 | 9( 9) | 66( 66) | 71 | 33( 32) | 33 | 38( 38) | 241( 240) |
| Total | 9,382 | 1,710 | 562( 562) | 514 | 165( 163) | 241 | 74( 74) | 562( 562) | 514 | 282( 272) | 241 | 307( 307) | 1,906(1,896) |

Internal Medicine

| Year | Projected Medical School M.D. Grads. | Projected Medical School D.O. Grads. | Uncorrected Pa. Trained M.D. | Uncorrected Pa. Trained D.O. | Uncorrected Other State M.D. | Uncorrected Other State D.O. | Uncorrected Foreign M.D. | Final Pa. Trained M.D. | Final Pa. Trained D.O. | Final Other State M.D. | Final Other State D.O. | Final Foreign M.D. | Projected Yearly Supply |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 741 | 106 | 30( 22) | 1 | 16( 9) | 3 | 10( 6) | 35( 33) | 1 | 21( 10) | 3 | 20( 18) | 80( 65) |
| 1972 | 810 | 125 | 32( 24) | 1 | 17( 10) | 3 | 11( 7) | 37( 36) | 1 | 22( 11) | 3 | 22( 21) | 85( 72) |
| 1973 | 826 | 137 | 33( 25) | 1 | 18( 11) | 3 | 11( 7) | 38( 38) | 1 | 23( 12) | 3 | 22( 21) | 87( 75) |
| 1974 | 883 | 148 | 35( 26) | 1 | 19( 11) | 3 | 12( 8) | 40( 39) | 1 | 25( 12) | 3 | 24( 24) | 93( 79) |
| 1975 | 902 | 151 | 36( 27) | 2 | 19( 12) | 6 | 12( 8) | 41( 41) | 2 | 25( 13) | 6 | 24( 24) | 98( 86) |
| 1976 | 973 | 170 | 39( 29) | 2 | 21( 12) | 6 | 13( 8) | 45( 45) | 2 | 27( 13) | 6 | 26( 24) | 106( 90) |
| 1977 | 1,007 | 189 | 40( 30) | 2 | 22( 13) | 6 | 13( 9) | 46( 45) | 2 | 28( 14) | 6 | 26( 26)* | 108( 93) |
| 1978 | 1,052 | 212 | 42( 32) | 2 | 23( 14) | 6 | 14( 9) | 48( 48) | 2 | 30( 16) | 6 | 28( 27) | 114( 99) |
| 1979 | 1,084 | 236 | 43( 33) | 2 | 23( 14) | 6 | 14( 10) | 49( 49)* | 2 | 30( 16) | 6 | 28( 28)* | 115( 101) |
| 1980 | 1,104 | 236 | 44( 33) | 2 | 24( 14) | 6 | 15( 10) | 51( 50) | 2 | 31( 16) | 6 | 30( 30) | 120( 104) |
| Total | 9,382 | 1,710 | 374( 281) | 16 | 202( 120) | 48 | 125( 82) | 430( 424) | 16 | 262( 133) | 48 | 250( 243) | 1,006( 864) |

Pediatrics

| Year | Projected Medical School M.D. Grads. | Projected Medical School D.O. Grads. | Uncorrected Pa. Trained M.D. | Uncorrected Pa. Trained D.O. | Uncorrected Other State M.D. | Uncorrected Other State D.O. | Uncorrected Foreign M.D. | Final Pa. Trained M.D. | Final Pa. Trained D.O. | Final Other State M.D. | Final Other State D.O. | Final Foreign M.D. | Projected Yearly Supply |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 741 | 106 | 15( 15) | 1 | 8( 8) | 3 | 7( 7) | 24( 24)* | 1 | 8( 8) | 3 | 7( 7) | 43( 43) |
| 1972 | 810 | 125 | 16( 16) | 1 | 9( 8) | 3 | 8( 7) | 26( 26)* | 1 | 9( 8) | 3 | 8( 7) | 47( 45) |
| 1973 | 826 | 137 | 17( 17) | 1 | 9( 9) | 3 | 8( 8) | 28( 28)* | 1 | 9( 9) | 3 | 8( 8) | 49( 49) |
| 1974 | 883 | 148 | 18( 18) | 1 | 10( 10) | 3 | 9( 8) | 29( 29)* | 1 | 10( 10) | 3 | 9( 8) | 52( 51) |
| 1975 | 902 | 151 | 18( 18) | 2 | 10( 10) | 6 | 9( 8) | 29( 29)* | 2 | 10( 10) | 6 | 9( 8) | 56( 55) |
| 1976 | 973 | 170 | 19( 19) | 2 | 10( 10) | 6 | 9( 9) | 31( 31)* | 2 | 10( 10) | 6 | 9( 9) | 58( 58) |
| 1977 | 1,007 | 189 | 20( 20) | 2 | 11( 11) | 6 | 10( 9) | 33( 33)* | 2 | 11( 11) | 6 | 10( 9) | 62( 61) |
| 1978 | 1,052 | 212 | 21( 21) | 2 | 12( 11) | 6 | 10( 9) | 34( 34)* | 2 | 12( 11) | 6 | 10( 9) | 64( 62) |
| 1979 | 1,084 | 236 | 22( 22) | 2 | 12( 12) | 6 | 11( 10) | 36( 36)* | 2 | 12( 12) | 6 | 11( 10) | 67( 66) |
| 1980 | 1,104 | 236 | 22( 22) | 2 | 12( 12) | 6 | 11( 10) | 36( 36)* | 2 | 12( 12) | 6 | 11( 10) | 67( 66) |
| Total | 9,382 | 1,710 | 188( 188) | 16 | 103( 101) | 48 | 92( 85) | 306( 306)* | 16 | 103( 101) | 48 | 92( 85) | 565( 556) |

Table 22a (Continued)

General Surgery

| Year | Projected Medical School M.D. Grads.[a] | Projected Medical School D.O. Grads.[a] | Uncorrected Estimates of Pa. Trained M.D. Supply[b] | Uncorrected Estimates of Pa. Trained D.O. Supply[b] | Uncorrected Estimates of Other State Trained M.D. Supply[c] | Uncorrected Estimates of Other State Trained D.O. Supply[c] | Uncorrected Estimates of Foreign Trained M.D. Supply[d] | Final Estimate of Pa. Trained M.D. Supply[e] | Final Estimate of Pa. Trained D.O. Supply[f] | Final Estimate of Other State Trained M.D. Supply[e] | Final Estimate of Other State Trained D.O. Supply[f] | Final Estimate of Foreign Trained M.D. Supply[e] | Projected Yearly Supply of Active Physicians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 741 | 106 | 15( 15) | 2 | 6( 6) | 2 | 10( 9) | 30( 29) | 2 | 19( 18) | 2 | 20( 17) | 73( 68) |
| 1972 | 810 | 125 | 16( 16) | 3 | 6( 6) | 2 | 11( 9) | 32( 31) | 3 | 19( 18) | 2 | 22( 17) | 78( 71) |
| 1973 | 826 | 137 | 17( 17) | 3 | 7( 6) | 2 | 11( 10) | 34( 33) | 3 | 22( 18) | 2 | 22( 19) | 83( 75) |
| 1974 | 883 | 148 | 18( 18) | 3 | 7( 7) | 2 | 12( 10) | 36( 35) | 3 | 22( 21) | 2 | 24( 19) | 87( 80) |
| 1975 | 902 | 151 | 18( 18) | 3 | 7( 7) | 2 | 12( 10) | 36( 35) | 3 | 22( 21) | 2 | 24( 19) | 87( 80) |
| 1976 | 973 | 170 | 19( 19) | 3 | 7( 7) | 2 | 13( 11) | 38( 36) | 3 | 22( 21) | 2 | 26( 21) | 91( 83) |
| 1977 | 1,007 | 189 | 20( 20) | 4 | 8( 8) | 3 | 13( 12) | 40( 38) | 4 | 26( 24) | 3 | 26( 23) | 99( 92) |
| 1978 | 1,052 | 212 | 21( 21) | 4 | 8( 8) | 3 | 14( 12) | 42( 40) | 4 | 26( 24) | 3 | 28( 23) | 103( 94) |
| 1979 | 1,084 | 236 | 22( 22) | 5 | 9( 8) | 4 | 15( 13) | 44( 42) | 5 | 29( 24) | 4 | 30( 24) | 112( 99) |
| 1980 | 1,104 | 236 | 22( 22) | 5 | 9( 8) | 4 | 15( 13) | 44( 42) | 5 | 29( 24) | 4 | 30( 24) | 112( 99) |
| Total | 9,382 | 1,710 | 188( 188) | 35 | 74( 71) | 26 | 126( 109) | 376( 361) | 35 | 236( 213) | 26 | 252( 206) | 925( 841) |

Other Specialties

| Year | Projected Medical School M.D. Grads.[a] | Projected Medical School D.O. Grads.[a] | Uncorrected Estimates of Pa. Trained M.D. Supply[b] | Uncorrected Estimates of Pa. Trained D.O. Supply[b] | Uncorrected Estimates of Other State Trained M.D. Supply[c] | Uncorrected Estimates of Other State Trained D.O. Supply[c] | Uncorrected Estimates of Foreign Trained M.D. Supply[d] | Final Estimate of Pa. Trained M.D. Supply[e] | Final Estimate of Pa. Trained D.O. Supply[f] | Final Estimate of Other State Trained M.D. Supply[e] | Final Estimate of Other State Trained D.O. Supply[f] | Final Estimate of Foreign Trained M.D. Supply[e] | Projected Yearly Supply of Active Physicians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 741 | 106 | 148( 126) | 8 | 81( 59) | 7 | 93( 69) | 148( 126) | 8 | 107( 61) | 7 | 93( 72) | 363( 274) |
| 1972 | 810 | 125 | 162( 138) | 10 | 89( 65) | 8 | 102( 76) | 162( 138) | 10 | 117( 68) | 8 | 102( 80) | 399( 304) |
| 1973 | 826 | 137 | 165( 140) | 11 | 91( 66) | 9 | 104( 77) | 165( 140) | 11 | 120( 69) | 9 | 104( 81) | 409( 310) |
| 1974 | 883 | 148 | 177( 150) | 12 | 97( 71) | 10 | 112( 83) | 177( 150) | 12 | 128( 74) | 10 | 112( 87) | 439( 333) |
| 1975 | 902 | 151 | 180( 153) | 12 | 99( 72) | 10 | 113( 84) | 180( 153) | 12 | 131( 75) | 10 | 113( 88) | 446( 338) |
| 1976 | 973 | 170 | 195( 165) | 14 | 107( 78) | 11 | 123( 91) | 195( 165) | 14 | 141( 81) | 11 | 123( 96) | 484( 367) |
| 1977 | 1,007 | 189 | 201( 171) | 15 | 111( 80) | 12 | 127( 94) | 201( 171) | 15 | 147( 83) | 12 | 127( 99) | 502( 380) |
| 1978 | 1,052 | 212 | 210( 179) | 17 | 116( 84) | 14 | 132( 98) | 210( 179) | 17 | 153( 87) | 14 | 132( 103) | 526( 400) |
| 1979 | 1,084 | 236 | 217( 184) | 19 | 119( 86) | 16 | 137( 101) | 217( 184) | 19 | 157( 89) | 16 | 137( 106) | 546( 414) |
| 1980 | 1,104 | 236 | 221( 188) | 19 | 122( 88) | 16 | 139( 103) | 221( 188) | 19 | 161( 92) | 16 | 139( 108) | 556( 423) |
| Total | 9,382 | 1,710 | 1,876(1,594) | 137 | 1,032( 749) | 113 | 1,182( 876) | 1,876(1,594) | 137 | 1,362( 779) | 113 | 1,182( 920) | 4,670(3,543) |

*Whenever the direct care estimate exceeds the active physician estimate the direct care total is reduced to equality with the active physician estimates.

[a]From Table 4, i.e., projection of Pennsylvania graduates.

[b]Table 6 percentages of 1961-63 graduates retained as active or direct care physicians in this specialty area in Pennsylvania times the projected graduate output of either column 1 or 2 of this table.

[c]Percentage ratio of out-of-state entrants to Pennsylvania trained retainees (See Table 6) times the appropriate estimated Pennsylvania supply figure computed as in note b above and entered into columns 4 and 5 of the table.

[d]Percentage ratio of foreign trained entrants to Pennsylvania trained retainees (See Table 6) times the appropriate estimated Pennsylvania supply figure of columns 4 or 5 above.

[e]Uses the estimation factors of Tables 16-21 times their corresponding uncorrected estimates in this table, i.e., times the data of columns 4, 6 and 8 of this table.

[f]A 10 per cent sampling of the 1971 American Osteopathic Association Directory listings for Pennsylvania when compared with 1967 listings for these physicians yield no evidence for in-migration of active or direct care D.O.'s. The uncorrected estimates of columns 5 and 7 were therefore accepted as the best available estimate.

Table 22b

Historical Trend Based Projections of Active and Direct Care Physician Supply

All Active or Direct Care Physicians

| Year | Historical M.D. Graduate Projection[a] | Historical D.O. Graduate Projection[a] | Un-corrected Estimate Pa. Trained M.D. Supply[b] | Un-corrected Estimate Pa. Trained D.O. Supply[b] | Un-corrected Estimate Other State Trained M.D. Supply[c] | Un-corrected Estimate Other State Trained D.O. Supply[c] | Un-corrected Estimate Foreign Trained M.D. Supply[d] | Corrected Pa. Trained M.D. Supply[e] | Corrected Pa. Trained D.O. Supply[f] | Corrected Other State Trained M.D. Supply[e] | Corrected Other State Trained D.O. Supply[f] | Corrected Foreign Trained M.D. Supply[e] | Projected Yearly Supply of Active Physicians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 673 | 90 | 229( 202) | 38 | 115( 87) | 22 | 117( 89) | 229( 214) | 38 | 178( 103) | 22 | 143( 123) | 610( 500) |
| 1972 | 679 | 92 | 231( 204) | 39 | 116( 88) | 23 | 118( 90) | 231( 216) | 39 | 180( 104) | 23 | 144( 124) | 617( 506) |
| 1973 | 685 | 94 | 233( 206) | 39 | 117( 89) | 23 | 119( 91) | 233( 218) | 39 | 181( 105) | 23 | 145( 126) | 621( 511) |
| 1974 | 691 | 96 | 235( 207) | 40 | 118( 89) | 24 | 120( 91) | 235( 219) | 40 | 183( 105) | 24 | 146( 126) | 628( 514) |
| 1975 | 696 | 98 | 237( 209) | 41 | 119( 90) | 24 | 121( 92) | 237( 222) | 41 | 184( 106) | 24 | 148( 127) | 634( 520) |
| 1976 | 702 | 100 | 239( 211) | 42 | 120( 91) | 25 | 122( 93) | 239( 224) | 42 | 186( 107) | 25 | 149( 128) | 641( 526) |
| 1977 | 708 | 102 | 241( 212) | 43 | 121( 91) | 25 | 123( 93) | 241( 225) | 43 | 188( 107) | 25 | 150( 128) | 647( 528) |
| 1978 | 714 | 104 | 243( 214) | 44 | 122( 92) | 26 | 124( 94) | 243( 227) | 44 | 189( 109) | 26 | 151( 130) | 653( 536) |
| 1979 | 720 | 106 | 245( 216) | 45 | 123( 93) | 27 | 125( 95) | 245( 229) | 45 | 191( 110) | 27 | 153( 131) | 661( 542) |
| 1980 | 726 | 109 | 247( 218) | 46 | 124( 94) | 27 | 126( 96) | 247( 231) | 46 | 192( 111) | 27 | 154( 132) | 666( 547) |
| Total | 6,994 | 991 | 2,380(2,099) | 417 | 1,195(904) | 246 | 1,215(924) | 2,380(2,225) | 417 | 1,852(1,067) | 246 | 1,483(1,275) | 6,378(5,230) |
| | | | | | | General or Family Practice | | | | | | | |
| 1971 | 673 | 90 | 40( 40) | 27 | 12( 12) | 13 | 5( 5) | 40( 40) | 27 | 20( 20) | 13 | 20( 20)* | 120( 120) |
| 1972 | 679 | 92 | 41( 41) | 28 | 12( 12) | 13 | 5( 5) | 41( 41) | 28 | 20( 20) | 13 | 20( 20) | 122( 122) |
| 1973 | 685 | 94 | 41( 41) | 28 | 12( 12) | 13 | 5( 5) | 41( 41) | 28 | 20( 20) | 13 | 20( 20) | 122( 122) |
| 1974 | 691 | 96 | 41( 41) | 29 | 12( 12) | 14 | 5( 5) | 41( 41) | 29 | 20( 20) | 14 | 20( 20) | 124( 124) |
| 1975 | 696 | 98 | 42( 42) | 29 | 13( 12) | 14 | 5( 5) | 42( 42) | 29 | 22( 20) | 14 | 20( 20) | 127( 125) |
| 1976 | 702 | 100 | 42( 42) | 30 | 13( 12) | 14 | 5( 5) | 42( 42) | 30 | 22( 20) | 14 | 22( 20) | 128( 126) |
| 1977 | 708 | 102 | 42( 42) | 31 | 13( 12) | 15 | 5( 5) | 42( 42) | 31 | 22( 20) | 15 | 20( 20) | 130( 128) |
| 1978 | 714 | 104 | 43( 43) | 31 | 13( 12) | 15 | 6( 6) | 43( 43) | 31 | 22( 20) | 15 | 24( 24) | 135( 133) |
| 1979 | 720 | 106 | 43( 43) | 32 | 13( 12) | 15 | 6( 6) | 43( 43) | 32 | 22( 20) | 15 | 24( 24) | 136( 134) |
| 1980 | 726 | 109 | 44( 44) | 33 | 13( 13) | 16 | 6( 6) | 44( 44) | 33 | 22( 22) | 16 | 24( 24) | 139( 139) |
| Total | 6,994 | 991 | 419( 419) | 298 | 126(121) | 142 | 53( 53) | 419( 419) | 298 | 212( 202) | 142 | 212( 212) | 1,283(1,273) |
| | | | | | | Internal Medicine | | | | | | | |
| 1971 | 673 | 90 | 27( 26) | 1 | 15( 11) | 3 | 9( 8) | 31( 31) | 1 | 19( 12) | 3 | 18( 18)* | 72( 65) |
| 1972 | 679 | 92 | 27( 26) | 1 | 15( 11) | 3 | 9( 8) | 31( 31) | 1 | 19( 12) | 3 | 18( 18) | 72( 63) |
| 1973 | 685 | 94 | 27( 27) | 1 | 15( 12) | 3 | 9( 8) | 31( 31) | 1 | 19( 13) | 3 | 18( 18) | 72( 66) |
| 1974 | 691 | 96 | 28( 27) | 1 | 15( 12) | 3 | 9( 8) | 32( 32) | 1 | 19( 13) | 3 | 18( 18) | 73( 67) |
| 1975 | 696 | 98 | 28( 27) | 1 | 15( 12) | 3 | 9( 8) | 32( 32) | 1 | 19( 13) | 3 | 18( 18) | 73( 67) |
| 1976 | 702 | 100 | 28( 27) | 1 | 15( 12) | 3 | 9( 8) | 32( 32) | 1 | 19( 13) | 3 | 18( 18) | 73( 67) |
| 1977 | 708 | 102 | 28( 28) | 1 | 15( 12) | 3 | 9( 8) | 32( 32) | 1 | 19( 13) | 3 | 18( 18) | 73( 67) |
| 1978 | 714 | 104 | 29( 28) | 1 | 16( 12) | 3 | 10( 8) | 33( 33) | 1 | 21( 13) | 3 | 20( 20) | 78( 70) |
| 1979 | 720 | 106 | 29( 28) | 1 | 16( 12) | 3 | 10( 8) | 33( 33) | 1 | 21( 13) | 3 | 20( 20) | 78( 70) |
| 1980 | 726 | 109 | 29( 28) | 1 | 16( 12) | 3 | 10( 8) | 33( 33) | 1 | 21( 13) | 3 | 20( 20) | 78( 70) |
| Total | 6,994 | 991 | 280( 272) | 10 | 153(118) | 30 | 93( 80) | 320( 320) | 10 | 196( 128) | 30 | 186( 186) | 742( 674) |
| | | | | | | Pediatrics | | | | | | | |
| 1971 | 673 | 90 | 13( 13) | 1 | 7( 7) | 1 | 6( 6) | 21( 21) | 1 | 7( 7) | 1 | 6( 6) | 36( 36) |
| 1972 | 679 | 92 | 14( 14) | 1 | 8( 8) | 1 | 7( 6) | 23( 23) | 1 | 8( 8) | 1 | 7( 6) | 40( 39) |
| 1973 | 685 | 94 | 14( 14) | 1 | 8( 8) | 1 | 7( 6) | 23( 23) | 1 | 8( 8) | 1 | 7( 6) | 40( 39) |
| 1974 | 691 | 96 | 14( 14) | 1 | 8( 8) | 1 | 7( 6) | 23( 23) | 1 | 8( 8) | 1 | 7( 6) | 40( 39) |
| 1975 | 696 | 98 | 14( 14) | 1 | 8( 8) | 1 | 7( 6) | 23( 23) | 1 | 8( 8) | 1 | 7( 6) | 40( 39) |
| 1976 | 702 | 100 | 14( 14) | 1 | 8( 8) | 1 | 7( 6) | 23( 23) | 1 | 8( 8) | 1 | 7( 6) | 40( 39) |
| 1977 | 708 | 102 | 14( 14) | 1 | 8( 8) | 1 | 7( 6) | 23( 23) | 1 | 8( 8) | 1 | 7( 6) | 40( 39) |
| 1978 | 714 | 104 | 14( 14) | 1 | 8( 8) | 1 | 7( 6) | 23( 23) | 1 | 8( 8) | 1 | 7( 6) | 40( 39) |
| 1979 | 720 | 106 | 14( 14) | 1 | 8( 8) | 1 | 7( 6) | 23( 23) | 1 | 8( 8) | 1 | 7( 6) | 40( 39) |
| 1980 | 726 | 109 | 15( 15) | 1 | 8( 8) | 1 | 7( 7) | 24( 24) | 1 | 8( 8) | 1 | 7( 7) | 41( 41) |
| Total | 6,994 | 991 | 140( 140) | 10 | 79( 79) | 10 | 69( 61) | 229( 229) | 10 | 79( 79) | 10 | 69( 61) | 397( 389) |

Table 22b (continued)

General Surgery

| Year | Historical M.D. Graduate Projection[a] | Historical D.O. Graduate Projection[a] | Un-corrected Estimate Pa. Trained M.D. Supply[b] | Un-corrected Estimate Pa. Trained D.O. Supply[b] | Un-corrected Estimate Other State Trained M.D. Supply[c] | Un-corrected Estimate Other State Trained D.O. Supply[c] | Un-corrected Estimate Foreign Trained M.D. Supply[d] | Corrected Pa. Trained M.D. Supply[e] | Corrected Pa. Trained D.O. Supply[f] | Corrected Other State Trained M.D. Supply[e] | Corrected Other State Trained D.O. Supply[f] | Corrected Foreign Trained M.D. Supply[e] | Projected Yearly Supply of Active Physicians |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 673 | 90 | 13( 13) | 2 | 5( 5) | 2 | 9( 8) | 26( 25) | 2 | 16( 15) | 2 | 18( 14) | 64( 59) |
| 1972 | 679 | 92 | 14( 14) | 2 | 5( 5) | 2 | 9( 8) | 28( 27) | 2 | 16( 15) | 2 | 18( 15) | 66( 61) |
| 1973 | 685 | 94 | 14( 14) | 2 | 5( 5) | 2 | 9( 8) | 28( 27) | 2 | 16( 15) | 2 | 18( 15) | 66( 61) |
| 1974 | 691 | 96 | 14( 14) | 2 | 5( 5) | 2 | 9( 8) | 28( 27) | 2 | 16( 15) | 2 | 18( 15) | 66( 61) |
| 1975 | 696 | 98 | 14( 14) | 2 | 5( 5) | 2 | 9( 8) | 28( 27) | 2 | 16( 15) | 2 | 18( 15) | 66( 61) |
| 1976 | 702 | 100 | 14( 14) | 2 | 5( 5) | 2 | 9( 8) | 28( 27) | 2 | 16( 15) | 2 | 18( 15) | 66( 61) |
| 1977 | 708 | 102 | 14( 14) | 2 | 5( 5) | 2 | 9( 8) | 28( 27) | 2 | 16( 15) | 2 | 18( 15) | 66( 61) |
| 1978 | 714 | 104 | 14( 14) | 2 | 5( 5) | 2 | 9( 8) | 28( 27) | 2 | 16( 15) | 2 | 18( 15) | 66( 61) |
| 1979 | 720 | 106 | 14( 14) | 2 | 5( 5) | 2 | 9( 8) | 28( 27) | 2 | 16( 15) | 2 | 18( 15) | 66( 61) |
| 1980 | 726 | 109 | 15( 15) | 2 | 6( 6) | 2 | 10( 9) | 30( 29) | 2 | 19( 18) | 2 | 20( 17) | 73( 68) |
| Total | 6,994 | 991 | 140( 140) | 20 | 51( 51) | 20 | 91( 81) | 280( 270) | 20 | 163( 153) | 20 | 182(152) | 665( 615) |
| | | | | | | Other Specialties | | | | | | | |
| 1971 | 673 | 90 | 135( 114) | 7 | 74( 54) | 6 | 85( 63) | 135( 114) | 7 | 98( 56) | 6 | 85( 66) | 331( 249) |
| 1972 | 679 | 92 | 136( 115) | 7 | 75( 54) | 6 | 86( 63) | 136( 115) | 7 | 99( 56) | 6 | 86( 66) | 334( 250) |
| 1973 | 685 | 94 | 1 7( 116) | 8 | 75( 55) | 7 | 86( 64) | 137( 116) | 8 | 99( 57) | 7 | 86( 67) | 337( 255) |
| 1974 | 691 | 96 | 138( 117) | 8 | 76( 55) | 7 | 87( 64) | 138( 117) | 8 | 100( 57) | 7 | 87( 67) | 340( 256) |
| 1975 | 696 | 98 | 139( 118) | 8 | 76( 55) | 7 | 88( 65) | 139( 118) | 8 | 100( 57) | 7 | 88( 68) | 342( 258) |
| 1976 | 702 | 100 | 140( 119) | 8 | 77( 56) | 7 | 88( 66) | 140( 119) | 8 | 102( 58) | 7 | 88( 69) | 345( 261) |
| 1977 | 708 | 102 | 142( 120) | 8 | 78( 56) | 7 | 89( 66) | 142( 120) | 8 | 103( 58) | 7 | 89( 69) | 349( 262) |
| 1978 | 714 | 104 | 143( 121) | 8 | 79( 57) | 7 | 90( 67) | 143( 121) | 8 | 104( 59) | 7 | 90( 70) | 352( 265) |
| 1979 | 720 | 106 | 144( 122) | 8 | 79( 57) | 7 | 91( 67) | 144( 122) | 8 | 104( 59) | 7 | 91( 70) | 354( 266) |
| 1980 | 726 | 109 | 145( 123) | 9 | 80( 58) | 7 | 91( 68) | 145( 123) | 9 | 106( 60) | 7 | 91( 71) | 358( 270) |
| Total | 6,994 | 991 | 1,399(1,185) | 79 | 769(557) | 68 | 881(653) | 1,399(1,185) | 79 | 1,015( 577) | 68 | 881(683) | 3,442(2,592) |

*Wherever the direct care estimate would exceed the active care estimate as in this column the direct care value was reduced to equality with the active care estimate.

[a]From Table 7, i.e., historical trend based projections of Pennsylvania graduates.

[b]Table 6 percentages of 1961-63 graduates retained as active or direct care physicians in this specialty area in Pennsylvania times the projected graduate output of either column 1 or 2 of this table.

[c]Percentage ratio of out-of-state entrants to Pennsylvania trained retainees (See Table 6) times the appropriate estimated Pennsylvania supply figure computed as in note b above and entered into columns 4 and 5 of the table.

[d]Percentage ratio of foreign trained entrants to Pennsylvania trained retainees (See Table 6) times the appropriate estimated Pennsylvania supply figure of columns 4 or 5 above.

[e]Uses the estimation factors of Tables 18-23 times their corresponding uncorrected estimates in this table, i.e., times the data of columns 4, 6 and 8 of this table.

[f]A 10 per cent sampling of the 1971 American Osteopathic Association Directory listings for Pennsylvania when compared with 1967 listings for these physicians yield no evidence for in-migration of active or direct care D.O.'s. The uncorrected estimates of columns 5 and 7 were therefore accepted as the best available estimate.

## Supply and Physician Income

The supply of physicians is partly controlled by the a ailability of places for first year medical students in ou medical schools. This is a function of the money made available to permit expansion of facilities and faculty for this purpose, but the degree of student demand for medical education and the consequent pressure to meet that need cannot be ignored.

It is apparent that, currently, we are not beginning to meet that demand. In January of 1971 The Chronicle of Higher Education reported that 35,000 medical school applicants were competing for 13,000 openings[8] and reports of Americans taking medical training in Mexico and elsewhere are constantly being published.[9]

Furthermore, there is evidence that an interest in medicine as a career is increasing among college students. A survey of 188,900 freshmen at 373 institutions carried out by the American Council on Education[10] indicates that college freshmen interested in medicine have, since 1966, increased from 4.8 per cent of the freshmen sampled to 5.5 per cent in 1972. During the same period, the proportions for other professions such as college teacher (1.8 per cent to 0.6 per cent), teacher of secondary education (14.1 per cent of 6.5 per cent), elementary education (7.6 per cent to 5.6 per cent) and engineer (8.9 per cent to 5.3 per cent) have decreased. Only law (3.9 per cent to 4.7 per cent) and auxiliary health professions (4.7 per cent to 7.3 per cent) have increased in emphasis during this period. The number of applicants to medical school in 1975 would be smaller than these figures would imply since slightly more than half of the freshmen interested in medicine will attrite by the senior year.

Interest in medicine, as in many other professions, is to a significant degree a function of the perceived income of the professionals as seen by the student who is deciding upon a career. Freeman,[11] for example, has emphasized the importance of perceived income in addition to interest in the work per se. He suggests therefore, that salaries, in the long run, have a greater effect in controlling entrance or applicant rates than the size of available stipends for majors in the profession.

If we accept this principle, then the increase in net income for physicians becomes a matter of interest as an indicator of future demand for admission to medical education. It also reflects a possible physician shortage due to the operation of the supply and demand principle.

Table 23 summarizes physician net income data from the journal Medical Economics. Historical data is shown for the years 1959-1969 with projections to 1980. A hiatus of relatively static net income is postulated for the years 1971-73 due to probable continuation or reimposition of wage-price control during this period. If such controls are not forthcoming, the linear projections of the growth in net income during the 1960s would have given the 1980 figure of Table 23 as the figures for 1977. The conclusions would be the same, in any case, i.e., applicant pressures for admission to medical school are likely to rise if only because of the impact of the perceived monetary status of the physician. As Freeman[11] shows in his Table 11.6, medicine, law and business are perceived by students as having the highest incomes near retirement with medicine unequivocally the highest after 15 years' experience.

## Pennsylvania Medical School Applicants

Tables 24 to 26 of this report are an attempt to summarize some of the data on applicant patterns derived from the survey of Pennsylvania medical schools carried out for this study.

Table 24 lists the total number of applications, not applicants, submitted to the medical schools of Pennsylvania during the years 1963-64 to 1971-72. Where available it gives data concerning the number and per cent of applications from residents of Pennsylvania. It indicates the number of students actually admitted and the number and percentage of admittees who were Pennsylvania residents at the time of admission. In general, between 59 per cent and 69 per cent of the first year classes have been Pennsylvanians (median 65.5 per cent) over the last decade.

Table 25 indicates the difference between the various medical schools of Pennsylvania regarding applicant and first year entry data in 1970-71. For example, an applicant for admission has a better chance of being accepted and admitted at the Philadelphia College of Osteopathic Medicine (20.5 per cent of appliants) while those applying for admission to the new, and still small, Hershey Medical School have the least chance of admission (2.8 per cent of applicants are accepted and admitted).

The data in Table 25 are not aggregated since the total number of applications would not be equivalent to the total number of applicants. It seems likely that many of the applicants applied to more than one Pennsylvania medical school but data on this point is

Table 23

Physician Net Income Projections and Historical Values, 1959-1980[a]

Actual[b]

| Year | All M.D.'s | General Practice | Internal Medicine | Pediatrics | Obstetrics-Gynecology | General Surgery |
|---|---|---|---|---|---|---|
| 1959 | 22,100 | 20,000 | 22,300 | 20,700 | 27,900 | 27,900 |
| 1964 | 28,380 | 24,420 | 25,580 | 24,490 | 28,400 | 31,540 |
| 1965 | 28,960 | 25,090 | 27,730 | 25,240 | 30,520 | 32,510[c] |
| 1966 | 32,170 | 27,720 | 32,290 | 28,110 | 33,940 | 35,560 |
| 1967 | 34,730 | 31,370 | 32,530 | 27,600 | 37,380 | 37,690 |
| 1968 | 37,620 | 32,990 | 38,840 | 32,950 | 39,720 | 40,740 |
| 1969 | 40,550 | 35,140 | 38,350 | 34,430 | 43,770 | 42,960 |
| | | | Projected[d] | | | |
| 1970 | 43,385 | 38,265 | 42,280 | 39,890 | 46,495 | 45,460 |
| 1971 | Est. Wage Freeze Period | | | | | |
| 1972 | " " " " | | | | | |
| 1973 | " " " " | | | | | |
| 1974 | 46,270 | 40,900 | 45,190 | 42,820 | 49,690 | 48,050 |
| 1975 | 49,155 | 43,535 | 48,100 | 45,750 | 52,885 | 50,640 |
| 1976 | 52,040 | 46,170 | 51,010 | 48,680 | 56,080 | 53,230 |
| 1977 | 54,925 | 48,805 | 53,820 | 51,610 | 59,275 | 55,820 |
| 1978 | 57,810 | 51,440 | 56,830 | 54,540 | 62,470 | 58,410 |
| 1979 | 60,695 | 54,075 | 59,740 | 57,470 | 65,665 | 61,000 |
| 1980 | 63,580 | 56,710 | 62,650 | 60,400 | 68,860 | 63,590 |

[a]It should be noted that the projected growth in net income may not be forthcoming since some specialties are nearly at their maximum capacity to handle patients using present delivery methods and also some are nearing the point of having a surplus of physicians, e.g., general surgery and obstetrics and gynecology. The table does reflect that the demand for services has been great or net income would not have risen so sharply, i.e., the law of supply and demand has been operating.

[b]Data from Medical Economics representing median net income before taxes for active patient care physicians under 65 years of age. Data is reproduced by permission of the Medical Economics Company. Copyright (c) 1971 by Medical Economics Company, Oradell, N. J. 07675.

[c]To keep even with inflation in 1972 the physician would have had to increase his income in 1965 by 39 per cent according to an article in U.S. News and World Report, October 2, 1972, p. 19, i.e., he would need a net income of 40,254 rather than the projected income of 45,460.

[d]Projections based upon an average increment arrived at by determining the median value of successive two-year averages from 1965 through 1969 and subjecting these values to a linear correlation to obtain regression equations. Two-year averages were used to reduce regular year to year fluctuations in growth. The 1974 figures are actually figures for 1971 but a freeze period has been assumed.

Table 24

A Summary of Pennsylvania Medical School Applicant and Admissions Patterns from 1963-64 to 1971-72[a]

| School Year | Total Applications | Pennsylvania Applications | Per Cent of Applications from Pa. Residents | Number Admitted First Year Class | Pennsylvanians Admitted First Year Class | Per Cent of First Year Class from Pennsylvania |
|---|---|---|---|---|---|---|
| 1963-64 | 7,872 | *[b] | *[b] | 806 | 542 | 67% |
| 1964-65 | 9,700 | * | * | 812 | 525 | 65% |
| 1965-66 | *[b] | * | * | 806 | *[b] | - |
| 1966-67 | 9,735 | * | * | 815 | 477 | 59% |
| 1967-68 | * | * | * | 898 | 563 | 63% |
| 1968-69 | 13,703 | * | * | 929 | 610 | 66% |
| 1969-70 | 15,303 | * | * | 988 | 632 | 64% |
| 1970-71 | 17,283 | 5,568 | 32% | 961 | 667 | 69% |
| 1971-72 | 19,014 | 6,333 | 33% | 1,088 | 731 | 67% |
| Percentage Change | +142% | +13%[c] | - | +35% | +35% | - |

[a]Data taken from a survey of the medical schools of Pennsylvania conducted for this report.

[b]Asterisk indicates not all of the medical schools could provide this data.

[c]Represents change from 1970-71 only. Total applications increased by 10 per cent during this one-year period, the number admitted to the first year class increased by 13 per cent and the number of Pennsylvanians admitted to the first year class increased by 10 per cent.

Table 25

1970-71 Applicant Entry Patterns for the Medical Schools of Pennsylvania[a]

| School | First-Year Entrants | Applications for Entry | Per Cent Applicants Entering | First-Year Entrants from Pa. | Applicants from Pa. | Per Cent Pa. Applicants Entering | Per Cent First-Year Class Pa. Residents | First-Year Female Entrants | Female Applicants | Per Cent Female Applicants Entering | First-Year Male Entrants | Male Applicants | Per Cent Male Applicants Entering |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hahnemann | 118 | 2,834 | 4.2 | 82 | 1,101 | 7.4 | 69.5 | 14 | 321 | 4.4 | 104 | 2,513 | 4.1 |
| Hershey | 69 | 2,461 | 2.8 | 38 | 1,020 | 3.7 | 55.1 | 7 | 282 | 2.5 | 62 | 2,179 | 2.8 |
| Jefferson | 212 | 3,339 | 6.3 | 158 | 980 | 16.1 | 74.5 | 26 | 272 | 9.6 | 186 | 3,067 | 6.1 |
| Medical Co-- of Pa. | 66 | 727 | 9.1 | 26 | 172 | 15.1 | 39.4 | 60 | 727 | 8.3 | 6 | *[c] | - |
| Philadelphia Osteopathic | 152 | 742 | 20.5 | 101 | N.A. | - | 66.4 | 3 | N.A. | - | 149 | N.A. | - |
| Temple | 160 | 2,572 | 6.2 | 125 | 1,065 | 11.7 | 78.1 | 13 | 219 | 5.9 | 147 | 2,353 | 6.2 |
| U. Pennsylvania | 150 | 2,690 | 5.6 | 46 | 491 | 9.4 | 30.7 | 18 | 273 | 6.6 | 132 | 2,199 | 6.0 |
| U. Pittsburgh | 128 | 1,918 | 6.7 | 91 | 739 | 12.3 | 71.1 | 9 | 147 | 6.1 | 119 | 1,771 | 6.7 |

[a]Data derived from a survey of medical schools in Pennsylvania.

[b]One or two entrants, generally, are repeaters rather than new entrants.

[c]Asterisk indicates the data is anomalous since 66 first year entrants are given with 60 of these female, yet the number of female applicants is equal to the total number of applicants listed. We must presume error or that 6 first year students are repeaters or were not required to formal application procedures.

not available. Nevertheless, the median percentage acceptance of applicants was 6.25 per cent.(Jefferson and Temple were close to the median value; Hahnemann, the University of Pennsylvania and Hershey were low, 4.2 per cent, 5.6 per cent and 2.8 per cent, respectively; while the Medical College of Pennsylvania, the University of Pittsburgh and the Philadelphia College of Osteopathic Medicine were high, 9.1 per cent, 6.7 per cent and 20.5 per cent, respectively.

It is interesting to note that one of the high ranking medical schools was primarily or exclusively a wor'en's medical college during this period. Another one is an osteopathic medical school that trains a large number of family practice (general practice) oriented physicians. Graduation from a school of osteopathic medicine may well be regarded as less acceptable by applicants despite the AMA recognition of osteopathic training as equ alent in kind and quality to that received by doctors of medicine.

The University of Pittsburgh is, on the other hand, the only medical school other than Hershey that is outside of the Philadelphia area and may consequently be less well known to the applicants than the others.

### Pennsylvania Applicants

Comparable, but incomplete, applicant entry data for the medical schools of Pennsylvania can also be found in Table 25. Philadelphia College of Osteopathic Medicine data on Pennsylvania applicants were not available. The rank order of the percentage of Pennsylvania applicants accepted was essentially the same as for the percentage of applicants entering with the exception of Jefferson, which ranked first in Pennsylvania applicants accepted but third in acceptance of applicants in general. The median percentage of Pennsylvania applicants accepted and entering was 11.7 per cent, which was substantially better than the overall applicant value of 6.2 per cent for the seven medical schools of Pennsylvania (osteopathy excepted).

### Pennsylvania Residents in First Year Class

A perennial question asked by legislators and others is that of what proportion of an entering class can we classify as being residents of Pennsylvania. In Table 25, we find that the proportion of Pennsylvanians in the entering class of 1970-71 was 68.75 per cent (median of eight medical schools) with the actual values ranging from 30.7 per cent for the University of Pennsylvania and 39.4 per cent for the Medical College of Pennsylvania to 78.1 per cent for Temple University School of Medicine, 74.5 per cent for Jefferson Medical School and 71.1 per cent for the University of Pittsburgh. Four of the eight medical schools of Pennsylvania had entering classes with less than 70 per cent Pennsylvania residents and two of these were below 50 per cent.

### Male and Female First Year Class Entry

Data regarding applicant and entry data for each sex are also found in Table 25. For the six medical schools able to provide applicant by sex data, the median percentage of male applicants accepted and entering was 6.0 per cent and for the female applicants, 6.0 per cent. A rank ordering of applications by each sex indicates that the male and female applicants entry figures for the six medical schools providing data do not rank in an identical fashion. Inspection of the data suggests that female applicants find it easier to be accepted and to enter Jefferson Medical School and the University of Pennsylvania Medical School.

### Historical Applicant Trends

Table 26 summarizes for each Pennsylvania medical school the overall historical trends for Pennsylvania applicants, out-of-state applicants, male applicants, female applicants and applicants in general, i.e., total applicants. The percentage of applicants for admission who are male or female Pennsylvania residents or nonresidents is given in the table breakdown. These percentage figures are given in parentheses following the number of applicants for each school. At the end of each section of the table, average annual percentage increase over the period of time for which data is available is given.

Inspection of Table 26 quickly reveals that the proportion of Pennsylvania residents among the applicants have steadily dropped from the earliest period recorded to the year 1971-72 where we find Hershey Medical School with the highest proportion (per cent) of Pennsylvanians among its applicants (44.3 per cent) and the University of Pennsylvania with the smallest number of Pennsylvania resident applications (22.8 per cent).

In contrast to this deteriorating situation the proportion of female applicants in the applicant population had generally risen to an all time high during this same period. Still, female applicants represent only 11.3 per cent (median of the institutions) of the applicants even now.

Table 26

Historical Trends for Pennsylvania Medical School Applicants[a]

Medical School--Total Applicants

| School Year | Hahnemann | Hershey | Jefferson | Med. College Pennsylvania | Philadelphia Osteopathic | Temple | Univ. Penna. | Univ. Pittsburgh |
|---|---|---|---|---|---|---|---|---|
| 1960-61 | N.A. | | 1,334 | N.A. | 219 | N.A. | 1,630 | N.A. |
| 1961-62 | N.A. | | 1,252 | N.A. | 251 | N.A. | 1,279 | 630 |
| 1962-63 | 855 | | 1,377 | N.A. | 275 | N.A. | 1,383 | 717 |
| 1963-64 | 1,473 | | 1,739 | 230 | 365 | 1,790 | 1,475 | 800 |
| 1964-65 | 1,882 | | 2,322 | 338 | 400 | 2,079 | 1,757 | 922 |
| 1965-66 | 1,821 | | 2,144 | 309 | 443 | N.A. | 1,656 | 1,279 |
| 1966-67 | 1,871 | | 2,037 | 306 | 424 | 2,051 | 1,682 | 1,364 |
| 1967-68 | 2,015 | 1,077 | 2,308 | 358 | 432 | N.A. | 1,750 | 1,082 |
| 1968-69 | 2,370 | 1,906 | 2,777 | 350 | 581 | 2,471 | 1,998 | 1,250 |
| 1969-70 | 2,692 | 2,163 | 2,984 | 379 | 717 | 2,488 | 2,304 | 1,576 |
| 1970-71 | 2,834 | 2,461 | 3,339 | 727 | 742 | 2,572 | 2,690 | 1,918 |
| 1971-72 | 2,588 | 2,339 | 3,194 | 1,247 | 908 | 3,471 | 2,565 | 2,705 |
| Average Per Cent Growth | 22.5 | 29.3 | 12.7 | 55.3 | 28.6 | 11.7 | 5.2 | 32.9 |

Medical School--Pennsylvania Applicants

| School Year | Hahnemann | Hershey | Jefferson | Med. College Pennsylvania | Philadelphia Osteopathic | Temple | Univ. Penna. | Univ. Pittsburgh |
|---|---|---|---|---|---|---|---|---|
| 1960-61 | N.A. | | 625( 46.9%) | N.A. | N.A. | N.A. | 414(25.4%) | N.A. |
| 1961-62 | N.A. | | 602( 48.1%) | N.A. | N.A. | N.A. | 359(28.[illegible] | N.A. |
| 1962-63 | 412(48.1%)[b] | | 663( 48.2%) | N.A. | N.A. | N.A. | 455(32.[illegible] | N.A. |
| 1963-64 | 689(46.8%) | | 805( 46.3%) | N.A. | N.A. | N.A. | 473(32.1%) | N.A. |
| 1964-65 | 815(43.3%) | | 890( 38.3%) | N.A. | N.A. | N.A. | 559(31.8%) | N.A. |
| 1965-66 | 788(43.3%) | | 982( 45.8%) | N.A. | N.A. | N.A. | 490(29.6%) | N.A. |
| 1966-67 | 724(38.7%) | | 737( 36.2%) | N.A. | N.A. | N.A. | 466(27.7%) | N.A. |
| 1967-68 | 832(41.3%) | 560(52.0%) | 897( 38.9%) | N.A. | N.A. | N.A. | 437(25.0%) | N.A. |
| 1968-69 | 923(38.9%) | 905(47.5%) | 830( 29.9%) | N.A. | N.A. | 1,021(41.3%) | 504(25.2%) | 457(36.6%) |
| 1969-70 | 1,047(38.9%) | 731(33.8%) | 915( 30.7%) | N.A. | N.A. | 1,018(40.9%) | 501(21.7%) | 620(39.3%) |
| 1970-71 | 1,101(38.9%) | 1,020(41.4%) | 980( 29.4%) | 172( 23.7%) | N.A. | 1,065(41.4%) | 491(18.3%) | 739(38.5%) |
| 1971-72 | 982(37.9%) | 1,037(44.3%) | 1,123( 35.2%) | 420( 33.7%) | N.A. | 1,224(35.3%) | 585(22.8%) | 926(34.2%) |
| Average Per Cent Growth | 15.4 | 21.3 | 7.2 | 144.2 | N.A. | 6.6 | 3.8 | 34.2 |

Medical School--Out-of-State Applicants

| School Year | Hahnemann | Hershey | Jefferson | Med. College Pennsylvania | Philadelphia Osteopathic | Temple | Univ. Penna. | Univ. Pittsburgh |
|---|---|---|---|---|---|---|---|---|
| 1960-61 | N.A. | | 709( 53.1%) | N.A. | N.A. | N.A. | 1,216(74.6%) | N.A. |
| 1961-62 | N.A. | | 650( 51.9%) | N.A. | N.A. | N.A. | 920(71.9%) | N.A. |
| 1962-63 | [illegible]43(51.9%)[b] | | 714( 51.8%) | N.A. | N.A. | N.A. | 928(67.1%) | N.A. |
| 1963-64 | 784(53.2%) | | 934( 53.7%) | N.A. | N.A. | N.A. | 1,002(67.9%) | N.A. |
| 1964-65 | 1,067(56.7%) | | 1,432( 61.7%) | N.A. | N.A. | N.A. | 1,198(68.2%) | N.A. |
| 1965-66 | 1,033(56.7%) | | 1,162( 54.2%) | N.A. | N.A. | N.A. | 1,166(70.4%) | N.A. |
| 1966-67 | 1,147(61.3%) | | 1,300( 63.8%) | N.A. | N.A. | N.A. | 1,216(72.3%) | N.A. |
| 1967-68 | 1,183(58.7%) | 517(48.0%) | 1,411( 61.1%) | N.A. | N.A. | N.A. | 1,313(75.0%) | N.A. |
| 1968-69 | 1,447(61.1%) | 1,001(52.5%) | 1,947( 70.1%) | N.A. | N.A. | 1,450(58.7%) | 1,494(74.8%) | 793(63.4%) |
| 1969-70 | 1,645(61.1%) | 1,432(66.2%) | 2,069( 69.3%) | N.A. | N.A. | 1,470(59.1%) | 1,803(78.3%) | 956(60.7%) |
| 1970-71 | 1,733(61.1%) | 1,441(58.6%) | 2,359( 70.6%) | 555( 76.3%) | N.A. | 1,507(58.6%) | 2,199(81.7%) | 1,179(61.5%) |
| 1971-72 | 1,606(62.1%) | 1,302(55.7%) | 2,071( 64.8%) | 827( 66.3%) | N.A. | 2,247(64.7%) | 1,980(77.2%) | 1,779(65.8%) |
| Average Per Cent Growth | 29.2 | 38.0 | 17.5 | 49.0 | N.A. | 18.3 | 5.7 | 41.5 |

Medical School--Female Applicants

| School Year | Hahnemann | Hershey | Jefferson | Med. College Pennsylvania | Philadelphia Osteopathic | Temple | Univ. Penna. | Univ. Pittsburgh |
|---|---|---|---|---|---|---|---|---|
| 1960-61 | N.A. | | 0( 0.0%) | N.A. | N.A. | N.A. | 93( 5.7%) | N.A. |
| 1961-62 | N.A. | | 38( 3.0%) | N.A. | N.A. | N.A. | 80( 6.3%) | 45( 7.1%) |
| 1962-63 | 173(20.2%)[b] | | 35( 2.5%) | N.A. | N.A. | N.A. | 85( 6.2%) | 42( 5.9%) |
| 1963-64 | 157(10.7%) | | 71( 4.1%) | 230(100.0%) | N.A. | 177( 9.9%) | 122( 8.3%) | 43( 5.4%) |
| 1964-65 | 190(10.1%) | | 152( 6.6%) | 338(100.0%) | N.A. | 161( 7.7%) | 154( 8.8%) | 43( 4.7%) |
| 1965-66 | 198(10.9%) | | 158( 7.4%) | 309(100.0%) | N.A. | N.A. | 141( 8.5%) | 69( 5.4%) |
| 1966-67 | 213(11.4%) | | 153( 7.5%) | 306(100.0%) | N.A. | N.A. | 158( 9.4%) | 112( 8.2%) |
| 1967-68 | 229(11.4%) | 89( 8.3%) | 170( 7.4%) | 358(100.0%) | N.A. | 176(-----) | 167( 9.5%) | 80( 7.4%) |
| 1968-69 | 262(11.1%) | 174( 9.1%) | 203( 7.3%) | 350(100.0%) | N.A. | N.A.(-----) | 168( 8.4%) | 99( 7.9%) |
| 1969-70 | 287(10.7%) | 213( 9.9%) | 212( 7.1%) | 379(100.0%) | N.A. | 187( 7.5%) | 221( 9.6%) | 113( 7.2%) |
| 1970-71 | 321(11.3%) | 282(11.5%) | 272( 8.1%) | 727(100.0%) | N.A. | 219( 8.5%) | 273(10.2%) | 147( 7.7%) |
| 1971-72 | 294(11.4%) | 341(14.6%) | 395( 12.4%) | 669( 53.7%) | N.A. | 392(11.3%) | 333(13.0%) | 306(11.3%) |
| Average Per Cent Growth | 7.8 | 70.8 | 103.9* | 23.9 | N.A. | 15.2 | 23.5 | 52.7 |

*Average of school years 1961-62 to 1971-72 since the growth from 1960-61 is incalculable but dramatic.

Medical School--Male Applicants

| School Year | Hahnemann | Hershey | Jefferson | Med. College Pennsylvania | Philadelphia Osteopathic | Temple | Univ. Penna. | Univ. Pittsburgh |
|---|---|---|---|---|---|---|---|---|
| 1960-61 | | | 1,334(100.0%) | N.A. | N.A. | N.A. | 1,537(94.3%) | N.A. |
| 1961-62 | | | 1,214( 97.0%) | N.A. | N.A. | N.A. | 1,199(93.7%) | 585(92.9%) |
| 1962-63 | 682(79.8%)[b] | | 1,342( 97.5%) | N.A. | N.A. | N.A. | 1,298(93.8%) | 675(94.1%) |
| 1963-64 | 1,316(89.3%) | | 1,668( 95.9%) | 0( 0.0%) | N.A. | 1,613(90.1%) | 1,353(91.7%) | 757(94.6%) |
| 1964-65 | 1,692(89.9%) | | 2,170( 93.4%) | 0( 0.0%) | N.A. | 1,918(92.3%) | 1,603(91.2%) | 879(95.3%) |
| 1965-66 | 1,623(89.1%) | | 1,986( 92.6%) | 0( 0.0%) | N.A. | N.A. | 1,515(91.5%) | 1,210(94.6%) |
| 1966-67 | 1,658(88.6%) | | 1,884( 92.5%) | 0( 0.0%) | N.A. | N.A. | 1,524(90.6%) | 1,252(91.8%) |
| 1967-68 | 1,786(88.6%) | 988(91.7%) | 2,138( 92.6%) | 0( 0.0%) | N.A. | N.A. | 1,583(90.5%) | 1,002(92.6%) |
| 1968-69 | 2,108(88.9%) | 1,732(90.9%) | 2,574( 92.7%) | 0( 0.0%) | N.A. | N.A. | 1,830(91.6%) | 1,151(92.1%) |
| 1969-70 | 2,405(89.3%) | 1,950(90.1%) | 2,772( 92.9%) | 0( 0.0%) | N.A. | 2,301(92.5%) | 2,083(90.4%) | 1,463(92.8%) |
| 1970-71 | 2,513(88.7%) | 2,179(88.5%) | 3,067( 91.9%) | 0( 0.0%) | N.A. | 2,353(91.5%) | 2,417(89.8%) | 1,771(92.3%) |
| 1971-72 | 2,294(88.6%) | 1,998(85.4%) | 2,799( 87.6%) | 578( 53.7%) | N.A. | 3,079(88.7%) | 2,232(87.0%) | 2,399(88.7%) |
| Average Per Cent Growth | 26.3 | 25.6 | 10.0 | * | N.A. | 11.4 | 4.1 | 31.0 |

*Growth incalculable, but dramatic, over last year of this series.

[a] ... survey of the medical schools conducted by the author.

[b] ...e of total applicants.

The estimates of annual percentage growth at the bottom of each set of figures are based upon the years for which data were available. In some instances, the medical schools were unable to provide data for more than two years back. These annual percentage increase estimates are therefore not strictly comparable under the same time period involved, but they do indicate that applicant activity has increased for all of the institutions regardless of the origin or sex of the applicant with some institutions reflecting quite dramatic increases particularly in recent years, e.g., Hershey, the Medical College of Pennsylvania, the University of Pittsburgh and Philadelphia Osteopathic. In general, the larger medical schools had more moderate growth patterns, with Hahnemann a notable exception.

Historical First Year Class Trends

Table 27 is similar to Table 26 but traces the patterns for first year entrants to the medical schools of Pennsylvania. Here we see more moderate growth estimates ranging from 0.4 per cent per annum for the Medical College of Pennsylvania to 18.8 per cent per annum for the newly created Hershey Medical School. The median value for the seven established institutions is 1.9 per cent per annum, a far cry from the figure of 22.52 per cent applicant growth for these institutions.

So far as Pennsylvania resident enrollment is concerned, the proportion of Pennsylvania residents in the first year class has increased dramatically in one instance, e.g., the Medical College of Pennsylvania with 33.3 per cent in 1960-61 to 60.6 per cent in 1971-72. Unfortunately, the proportion of Pennsylvania residents has also decreased in the case of the University of Pennsylvania Medical School (56 per cent to 47.5 per cent), the University of Pittsburgh (81 per cent to 72 per cent), and the Philadelphia College of Osteopathic Medicine (77.5 per cent to 64 per cent) despite a general increase in the number of Pennsylvania residents in the first year of medical school.

The proportion of females in the first year class has increased markedly in the case of Jefferson Medical School (0.0 per cent to 13.2 per cent), Temple (4 per cent to 15 per cent) and the University of Pennsylvania (5 per cent to 11 per cent), while decreasing from 100 per cent to 91 per cent in the previously all female Medical College of Pennsylvania.

All told, the medical schools of Pennsylvania in 1970-71 had a median percentage of Pennsylvania residents of 67.9 per cent with a low of 30.7 per cent (University of Pennsylvania) since raised to 47.5 per cent in 1971-72 and a high of 78.1 per cent (Temple), since increased to 78.8 per cent in 1971-72. With the exception of the Medical College of Pennsylvania, they had an institutional median proportion of females in the first year class of 11.9 per cent, with a high of 23.8 per cent for the University of Pittsburgh and a low of 3.8 per cent for the Philadelphia School of Osteopathic Medicine.

The Pennsylvania resident historical trends are even more clearly discernable in Table 28 with regard to both applicant activity and the first year classes of 1961-62 to 1971-72.

Legal Residence of Medical Students

Table 29 summarizes findings concerning a comparison between the fall 1971 legal residence of the full-time student body of the medical schools of Pennsylvania and the legal residence of the 1970-71 school-year graduates.

As may be seen, residents of foreign countries comprise a very small part (0.7 per cent) of our medical students. The proportion of Pennsylvania residents varies markedly between state-related (77.2 per cent) and private state-aided medical schools (58.7 per cent), with the figures for the graduates very similar in pattern.

The differences between the legal residence of the graduates and the student body as a whole suggests that the private medical schools may be taking more foreign medical students and fewer out-of-state students than in the past along with a substantial increase in the proportion of Pennsylvania residents.

In contrast, the data of Table 29 suggest that the state-related medical schools are taking somewhat fewer Pennsylvania residents, somewhat more out-of-state residents and slightly fewer foreign residents.

The data of Table 29 were taken from the reports sent to the Division of Educational Statistics of the Commonwealth rather than the survey forms, with the exception of the Philadelphia College of Osteopathic Medicine. Additional data from Hershey were available (note b of Table 29), indicating the proportion of Pennsylvania residents in the graduating class of 1972 to be 87.8 per cent in contrast to the 84.8 per cent figure of 1971. All of these data are, however, somewhat suspect. It is possible for a medical student from another state to establish legal residence in

Table 27

Historical Trends for Pennsylvania Medical School Entrants to the First Year[a]

Medical School--First Year Class Size

| School Year | Hahnemann | Hershey | Jefferson | Med.College Pennsylvania | Philadelphia Osteopathic | Temple | Univ. Penna. | University Pittsburgh |
|---|---|---|---|---|---|---|---|---|
| 1960-61 | 110 | | 176 | 63 | 91 | 137 | 125 | 101 |
| 1961-62 | 110 | | 176 | 62 | 88 | 136 | 125 | 101 |
| 1962-63 | 110 | | 175 | 64 | 93 | 138 | 129 | 102 |
| 1963-64 | 110 | | 178 | 64 | 89 | 137 | 126 | 102 |
| 1964-65 | 110 | | 176 | 60 | 100 | 137 | 127 | 102 |
| 1965-66 | 110 | | 176 | 64 | 93 | 137 | 125 | 101 |
| 1966-67 | 110 | | 176 | 64 | 95 | 139 | 125 | 106 |
| 1967-68 | 115 | 40 | 186 | 66 | 113 | 137 | 133 | 108 |
| 1968-69 | 115 | 48 | 192 | 66 | 123 | 146 | 132 | 107 |
| 1969-70 | 115 | 64 | 192 | 66 | 145 | 146 | 151 | 109 |
| 1970-71 | 118 | 69 | 212 | 66 | 152 | 160 | 150 | 128 |
| 1971-72 | 130[b] | 70 | 212 | 66 | 160 | 160 | 160 | 130 |
| Average Per Cent Growth | 1.7 | 18.8 | 1.9 | 0.4 | 6.9 | 1.5 | 2.5 | 2.6 |

Medical School--Pennsylvania Entrants

| School Year | Hahnemann | Hershey | Jefferson | Med.College Pennsylvania | Philadelphia Osteopathic | Temple | Univ. Penna. | University Pittsburgh |
|---|---|---|---|---|---|---|---|---|
| 1960-61 | N.A. | | 118(67.0%) | 21(33.3%) | N.A. | N.A. | 70(56.0%) | 82(81.2%) |
| 1961-62 | N.A. | | 115(65.3%) | 11(17.7%) | N.A. | N.A. | 67(53.6%) | 82(81.2%) |
| 1962-63 | 69(62.7%)[c] | | 126(72.0%) | 16(25.0%) | N.A. | N.A. | 74(57.4%) | 70(68.6%) |
| 1963-64 | 78(70.9%) | | 138(77.5%) | 19(29.7%) | 69(77.5%) | 105(76.6%) | 73(57.9%) | 60(58.8%) |
| 1964-65 | 74(67.3%) | | 117(66.5%) | 16(26.7%) | 76(76.0%) | 104(75.9%) | 66(52.0%) | 72(70.6%) |
| 1965-66 | 79(71.8%) | | 106(60.2%) | 14(21.9%) | 61(65.6%) | N.A. | 56(44.8%) | 64(63.4%) |
| 1966-67 | 77(70.0%) | | 105(59.7%) | 18(28.1%) | 62(65.3%) | 102(73.4%) | 53(42.4%) | 60(56.6%) |
| 1967-68 | 85(73.9%) | 31(77.5%) | 119(64.0%) | 18(27.3%) | 80(70.8%) | 105(76.6%) | 48(36.1%) | 77(71.3%) |
| 1968-69 | 85(73.9%) | 38(79.2%) | 138(71.9%) | 22(33.3%) | 82(66.7%) | 115(78.8%) | 48(36.4%) | 82(76.6%) |
| 1969-70 | 80(69.6%) | 44(68.8%) | 134(69.8%) | 34(51.5%) | 103(71.0%) | 110(75.3%) | 46(30.5%) | 81(74.3%) |
| 1970-71 | 82(69.5%) | 38(55.1%) | 158(74.5%) | 26(39.4%) | 101(66.4%) | 125(78.1%) | 46(30.7%) | 91(71.1%) |
| 1971-72 | -[b] | 55(78.6%) | 156(73.6%) | 40(60.6%) | 102(63.8%) | 126(78.8%) | 76(47.5%) | 94(72.3%) |
| Average Per Cent Growth | 2.4 | 19.4 | 2.9 | 8.2 | 6.0 | 2.5 | 0.8 | 1.3 |

Medical School--Out-of-State Entrants

| School Year | Hahnemann | Hershey | Jefferson | Med.College Pennsylvania | Philadelphia Osteopathic | Temple | Univ. Penna. | University Pittsburgh |
|---|---|---|---|---|---|---|---|---|
| 1960-61 | N.A. | | 58(33.0%) | 42(66.7%) | N.A. | N.A. | 55(44.0%) | 19(18.8%) |
| 1961-62 | N.A. | | 61(34.7%) | 51(82.3%) | N.A. | N.A. | 58(46.4%) | 19(18.8%) |
| 1962-63 | 41(37.3%)[c] | | 49(28.0%) | 48(75.0%) | N.A. | N.A. | 55(42.6%) | 32(31.4%) |
| 1963-64 | 32(29.1%) | | 40(22.5%) | 45(70.3%) | 20(22.5%) | 32(23.4%) | 53(42.1%) | 42(41.2%) |
| 1964-65 | 36(32.7%) | | 59(33.5%) | 44(73.3%) | 24(24.0%) | 33(24.1%) | 61(48.0%) | 30(29.4%) |
| 1965-66 | 31(28.2%) | | 70(39.8%) | 50(78.1%) | 32(34.4%) | N.A. | 69(55.2%) | 37(36.6%) |
| 1966-67 | 33(30.0%) | | 71(40.3%) | 46(71.9%) | 33(34.7%) | 37(26.6%) | 72(57.6%) | 46(43.4%) |
| 1967-68 | 30(26.1%) | 8(22.5%) | 67(36.0%) | 48(72.7%) | 33(29.2%) | 32(23.4%) | 85(63.9%) | 31(28.7%) |
| 1968-69 | 30(26.1%) | 10(20.8%) | 54(28.1%) | 44(66.7%) | 41(33.3%) | 31(21.2%) | 84(63.6%) | 25(23.4%) |
| 1969-70 | 35(30.4%) | 20(31.2%) | 58(30.2%) | 32(48.5%) | 42(29.0%) | 36(24.7%) | 105(69.5%) | 28(25.7%) |
| 1970-71 | 36(30.5%) | 31(44.9%) | 54(25.5%) | 40(60.6%) | 51(33.6%) | 35(21.9%) | 104(69.3%) | 37(28.9%) |
| 1971-72 | -[b] | 15(21.4%) | 56(26.4%) | 26(39.4%) | 58(36.2%) | 34(21.2%) | 84(52.5%) | 36(27.7%) |
| Average Per Cent Growth | -1.5 | 21.9 | -0.3 | -3.5 | 23.8 | 0.8 | 4.8 | 8.1 |

Medical School--Female Entrants

| School Year | Hahnemann | Hershey | Jefferson | Med.College Pennsylvania | Philadelphia Osteopathic | Temple | Univ. Penna. | University Pittsburgh |
|---|---|---|---|---|---|---|---|---|
| 1960-61 | 7( 6.4%)[c] | | 0( 0.0%) | 63(100.0%) | 2( 2.2%) | 5( 3.6%) | 6( 4.8%) | 7( 6.9%) |
| 1961-62 | 4( 3.6%) | | 9( 5.1%) | 62(100.0%) | 3( 3.4%) | 12( 8.8%) | 4( 3.2%) | 6( 5.9%) |
| 1962-63 | 3( 2.7%) | | 10( 5.7%) | 64(100.0%) | 1( 1.1%) | 9( 6.5%) | 6( 4.7%) | 5( 4.9%) |
| 1963-64 | 5( 4.6%) | | 12( 6.7%) | 62( 96.9%) | 2( 2.2%) | 15(10.9%) | 5( 4.0%) | 8( 7.8%) |
| 1964-65 | 11(10.0%) | | 11( 6.3%) | 60(100.0%) | 6( 6.0%) | 14(10.2%) | 8( 6.3%) | 6( 5.9%) |
| 1965-66 | 6( 5.5%) | | 13( 7.4%) | 64(100.0%) | 2( 2.2%) | 15(10.9%) | 6( 4.8%) | 11(10.9%) |
| 1966-67 | 9( 8.2%) | | 13( 7.4%) | 64(100.0%) | 3( 3.2%) | 10( 7.2%) | 5( 4.0%) | 7( 6.6%) |
| 1967-68 | 8( 7.0%) | 3( 7.5%) | 16( 8.6%) | 66(100.0%) | 3( 2.7%) | 11( 8.0%) | 10( 7.5%) | 13(12.0%) |
| 1968-69 | 12(10.4%) | 4( 8.3%) | 22(11.5%) | 66(100.0%) | 6( 4.9%) | 14( 9.6%) | 11( 8.3%) | 10( 9.3%) |
| 1969-70 | 19(16.5%) | 6( 9.4%) | 19( 9.9%) | 66(100.0%) | 3( 2.1%) | 13( 8.9%) | 17(11.3%) | 4( 3.7%) |
| 1970-71 | 14(11.9%) | 7(10.1%) | 26(12.3%) | 60( 90.0%) | 3( 2.0%) | 13( 8.1%) | 18(12.0%) | 9( 7.0%) |
| 1971-72 | 10( 7.7%) | 7(10.0%) | 28(13.2%) | 60( 90.9%) | 6( 3.8%) | 24(15.0%) | 17(10.6%) | 31(23.8%) |
| Average Per Cent Growth | 3.9 | 33.3 | 21.1 | -0.4 | 18.2 | 34.5 | 16.7 | 31.2 |

Medical School--Male Entrants

| School Year | Hahnemann | Hershey | Jefferson | Med.College Pennsylvania | Philadelphia Osteopathic | Temple | Univ. Penna. | University Pittsburgh |
|---|---|---|---|---|---|---|---|---|
| 1960-61 | 103(93.6%)[c] | | 176(100.0%) | 0( 0.0%) | 89(97.8%) | 132(96.4%) | 119(95.2%) | 94(93.1%) |
| 1961-62 | 106(96.4%) | | 167(94.9%) | 0( 0.0%) | 85(96.6%) | 124(91.2%) | 121(96.8%) | 95(94.1%) |
| 1962-63 | 107(97.3%) | | 165(94.3%) | 0( 0.0%) | 92(98.9%) | 129(93.5%) | 123(95.3%) | 97(95.1%) |
| 1963-64 | 105(95.4%) | | 166(93.3%) | 2( 3.1%) | 87(97.8%) | 122(89.1%) | 121(96.0%) | 94(92.2%) |
| 1964-65 | 99(90.0%) | | 165(93.7%) | 0( 0.0%) | 94(94.0%) | 123(89.8%) | 119(93.7%) | 96(94.1%) |
| 1965-66 | 104(94.5%) | | 163(92.6%) | 0( 0.0%) | 91(97.8%) | 122(89.1%) | 119(95.2%) | 90(89.1%) |
| 1966-67 | 101(91.8%) | | 163(92.6%) | 0( 0.0%) | 92(96.8%) | 129(92.8%) | 120(96.0%) | 99(93.4%) |
| 1967-68 | 107(93.0%) | 37(92.5%) | 170(91.4%) | 0( 0.0%) | 110(97.3%) | 126(92.0%) | 123(92.5%) | 95(88.0%) |
| 1968-69 | 103(89.6%) | 44(91.7%) | 170(88.5%) | 0( 0.0%) | 117(95.1%) | 132(90.4%) | 121(91.7%) | 97(90.7%) |
| 1969-70 | 96(83.5%) | 58(90.6%) | 173(90.1%) | 0( 0.0%) | 142(97.9%) | 133(91.1%) | 134(88.7%) | 105(96.3%) |
| 1970-71 | 104(88.1%) | 62(89.9%) | 186(87.7%) | 6( 9.1%) | 149(98.0%) | 147(91.9%) | 132(88.0%) | 119(93.0%) |
| 1971-72 | 120(92.3%) | 63(90.0%) | 184(86.8%) | 6( 9.1%) | 154(96.2%) | 136(85.0%) | 143(89.4%) | 99(76.2%) |
| Average Per Cent Growth | 1.5 | 17.6 | 0.4 | 25.0 | 6.6 | 0.3 | 1.8 | 0.5 |

[a]Data derived from Survey of Medical Schools conducted for this study.

[b]First year figure modified from 118 to 130 and female entrant figure from 10 to 11 on basis of November 30, 1971 report to Division of Educational Statistics, Bureau of Information Systems, Commonwealth of Pennsylvania. Data breakdown as to Pennsylvania entrants is therefore considered as questionable and is not given.

ntage of first year entrants.

Table 28

Historical Pattern of the Pennsylvania Resident Proportion of First Year Entrants and Applicants to Pennsylvania's Medical Schools[a]

Applicants

| School | 1961-1962 | 1962-1963 | 1963-1964 | 1964-1965 | 1965-1966 | 1966-1967 | 1967-1968 | 1968-1969 | 1969-1970 | 1970-1971 | 1971-1972 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | % | % | % | % | % | % | % | % | % | % | % |
| Hahnemann | N.A. | 48.2 | 46.8 | 43.3 | 43.3 | 38.7 | 41.3 | 38.9 | 38.9 | 38.8 | 37.9 |
| Hershey[b] | | | | | | | 52.0 | 47.5 | 33.8 | 41.4 | 44.3 |
| Jefferson | 48.1 | 48.1 | 46.3 | 38.3 | 45.8 | 36.2 | 38.9 | 29.9 | 30.7 | 29.4 | 35.2 |
| Medical College of Pa. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | 23.7 | 33.7 |
| Philadelphia Osteopathic | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. |
| Temple | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | 41.3 | 40.9 | 41.4 | 35.3 |
| U. Pennsylvania | 28.1 | 32.9 | 32.1 | 31.8 | 29.6 | 27.7 | 25.0 | 25.2 | 21.7 | 18.3 | 22.8 |
| U. Pittsburgh | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | 36.6 | 39.3 | 38.5 | 34.2 |

First-Year Entrants

| School | 1961-1962 | 1962-1963 | 1963-1964 | 1964-1965 | 1965-1966 | 1966-1967 | 1967-1968 | 1968-1969 | 1969-1970 | 1970-1971 | 1971-1972 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hahnemann | N.A. | 62.7 | 70.9 | 67.3 | 71.8 | 70.07 | 73.9 | 73.9 | 69.6 | 69.5 | 69.5 |
| Hershey | | | | | | | 77.5 | 79.2 | 68.8 | 55.1 | 78.6 |
| Jefferson | 65.3 | 72.0 | 77.5 | 66.5 | 60.2 | 59.7 | 64.0 | 71.9 | 69.8 | 74.5 | 73.6 |
| Medical College of Pa. | 17.7 | 25.0 | 29.7 | 26.7 | 21.9 | 28.1 | 27.3 | 33.3 | 51.5 | 39.4 | 60.6 |
| Philadelphia Osteopathic | N.A. | N.A. | 77.5 | 76.0 | 65.6 | 65.3 | 70.8 | 66.7 | 71.0 | 66.4 | 63.8 |
| Temple | N.A. | N.A. | 76.6 | 75.9 | N.A. | 73.4 | 76.6 | 78.8 | 7[illegible].3 | 78.1 | 78.8 |
| U. Pennsylvania | 53.6 | 57.4 | 57.9 | 52.0 | 44.8 | 42.4 | 36.1 | 36.4 | 30.5 | 30.7 | 47.5 |
| U. Pittsburgh | 81.2 | 68.6 | 58.8 | 70.6 | 63.4 | 56.6 | 71.3 | 76.6 | 74.3 | 71.1 | 72.3 |

[a] Data derived from survey responses found in Appendix.

[b] Hershey is a new medical school that began accepting applicants and students in 1968/69.

Table 29

Legal Residence of Full-Time Medical Students and Graduates[a]

A. Legal Residence of Full-Time Students, Fall 1971

| School | Total | Residents of Pennsylvania | Residents of Other States | Residents of Foreign Countries |
|---|---|---|---|---|
| State Related | 1,319 | 1,019(77.2%) | 291(22.1%) | 9(0.7%) |
| Hershey | 237 | 169(71.3%) | 67(28.3%) | 1(0.4%) |
| Temple | 617 | 508(82.3%) | 104(16.9%) | 5(0.8%) |
| Pittsburgh | 465 | 342(73.6%) | 120(25.8%) | 3(0.6%) |
| Private State-Aided | 2,154 | 1,264(58.7%) | 874(40.6%) | 16(0.7%) |
| Hahnemann | 475 | 328(69.1%) | 146(30.7%) | 1(0.2%) |
| Medical College of Pa. | 269 | 135(50.2%) | 131(48.7%) | 3(1.1%) |
| Jefferson | 810 | 597(73.7%) | 210(25.9%) | 3(0.4%) |
| Pennsylvania | 600 | 204(34.0%) | 387(64.5%) | 9(1.5%) |
| Phila. Osteopathic | 575 | 404(70.3%) | 169(29.4%) | 2(0.3%) |
| Grand Total | 4,048 | 2,687(66.4%) | 1,334(32.9%) | 27(0.7%) |

B. Legal Residence of Graduates 1970-71

| School | Total | Residents of Pennsylvania | Residents of Other States | Residents of Foreign Countries |
|---|---|---|---|---|
| State Related | 263 | 209(79.4%) | 52(19.8%) | 2(0.8%) |
| Hershey | 33 | 28(84.8%)[b] | 5(15.2%) | - - |
| Temple | 134 | 110(82.1%) | 22(16.4%) | 2(1.5%) |
| Pittsburgh | 96 | 71(74.0%) | 25(26.0%) | - - |
| Private State-Aided | 474 | 253(53.4%) | 219(46.2%) | 2(0.4%) |
| Hahnemann | 107 | 72(67.3%) | 35(32.7%) | - - |
| Medical College of Pa. | 52 | 15(28.8%) | 36(69.2%) | 1(1.9%) |
| Jefferson | 184 | 117(63.6%) | 67(36.4%) | - - |
| Pennsylvania | 131 | 49(37.4%) | 81(61.8%) | 1(0.8%) |
| Phila. Osteopathic | 106 | 70(66.0%) | 36(34.0%) | - - |
| Grand Total | 843 | 532(63.1%) | 307(36.4%) | 4(0.5%) |

[a]Data provided by Division of Educational Statistics, Bureau of Information Systems, Department of Education, Commonwealth of Pennsylvania, with the exception of the data for the Philadelphia College of Osteopathic Medicine which was obtained from their survey return.

[b]Of Hershey's June 1972 graduating class of 41 students, 36 were originally admitted as Pennsylvania residents, i.e., 87.8 per cent were residents of Pennsylvania.

Pennsylvania for the express purpose of avoiding the higher rate of tuition charged to out-of-state students. The report of the medical schools may be based, in some instances at least, upon the current legal residence of their students at the time of graduation.

## Applicant Residence

In Table 30, for each state, the number of male and female applicants as a whole or with one or more acceptances by a medical school is given. The percentage with one or more acceptances, the total number of applications and the average number of applications is also given. At the bottom of the table the rank of Pennsylvania in comparison to the 50 states is indicated.

Pennsylvania apparently does very well in terms of the number of applicants and acceptances since it ranks second or third on these items. Only New York (1,439) and California (730) have more accepted applicants than Pennsylvania (702), and a similar pattern is found for the number of applicants as a whole.

The picture is not so bright, however, when one examines the figures for percentage of applicants with one or more acceptances. Despite the fact that the Pennsylvania applicants submit 5.8 applications per applicant (ranking 10th among the states), Pennsylvania ranks 40th with regard to the percentage of its applicants accepted by a U.S. medical school (39.5 per cent of all Pennsylvania applicants receive at least one acceptance). The situation for female applicants is somewhat better, with Pennsylvania ranking 30th out of the 50 states (43.6 per cent with an acceptance). It should be noted, however, that the generally superior California does less well than Pennsylvania in this regard with only 35.2 per cent of her resident applicants receiving acceptances. New York State, in contrast, does better than either California or Pennsylvania with its acceptance rate of 43 per cent.

These findings may be due to the fact that we have so large a number of applicants relative to our training capacity. This possibility seems unlikely since New York has an even larger number of applicants but a better acceptance rate. It seems far more likely that the acceptance rate is a reflection of (1) the excellence of the premedical and public school training received by its residents, (2) the degree to which the medical schools in the home state give preference to residents due to geographic isolation, etc. (Alaska, Hawaii) and (3) willingness and ability to train state residents even though not as qualified by their education as residents from other states, e.g., Mississippi.

Pennsylvania may actually be doing quite well despite the situation depicted in Table 29, but definitive data pinpointing the issue are lacking.

## The Quality of Pennsylvania's Medical Students

An examination of Tables 31 and 32 suggests that Pennsylvania's position with regard to the quality of its medical students has not only been increasing with the years but also exceeds that characterizing the nation's medical students as a whole. Unfortunately, not all of the medical schools were able to provide mean Medical College Aptitude Test scores for the years tabled. The tabled data (Table 32), therefore, are a mean of the mean values for Temple and the University of Pittsburgh only. If we assume, however, that the national accepted applicant figures in Table 31 are roughly equivalent to the first year students in Table 32, we find that the national mean scores on the Medical College Aptitude Test for the year 1969-70 accepted applicant groups are consistently higher than those for the two Pennsylvania medical schools in Table 32. The reverse was the case earlier in the decade. For 1969-70 the MCAT verbal mean score nationally was 562 while the Pennsylvania mean score (Temple and Pittsburgh combined) was 612.5. In 1961-62 the national score was 533 and for these two Pennsylvania institutions it was 512.5.

As may be seen in Table 31, the national proportion of applicants accepted by the medical schools has declined over the decade from approximately 60 per cent to 43 per cent while the number of accepted and nonaccepted applicants combined has risen from 14,397 to 24,465 in 1969-70 and, as indicated earlier, in this report, to approximately 35,000 in 1971.[8]

In Table 32, we find that the MCAT mean score differences between applicants in general and successful admitted applicants (first year class enrollees) has steadily increased over time. In 1961, for example, the applicants in general and those applicants in the first year of medical school differed by 3.5 points in verbal aptitude, and 12 points in quantitative aptitude, 7.5 points in general information and 19 points in science. Apparently selection was primarily based on quantitative and scientific aptitude.

In 1969, on the other hand, we now find much larger differences in all of the scales, i.e., verbal, 66 points, quantitative, 34 points, general information, 22 points and science, 46.5 points. The greatest growth occurred in the first year class verbal and quantitative aptitude scores, i.e., 19.51 per cent and a 18.82 per

Table 30

A Comparison Between Areas of Residence for Applicants who have been Accepted and Applicants Generally with Regard to Rate of Acceptance and Average Number of Applications Submitted to the Medical Schools of the United States[a]

| State or Region | Applicants with One or More Acceptance | | | Percentage with One or More Acceptance | | | Total Number of Applicants | Total Applications | Average Number of Applications |
|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | Total | Male | Female | Total | | | |
| Alabama | 122 | 7 | 129 | 47.3 | 35.0 | 46.4 | 278 | 931 | 3.3 |
| Alaska | 8 | 0 | 8 | 57.1 | ---- | 57.1 | 14 | 75 | 5.4 |
| Arizona | 76 | 8 | 84 | 45.7 | 38.1 | 41.0 | 205 | 1,040 | 5.1 |
| Arkansas | 90 | 3 | 93 | 46.4 | 33.3 | 45.8 | 203 | 403 | 2.0 |
| California | 665 | 65 | 730 | 35.6 | 31.1 | 35.2 | 2,076 | 13,581 | 6.5 |
| Colorado | 82 | 7 | 89 | 46.3 | 41.2 | 45.9 | 194 | 737 | 3.8 |
| Connecticut | 143 | 25 | 168 | 41.7 | 48.1 | 42.5 | 395 | 3,140 | 8.0 |
| Delaware | 19 | 2 | 21 | 35.2 | 100.0 | 37.5 | 56 | 310 | 5.5 |
| District of Columbia | 67 | 10 | 77 | 46.5 | 34.5 | 44.5 | 173 | 723 | 4.2 |
| Florida | 225 | 21 | 246 | 37.4 | 48.8 | 38.1 | 645 | 3,087 | 4.8 |
| Georgia | 184 | 16 | 200 | 40.5 | 45.7 | 40.9 | 489 | 1,563 | 3.2 |
| Hawaii | 49 | 3 | 52 | 59.0 | 50.0 | 58.4 | 89 | 469 | 5.3 |
| Idaho | 25 | 0 | 25 | 36.8 | 0.0(3)[b] | 35.2 | 71 | 331 | 4.7 |
| Illinois | 536 | 55 | 591 | 45.1 | 50.0 | 45.5 | 1,299 | 7,160 | 5.5 |
| Indiana | 253 | 23 | 276 | 45.3 | 45.1 | 45.3 | 609 | 1,936 | 3.2 |
| Iowa | 132 | 15 | 147 | 49.1 | 51.7 | 49.3 | 298 | 1,015 | 3.4 |
| Kansas | 127 | 16 | 143 | 46.9 | 61.5 | 48.2 | 297 | 964 | 3.3 |
| Kentucky | 178 | 19 | 197 | 51.6 | 59.4 | 52.3 | 377 | 1,182 | 3.1 |
| Louisiana | 198 | 13 | 211 | 52.4 | 50.0 | 52.2 | 404 | 1,048 | 2.6 |
| Maine | 29 | 0 | 29 | 50.9 | 0.0(4) | 47.5 | 61 | 371 | 6.1 |
| Maryland | 216 | 32 | 248 | 49.2 | 54.2 | 49.8 | 498 | 2,611 | 5.2 |
| Massachusetts | 259 | 34 | 293 | 40.9 | 36.6 | 40.3 | 727 | 6,223 | 8.6 |
| Michigan | 351 | 36 | 387 | 46.3 | 44.4 | 41.2 | 939 | 3,909 | 4.2 |
| Minnesota | 188 | 25 | 213 | 47.2 | 49.0 | 47.4 | 449 | 1,691 | 3.8 |
| Mississippi | 110 | 12 | 122 | 49.3 | 63.2 | 50.4 | 242 | 565 | 2.3 |
| Missouri | 166 | 10 | 176 | 45.7 | 40.0 | 45.4 | 388 | 1,738 | 4.5 |
| Montana | 25 | 2 | 27 | 31.6 | 33.3 | 31.8 | 85 | 452 | 5.3 |
| Nebraska | 130 | 9 | 139 | 53.5 | 60.0 | 53.9 | 258 | 670 | 2.6 |
| Nevada | 9 | 0 | 9 | 25.7 | 0.0(1) | 25.0 | 36 | 215 | 6.0 |
| New Hampshire | 16 | 0 | 16 | 34.8 | 0.0(2) | 33.3 | 48 | 281 | 5.9 |
| New Jersey | 430 | 45 | 475 | 40.8 | 38.1 | 40.6 | 1,171 | 9,035 | 7.7 |
| New Mexico | 43 | 7 | 50 | 46.7 | 87.5 | 50.0 | 100 | 356 | 3.6 |
| New York | 1,275 | 164 | 1,439 | 42.5 | 46.9 | 43.0 | 3,350 | 30,649 | 9.2 |
| North Carolina | 157 | 18 | 175 | 45.9 | 58.1 | 46.9 | 373 | 1,460 | 3.9 |
| North Dakota | 39 | 4 | 43 | 61.9 | 66.7 | 62.3 | 69 | 154 | 2.2 |
| Ohio | 436 | 37 | 473 | 42.2 | 52.1 | 42.8 | 1,104 | 5,758 | 5.2 |
| Oklahoma | 137 | 9 | 146 | 43.6 | 45.0 | 43.7 | 334 | 1,142 | 3.4 |
| Oregon | 95 | 9 | 104 | 52.8 | 50.0 | 52.5 | 198 | 871 | 4.4 |
| Pennsylvania | 620 | 82 | 702 | 39.0 | 43.6 | 39.5 | 1,776 | 10,232 | 5.8 |
| Rhode Island | 27 | 6 | 33 | 36.5 | 50.0 | 38.4 | 86 | 661 | 7.7 |
| South Carolina | 139 | 10 | 149 | 58.2 | 58.8 | 58.2 | 256 | 666 | 2.6 |
| South Dakota | 36 | 1 | 37 | 52.9 | 16.7 | 50.0 | 74 | 210 | 2.8 |
| Tennessee | 210 | 18 | 228 | 54.4 | 56.3 | 54.5 | 418 | 1,131 | 2.7 |
| Texas | 435 | 51 | 486 | 46.1 | 54.3 | 46.8 | 1,038 | 4,264 | 4.1 |
| Utah | 60 | 2 | 62 | 28.0 | 40.0 | 28.3 | 219 | 1,168 | 5.3 |
| Vermont | 30 | 2 | 32 | 69.8 | 28.6 | 64.0 | 50 | 142 | 2.8 |
| Virginia | 185 | 17 | 202 | 46.7 | 51.5 | 47.1 | 429 | 1,804 | 4.2 |
| Washington | 112 | 7 | 119 | 41.0 | 38.9 | 40.9 | 291 | 1,317 | 4.5 |
| West Virginia | 78 | 12 | 90 | 50.3 | 42.9 | 49.2 | 183 | 578 | 3.2 |
| Wisconsin | 186 | 15 | 201 | 46.9 | 39.5 | 46.2 | 435 | 2,073 | 4.8 |
| Wyoming | 10 | 2 | 12 | 32.3 | 50.0 | 34.3 | 35 | 201 | 5.7 |
| Puerto Rico | 73 | 18 | 91 | 41.7 | 25.4 | 37.0 | 246 | 408 | 1.7 |
| U. S. Possessions | 4 | 0 | 4 | 66.7 | 0.0(1) | 57.1 | 7 | 23 | 3.3 |
| Canada | 7 | 2 | 9 | 6.2 | 13.3 | 6.9 | 130 | 367 | 2.8 |
| Foreign | 32 | 6 | 38 | 19.2 | 26.1 | 20.0 | 190 | 731 | 3.9 |
| United States | 9,418 | 986 | 10,404 | 43.4 | 45.2 | 43.6 | 23,892 | 132,293 | 5.5 |
| Total | 9,534 | 1,012 | 10,546 | 43.0 | 44.2 | 43.1 | 24,465 | 133,822 | 5.5 |
| Pa. Ranking[c] (50 States) | 3 | 2 | 3 | 40 | 30 | 40 | 3 | 3 | 10 |

[a]Data abstracted and derived from Table 10 in "A Study of U.S. Medical School Applicants, 1969-70" by Stritter, F. T., Hutton, J. G., Jr., and Duke, W. F., Journal of Medical Education, Vol. 46, January 1971.

[b]Number in parentheses indicates number of female applicants who were not accepted.

[c]Ranked from largest figure to lowest, i.e., 1 to 50.

Table 31

National Mean MCAT Score Patterns of Accepted and Nonaccepted Medical School Applicants 1960-61 Through 1969-70[a]

| First Year Class | Verbal Ability | Quantitative Ability | General Information | Science | Total Applicants | Per Cent Accepted of Total Applicants |
|---|---|---|---|---|---|---|
| | | | Accepted Applicants | | | |
| 1960-61 | 527 | 533 | 527 | 533 | 8,560 | 59.5 |
| 1961-62 | 533 | 538 | 522 | 537 | 8,682 | 60.4 |
| 1962-63 | 544 | 537 | 541 | 545 | 8,959 | 56.5 |
| 1963-64 | 537 | 552 | 549 | 545 | 9,063 | 51.2 |
| 1964-65 | 540 | 567 | 561 | 556 | 9,043 | 47.2 |
| 1965-66 | 541 | 583 | 565 | 549 | 9,012 | 48.2 |
| 1966-67 | 549 | 584 | 566 | 550 | 9,123 | 50.0 |
| 1967-68 | 554 | 596 | 566 | 565 | 9,702 | 51.8 |
| 1968-69 | 556 | 600 | 570 | 577 | 10,092 | 47.8 |
| 1969-70 | 562 | 603 | 569 | 577 | 10,547 | 43.1 |
| | | | Nonaccepted Applicants | | | |
| 1960-61 | 464 | 453 | 473 | 449 | 5,837 | |
| 1961-62 | 469 | 465 | 469 | 458 | 5,699 | |
| 1962-63 | 475 | 464 | 485 | 460 | 6,888 | |
| 1963-64 | 484 | 476 | 501 | 467 | 8,605 | |
| 1964-65 | 481 | 492 | 509 | 473 | 10,125 | |
| 1965-66 | 473 | 502 | 511 | 466 | 9,691 | |
| 1966-67 | 488 | 510 | 516 | 478 | 9,127 | |
| 1967-68 | 496 | 514 | 514 | 485 | 9,022 | |
| 1968-69 | 497 | 526 | 519 | 495 | 11,026 | |
| 1969-70 | 506 | 536 | 524 | 507 | 13,918 | |

[a]Data abstracted from a reprint of the article, "Study of U.S. Medical School Applicants, 1969-70," that appeared in the January 1971 issue of the *Journal of Medical Education* published by the Association of American Medical Colleges. (See Stritter, F. T., Hutton, Jr., J. G. and Duke, W. F. reference in the Bibliography.)

Table 32

MCAT Mean Scores and Mean Score Differences Over Time for Applicants and First Year Students from Two Medical Schools Providing Complete Data (Temple and Pittsburgh)[a]

| | Verbal | | | Quantitative | | | General Information | | | Science | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Applicant | 1st Year | Diff. | Applicant | 1st Year | Diff. | Applicant | 1st Year | Diff. | Applicant | 1st Year | Diff. |
| 1961 | 509.0 | 512.5 | 3.5 | 503.5 | 515.5 | 12.0 | 504.0 | 511.5 | 7.5 | 502.5 | 521.5 | 19.0 |
| 1962 | 516.5 | 539.5 | 23.0 | 504.0 | 531.0 | 27.0 | 513.0 | 530.0 | 17.0 | 507.0 | 547.0 | 40.0 |
| 1963 | 523.5 | 541.0 | 17.5 | 516.0 | 545.0 | 29.0 | 530.5 | 549.5 | 19.0 | 512.5 | 555.0 | 42.5 |
| 1964 | 521.5 | 559.0 | 37.5 | 517.0 | 550.5 | 33.5 | 539.0 | 575.0 | 36.0 | 517.0 | 562.0 | 45.0 |
| 1965 | 525.5 | 569.0 | 43.5 | 540.5 | 594.5 | 54.0 | 550.5 | 579.5 | 29.0 | 521.0 | 575.0 | 54.0 |
| 1966 | 532.5 | 598.0 | 65.5 | 557.5 | 598.5 | 40.5 | 555.5 | 584.5 | 29.0 | 524.0 | 576.0 | 52.0 |
| 1967 | 542.5 | 603.0 | 60.5 | 566.0 | 603.0 | 37.0 | 557.5 | 569.5 | 12.0 | 533.5 | 572.5 | 39.0 |
| 1968 | 545.5 | 610.5 | 65.5 | 576.5 | 610.5 | 34.0 | 560.5 | 584.5 | 24.0 | 551.5 | 597.0 | 45.5 |
| 1969 | 546.5 | 612.5 | 66.0 | 578.5 | 612.5 | 34.0 | 559.0 | 581.0 | 22.0 | 555.0 | 601.5 | 46.5 |
| % Change | 7.37% | 19.51% | | 14.90% | 18.82% | | 10.91% | 13.59% | | 10.45% | 15.34% | |

[a]Mean values shown in this table represent an arithmetic average of the applicant or class mean values cited by the two schools in question. MCAT is an acronym for the Medical College Aptitude Test required of applicants for admission.

cent increase, respectively. The increase in the general run of applicant verbal scores did not match those of the accepted (first year class) applicants, e.g., 7.37 per cent verbal (applicant) compared with 19.51 per cent increase for the first year class. The findings of Table 31 and 32, taken as a whole, suggest that we have been, nationally, and in Pennsylvania, selecting medical students on an increasingly stringent basis and, furthermore, that we have been selecting them based on their high quantitative and intellectual (verbal aptitude) skills.

Several implications may well follow from this. First, we could easily increase the number selected (enlarged medical school classes) without seriously impairing the quality of the physicians produced, since it can hardly be argued that the acceptable candidate in 1960 or 1961 would not still be acceptable in 1972 if a place were available.

Since the number of applicants has increasingly exceeded the number of student seats available, the medical schools have been able to, in effect, select from what was, in 1960-61, an already highly select and able group. It would, therefore, seem likely that more student places would only make the selection process less rigorous rather than produce a severe reduction in the quality of our medical students. In light of this, expansion of the nation's medical schools certainly seems feasible although the question still remains as to whether such expansion is now necessary or desirable.

It could be argued that rigorous selection on the basis of quantitative and scientific aptitude, while not undesirable per se, is certainly likely to produce more physicians who are likely to specialize or to seek to engage in research and other challenging activities outside of patient care. Perhaps our medical schools should admit more of the less intellectually able applicants. Such students might attrite more frequently but they might also be more amenable to the possibility of becoming family physicians.

The existing selection process may very well be systematically screening out the would be physician coming from a rural area. Such students might well be more willing to practice in a rural area, but they do not get the quality of basic science and mathematics education that the suburban student takes for granted. They, therefore, do less well in their premedical courses and are thus, weaker applicants for entry into medical school.

## Summary

The supply of physicians should increase markedly during the 1971-80 period if the medical schools of Pennsylvania increase their enrollments as they now project.

Such increases in supply will vary in amount with the area of specialization involved, with basic care specialities such as internal medicine, pediatrics and family practice growing less than the more specialized areas, unless the values of the physician become less oriented toward the good life, monetary return and intellectually challenging specialism.

Enrollment in medical school is not keeping pace with student demand for medical education and the result is an increasing selectivity which encourages specialism.

Foreign – trained physicians are meeting an enormous part of our demand for physicians, with approximately one-half of all new physicians in a given year in the United States being foreign-trained. These foreign-trained physicians come, in large part, from countries that can ill afford to lose them (Asia, Africa, South America, Philippines).

There is sound reason on this basis to believe that our medical system is not producing enough physicians to meet the demand, and it is ethically questionable whether either Pennsylvania or the nation should continue to depend upon foreign-trained physicians as a primary source of physicians. For that matter, will these nations, from whom we draw their sorely needed physicians, continue to permit us to drain their medical resources by importing the physicians they train at such cost to themselves?

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# CHAPTER VIII

## PHYSICIAN GROWTH

In any attempt to project growth it must be remembered that factors are playing a role, or may well play a role, that historically have had relatively little or no impact. We cannot, for example, anticipate the impact of a change in the delivery system on the basis of past trends since changes caused by a shift to national health plans, etc., have no historical precedent in this country.

The future growth of the medical profession is likely to be influenced by some or all of the following:

1. Increases in population, especially in the young and older groups.
2. Rising health consciousness of the public with a consequent increase in demand for services.
3. Higher standards of health care than are now current.
4. A probable expansion of prepaid medical care.
5. Continued or increased care for members of the armed forces, their families, and for veterans.
6. A continued growth in public health, rehabilitation, industrial medicine and mental health programs and facilities.
7. An increased need for research personnel and medical school faculty as we seek to develop biomedical medicine and find the basic causes of such diseases as cancer, arteriosclerosis, hypertension and osteoarthritis.

The Bureau of Labor Statistics of the U.S. Department of Labor in its bulletin, **College Educated Workers 1968-1980** projects an increase in the total number of U.S. physicians (D.O.'s excluded) from 295,000 in 1968 to 450,000 in 1980.[1] The publication, **Occupational and Manpower Training Needs**, published in 1971[2] cites the same figures for physicians and also a growth from 1,200 in 1968 to 18,500 in 1980 for osteopaths (increase of 54.2 per cent).

For all physicians combined (M.D. and D.O.) the growth anticipated is a 52.6 per cent increase from 1968-1980 or some 161,500 physicians and osteopaths during this period. This would average about 13,458 per year, a figure which is somewhat smaller than their published figure adding up to 13,800[2]. In addition to growth demand, physicians will be needed to replace those who die or retire. The Bureau of Labor Statistics has estimated a figure of 7,300 annually to meet this need. This represents an estimated combined death and retirement rate of 1.88 per cent nationally.

The total annual requirement for physicians in the United States during the period 1968-1980, as projected by the BLS would, therefore, be about 20,758 per year.

During the period 1964 to 1968, our medical schools were producing an average of 8,200 physicians annually with an additional 1,800 foreign-trained physicians entering as in-migrants or 10,000 physicians per year in all.[3] This is about half of the projected 1968-1980 annual requirement of 20,758 as cited above. According to more recent figures,[4] the medical schools of the United States graduated 8,974 physicians in 1971 while the foreign physicians admitted as in-migrants, or as visitors, totaled 10,540, making a grand total of 19,514 which is somewhat less than the projected average annual need of 20,000.

The American Association of Medical Colleges foresees a first year class of 15,000 or more medical students by 1975[5] which suggests that the production of physicians by the medical schools of the United States will have begun to meet a large part of the BLS's projected need of 20,000 per year by 1980. This indicates that most of the projected shortage will have been met by the use of foreign medical school graduates in the interim but the problem for the 1980s may well be one of physician maldistribution combined with surplus conditions in some areas of specialization. This latter possibility may well be the basis for current hesitation on the part of the federal government to spend monies designed to bring about a permanent general expansion of medical school capacity.[6] The government is, instead, seeking to expend monies in such a way as to expand those medical schools that produce the much needed practitioner of general or family medicine through a safety valve approach to medical school support.[6]

## Projections of Growth for Pennsylvania

As pointed out earlier, Pennsylvania is relatively well endowed with physicians in comparison with other states. It is, therefore, not likely that our growth needs will be as great as those for the United States as a whole. In fact, projections of growth for Pennsylvania's physicians under 70 years of age, made by the U.S. Bureau of Labor Statistics for the Bureau of Employment Security of the Commonwealth of Pennsylvania, indicate an overall growth of 33.4 per cent (33.5 per cent for M.D.'s and 31.6 per cent for D.O.'s) during the period 1970 to 1980. This is equivalent to an annual rate of 3.34 per cent for Pennsylvania during 1970-1980 as compared with an average of 4.38 per cent for the nation during the period 1968-1980, i.e., 52.6 per cent ÷ 12 = 4.38 per cent.

If Pennsylvania's total physician growth were proportionately the same as that projected for the Nation by the U.S. Bureau of Labor Statistics, then Pennsylvania would have 26,499 nonfederal physicians by 1980 (based on AMA figures for 1968) using the national growth rate of 52.6 per cent. In contrast, if the BLS growth estimate for Pennsylvania were used, then Pennsylvania would have 23,847 physicians (based upon AMA figures for 1970) using the growth rate of 33.4 per cent.

It should be noted here that the growth rate for Pennsylvania estimated by BLS was derived in the same manner (industry by occupation matrices) for the publication, Tomorrow's Manpower Needs, which in its latest review indicates a total growth of 48.5 per cent for physicians and surgeons and 43.7 per cent for osteopathic physicans, or a rate of 48.3 per cent, overall.[10] If this estimate for the nation is used on the 1970 Pennsylvania nonfederal physician figure, we obtain an estimate of 26,510 which is similar to the BLS figure, 26,499. It seems likely, then, that the total number of physicians arrived at in the present study will fall close to or within these values, i.e., between 23,847 and 26,510. In fact, the figure actually arrived at in this study is 25,901 (Table 36). This latter figure is well within the range given above. It represents an estimate based upon the aggregation of separate projections for each medical specialty plus modifications based upon anticipated future medical school output and in-migration during the 1970s.

## Historical Growth Trends for Pennsylvania Physicians

It seems highly likely that medicine can be considered as actually a complex of related but somewhat independent sub-professions, i.e., medicine is highly specialized with differential growth patterns for each specialty. Specialty maldistribution was also considered as a likely problem. For these reasons separate projections for each specialty and for several categories of physicians were made for use in the present study.

The projections were based on the data for the years 1963 to 1970 and the AMA series **Distribution of Physicians in the United States**. Modification of the data for the years 1967 and earlier were made prior to projection. These modifications were based upon shifts in physician allocation for 1968 due to a changeover from an older classification system to a new one in that year.[8] If, for example, there were 780 physicians listed in a given specialty under the old classification in 1968 and only 540 under that specialty in the new 1968 tables given in the AMA publication **Reclassification of Physicians, 1968,**[8] then a correction factor of 69 per cent (540 ÷ 780 = 0.69) was used for data of years prior in order to make the figures in the time series more comparable. An assumption was made that the degree of change required in 1968 would not greatly differ from that which would have been required in any other previous year if the reclassification had taken place then.

As a first step in the projecting of physician growth, linear projections were made based on the now corrected historical data from the AMA's Classification of Physicians series (Appendix A). In some instances, however, the linear projection method seemed inappropriate to the data. Judgments as to trend were, therefore, made by a visual inspection of the data or a graph of a suspected nonlinear trend. In some instances, several alternative projections were made. The basis on which each projection was made is indicated on each of the tables of Appendix A.

Since the American Osteopathic Association does not publish a similar statistical series involving physician counts for specialties and type of activity, it was necessary to project the number of osteopaths during the 1960s into the 1970s and then estimate the number of direct care physicians in general practice, internal medicine, pediatric medicine and in general surgery using the proportions of such physicians found in the **1971 Directory of Osteopathic Physicians.**[9] The results of this procedure are in Table 33. Admittedly, actual counts could have been made but the pressure of time and lack of personnel made this impractical.

### The Problem of Ahistorical Supply

It is obvious that projections of growth without regard to the impact of increases in medical school output and in-migration, due to demands and factors not operating in the historical past, must be, of necessity, in error to some degree. For this reason, an effort was made by the author to project what might be called ahistorical growth based upon the discrepancy between the number of physicians projected as supply in Tables 22a and 22b. This discrepancy is, in effect, the difference between the projection of supply if Pennsylvania physicians continued to be produced, be retrained and in-migrate at the same rate as in the 1960s (Table 22b) and the projections of supply based on the medical schools' conception of their future growth in the 1970s (Table 22a).

Table 34 contains historical trend medical physician and doctors of osteopathy supply projections subtracted from the survey-based supply projections in order to obtain the desired estimates of ahistorical medical physician and doctor of osteopathy supply. This table indicates that 479 more doctors of osteopathy and 1,936 more medical physicians will have entered active practice in Pennsylvania during the 1970s than would have entered if the medical schools' graduate output and the in-migration patterns remained as they were in the 1960s.

The estimates of ahistorical growth found in Table 34 will have a margin of error if the medical schools do not actually expand as they have indicated or if the retention rates of Pennsylvania trained and out-of-state trained physicians change markedly during the 1970s. These estimates are merely the best available without making blind assumptions about entry rate changes.

Table 35 is an attempt to combine the data of Table 34 together with the individual and aggregated projections of Table 33 (doctors of osteopathy) and of Appendix A in order to obtain final corrected growth estimates for Pennsylvania physicians.

In Table 35 projected historical growth trends are taken from either Appendix A or from Table 33 and then the cumulative values of the historical growth projection for that year (Table 34) are added in order to obtain final corrected projections of physician growth. The last column in Table 35 represents the final projections of physician growth (medical physician and doctors of osteopathy combined) that have been thus corrected for the probable impact of ahistorical medical school growth.

General physician growth estimates are also to be found in Table 36 which first gives the actual growth of Pennsylvania physicians for medical physicians only (for doctors of osteopathy see Table 33) and then gives projections of medical physicians and doctors of osteopathy growth from 1971 through to 1980 with appropriate ahistorical corrections. If the projections in Table 36 are correct, we should see the total physician figure for Pennsylvania rise from some 17,876 medical physicians and 1,601 doctors of osteopathy in 1970 (19,477 altogether) to a total of 25,901 by 1980, a 33 per cent increase in 10 years over the 1970 figure.

As pointed out earlier, this final figure of 25,901 is very close to that projected, using BLS and Tomorrow's Manpower Needs percentage growth estimate for the Nation.

### General Comments

As may be seen in Table 37, a general pattern of improved population per physician ratios is projected in the 1970s for all categories of physician with the exception of general and family practice where the pattern is one of a rapidly decreasing number of physicians. Projected here is a deteriorating balance of general practice physicians to the Pennsylvania population through 1977, after which the situation begins to improve.

Inspection of the data in Table 35 indicates that the projected improvement beyond 1977, with regard to general practice, is largely attributable to a projected marked increase in the number of osteopathic physicians. Unfortunately, there is some question as to whether this development will aid the rural areas. Data available to the author[9] indicates that osteopathic physicians tend to practice in or near an established osteopathic hospital. It may be hypothesized that, despite the position of the AMA that their training is now equivalent to that of the medical physician (California recently passed legislation permitting osteopaths to be licensed as medical physicians), they will find it difficult to practice away from an osteopathic hospital because they are subject to a denial of access to nonosteopathic medical hospital facilities because of residual prejudice and, possibly, medical competitiveness.

Table 33

Historical Trend Based Projections of the Total Number of Doctors of Osteopathy in Pennsylvania with Estimates of Subtotals Based on Current 1971 Ratios[a]

| Year | Total D.O.'s[b] | Estimated Active or Direct Care[c] | Estimated General Practice Total[d] | Estimated Internal Medicine Total[e] | Estimated Pediatrics Total[f] | Estimated General Surgery Total[g] | Estimated Other Specialties Total[h] |
|---|---|---|---|---|---|---|---|
| 1960 | 1,357 | 988 | 636 | 47 | 26 | 52 | 226 |
| 1961 | 1,364 | 993 | 639 | 48 | 26 | 53 | 227 |
| 1962 | 1,393 | 1,014 | 653 | 49 | 26 | 54 | 232 |
| 1963 | 1,442 | 1,050 | 676 | 50 | 27 | 56 | 240 |
| 1964 | 1,449 | 1,055 | 679 | 51 | 27 | 56 | 242 |
| 1965 | 1,461 | 1,064 | 685 | 51 | 28 | 56 | 244 |
| 1966 | 1,487 | 1,083 | 697 | 52 | 28 | 57 | 248 |
| 1967 | 1,526 | 1,111 | 715 | 53 | 29 | 59 | 254 |
| 1968 | 1,550 | 1,128 | 726 | 54 | 29 | 60 | 258 |
| 1969 | 1,573 | 1,145 | 737 | 55 | 30 | 61 | 262 |
| 1970 | 1,601 | 1,166 | 751 | 56 | 30 | 62 | 267 |
| | | | | Projections | | | |
| 1971 | 1,667 | 1,213 | 781 | 58 | 32 | 64 | 278 |
| 1972 | 1,666 | 1,213 | 781 | 58 | 32 | 64 | 278 |
| 1973 | 1,690 | 1,230 | 792 | 59 | 32 | 65 | 282 |
| 1974 | 1,716 | 1,249 | 804 | 60 | 33 | 66 | 286 |
| 1975 | 1,743 | 1,269 | 817 | 61 | 33 | 67 | 291 |
| 1976 | 1,770 | 1,289 | 830 | 62 | 34 | 68 | 296 |
| 1977 | 1,796 | 1,307 | 842 | 63 | 34 | 69 | 299 |
| 1978 | 1,823 | 1,327 | 855 | 64 | 35 | 70 | 304 |
| 1979 | 1,850 | 1,347 | 867 | 65 | 35 | 71 | 308 |
| 1980 | 1,877 | 1,366 | 880 | 66 | 36 | 72 | 313 |

[a]Actual known totals are underlined. All others are ratio estimates based on the 1971 data or are linear projections of the D.O. totals from 1960 to 1972.

[b]Taken from the totals of the American Osteopathic Association directories for the years 1960-1972 as listed in correspondence from the American Osteopathic Association.

[c]Estimates based upon the 1971 finding that 1,213 direct care D.O.'s is 72.8 per cent of the 1,667 D.O.'s listed for Pennsylvania.

[d]Estimates based on the 1971 finding that 781 is 64.4 per cent of the direct care figure of 1,213.

[e]Same as in note d but percentage is now 4.8 per cent.

[f]Same as in note d but percentage is now 2.6 per cent.

[g]Same as in note d but percentage is now 5.3 per cent.

[h] as in note d but percentage is now 22.9 per cent.

Table 34

Projection of Ahistorical Supply to be Used as a Correction Factor for Linear Growth Projections of Appendix A

All Active or Direct Care Physicians

| Year | Historical Trend M.D. Supply Projection[a] | Survey Based M.D. Supply Projection[b] | Ahistorical M.D. Supply Projection[c] | Historical Trend D.O. Supply Projection[a] | Survey Based D.O. Supply Projection[b] | Ahistorical D.O. Supply Projection[c] |
|---|---|---|---|---|---|---|
| 1971 | 550( 440)[d] | 604( 472)[d] | 54( 32)[d] | 60[e] | 72[e] | 12[e] |
| 1972 | 555( 444) | 660( 530) | 105( 86) | 62 | 84 | 22 |
| 1973 | 559( 449) | 674( 539) | 115( 90) | 62 | 92 | 30 |
| 1974 | 564( 450) | 720( 577) | 156( 127) | 64 | 99 | 35 |
| 1975 | 569( 455) | 738( 589) | 169( 134) | 65 | 100 | 35 |
| 1976 | 574( 459) | 794( 637) | 220( 178) | 67 | 113 | 46 |
| 1977 | 579( 460) | 819( 657) | 240( 197) | 68 | 126 | 58 |
| 1978 | 583( 466) | 858( 687) | 275( 221) | 70 | 142 | 72 |
| 1979 | 589( 470) | 885( 707) | 296( 237) | 72 | 157 | 85 |
| 1980 | 593( 474) | 899( 720) | 306( 246) | 73 | 157 | 84 |
| Total | 5,715(4,567) | 7,651(6,115) | 1,936(1,548) | 663 | 1,142 | 479 |
| | | | General and Family Practice | | | |
| 1971 | 80( 80) | 91( 91) | 11( 11) | 40 | 47 | 7 |
| 1972 | 81( 81) | 99( 97) | 18( 16) | 41 | 56 | 15 |
| 1973 | 81( 81) | 104( 104) | 23( 23) | 41 | 60 | 19 |
| 1974 | 81( 81) | 109( 107) | 28( 26) | 43 | 65 | 22 |
| 1975 | 84( 82) | 110( 110) | 26( 28) | 43 | 66 | 23 |
| 1976 | 84( 82) | 119( 119) | 35( 37) | 44 | 75 | 31 |
| 1977 | 84( 82) | 123( 121) | 39( 39) | 46 | 84 | 38 |
| 1978 | 89( 87) | 128( 126) | 39( 39) | 46 | 94 | 48 |
| 1979 | 89( 87) | 131( 130 | 42( 43) | 47 | 104 | 57 |
| 1980 | 90( 90) | 137( 136) | 47( 46) | 49 | 104 | 55 |
| Total | 843( 833) | 1,151(1,141) | 308( 308) | 440 | 755 | 315 |
| | | | Internal Medicine | | | |
| 1971 | 68( 61) | 76( 61) | 8( 0) | 4 | 4 | 0 |
| 1972 | 68( 61) | 81( 68) | 13( 7) | 4 | 4 | 0 |
| 1973 | 68( 62) | 83( 71) | 15( 9) | 4 | 4 | 0 |
| 1974 | 69( 63) | 89( 75) | 20( 12) | 4 | 4 | 0 |
| 1975 | 69( 63) | 90( 78) | 21( 15) | 4 | 8 | 4 |
| 1976 | 69( 63) | 98( 82) | 29( 19) | 4 | 8 | 4 |
| 1977 | 69( 63) | 100( 85) | 31( 22) | 4 | 8 | 4 |
| 1978 | 74( 66) | 106( 91) | 32( 25) | 4 | 8 | 4 |
| 1979 | 74( 66) | 107( 93) | 33( 27) | 4 | 8 | 4 |
| 1980 | 74( 66) | 112( 96) | 38( 30) | 4 | 8 | 4 |
| Total | 702( 634) | 942( 800) | 240( 166) | 40 | 64 | 24 |

Table 34 (Continued)

Pediatrics

| Year | Historical Trend M.D. Supply Projection[a] | Survey Based M.D. Supply Projection[b] | Ahistorical M.D. Supply Projection[c] | Historical Trend D.O. Supply Projections[d] | Survey Based D.O. Supply Projection[b] | Ahistorical D.O. Supply Projection[c] |
|---|---|---|---|---|---|---|
| 1971 | 34( 34) | 39( 39) | 5( 5) | 2 | 4 | 0 |
| 1972 | 38( 37) | 43( 41) | 5( 4) | 2 | 4 | 0 |
| 1973 | 38( 37) | 45( 45) | 7( 8) | 2 | 4 | 0 |
| 1974 | 38( 37) | 48( 47) | 10( 10) | 2 | 4 | 0 |
| 1975 | 38( 37) | 48( 47) | 10( 10) | 2 | 8 | 4 |
| 1976 | 38( 37) | 50( 50) | 12( 13) | 2 | 8 | 4 |
| 1977 | 38( 37) | 54( 53) | 16( 16) | 2 | 8 | 4 |
| 1978 | 38( 37) | 56( 54) | 18( 17) | 2 | 8 | 4 |
| 1979 | 38( 37) | 59( 58) | 21( 21) | 2 | 8 | 4 |
| 1980 | 39( 39) | 59( 58) | 20( 19) | 2 | 8 | 4 |
| Total | 377( 369) | 501( 492) | 124( 123) | 20 | 64 | 24 |
| | | | **General Surgery** | | | |
| 1971 | 60( 55) | 69( 64) | 9( 9) | 4 | 4 | 0 |
| 1972 | 62( 57) | 73( 66) | 11( 9) | 4 | 5 | 1 |
| 1973 | 62( 57) | 78( 70) | 16( 13) | 4 | 5 | 1 |
| 1974 | 62( 57) | 82( 75) | 20( 18) | 4 | 5 | 1 |
| 1975 | 62( 57) | 82( 75) | 20( 18) | 4 | 5 | 1 |
| 1976 | 62( 57) | 86( 78) | 24( 21) | 4 | 5 | 1 |
| 1977 | 62( 57) | 92( 85) | 30( 28) | 4 | 7 | 3 |
| 1978 | 62( 57) | 96( 87) | 34( 30) | 4 | 7 | 3 |
| 1979 | 62( 57) | 103( 90) | 41( 33) | 4 | 9 | 5 |
| 1980 | 69( 64) | 103( 90) | 34( 26) | 4 | 9 | 5 |
| Total | 625( 575) | 864( 780) | 239( 205) | 40 | 61 | 21 |
| | | | **Other Specialties** | | | |
| 1971 | 318( 236) | 348( 259) | 30( 23) | 13 | 15 | 2 |
| 1972 | 321( 237) | 381( 286) | 60( 49) | 13 | 18 | 5 |
| 1973 | 322( 240) | 389( 290) | 67( 50) | 15 | 20 | 5 |
| 1974 | 325( 241) | 417( 311) | 92( 70) | 15 | 22 | 7 |
| 1975 | 327( 243) | 424( 316) | 97( 73) | 15 | 22 | 7 |
| 1976 | 330( 246) | 459( 342) | 129( 96) | 15 | 25 | 10 |
| 1977 | 334( 247) | 475( 353) | 141( 106) | 15 | 27 | 12 |
| 1978 | 337( 250) | 495( 369) | 158( 119) | 15 | 31 | 16 |
| 1979 | 339( 251) | 501( 369) | 162( 118) | 15 | 45 | 30 |
| 1980 | 342( 254) | 511( 378) | 169( 124) | 16 | 45 | 29 |
| Total | 3,295(2,445) | 4,400(3,273) | 1,105( 828) | 147 | 270 | 123 |

[a]See Table 22b from which derived.

[b]See Table 22a from which derived.

[c]A simple subtraction of preceding raw data to get an estimate of supply growth that could not be accounted for in historical trend growth estimates of Appendix A for these specialties.

[d]The value in parentheses represents direct care physicians while the preceding figure represents active physicians, exclusive of interns and residents.

[e]Osteopaths are assumed to be in direct care if they are active.

## Table 35

### Projections of Pennsylvania Physician Totals (Growth) From 1971-80

#### Active Practice

| Year | Historical Trend M.D. Projection[a] | Cumulative Ahistorical M.D. Growth Projection[b] | Historical Trend D.O. Projection[c] | Cumulative Ahistorical D.O. Growth Projection[b] | Projected Total Active Physicians |
|---|---|---|---|---|---|
| 1971 | 13,846 | 54 | 1,213 | 12 | 15,125 |
| 1972 | 14,084 | 159 | 1,213 | 34 | 15,490 |
| 1973 | 14,323 | 274 | 1,230 | 64 | 15,891 |
| 1974 | 14,559 | 430 | 1,249 | 99 | 16,337 |
| 1975 | 14,799 | 599 | 1,269 | 134 | 16,801 |
| 1976 | 15,039 | 819 | 1,289 | 180 | 17,327 |
| 1977 | 15,277 | 1,059 | 1,307 | 238 | 17,881 |
| 1978 | 15,519 | 1,334 | 1,327 | 310 | 18,490 |
| 1979 | 15,757 | 1,630 | 1,347 | 395 | 19,129 |
| 1980 | 15,991 | 1,936 | 1,366 | 479 | 19,772 |

#### Direct Care

| Year | Historical Trend M.D. Projection[a] | Cumulative Ahistorical M.D. Growth Projection[b] | Historical Trend D.O. Projection[c] | Cumulative Ahistorical D.O. Growth Projection[b] | Projected Total Active Physicians |
|---|---|---|---|---|---|
| 1971 | 12,135 | 32 | 1,213 | 12 | 13,392 |
| 1972 | 12,328 | 118 | 1,213 | 34 | 13,693 |
| 1973 | 12,521 | 208 | 1,230 | 64 | 14,023 |
| 1974 | 12,713 | 335 | 1,249 | 99 | 14,297 |
| 1975 | 12,907 | 469 | 1,269 | 134 | 14,779 |
| 1976 | 13,101 | 647 | 1,289 | 180 | 15,217 |
| 1977 | 13,294 | 844 | 1,307 | 238 | 15,683 |
| 1978 | 13,490 | 1,065 | 1,327 | 310 | 16,192 |
| 1979 | 13,682 | 1,302 | 1,347 | 395 | 16,726 |
| 1980 | 13,871 | 1,548 | 1,366 | 479 | 17,264 |

#### General and Family Practice

| Year | Historical Trend M.D. Projection[a] | Cumulative Ahistorical M.D. Growth Projection[b] | Historical Trend D.O. Projection[c] | Cumulative Ahistorical D.O. Growth Projection[b] | Projected Total Active Physicians |
|---|---|---|---|---|---|
| 1971 | 3,188 | 11 | 781 | 7 | 3,987 |
| 1972 | 3,099 | 27 | 781 | 22 | 3,929 |
| 1973 | 3,011 | 50 | 792 | 41 | 3,894 |
| 1974 | 2,922 | 76 | 804 | 63 | 3,865 |
| 1975 | 2,833 | 104 | 817 | 86 | 3,840 |
| 1976 | 2,744 | 141 | 830 | 117 | 3,832 |
| 1977 | 2,656 | 180 | 842 | 155 | 3,833 |
| 1978 | 2,567 | 219 | 855 | 203 | 3,844 |
| 1979 | 2,478 | 262 | 867 | 260 | 3,867 |
| 1980 | 2,390 | 308 | 880 | 315 | 3,893 |

#### Internal Medicine

| Year | Historical Trend M.D. Projection[a] | Cumulative Ahistorical M.D. Growth Projection[b] | Historical Trend D.O. Projection[c] | Cumulative Ahistorical D.O. Growth Projection[b] | Projected Total Active Physicians |
|---|---|---|---|---|---|
| 1971 | 1,335 | 0 | 58 | 0 | 1,393 |
| 1972 | 1,359 | 7 | 58 | 0 | 1,424 |
| 1973 | 1,384 | 16 | 59 | 0 | 1,459 |
| 1974 | 1,408 | 28 | 60 | 0 | 1,496 |
| 1975 | 1,432 | 43 | 61 | 4 | 1,540 |
| 1976 | 1,456 | 62 | 62 | 8 | 1,588 |
| 1977 | 1,481 | 84 | 63 | 12 | 1,640 |
| 1978 | 1,505 | 109 | 64 | 16 | 1,694 |
| 1979 | 1,529 | 136 | 65 | 20 | 1,750 |
| 1980 | 1,553 | 166 | 66 | 24 | 1,809 |

Table 35 (continued)

Pediatrics

| Year | Historical Trend M.D. Projection[a] | Cumulative Ahistorical M.D. Growth Projection[b] | Historical Trend D.O. Projection[c] | Cumulative Ahistorical D.O. Growth Projection[b] | Projected Total Active Physicians |
|---|---|---|---|---|---|
| 1971 | 594 | 5 | 32 | 0 | 631 |
| 1972 | 622 | 9 | 32 | 0 | 663 |
| 1973 | 649 | 17 | 32 | 0 | 698 |
| 1974 | 677 | 27 | 33 | 0 | 737 |
| 1975 | 704 | 37 | 33 | 4 | 778 |
| 1976 | 732 | 50 | 34 | 8 | 824 |
| 1977 | 759 | 66 | 34 | 12 | 871 |
| 1978 | 787 | 83 | 35 | 16 | 921 |
| 1979 | 814 | 104 | 35 | 20 | 973 |
| 1980 | 842 | 123 | 36 | 24 | 1,025 |
| General Surgery | | | | | |
| 1971 | 1,073 | 9 | 64 | 0 | 1,146 |
| 1972 | 1,103 | 18 | 64 | 1 | 1,185 |
| 1973 | 1,132 | 31 | 65 | 2 | 1,230 |
| 1974 | 1,161 | 49 | 66 | 3 | 1,279 |
| 1975 | 1,191 | 67 | 67 | 4 | 1,329 |
| 1976 | 1,220 | 88 | 68 | 5 | 1,381 |
| 1977 | 1,249 | 116 | 69 | 8 | 1,442 |
| 1978 | 1,279 | 146 | 70 | 11 | 1,506 |
| 1979 | 1,308 | 179 | 71 | 16 | 1,574 |
| 1980 | 1,337 | 205 | 72 | 21 | 1,635 |
| Other Specialties | | | | | |
| 1971 | 5,945 | 23 | 278 | 2 | 6,238 |
| 1972 | 6,145 | 72 | 278 | 7 | 6,502 |
| 1973 | 6,346 | 122 | 282 | 12 | 6,762 |
| 1974 | 6,545 | 192 | 286 | 19 | 7,042 |
| 1975 | 6,747 | 265 | 291 | 26 | 7,329 |
| 1976 | 6,949 | 361 | 296 | 36 | 7,642 |
| 1977 | 7,149 | 467 | 299 | 48 | 7,963 |
| 1978 | 7,352 | 586 | 304 | 64 | 8,306 |
| 1979 | 7,553 | 704 | 308 | 94 | 8,659 |
| 1980 | 7,749 | 828 | 313 | 123 | 9,013 |

[a]For active and direct care physicians see Table 36 which is based on an aggregation of the projections of Appendix A. For the specialty areas themselves go to Appendix A directly.

[b]See Table 34 for projections of ahistorical supply.

[c]See Table 33 which projects the total number of Doctors of Osteopathy 1973-80 and then estimates the number of active, direct care, general practitioners, etc.

[d]Derived by subtracting the previous specialty area totals of this table from the direct care physician totals.

Table 36

Historical (Actual) and Projected Physicians in Pennsylvania
Based Upon Aggregated Individual Projections from Appendix A

Actual

| | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 |
|---|---|---|---|---|---|---|---|---|
| Direct Patient Care[a] | 10,975 | 11,111 | 11,078 | 11,270 | 11,357 | 11,580 | 11,692 | 12,016 |
| Administration | 520 | 538 | 531 | 570 | 591 | 570 | 610 | 601 |
| Medical Teaching | 210 | 226 | 267 | 284 | 309 | 307 | 305 | 324 |
| Research | 520 | 581 | 774 | 845 | 865 | 828 | 636 | 620 |
| Other Activities | 42 | 45 | 64 | 56 | 106 | 131 | 140 | 141 |
| Interns | 703 | 735 | 712 | 765 | 757 | 792 | 821 | 727 |
| Residents | 1,656 | 1,697 | 1,898 | 1,907 | 2,068 | 2,148 | 2,302 | 2,430 |
| Inactive | 1,238 | 1,211 | 1,167 | 1,126 | 1,098 | 1,009 | 1,078 | 1,017 |
| Active Practice M.D.'s[c] | 12,267 | 12,501 | 12,714 | 13,025 | 13,228 | 13,416 | 13,383 | 13,702 |
| Total M.D.'s | 15,864 | 16,144 | 16,491 | 16,823 | 17,151 | 17,365 | 17,584 | 17,876 |
| Actual AMA Total[d] | 16,030 | 16,278 | 16,602 | 16,814 | 17,163 | 17,365 | 17,584 | 17,876 |
| Per Cent Deviance | -1.04 | -0.82 | -0.67 | 0.05 | -0.07 | | | |

Projected

| | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|---|---|---|---|
| Direct Patient Care | 12,135 | 12,328 | 12,521 | 12,713 | 12,907 | 13,101 | 13,294 | 13,490 | 13,682 | 13,871 |
| Administration[b] | 623 | 636 | 649 | 661 | 674 | 687 | 699 | 712 | 725 | 737 |
| Medical Teaching[b] | 351 | 367 | 383 | 398 | 414 | 430 | 446 | 462 | 478 | 494 |
| Research[b] | 570 | 570 | 570 | 570 | 570 | 570 | 570 | 570 | 570 | 570 |
| Other Activities[b] | 167 | 183 | 200 | 217 | 234 | 251 | 268 | 285 | 302 | 319 |
| Interns[b] | 796 | 806 | 816 | 826 | 835 | 845 | 855 | 865 | 875 | 885 |
| Residents[b] | 2,514 | 2,626 | 2,737 | 2,848 | 2,960 | 3,071 | 3,183 | 3,294 | 3,405 | 3,517 |
| Inactive[b] | 960 | 925 | 891 | 856 | 822 | 787 | 753 | 718 | 684 | 649 |
| Active Practice M.D.'s | 13,846 | 14,084 | 14,323 | 14,559 | 14,799 | 15,039 | 15,277 | 15,519 | 15,757 | 15,991 |
| Total M.D.'s | 18,116 | 18,441 | 18,767 | 19,089 | 19,416 | 19,742 | 20,068 | 20,396 | 20,721 | 21,042 |
| Projected Active D.O.'s[e] | 1,213* | 1,213* | 1,230 | 1,249 | 1,269 | 1,289 | 1,307 | 1,327 | 1,347 | 1,366 |
| Projected Active Physician Ahistorical Growth[f] | 66 | 193 | 338 | 529 | 733 | 939 | 1,297 | 1,644 | 2,025 | 2,415 |
| Total Active Physicians[g] | 15,125 | 15,490 | 15,891 | 16,337 | 16,801 | 17,327 | 17,881 | 18,490 | 19,129 | 19,772 |
| Estimated Total Physicians[h] | 19,814 | 20,292 | 20,817 | 21,401 | 22,009 | 22,698 | 23,424 | 24,222 | 25,059 | 25,901 |

*Actual figures rather than projected.

[a] An aggregation of the direct patient care M.D. estimates for each specialty area found in Appendix A.

[b] See last portion of Appendix A for projections of M.D.'s in administration, medical teaching, etc.

[c] Interns, residents and inactive M.D.'s excluded.

[d] Totals actually published by the AMA used here for comparison with the total obtained by aggregating the corrected totals for 1963-1967 in Appendix A, i.e., see percentage deviance below.

[e] A projection of the number of doctors of osteopathy based upon data from the American Osteopathic Association for the 1960's (See Table 33).

[f] An estimate of active physician growth due to the projected increase in medical student output by Pennsylvania's medical schools and on assumption of similar increases in the other medical schools of the country. (See Table 35, e.g., 54 + 12 = 66, 159 + 34 = 193, etc.)

[g] Excludes interns and residents as well as inactives and manipulative therapy D.O.'s and assumes the ahistorical growth physician to be active physicians.

[h] Based upon 1970 finding that the 14,915 active physicians (13,702 M.D.'s and 1,213 D.O.'s) is 31 per cent less than the 19,543 physician total (17,876 M.D.'s and 1,667 D.O.'s) for 1970, i.e., 19,543 ÷ 14,915 = 1.31, which can be used as an estimation factor, e.g., 1.31 times 15,125 equals 19,814.

Table 37

Population Per Physician Ratios Based on the Projections of Growth in Table 35[a]

| Year | Active Practice | Direct Patient Care | General and Family Practice | Internal Medicine | Pediatrics | General Surgery | Other Specialties | All Physicians[b] |
|---|---|---|---|---|---|---|---|---|
| 1971 | 790 | 892 | 2,996 | 8,576 | 18,933 | 10,424 | 2,009 | 603 |
| 1972 | 768 | 869 | 3,029 | 8,357 | 17,950 | 10,043 | 1,830 | 586 |
| 1973 | 752 | 852 | 3,069 | 8,192 | 17,124 | 9,717 | 1,768 | 574 |
| 1974 | 735 | 839 | 3,105 | 8,021 | 16,282 | 9,382 | 1,704 | 561 |
| 1975 | 717 | 815 | 3,136 | 7,820 | 15,480 | 9,062 | 1,643 | 547 |
| 1976 | 697 | 794 | 3,153 | 7,608 | 14,661 | 8,748 | 1,581 | 532 |
| 1977 | 677 | 772 | 3,160 | 7,386 | 13,907 | 8,400 | 1,521 | 517 |
| 1978 | 657 | 750 | 3,158[c] | 7,166 | 13,180 | 8,060 | 1,461 | 501 |
| 1979 | 636 | 727 | 3,144 | 6,947 | 12,495 | 7,724 | 1,404 | 485 |
| 1980 | 616 | 705 | 3,126 | 6,728 | 11,874 | 7,444 | 1,350 | 470 |

[a] From Senier and Mulvihill, "1971-1980 Population Projections for Pennsylvania, Counties and Major Cities," Division of Applied Research, Bureau of Educational Research, Pennsylvania Department of Education, 1972.

[b] Based on projections at the bottom of Table 36.

[c] A change in trend from undesirable to desirable due to the impact of the projected increased output of the medical schools even though an increase in rate of entry into general or family medicine has not been assumed.

There can be no doubt, however, that in many areas of the state the osteopaths are now providing basic care that would not otherwise be available. This is so indicated by Table 6 of this report where we see that 1 per cent of the medical physician graduates of 1961-63 entered into the practice of family medicine in Pennsylvania (a new specialty) and another 5 per cent remained as general practitioners. In contrast, we find in Table 6 that 30 per cent of the Philadelphia College of Osteopathic Medicine graduates of 1961-63 remained in Pennsylvania as general practitioners. This indicates that future increases in the number of osteopathic graduates will have a larger effect on increasing the availability of basic care than would an equivalent numerical increase in the output of medical physician graduates assuming no marked change in the medical physician retention rate figure.

## Medicine in a State of Flux

American medicine is now in a period of rapid flux both technologically and in terms of changing demand patterns and, furthermore, is likely to remain so. As a consequence, precise projections of physician growth are rendered somewhat difficult at the medical specialty level. New specialties in medicine are constantly emerging in response to the changing technology and demand patterns, and we have no historical precedent to guide us as to the rate of their probable future growth. We can be sure, however, that they will bring about a further reallocation of physicians and thus reduce the number of physicians available for basic care and the older areas of strong specialization. For example, the rapidly increasing concern about the quality and amount of emergency care[11,12] is likely to bring about considerable growth of emergency care as a specialty itself. A rapidly increasing use of nuclear radiation in medicine has created new specialties in radiology, and there is no reason to believe that such things as computers, laser technology, etc., will not continue to bring about other new specialties. Certainly, biomedical and bioengineering research specialties are likely to emerge increasingly as we continue to seek mechanical and electronic solutions to such problems as the loss of limbs or the senses, the effect of nerve induced paralysis and the loss of functions in such organs as the heart, liver and kidneys.

## Family Medicine as an Emerging Specialty

A dramatic, but as yet unrealized, change in basic care may be brought about by the recent emergence of family medicine as a specialty. Although this specialty of family medicine is included in the 1971 AMA tapes that provided some of our data, the specialty of family medicine is itself so new that the most recent (1970) issue of the **Distribution in the Physicians in the United States** does not list it as a specialty in its tabulations. The AMA tapes indicate, however, that the number of practitioners of family medicine in the state, as of 1971, was, in fact, very small, i.e., 102, and represented only 3.1 per cent of the same 3,285 doctors in the United States who were charter diplomats of the American Board of Family Practice.

In order to achieve the status of a certified specialist in the discipline of family medicine, the aspiring physician must first complete a three-year family practice residency or must have been a practitioner of family medicine for a minimum of six years and have successfully completed 300 hours of postgraduate medical education. He must then take the written examination given by the Board of Family Practice. Every six years he must repeat this written examination in order to be recertified,

Alone of all medical certifying boards, the Board of Family Practice had, at its creation, no *grandfather* clause designed to allow practicing physicians to automatically become diplomates. Furthermore, none of the other specialty boards have required that their diplomates prove their competence on a continuing basis. There can be no doubt, therefore, that there is a real difference between the practitioner of the specialty called family practice and the general practitioner. The physician in general practice is able to enter practice immediately upon completing his internship and is not required to meet any other certifying standards.

Diplomate status in this newest of the specialties requires the passing, every six years, of an intensive two-day written examination in the areas of internal medicine, surgery, obstetrics-gynecology, pediatrics, psychiatry, preventative medicine and other traditional specialties in addition to the three years of residency following internship.

Despite its recognition by the AMA as a certified specialty, the future of the specialty of family practice must be considered as uncertain. Three questions are, as of now, unanswered. First, will the general public recognize that such physicians do actually differ from the ordinary general practitioners in their training and their presumed competence? Second, will the medical profession as a whole give due recognition and status to these physicians as true specialists? Third, will the medical students themselves choose to enter into this upgraded version of general practice with its much more rigorous requirements?

As to the last question, it is, of course, too soon to say for certain, but it is interesting to note that despite the emphasis upon family medicine as a justification for the creation of the Hershey Medical School, only 4 of the 33 graduates of 1971 had indicated family medicine as their goal in response to a survey one year later (Tables 86 and 87). This survey was carried out by the Hershey Medical School and the data made available to the author for analysis.

In light of the above, it should, therefore, be remembered that the projections of growth for general practice in this study may well have to be modified in the future if the specialty of family practice begins to represent a larger share of the basic care physician total and as historical data suitable for trend analysis become possible.

The present projections of growth found in this chapter will be used later in Chapter XI, in order to derive projections of replacement demand due to growth. This will be a part of that chapter's effort to interface all demand and supply projections in order to obtain projections of physician need.

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# CHAPTER IX

## DEMAND DUE TO UNMET NEEDS

The true need for physicians is not easily determined. It will vary as our delivery system varies and as the productivity of the individual physician varies due to improved technology and an increased use of auxiliary paramedical personnel. In addition, physicians themselves are, to some degree, creators of their own demand since they control the number of patients seen (time per patient, frequency of patient visits, office hours, etc.), the amount of treatment or surgery prescribed, etc.

It seems obvious, then, that a projection of probable growth plus replacement demand due to death, retirement, etc., will not suffice if, in fact, the supply of physicians is reduced by constraints on the number of physicians trained due to factors other than physician demand, actual or potential. Potential demand may be defined as demand that would materialize as a consequence of any change in the delivery system that would make medical care more freely available or less costly, e.g., the advent of Medicaid and Medicare or the introduction of national health insurance. Such elimination of financial or other barriers to medical care must inevitably lead to an increased level of demand for services by the poor, the aged and, in general, all those who previously put off medical care for financial and other reasons.

Actual or present demand, in contrast, may be taken to mean the demand for medical care that is not now being met but is indirectly reflected by demands for service in the form of long waiting room lines, difficulties in obtaining an appointment, etc.

These two types or levels of demand can be estimated if one can obtain criteria that would indicate an adequate or optimum degree of medical service would exist under each of two possible situations. What is needed is some way of judging whether we have enough physicians of a given specialty to meet the criterion of optimum care in, first, the present system of medical delivery and, second, a universal system of medical delivery that makes full use of the potential of paramedical personnel and prepaid group practice for increased physician productivity, along with full spectrum quality medical care.[1,2,3]

In the course of preparing this study, efforts were made to utilize data on patient visits per week, physician working hours, etc., to estimate how many physicians would be required to serve a given number of people. Unfortunately, these efforts were not successful because an estimate of the average number of individual patients treated one or more times in a given year by a given type of physician could not be derived from the data, and no direct study of patient load in terms of the average number of individuals recorded as being treated in a given year had been found.

Fortunately, an alternative was found in the survey carried out by the publication Medical Economics[4] where professionals in a given specialty were surveyed as to what they believed to be a desirable population to physician ratio for good medical care. In addition, estimates were obtained from federal and other sources which used different methods to arrive at estimates of desirable or optimum physician ratios for our present medical system. The journal then presented its findings in the form of the median estimate for all of the information sources covered by its survey.[4] These median ratios are reprinted in Table 38 of this report by permission of the publishers of Medical Economics. For those specialties for which no optimum ratio was given, the author of this study made arbitrary estimates based upon the data available for the other specialties in Table 38.

For comparative purposes, and to illustrate the kind of ratios used by various writers to estimate need under our current delivery system, ratios for the United States in general, for New York, the highest state, and for Pennsylvania are also given in Table 38. Comparison of the various state ratios with the optimum ratios from Medical Economics[4] suggests that specialties such as general practice must be in stronger demand than are some other specialties where the optimum figure is more closely approximated by the state ratios.

In addition, Table 38 lists the population per physician ratios that have been developed by those prepaid group medical plans whose membership most closely approximates that of the general United States population at all age levels. As can be seen, these prepaid plan ratios are substantially lower, by and large, than the ratios suggested by the Medical Economics study. In a sense, they substantiate the findings of those who have suggested that greater physician productivity and, hence, lower physician requirements would be characteristic of this type of delivery system.[2,3]

Table 38

A Summary of Population Per Physician Ratios for Possible Use As Estimators of True or Unmet Need for Active Patient Care Physicians

| Specialty | Health Insurance Plan[a] | Kaiser-Puget Sound[b] | Medical Economics Survey[c] | 1970 U.S. Ratio[d] | 1970 Median State Ratio[e] | 1970 Penna. Ratio[d] |
|---|---|---|---|---|---|---|
| Allergy | | | 25,000 | 142,058 | | 112,323 |
| Anesthesiology | | 30,562 | 15,000 | 24,368 | 29,444 | 33,411 |
| Cardiology | | | 100,000 | 46,288 | | 37,560 |
| Colon & Rectal Surgery | | | (200,000)[g] | 326,940 | 213,636 | 235,878 |
| Dermatology | 100,000 | 32,930 | 50,000 | 67,308 | 72,000 | 79,154 |
| Gastroenterology | | | (100,000)[g] | 165,753 | | 149,290 |
| General Practice/ Family Practice | 6,736 | 3,397 | 2,000 | 3,809 | 3,459 | 3,594 |
| General Surgery | 16,666 | 17,824 | 10,000 | 10,342 | 8,223 | 11,297 |
| Internal Medicine | 4,114 | 7,510 | 5,000 | 8,040 | 6,333 | 7,455 |
| Neurology | | | 75,000 | 141,460 | 125,000 | 145,604 |
| Neurosurgery | | 54,839 | 100,000 | 113,518 | 104,166 | 138,752 |
| Obstetrics-Gynecology | 9,090 | 9,770 | 11,000 | 13,874 | 14,299 | 13,826 |
| Ophthalmology | 33,333 | 47,552 | 20,000 | 25,825 | 26,129 | 23,971 |
| Orthopedics | 25,000 | 29,694 | 30,000 | 29,600 | 26,538 | 37,205 |
| Otolaryngology | 50,000 | 38,857 | 25,000 | 50,055 | 48,552 | 45,015 |
| Pathology | | 47,552 | 20,000 | 39,827 | 30,286 | 38,045 |
| Pediatrics | 4,545 | 9,031 | 10,000 | 17,508 | 17,000 | 20,874 |
| Plastic Surgery | | | 50,000 | 165,753 | 188,000 | 203,343 |
| Psychiatry | 50,000 | | 10,000 | 13,579 | 16,730 | 13,619 |
| Pulmonary Disease | | | (150,000)[g] | 157,349 | | 173,440 |
| Radiology | 25,000 | 30,562 | 15,000 | 22,835 | 19,285 | 20,619 |
| Thoracic Surgery | | | 100,000 | 149,645 | 182,500 | 170,926 |
| Urology | 100,000 | 44,590 | 30,000 | 45,300 | 43,800 | 45,187 |
| All Physicians | 1,000 | 1,070 | 635[f] | 791 | 964 | 982 |

[a]Health Insurance Plan optimums published in Journal of American Medical Association, March 20, 1972, 219, No. 12. Used here because age distribution of its 780,000 subscribers in Greater New York close approximates that of the general United States population. (See Mason, Henry R., Manpower Needs By S ialty, pp. 1621, 1626.

[b]Kaiser-Permamente Prepayment Plan located at Puget Sound, Washington. Data from source quoted in not above. Age distribution similar to but not identical to that of the general population.

[c]Data from the journal, Medical Economics, which is being used here with the permission of the publish and may not be reproduced elsewhere, in whole or in part, without their prior permission. Copyrighte by Medical Economics Company, Oradell, New Jersey, reprinted by permission. Figures in parentheses a arbitrary estimates by the author of this study.

[d]Based upon the 1970 census population estimate and the number of physicians in this specialty who are not in residency or internship programs as listed in the 1970 edition of the Distribution of Physicians in the United States published by the AMA.

[e]See reference in note a.

[f]The ratios for each specialty were divided into an arbitrary population figure of 100,000. The total of the resulting estimates was then divided into 100,000 to get the all physician estimate shown, i.e., 635.

[g]Figures in parentheses are arbitrary estimates by the author of this study.

Projections of Unmet Need

The discrepancy between projected estimates of the number of physicians needed to meet the optimum ratios of Table 38 and the projections of probable physician growth made earlier should result in projections of the number of physicians still needed in any given year to meet the optimum care standards implied by the ratios of Table 38.

In Table 39, projections of true need are found for various categories of physicians. True need is the total number of physicians in that category or specialty that Pennsylvania would have to have in order to meet the optimum ratio standards (Medical Economics based) of Table 38. The optimum ratio based entries of Table 39 were derived by dividing the optimum ratio for a given specialty into projections of Pennsylvania population made by Senier and Mulvihill.[5]

Table 39 indicates, for example, that, by 1980, the state should ideally have 6,085 practitioners of general medicine, 2,434 practitioners of internal medicine, 1,217 pediatricians, etc.

In Table 40, an effort has been made to estimate unmet need in 1980 for the physician catagories used throughout this report based upon the data in Table 39. The ratio of 643:1 which has been used in Table 40 to estimate the number of direct care physicians required to meet Pennsylvania's optimum care needs is simply a resultant of combining all of the specialties in Table 39. For the category of other specialties, combined data from Table 39 were again used with general practice, internal medicine, pediatrics and general surgery deleted in arriving at a ratio of 1,529:1.

Table 41 is the result of computing the difference between the optimum physician figures of Table 39 and matching projected growth estimates from Table 35. Data in Table 41 indicate that, by 1980, there will be a surplus situation with regard to the specialty of general surgery as well as for the more specialized fields in general. This should be true if the median optimum ratios arrived at in the Medical Economics survey[4] are reasonably valid. For example, in Table 41 a surplus of 418 general surgeons by 1980 contrasts markedly with the sizable shortage of 2,192 general and family practice physicians by that year.

Since Table 41 suggests that surpluses might well exist in the near future for the more specialized areas, it was thought worthwhile to attempt to estimate roughly which of these specialties might be likely to be responsible for any surplus condition. It is highly unlikely that these surplus physicians will actually enter into practice in Pennsylvania. Table 41 suggests that, in the future, an even greater proportion of the physicians trained by us at such a high cost will not remain in the state. A poorer holding rate will certainly result unless these future physicians can somehow be rerouted into the areas of greater need. The instructional cost of educating these physicians is now approximately $5,582 per year per equivalent full-time medical student and is likely to increase with time according to information received from the Bureau of Budget and Evaluation of the Pennsylvania Department of Education. (see Appendix F)

Table 42 attempts to correct the estimates of growth found in Appendix A in order to estimate unmet need for the category of other specialties. It can be readily seen in Table 42 that certain specialties seem to be primarily responsible for the indicated overall surplus of highly specialized physicians. Cardiology itself seems to be the main determiner of the surplus finding. According to the findings in Table 42, cardiology would have, by 1980, a figure over three times as great as that which would be optimum for that year (322%). This surplus may possibly be, to some degree, in error, however, since we cannot really be certain that the respondents and data sources used by the journal of Medical Economics defined a cardiologist, or pediatric cardiologist, in the same manner as did the American Medical Association. Assuming, however, that these sources did agree on the definition of a cardiologist, Pennsylvania will, in 1980, have a surplus of cardiologists unless the past trend toward specialization in this area changes to a lower rate.

Aside from the, possibly anomalous, specialty of cardiology, we find that the following specialties, along with general surgery, may have a surplus (Table 42) by 1980: neurology, neurosurgery, obstetrics-gynecology, opthalmology, orthopedics and psychiatry. In addition, the following specialities may be very close to a surplus: gastroenterology, pulmonary disease, radiology, thoracic surgery, urology and, to a lesser degree, pathology.

The specialty shortage areas for 1980 would seem to be: allergy, anesthesiology, colon and rectal surgery, dermatology, otolaryngology, and plastic surgery, with allergy and plastic surgery in a state of markedly greater shortage than the others. Apparently, these specialties, along with general or family practice, internal medicine and pediatrics, will still be areas of some concern for the 1980s.

Table 39

Projections of True Need Based Upon Median Optimum Ratios of Population Per Physician (M.D.)

| Year | Actual 1970 and Projected Pa. Population | General Practice | Internal Medicine | Obstetrics-Gynecology | Pediatrics | General Surgery | Ophthalmology | Oto-laryngology | Allergy | Anesthesiology | Cardiology |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1970 | 11,793,909[a] | 5,897 | 2,359 | 1,072 | 1,179 | 1,179 | 590 | 472 | 472 | 786 | 118 |
| 1971 | 11,846,420[b] | 5,923 | 2,369 | 1,077 | 1,185 | 1,185 | 592 | 474 | 474 | 790 | 118 |
| 1972 | 11,900,608 | 5,950 | 2,380 | 1,082 | 1,190 | 1,190 | 595 | 476 | 476 | 793 | 119 |
| 1973 | 11,952,261 | 5,976 | 2,390 | 1,087 | 1,195 | 1,195 | 598 | 478 | 478 | 797 | 120 |
| 1974 | 12,000,026 | 6,000 | 2,400 | 1,091 | 1,200 | 1,200 | 600 | 480 | 480 | 800 | 120 |
| 1975 | 12,043,124 | 6,022 | 2,409 | 1,095 | 1,204 | 1,204 | 602 | 482 | 482 | 803 | 120 |
| 1976 | 12,080,981 | 6,040 | 2,416 | 1,098 | 1,208 | 1,208 | 604 | 483 | 483 | 805 | 121 |
| 1977 | 12,112,951 | 6,056 | 2,423 | 1,101 | 1,211 | 1,211 | 606 | 485 | 485 | 808 | 121 |
| 1978 | 12,138,767 | 6,069 | 2,428 | 1,104 | 1,214 | 1,214 | 607 | 486 | 486 | 809 | 121 |
| 1979 | 12,158,037 | 6,079 | 2,432 | 1,105 | 1,216 | 1,216 | 608 | 486 | 486 | 811 | 122 |
| 1980 | 12,170,681 | 6,085 | 2,434 | 1,106 | 1,217 | 1,217 | 609 | 487 | 487 | 811 | 122 |
| Optimum Ratio Value[c] | | 2,000:1 | 5,000:1 | 11,000:1 | 10,000:1 | 10,000:1 | 20,000:1 | 25,000:1 | 25,000:1 | 15,000:1 | 100,000:1 |

| Year | Dermatology | Neurology | Neuro-Surgery | Psychiatry | Orthopedic Surgery | Pathology | Plastic Surgery | Radiology | Thoracic Surgery | Urology |
|---|---|---|---|---|---|---|---|---|---|---|
| 1970 | 236 | 157 | 118 | 1,179 | 393 | 590 | 236 | 786 | 118 | 393 |
| 1971 | 237 | 158 | 118 | 1,185 | 395 | 592 | 237 | 790 | 118 | 395 |
| 1972 | 238 | 159 | 119 | 1,190 | 397 | 595 | 238 | 793 | 119 | 397 |
| 1973 | 239 | 159 | 120 | 1,195 | 398 | 598 | 239 | 797 | 120 | 398 |
| 1974 | 240 | 160 | 120 | 1,200 | 400 | 600 | 240 | 800 | 120 | 400 |
| 1975 | 241 | 161 | 120 | 1,204 | 401 | 602 | 241 | 803 | 120 | 401 |
| 1976 | 242 | 161 | 121 | 1,208 | 403 | 604 | 242 | 805 | 121 | 403 |
| 1977 | 242 | 162 | 121 | 1,211 | 404 | 606 | 242 | 808 | 121 | 404 |
| 1978 | 243 | 162 | 121 | 1,214 | 405 | 607 | 243 | 809 | 121 | 405 |
| 1979 | 243 | 162 | 122 | 1,216 | 405 | 608 | 243 | 811 | 122 | 405 |
| 1980 | 243 | 162 | 122 | 1,217 | 406 | 609 | 243 | 811 | 122 | 406 |
| Optimum Ratio Value[c] | 50,000:1 | 75,000:1 | 100,000:1 | 10,000:1 | 30,000:1 | 20,000:1 | 50,000:1 | 15,000:1 | 100,000:1 | 30,000:1 |

[a] U. S. Census, 1970.

[b] This figure and succeeding population estimates are from the study 1971-1980 Population Projections for Pennsylvania, Counties and Major Cities. by John K. S. Senier and Philip J. Mulvihill of the Bureau of Educational Research, Department of Education, Commonwealth of Pennsylvania, 1972.

[c] Taken from Medical Economics, October 30, 1967 in article entitled "How Many People to Support a Specialist?" Values shown are medians for the various sources surveyed. Copyright 1967 by Medical Economics Company, Oradell, New Jersey.

Table 40

Approximated Unmet (True) Need for Direct Care and Other Specialties

| Year | Direct Care Optimum[a] | Projected Direct Care Totals[b] | Direct Care Unmet Need | Other Specialties Optimum[c] | Projected Other Specialties Totals[b] | Other Specialties Unmet Need |
|---|---|---|---|---|---|---|
| 1971 | 18,424 | 13,392 | 5,032 | 7,753 | 6,238 | 1,515 |
| 1972 | 18,508 | 13,693 | 4,815 | 7,788 | 6,502 | 1,286 |
| 1973 | 18,588 | 14,023 | 4,565 | 7,822 | 6,762 | 1,060 |
| 1974 | 18,663 | 14,297 | 4,366 | 7,853 | 7,042 | 811 |
| 1975 | 18,730 | 14,779 | 3,951 | 7,882 | 7,329 | 493 |
| 1976 | 18,788 | 15,217 | 3,571 | 7,906 | 7,642 | 264 |
| 1977 | 18,838 | 15,683 | 3,155 | 7,927 | 7,963 | ( 36)[d] |
| 1978 | 18,878 | 16,192 | 2,686 | 7,944 | 8,306 | ( 362) |
| 1979 | 18,908 | 16,726 | 2,182 | 7,957 | 8,659 | ( 702) |
| 1980 | 18,928 | 17,264 | 1,664 | 7,965 | 9,013 | (1,048) |

[a] Based upon the ratio of 643:1 which was derived from Table 39 by adding up the 1980 unmet need projections over all listed specialties, e.g., 12,170,681 population divided by a total of 18,916 equals 643 (rounded off).

[b] Taken from Table 35.

[c] Based upon the ratio of 1,528:1 which was derived as in note a above by deleting the optimum totals in Table 39 for general practice, internal medicine, pediatrics and general surgery.

[d] Indicates more specialists would be available than optimally needed from 1977 on, i.e., a surplus of physicians in many of the specialties.

Table 41

Projections of Unmet (True) Need for Selected Medical Specialties (Basic Care) and All Physicians in Direct Patient Care[a]

| Year | Direct Patient Care[b] | General/ Family Practice[c] | Internal Medicine[c] | Pediatrics[c] | General Surgery[c] | Other Specialties[b] |
|---|---|---|---|---|---|---|
| 1971 | 5,032 | 1,936 | 976 | 554 | 39 | 1,515 |
| 1972 | 4,815 | 2,021 | 956 | 527 | 5 | 1,286 |
| 1973 | 4,565 | 2,082 | 931 | 497 | ( 35)[d] | 1,060 |
| 1974 | 4,366 | 2,135 | 904 | 463 | ( 79) | 811 |
| 1975 | 3,951 | 2,182 | 869 | 426 | (125) | 493 |
| 1976 | 3,571 | 2,198 | 828 | 384 | (173) | 264 |
| 1977 | 3,155 | 2,223 | 783 | 340 | (231) | ( 36)[d] |
| 1978 | 2,686 | 2,225 | 734 | 293 | (292) | ( 362) |
| 1979 | 2,182 | 2,212 | 682 | 243 | (358) | ( 702) |
| 1980 | 1,664 | 2,192 | 625 | 192 | (418) | (1,048) |

[a]All figures based upon direct patient care physician estimates.

[b]Taken from Table 40.

[c]Each value is the resultant of subtracting the projected figure of Table 35 from the optimum number given in Table 39, e.g., for internal medicine in 1971, 2,369 - 1,393 = 976.

[d]The values in parentheses represent surplus physicians rather than unmet need.

Table 42

An Approximation of Specific Unmet Other Specialties Need or Surplus Patterns in 1980

| Specialty | 1980 Optimum[a] | Projection from Appendix A[b] | Corrected Projection | Unmet Need | Surplus | Percentage Deviation from Optimum |
|---|---|---|---|---|---|---|
| Allergy | 487 | 146 | 161 | 326 | - | - 67 |
| Anesthesiology | 811 | 475 | 523 | 288 | - | - 36 |
| Cardiology | 122 | 468 | 515 | - | 393 | 322 |
| Colon & Rectal | (61)[d] | 39 | 43 | 18 | - | - 30 |
| Dermatology | 243 | 153 | 168 | 75 | - | - 31 |
| Gastroenterology | (122) | 123 | 135 | - | 13 | - 11 |
| Neurology | 162 | 148 | 163 | - | 1 | 1 |
| Neurosurgery | 122 | 122 | 134 | - | 12 | 10 |
| Obstetrics/Gynecology | 1,106 | 1,089 | 1,198 | - | 92 | 8 |
| Ophthalmology | 609 | 578 | 636 | - | 27 | 4 |
| Orthopedics | 406 | 440 | 484 | - | 78 | 19 |
| Otolaryngology | 487 | 287 | 316 | 171 | - | - 35 |
| Pathology | 609 | 442 | 486 | 123 | - | - 20 |
| Plastic Surgery | 243 | 80 | 88 | 155 | - | - 64 |
| Psychiatry | 1,217 | 1,266 | 1,393 | - | 176 | 14 |
| Pulmonary Disease | (81) | 75 | 83 | - | 2 | - 2 |
| Radiology | 811 | 726 | 799 | 12 | - | - 2 |
| Thoracic Surgery | 122 | 105 | 116 | 6 | - | - 5 |
| Urology | 406 | 323 | 355 | 51 | - | - 13 |

[a]Computed on basis of the published optimum Medical Economics ratios found in Table 39 divided into a projection of Pennsylvania's 1980 Population published by Senier and Mulvihill (1972).

[b]Taken from the historical trend projections of Appendix A. Assumes that the osteopaths make a negligible contribution to the specialties listed.

[c]The figures in this column are rough estimates based upon the overall growth of 10 per cent attributable to projected medical school growth over and above their historical growth.

[d]Figures in parentheses represent arbitrary estimates of need based upon the data available for other specialties and the growth figures for the specialty.

### Unmet Need if Medical Schools Do Not Expand as Planned

Table 43 is the result of an effort to determine the degree of surplus for all areas of medicine, should the medical schools be unable to expand as they now project and, instead, simply expand much as they did in the 1960s.

The surplus areas in Table 43 are, of course, fewer in number than in Table 42, i.e., cardiology, gastroenterology, general surgery, neurosurgery, orthopedics and psychiatry. The areas where the number of specialists in 1980 will closely but not quite approximate the optimum (80 per cent of optimum or better) are: neurology, obstetrics-gynecology, opthalmology, pulmonary disease, radiology, thoracic surgery and urology.

As might be also expected, the unmet need values are higher and there are more areas of unmet need than in Table 42. For example, 2,815 more general or family practice physicians are projected as still needed by 1980 in Table 43 while the earlier figure for this field of practice was 2,192 (Table 41).

### Effect of Delivery System Change Upon True Need

We cannot, of course, foresee the actual changes in the medical delivery system that will be forthcoming in the future, but there can be little doubt that such changes are coming unless the problem of rapidly rising medical costs is solved.

It seems reasonable to suppose that much of the change, when it does come, will involve an emphasis on cost effectiveness and lowered economic barriers to quality care. Two of the most promising concepts, in this regard, are the use of paramedical personnel (physicians' assistants, etc.) to increase physician productivity and the Health Maintainance Organization. The HMO concept is modeled after the prepaid group plan of the Kaiser-Permanente variety and is intended to increase the availability of quality care in rural and urban center areas.

Past experience with the prepaid group plans now in existence may be viewed as a basis for estimating the likely need for physicians when paramedicals are used in a cost efficient group setting that is designed to provide wide spectrum quality medical care to the general public without prohibitive monetary barriers.

As a basis for such estimations, Table 44 summarizes the population to physician ratios that have been found to be optimum for two well known prepaid group plans whose membership approximates the general population in their age distribution. The data for the two plans are combined in Table 44 in terms of physician per 200,000 population. A generalized prepaid group (HMO) optimum ratio is then computed in terms of a population per physician ratio. The ratio for general and family medicine is 4,516:1 in Table 44. This contrasts strongly with a figure of 2,000:1 from the journal of Medical Economics survey[4] data. It is obvious that these prepaid plans are indeed able to increase the productivity of their general practitioners and delegate patients efficiently to paramedicals or other specialists in such a manner as markedly to decrease the need for family physicians if equivalent quality of care can be assumed. It is also apparent that these two plans are using internists and general practitioners almost interchangeably since when they are combined, the physician per 100,000 ratios become much alike for the two plans, i.e., 39.16 vs. 42.76 or a difference of 3 to 4 physicians rather than differences of 11 to 14 physicians in the case of internists and general/family practitioners, respectively.

The combination of the two specialties, internal medicine and general/family practice, results in a final population per physician ratio of 2,441:1 which is somewhat more favorable with regard to physician needs than the earlier 2,000:1 figure from the Medical Economics.[6] The 5,000:1 figure for internal medicine from that journal does not seem relevant here. Apparently the prepaid group plans have already done what is predicted for the future in an article *Forecast For Internists: a G.P.'s Life--More and More They Will Be Taking Over the G.P.'s Primary Care.* [6]

The ratios in Table 44 for pediatrics and general surgery are interesting to compare. The ratio for general surgery in Table 44 is 17,227, a much higher figure than the Medical Economics survey[4] figure of 10,000:1 cited earlier. The population per physician ratio for pediatricians is 6,048:1, a substantially lower figure than the figure of 10,000:1 arrived at in the Medical Economics survey.[4] Apparently, the prepaid group plans reduce the amount of surgery required. Possibly, they achieve this by the practice of preventative medicine and by eliminating all unnecessary surgery.

Prepaid plans apparently make a greater use of pediatricians than the present delivery system would

Table 43

Estimates of Unmet Specialty Needs in 1980 if the Growth of Physicians Continues in the 1970s as It Had in the 1960s

| Specialty | 1980 Optimum[a] | Projections from Appendix A[b] | Unmet Need | Surplus | Percentage Deviation From Optimum |
|---|---|---|---|---|---|
| Allergy | 487 | 146 | 341 | | - 70 |
| Anesthesiology | 811 | 475 | 336 | | - 41 |
| Cardiology | 122 | 468 | | 346 | 284 |
| Colon & Rectal | (61) | 39 | 22 | | - 36 |
| Dermatology | 243 | 153 | 90 | | - 37 |
| Gastroenterology | (122) | 123 | | 1 | 1 |
| General/Family Practice | 6,085 | 3,270[c] | 2,815 | | - 46 |
| General Surgery | 1,217 | 1,409[c] | | 192 | 16 |
| Internal Medicine | 2,434 | 1,619[c] | 815 | | - 33 |
| Neurology | 162 | 148 | 14 | | - 9 |
| Neurosurgery | 122 | 122 | 0 | 0 | 0 |
| Obstetrics/Gynecology | 1,106 | 1,089 | 17 | | - 2 |
| Ophthalmology | 609 | 578 | 31 | | - 5 |
| Orthopedics | 406 | 440 | | 34 | 8 |
| Otolaryngology | 487 | 287 | 200 | | - 41 |
| Pathology | 609 | 442 | 167 | | - 27 |
| Pediatrics | 1,217 | 878[c] | 339 | | - 28 |
| Plastic Surgery | 243 | 80 | 163 | | - 67 |
| Psychiatry | 1,217 | 1,266 | | 49 | 4 |
| Pulmonary Disease | (81) | 75 | 6 | | - 7 |
| Radiology | 811 | 726 | 85 | | - 10 |
| Thoracic Surgery | 122 | 105 | 17 | | - 14 |
| Urology | 406 | 323 | 83 | | - 20 |

[a]From Tables 39 and 42.

[b]Linear projections of historical data as found in Table 35 and in Appendix A. Assumes D.O.'s negligible in most specialties.

[c]Includes doctors of osteopathy as derived from Table 35.

Table 44

Estimates of Basic Care and Direct Patient Care Optimum Ratios for Prepaid Group Insurance Medical Delivery Systems Covering the General Population

| Specialty | Health Insurance Plan[a] | Puget Sound[b] | HIP Physicians Per 100,000 | Puget Physicians Per 100,000 | Total Physicians Per 200,000 | Optimum Ratio |
|---|---|---|---|---|---|---|
| General/Family | 6,736 | 3,397 | 14.85 | 29.44 | 44.29 | 4,516 |
| Internal Medicine | 4,114 | 7,510 | 24.31 | 13.32 | 37.63 | 5,315 |
| Subtotal | | | 39.16 | 42.76 | 81.92 | 2,441[d] |
| General Surgery | 16,666 | 17,824 | 6.00 | 5.61 | 11.61 | 17,227 |
| Pediatrics | 4,545 | 9,031 | 22.00 | 11.07 | 33.07 | 6,048 |
| Opthalmology | 33,333 | 47,552 | 3.00 | 2.10 | 5.10 | 39,216 |
| Otolaryngology | 50,000 | 38,857 | 2.00 | 2.57 | 4.57 | 43,764 |
| All Direct Care[c] | 1,000 | 1,070 | 100.00 | 93.46 | 193.46 | 1,034 |

[a] Health Insurance Plan optimums published in Journal of American Medical Association, March 20, 1972, Vol. 219, No. 12. Used here because age distribution of its 780,000 subscribers in Greater New York closely approximates that of the general United States population. (See Mason, Henry R., Manpower Needs By Specialty, pp. 1621-1626.)

[b] Kaiser-Permamente Puget Sound Plan in Washington State cited in Journal of American Medical Association issue of March 20, 1972 (see note "a" above). Also chosen because it approximates, but less closely in over 65 age bracket, the age distribution for the U.S.A. The age distributions are given in the article cited.

[c] This is for direct care physicians likely to be part of such a plan. Anesthesiologists, neurosurgeons, pathologists, psychiatrists and physiatrists may not be included in a given plan. These plans do include dermatologists, family practitioners, general surgeons, internists, obstetricians and gynecologists, ophthalmologists, otolaryngologists, orthopedists, pediatricians, radiologists and urologists. Neurologists and plastic surgeons are not included in either plan though some plans do include them.

[d] This ratio is not a subtotal but rather is computed from the subtotal in the preceding column, i.e., 200,000 ÷ 81.92 = 2,441. It represents a mix of general/family practice and internal medicine with internists apparently considered as roughly equivalent to general/family practitioners in the prepaid systems since the ratios of one to the other are near to being an exact reverse of each other (15:24 compared to 13:29).

seem to regard as optimum and viable. The strong emphasis upon preventative as well as curative care in these plans might well account for these ratio differences when combined with the economies inherent in the operation [2,3] of such plans.

As indicated in Table 44, approximately 1,000 people per physician (1,034 to be exact) are typically handled under these plans. Note C indicates, however, that these plans do not include physicians over the full range of specialization. Efforts to estimate present physician shortages using this figure of 1,000:1 are, therefore, suspect as unduly conservative, if only for this reason. For example, the 50,000 physician shortage figure arrived at by the federal government (See Appendix E) was, in part, based upon this rather optimistic prepaid plan ratio. It is doubtful that the present medical delivery system is that efficient nor is it likely to become so in the near future. The true population per physician optimum figure is, therefore, likely to be much lower, say, 643 persons per direct patient care physician as in Table 40.

## The Impact of a Full-Scale Change to HMO's

Tables 45 through 47 represent an attempt to project the impact of a full-scale shift from the present delivery system to one resembling the prepaid group systems cited in Table 44. It compares these projections with those based on the Medical Economics article cited earlier.[4]

In the case of general/family practice and internists, combined, Table 45 reveals that the large projected need figures for these basic entry physicians under the present delivery system criterion standards (Medical Economics survey) would change into surplus estimates under the standards of the prepaid group plans of Table 44. In effect, it suggests that the current shortages of basic care physicians could conceivably be erased by the efficiencies that are said to be inherent in these plans.[2,3] One has to assume, of course, that such plans do give equivalent or better care than that now obtainable. For rural and central city dwellers this might easily be the case. Furthermore, the possibility of preventative as well as curative and palliative treatment being provided by such plans cannot be ignored with regard to any segment of the population, however well to do, since the conventional medical system now does very little in this area of preventative care.

Table 46 indicates that the optimum prepaid plan standards for pediatricians would require many more pediatricians than our present delivery system requires. However, the number needed would decline to a figure of 987 by 1980 if we then had this type of medical delivery system as our standard pattern.

Table 47 indicates that the reduced use of general surgeons under prepaid group insurance (HMO) conditions would result in a much more severe surplus situation than is projected under our present delivery system. This table assumes that the number of physicians in this specialty will continue to increase at the same rate and will remain in Pennsylvania to the same degree as was true in the 1960s.

## Some Conclusions

Obviously, the use of the HMO and paramedical concepts could make our need for basic physicians less acute, or even nonexistant, due to the efficiencies of scale and increased physician productivity potential that they make possible. This report's final projections of need would be too large and the projections of surplus too small if such a drastic change in the medical delivery system occurred in the near future. However, it is not considered likely that so drastic a change will occur so quickly as to render suspect the projections of need made later in this report.

Table 45

A Comparison Between the Conventional Optimum Care Estimates and Prepaid Group Optimum Care Estimates Relative to the Need for General Practice and Internal Medicine Practitioners (Basic Care)[2]

| Year | Prepaid Optimum[a] | Medical Economics Optimum[b] | Prepaid Need/ Surplus[c] | Medical Economics Need/Surplus[d] |
|---|---|---|---|---|
| 1971 | 4,853 | 8,292 | 527 | -2,912 |
| 1972 | 4,875 | 8,330 | 478 | -2,977 |
| 1973 | 4,896 | 8,366 | 457 | -3,013 |
| 1974 | 4,916 | 8,400 | 445 | -3,039 |
| 1975 | 4,934 | 8,431 | 446 | -3,051 |
| 1976 | 4,949 | 9,456 | 471 | -3,059 |
| 1977 | 4,962 | 8,479 | 511 | -3,006 |
| 1978 | 4,973 | 8,497 | 565 | -2,959 |
| 1979 | 4,981 | 8,511 | 636 | -2,894 |
| 1980 | 4,986 | 8,519 | 716 | -2,817 |

[a]Uses the combined general practice and internal medicine ratio (2,441:1) of Table 44 x the population projections of Senier and Mulvihill (1972)[5].

[b]Total of the general practice and internal medicine optimum values of Table 39.

[c]Difference between the total of the two values projected in Table 35 for general practice and internal medicine and the value in column 1 of this table.

[d]Values are from Table 41, i.e., the projected total of the general practice and internal medicine values. A positive value in these columns represents a surplus physician situation and a negative value represents probable unmet need.

Table 46

A Comparison Between the Conventional Optimum Care Estimates and Prepaid Group Optimum Care Estimates Relative to the Need for Pediatricians

| Year | Prepaid Optimum[a] | Medical Economics Optimum[b] | Prepaid Need/Surplus[c] | Medical Economics Need/Surplus[d] |
|---|---|---|---|---|
| 1971 | 1,959 | 1,185 | -1,328 | -554 |
| 1972 | 1,968 | 1,190 | -1,305 | -527 |
| 1973 | 1,976 | 1,195 | -1,278 | -497 |
| 1974 | 1,984 | 1,200 | -1,247 | -463 |
| 1975 | 1,991 | 1,204 | -1,213 | -426 |
| 1976 | 1,998 | 1,208 | -1,174 | -384 |
| 1977 | 2,003 | 1,211 | -1,132 | -340 |
| 1978 | 2,007 | 1,214 | -1,086 | -293 |
| 1979 | 2,010 | 1,216 | -1,037 | -243 |
| 1980 | 2,012 | 1,217 | - 987 | -192 |

[a]Based on the pediatrics ratio (6,048:1) of Table 44 times the population projections of Senier and Mulvihill (1972)[5].

[b]From Table 39.

[c]Difference between the value projected in Table 35 and the value in column 1 of this table.

[d]From Table 41. A positive value in these columns represents a surplus physician situation and a negative value represents probable unmet need. The values in these two columns suggest that a greater demand for pediatricians would develop in a prepaid medical delivery system since many children are now cared for by a general practitioner and parents do not take them to a physician as often as they might like for financial reasons.

Table 47

A Comparison Between the Conventional Optimum Care Estimates and Prepaid Group Optimum Care Estimates Relative to the Need for General Surgeons

| Year | Prepaid Optimum[a] | Medical Economics Optimum[b] | Prepaid Need/ Surplus[c] | Medical Economics Need/Surplus[d] |
|---|---|---|---|---|
| 1971 | 688 | 1,185 | 458 | - 39 |
| 1972 | 691 | 1,190 | 494 | - 5 |
| 1973 | 694 | 1,195 | 536 | 35 |
| 1974 | 697 | 1,200 | 582 | 79 |
| 1975 | 699 | 1,204 | 630 | 125 |
| 1976 | 701 | 1,208 | 680 | 173 |
| 1977 | 703 | 1,211 | 739 | 231 |
| 1978 | 705 | 1,214 | 801 | 292 |
| 1979 | 706 | 1,216 | 868 | 358 |
| 1980 | 707 | 1,217 | 928 | 418 |

[a]Based on the general surgery ratio (17,227:1) of Table 44 times the population projections of Senier and Mulvihill (1972)[5].

[b]From Table 39.

[c]Difference between the value projected in Table 35 and the value in column one of this table.

[d]From Table 41. A positive value in this column represents a surplus physician situation and a negative value represents probable unmet need.

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# CHAPTER X

## DEMAND DUE TO DEATH, DISABILITY, RETIREMENT AND OUT-MIGRATION

The problem of estimating the need for physicians would be relatively straightforward if it involved only the number of physicians needed to meet anticipated growth or unmet need demand. This is not the whole story, however. Physicians do die, retire, become disabled or go elsewhere to practice (out-migration) and must be replaced.

### Determination of a Mortality Rate Base

There is a limited amount of literature on physician mortality and much of it deals with special causes of death, i.e., suicide, radiation, drugs, etc.[1,2,3,4,5]

Several sources do, however, deal with the general issue of physician and/or professional mortality [6,7,8,9,10,11]. The most useful of these sources was judged to be the 1950 mortality estimates of HEW[11] based upon a sampling of death certificates. This material is seen as particularly useful in that it also gives mortality figures for many of the other professions for which projections are to be made by the author at a later date. A common data base for professional mortality rates was considered desirable, if only for comparative purposes.

Table 48 gives physician mortality per 1,000 physicians by age grouping using the HEW data. It then computes HEW mortality rates (percentage) for each age grouping. For comparative purposes Table 48 also gives HEW mortality statistics for all occupations combined.[11] Similar data from the Monthly Labor Review[12] is also given. As noted in Table 48, where the mortality rate for a physician age group was not given (age group 65-69), an arbitrary estimate was made based upon certain regularities between the physician mortality figures and the Monthly Labor Review[12] figures. The figures in Table 48 concerning physician mortality in percentage terms were the basis for later estimates of Pennsylvania physician mortality made in this chapter.

### Pennsylvania Physicians Age Distribution

Before the mortality rates of Table 48 could be utilized, however, it was necessary to determine the age distribution of Pennsylvania physicians. Table 49 gives total frequency and female medical physician frequencies by age group for all medical physicians in Pennsylvania, as of November 26, 1971. Total medical physician and specialty area counts are provided for all age groupings from age 20-24 to 100-104.

It was hypothesized that the general age distribution of osteopaths would be essentially identical to that of the medical physicians, and to test this hypothesis Table 50 was constructed.

In Table 50 we find that the discrepancies between the medical physician and doctors of osteopathy age distributions were indeed relatively small (plus or minus 1.7 per cent on the average) and did not exceed 4.7 per cent at the most (age 45-54). It was, therefore, concluded that Pennsylvania-based physician mortality statistics could have been based upon medical physician age distribution (percentage) data alone without serious error resulting. For this study, however, doctors of osteopathy age distribution counts were made and utilized.

### Method of Estimating Pennsylvania-Based Mortality Rates

Table 51 delineates the method used to develop estimates of physician deaths in a subcategory for any given year and then derive an overall mortality rate for that category of physician, i.e., .0125 or 1.25 per cent of all 1971 active physicians will die during the following year.

On the assumption that the mortality rate, so derived, would not change markedly from 1971 to 1980, mortality figures were similarly computed for the various specialty groupings of interest (Table 52).

These mortality rates are only for those physicians who are in active practice and under 70 years of age. As noted in Chapter XI, all physicians over 70 are, for the purpose of this study, considered as retired and not subject to replacement because of mortality.

As might be expected, due to differences in average age, the mortality rates for the specialty areas of Table 52 vary considerably from one another.

Table 48

A Comparison of Various Mortality Rate Figures Converted to Death Per 1,000 Base and a Percentage Rate of Mortality

| Age Group | Physician Mortality (HEW)[a] | All Occupation Mortality (HEW)[a] | All Occupation Mortality (Labor)[b] | HEW Physician Mortality Rate | All HEW Occupation Mortality Rate | Labor Review All Occupation Mortality Rate |
|---|---|---|---|---|---|---|
| 20-24 | 1.3 | 1.9 | 2.2 | 0.0013 | 0.0019 | 0.0022 |
| 25-29 | 1.2 | 1.9 | 2.0 | 0.0012 | 0.0019 | 0.0020 |
| 30-34 | 1.4 | 2.4 | 2.3 | 0.0014 | 0.0024 | 0.0023 |
| 35-44 | 3.3 | 4.4 | 4.0 | 0.0033 | 0.0044 | 0.0040 |
| 45-54 | 10.1 | 10.9 | 10.0 | 0.0101 | 0.0109 | 0.0100 |
| 55-59 | 18.2 | 20.4 | 19.7 | 0.0182 | 0.0204 | 0.0197 |
| 60-64 | 32.8 | 29.8 | 32.5 | 0.0328 | 0.0298 | 0.0325 |
| 65-69 | (66.0)[c] | - | 60.0 | (0.0660)[c] | - | 0.0600 |

[a]Data abstracted from a table of "Mortality by Occupation and Industry Among Men 20 to 64 Years of Age: United States, 1950," Vital Statistics--Special Reports, Vol. 53, No. 2, Health, Education and Welfare, Washington, D.C.

[b]Data abstracted from a table of "Working Life for Males, 1968" (Table 2) in Monthly Labor Review, June 1971, Howard N. Fullerton (Author). The two "all occupations" data sets in these tables do not significantly differ from one another overall.

[c]This is an estimate based upon the fact that the Labor Review rates are very similar to the HEW physician mortality rate for the older physicians but higher by one per cent or more, e.g., 60.0 + 1% of 60.0 = 66.0.

Table 49

Age Distributions for Selected Groupings and All M.D.'s as of 1971 Including a Separate Female Physician Count[a]

| Age | GP/FP[b] | IM[c] | GS[d] | PD[e] | Other Specialties | All M.D.'s |
|---|---|---|---|---|---|---|
| 20-24 | 3 | 14( 2) | 4 | 1 | 31( 12) | 53( 14) |
| 25-29 | 74( 8)[f] | 503( 43) | 256( 11) | 166( 54) | 1,289(205) | 2,288(321) |
| 30-34 | 160( 17) | 263( 31) | 259( 10) | 180( 63) | 1,655(200) | 2,517(321) |
| 35-39 | 271( 23) | 260( 15) | 172 | 144( 39) | 1,424(119) | 2,271(196) |
| 40-44 | 372( 24) | 254( 13) | 165( 5) | 120( 35) | 1,310(106) | 2,221(183) |
| 45-49 | 457( 18) | 245( 17) | 184( 6) | 106( 22) | 1,235(122) | 2,227(185) |
| 50-54 | 433( 26) | 174( 11) | 158( 2) | 104( 20) | 965( 95) | 1,834(154) |
| 55-59 | 456( 30) | 206( 9) | 167 | 69( 16) | 781( 59) | 1,679(114) |
| 60-64 | 503( 21) | 138( 4) | 120 | 54( 8) | 752( 47) | 1,567( 80) |
| 65-69 | 375( 14) | 117 | 75 | 27( 4) | 532( 34) | 1,126( 52) |
| 70-74 | 215( 19) | 61( 6) | 41 | 24( 3) | 327( 37) | 668( 65) |
| 75-79 | 143( 11) | 20( 1) | 23 | 9( 1) | 199( 21) | 394( 34) |
| 80-84 | 66( 3) | 21 | 13 | 5( 2) | 115( 13) | 220( 18) |
| 85-89 | 33( 2) | 5 | 6 | 3( 1) | 61( 5) | 108( 8) |
| 90-94 | 17 | | 2 | | 24( 8) | 43( 8) |
| 95-99 | 1 | | | | 7( 1) | 8( 1) |
| 100-104 | | 1 | | | 3( 2) | 4( 2) |
| Total | 3,579(216) | 2,282(152) | 1,645(34) | 1,012(268) | 10,710(1,086) | 19,228(1,756) |

[a]Derived from analysis by specialty and sex of the AMA tapes as of November 26, 1971.

[b]General practice and family practice combined.

[c]Internal medicine.

[d]General surgery.

[e]Pediatrics, pediatric cardiology, pediatric surgery, pediatric allergy and pediatric radiology combined.

[f]The number of female physicians included in the cell total is given in parentheses.

Table 50

A Comparison of the Age Distributions for Pennsylvania's Doctors of Medicine (Male) and Osteopathy[a]

| Age Group | Male M.D.'s | All D.O.'s | Per Cent M.D.'s | Per Cent D.O.'s | Per Cent Difference |
|---|---|---|---|---|---|
| 20-24 | 39 | --- | 0.2 | 0.0 | 0.2 |
| 25-29 | 1,967 | 185 | 11.3 | 11.7 | - 0.4 |
| 30-34 | 2,196 | 190 | 12.6 | 12.0 | 0.6 |
| 35-44 | 4,113 | 412 | 23.5 | 25.9 | - 2.4 |
| 45-54 | 3,722 | 414 | 21.3 | 26.0 | - 4.7 |
| 55-59 | 1,565 | 148 | 9.0 | 9.3 | - 0.3 |
| 60-64 | 1,487 | 86 | 8.5 | 5.4 | 3.1 |
| 65-69 | 1,074 | 69 | 6.1 | 4.3 | 1.8 |
| 70+ | 1,309 | 86 | 7.5 | 5.4 | 2.1 |
| Total | 17,472 | 1,590 | 100.0 | 100.0 | 0.0 |
| | | | | | 15.6% (Absolute Value) |
| Median Age[b] | (45.62) | (44.65) | | | ± 1.7% (Average Per Cent Difference) |

[a]Data derived from Directory of the American Osteopathic Association (1970) and a compilation of the AMA data tape (November 26, 1971) provided by the Pennsylvania Medical Society.

[b]Values may differ slightly from those shown elsewhere in this report since they are computed here directly from the table.

Table 51

A Method for Estimating Mortality Derived From the Age Distribution of Physicians in Pennsylvania as of November 26, 1971

| Age Grouping | Sample Frequency[a] | Percentage | Estimated Active Physicians in 1971[b] | Mortality Rate[c] | Estimated Deaths |
|---|---|---|---|---|---|
| 20-24 | 39 | 0.22 | 33 | .0013 | 0.04 |
| 25-29 | 2,152 | 12.18 | 1,842 | .0012 | 2.21 |
| 30-34 | 2,386 | 13.51 | 2,043 | .0014 | 2.86 |
| 35-44 | 4,525 | 25.61 | 3,874 | .0033 | 12.78 |
| 45-54 | 4,136 | 23.41 | 3,541 | .0101 | 35.76 |
| 55-59 | 1,713 | 9.70 | 1,467 | .0182 | 26.70 |
| 60-64 | 1,573 | 8.90 | 1,346 | .0328 | 44.14 |
| 65-69 | 1,143 | 6.47 | 979 | (.0660)[d] | 64.61 |
| Totals | 17,667 | 100.00 | 15,125 | (.0125)[e] | 189.10 |

[a]The frequencies here represent some of the 17,472 M.D.'s whose birthdates were given in the AMA November 26, 1971 tapes and 1,590 of the doctors of osteopathy listed in the _1970 Directory of Osteopathic Physicians_ for whom birthdates were given.

[b]From Table 35, active physician projections.

[c]"Mortality by Occupation and Industry Among Men 20 to 64 Years of Age: United States, 1950," _Vital Statistics--Special Reports_, Vol. 53, No. 2, September 1962, U.S. Department of Health, Education and Welfare. See Table 50.

[d]See Note c in Table 50.

[e]189 deaths ÷ 15,125 gives overall rate of .0125.

Table 52

Estimation of Overall Mortality Rate by Specialty and for All M.D.'s Based Upon Working Life of 20-69 Years[a]

| Year | Age Group Physician Mortality[b] | GP/FP Count | GP/FP Deaths | IM Count | IM Deaths | GS Count | GS Deaths | PD Count | PD Deaths | Other Spe-cialties Count | Other Spe-cialties Deaths | All M.D.'s Count | All M.D.'s Deaths |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20-24 | .0013 | 3 | - | 14 | - | 4 | - | 1 | - | 31 | - | 53 | - |
| 25-29 | .0012 | 74 | - | 503 | 1 | 256 | 1 | 166 | - | 1,289 | 1 | 2,288 | 3 |
| 30-34 | .0014 | 160 | - | 263 | 1 | 259 | 1 | 180 | - | 1,655 | 2 | 2,517 | 4 |
| 35-44 | .0033 | 643 | 2 | 514 | 2 | 337 | 1 | 264 | 1 | 2,734 | 9 | 4,492 | 15 |
| 45-54 | .0101 | 890 | 9 | 419 | 4 | 342 | 3 | 210 | 2 | 2,200 | 22 | 4,061 | 40 |
| 55-59 | .0182 | 456 | 8 | 206 | 4 | 167 | 3 | 69 | 1 | 781 | 14 | 1,679 | 30 |
| 60-64 | .0328 | 503 | 16 | 138 | 4 | 120 | 4 | 54 | 2 | 752 | 25 | 1,567 | 51 |
| 65-69 | (.0660) | 375 | 25 | 117 | 8 | 75 | 5 | 27 | 2 | 532 | 35 | 1,126 | 75 |
| Totals | (.0660) | 3,104 | 60 | 2,174 | 24 | 1,560 | 18 | 971 | 8 | 9,974 | 108 | 17,783 | 218 |
| Mortality Rate | | | .0193 | | .0110 | | .0115 | | .0082 | | .0108 | | .0123[d] |
| Corrected Rate[c] | | | .0196 | | .0112 | | .0117 | | .0083 | | .0110 | | .0125 |
| Percentage of M.D.'s[c] | | 86.73 | | 95.27 | | 94.83 | | 95.95 | | 93.13 | | 92.48 | |

[a]Physician counts taken from Table 49.

[b]Mortality rates taken from Table 50.

[c]Corrected by increasing the rate by 1.6 per cent based on note d below in order to approximate the impact of adding a doctor of osteopathy count if it were available.

[d]Slightly different in value from the rate of Table 50 which included doctors of osteopathy. This table assumes that any difference between the rates found here and those that would have been found if doctors of osteopathy had been included will be similarly small, i.e., less than 2 per cent difference from the M.D. plus D.O. value (1.6 per cent).

[e]Represents proportion of the 19,228 M.D.'s of this area of specialization listed in the November 26, 1971 AMA tape.

General practitioners, for example, have the highest rate of mortality because of their declining ranks. Here new physicians are not entering in sufficient numbers to replace those who die or retire. Pediatricians, in contrast, have the lowest mortality rate. This seems to be due to the relatively recent growth of that profession. Only 4 per cent of these medical physicians are 70 years of age or older. In contrast 13 per cent of general practitioners are age 70 or older.

Estimates of Death Replacement Demand

Based upon the Pennsylvania age-based mortality rates of Tables 51 and 52, projections of annual replacement needs due to the death of physicians under 70 years of age were computed. They are to be found in Table 53. As may be seen, 2,154 active practice physicians are projected as dying between the years 1971 and 1980 with 1,890 of these characterized as direct care physicians. Furthermore, as might be expected, the specialty with the greatest proportion of these deaths, is general practice, (759 deaths). The smallest number of deaths is that for pediatricians (68 deaths).

Annual deaths as projected for each category of physician is given. These figures will be used in the final determination of total demand for physicians in each year of the decade.

The Problem of Physician Disability

No specific disability rates for physicians were found in the literature. Fortunately, the United States census findings for Pennsylvania did give disability and related data for the professional, technical and kindred workers of Pennsylvania.[13]

The census findings are found in Table 54 and consist of information concerning disability totals for each age grouping by sex along with total employment figures by sex for each age grouping. The above findings were used to compute total employed per disabled worker ratios. These ratios were then used to approximate total physician disability based on physician (M.D.) age-group distribution data.

Table 55 uses the male professional disability ratios of Table 54 to get 1971 estimates of total disability for general practice, internal medicine, pediatrics, general surgery and other specialties, and for individual and active physicians in general. Specialty and active physician total employed per disabled physician rates were then derived and placed in Table 55, e.g., 13 active general practitioners per disabled general practitioner.

The active to disabled physician ratios of Table 55 were then applied to projections of the number of physicians of each category found in Table 35. This resulted in year by year projections of the number of disabled physicians in each category (see Table 56).

Replacement Due to Disability

The total number of disabled physicians for Pennsylvania in a given year (Table 56) does not, however, tell us how many of these physicians became disabled during that year and would, therefore, have to be replaced. This disability per year figure could, however, be considered as at least roughly equivalent to the number of disabled physicians this year minus the number for the preceding year, i.e., the change in number from year to year. We will have to assume, however, that the number of physicians who return to practice from the disabled category is small enough to be insignificant in its effect.

Table 57 attempts to summarize the differences between the disabled totals of Table 56 and introduces corrections for the purpose of getting smooth trend figures. In the case of general/family practice, the actual differences were negative values because of the shrinking of this profession and, therefore, could not accurately reflect the number becoming disabled each year. An arbitrary decision to make the newly disabled per year figure twice that for internal medicine was made based upon prior observed relationships between mortality, etc., of internists and general practitioners.

In general then, approximately 347 physicians will become disabled during the years from 1971 to 1980. Around 33 per year on the average will be disabled. To be more specific, 6 general practice, 3 internists, 2 to 3 pediatricians, 3 general surgeons and 17 physicians in other direct care specialties will become disabled each year if these figures are reasonably correct.

The Problem of Physician Retirement

Physicians, being largely self-employed, do not normally retire at age 65 as do most working males.[14] Instead, they often just continue working until, in some instances, they are in their 90s.[14] However, at least one study indicates that the working lifespan of physicians typically ends around age 71 or 72.[15]

Conversations with physicians and the Pennsylvania Medical Society combined with the data gathered for this study have led to a conclusion that retirement at an earlier age for physicians is fast

Table 53

Projections of Physician Replacement Due to Death

| Year | Projected General/Family Practice[a] | GP/FP Deaths[b] | Projected Internal Medicine[a] | IM Deaths[b] | Projected Pediatricians[a] | PD Deaths[b] | Projected General Surgeons[a] | GS Deaths[b] | Projected Other Specialties[a] | Other Specialty Deaths[b] | Direct Care Physicians[a] | Direct Care Physicians Deaths[b] | Active Practice Physicians[a] | Active Practice Deaths[c] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 3,987 | 78 | 1,393 | 16 | 631 | 5 | 1,146 | 13 | 6,238 | 69 | 13,392 | 167 | 15,125[d] | 189 |
| 1972 | 3,929 | 77 | 1,424 | 16 | 663 | 6 | 1,185 | 14 | 6,502 | 72 | 13,693 | 171 | 15,490 | 194 |
| 1973 | 3,894 | 76 | 1,459 | 16 | 698 | 6 | 1,230 | 14 | 6,762 | 74 | 14,023 | 175 | 15,891 | 199 |
| 1974 | 3,865 | 76 | 1,496 | 17 | 737 | 6 | 1,279 | 15 | 7,042 | 77 | 14,297 | 179 | 16,337 | 204 |
| 1975 | 3,840 | 75 | 1,540 | 17 | 778 | 6 | 1,329 | 16 | 7,329 | 81 | 14,779 | 185 | 16,801 | 210 |
| 1976 | 3,832 | 75 | 1,588 | 18 | 824 | 7 | 1,381 | 16 | 7,642 | 84 | 15,217 | 190 | 17,327 | 217 |
| 1977 | 3,833 | 75 | 1,640 | 18 | 871 | 7 | 1,442 | 17 | 7,963 | 88 | 15,683 | 196 | 17,881 | 224 |
| 1978 | 3,844 | 75 | 1,694 | 19 | 921 | 8 | 1,506 | 18 | 8,306 | 91 | 16,192 | 202 | 18,490 | 231 |
| 1979 | 3,867 | 76 | 1,750 | 20 | 973 | 8 | 1,574 | 18 | 8,659 | 95 | 16,726 | 209 | 19,129 | 239 |
| 1980 | 3,893 | 76 | 1,809 | 20 | 1,025 | 9 | 1,635 | 19 | 9,013 | 99 | 17,264 | 216 | 19,772 | 247 |
| Total Deaths | | 759 | | 177 | | 68 | | 153 | | 830 | | 1,890 | | 2,154 |

[a]See Table 35 for projections. All projections for direct care physicians with the exception of the active practice physicians (M.D. and D.O.).

[b]See Table 52 for mortality rates (corrected).

[c]Based on the same rate for direct care physicians. Assumes the non-direct care physician age distribution to be essentially the same as the direct care distribution.

[d]Does not include interns or residents in the active total.

Table 54

Estimation of Professional, Technical and Kindred Worker Disability Ratios Based on 1970 Census Findings[a]

I. Disability Totals by Age

| Sex | Age 25-34 | 35-44 | 45-54 | 55-64 | Total |
|---|---|---|---|---|---|
| Male | 3,320 | 3,316 | 4,934 | 3,884 | 15,454 |
| Female | 1,174 | 1,365 | 2,201 | 2,150 | 6,890 |

II. Total Employed By Age

| Sex | Age 25-34 | 35-44 | 45-54 | 55-64 | Total |
|---|---|---|---|---|---|
| Male | 112,264 | 90,845 | 72,921 | 43,508 | 319,538 |
| Female | 57,409 | 45,023 | 43,002 | 35,758 | 181,192 |

III. Total Employed Per Disabled Worker[b]

| Sex | Age 25-34 | 35-44 | 45-54 | 55-64 | Total |
|---|---|---|---|---|---|
| Male | 34 | 27 | 15 | 11 | 21 |
| Female | 49 | 33 | 20 | 17 | 26 |

[a]All data derived from Table 169 of the "Detailed Characteristics--Pennsylvania," Report PC(1)--D40, of the Bureau of the Census, U.S. Department of Commerce, November 1972.

[b]Result of dividing the disability total into the employed total to obtain the ratio of employed to disabled, e.g., 112,264 ÷ 3,320 = 34 (rounded off), i.e., 34 employed to each disabled professional, technical or kindred worker.

Table 55

Computation of Physician Disability Ratios Based on 1971 Active M.D. Age Distribution

| Age | Professional Technical Disability Ratio[a] | GP/FP Count[b] | GP/FP Disabled[c] | IM Count[b] | IM Disabled[c] | PD Count[b] | PD Disabled[c] | GS Count[b] | GS Disabled[c] | Other Specialty Count[b] | Other Specialty Disabled[c] | All Active Physicians Count[d] | Active Physicians Disabled[c] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25-34 | 34:1 | 234 | 7 | 766 | 23 | 346 | 10 | 515 | 15 | 2,944 | 87 | 4,538 | 133 |
| 35-44 | 27:1 | 643 | 24 | 514 | 19 | 264 | 10 | 337 | 13 | 2,734 | 101 | 4,525 | 168 |
| 45-54 | 15:1 | 890 | 59 | 419 | 28 | 210 | 14 | 342 | 23 | 2,200 | 147 | 4,136 | 276 |
| 55-64 | 11:1 | 959 | 87 | 344 | 31 | 123 | 11 | 287 | 26 | 1,533 | 139 | 3,286 | 299 |
| 65-69 | 7:1[e] | 375 | 54 | 117 | 17 | 27 | 4 | 75 | 11 | 532 | 76 | 1,143 | 163 |
| Total | | 3,104 | 231 | 2,174 | 118 | 971 | 49 | 1,560 | 88 | 9,974 | 550 | 17,667 | 1,039 |
| Physician Disability Ratio[f] | | 13:1 | | 18:1 | | 20:1 | | 18:1 | | 18:1 | | 17:1 | |

[a]See male total employed to disabled ratios of Table 54.

[b]Data derived from Table 52 (active M.D.'s including residents and interns).

[c]Previous column value divided by the number employed per disabled professional figure of column one, e.g., 234 ÷ 34 = 7.

[d]See Table 51 (includes D.O.'s).

[e]An arbitrary estimate. May even be conservative since disability due to stroke, etc. rises sharply in later years of life.

[f]Total 1971 physician count in question divided by the number disabled, e.g., 3,104 ÷ 231 = 13 or 13 employed to 1 disabled physician.

Table 56

Projections of Total Physician Disability By Year As A Base For Estimating Replacement Due to Disability

| Year | Projected General/ Family Practice[a] | GP/FP Disabled[b] | Projected Internal Medicine[a] | IM Disabled[b] | Projected Pedia- tricians[a] | PD Disabled[b] | Projected General Surgeons[a] | GS Disabled[b] | Projected Other Specialties[a] | Other Specialty Disabled[b] | Direct Care Physicians[a] | Direct Care Disabled[d] | Projected Other Activity[c] | Other Activity Disabled[e] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 3,987 | 307 | 1,393 | 77 | 631 | 32 | 1,146 | 64 | 6,238 | 347 | 13,392 | 788 | 1,733 | 96 |
| 1972 | 3,929 | 302 | 1,424 | 79 | 663 | 33 | 1,185 | 66 | 6,502 | 361 | 13,693 | 805 | 1,797 | 100 |
| 1973 | 3,894 | 300 | 1,459 | 81 | 698 | 35 | 1,230 | 68 | 6,762 | 376 | 14,023 | 825 | 1,868 | 104 |
| 1974 | 3,865 | 297 | 1,496 | 83 | 737 | 37 | 1,279 | 71 | 7,042 | 391 | 14,297 | 841 | 2,040 | 113 |
| 1975 | 3,840 | 295 | 1,540 | 86 | 778 | 39 | 1,329 | 74 | 7,329 | 407 | 14,779 | 869 | 2,022 | 112 |
| 1976 | 3,832 | 295 | 1,588 | 88 | 824 | 41 | 1,381 | 77 | 7,642 | 425 | 15,217 | 895 | 2,110 | 117 |
| 1977 | 3,833 | 295 | 1,640 | 91 | 871 | 44 | 1,442 | 80 | 7,963 | 442 | 15,683 | 923 | 2,198 | 122 |
| 1978 | 3,844 | 296 | 1,694 | 94 | 921 | 46 | 1,506 | 84 | 8,306 | 461 | 16,192 | 952 | 2,298 | 128 |
| 1979 | 3,867 | 297 | 1,750 | 97 | 973 | 49 | 1,574 | 87 | 8,659 | 481 | 16,726 | 984 | 2,403 | 134 |
| 1980 | 3,893 | 299 | 1,809 | 101 | 1,025 | 51 | 1,635 | 91 | 9,013 | 501 | 17,264 | 1,016 | 2,508 | 139 |

[a]See Table 35 for projections. All projections are for direct care M.D. and D.O. physicians with the exception of the other activity physicians.

[b]See Table 55 for the disability ratio used here, e.g., for GP/FP disability 3,987 ÷ 13 = 307. These figures must be treated with caution. The number of GP's is falling during the early period and also the average age of the group is high and rising during this period.

[c]Results of subtracting direct care projections of Table 35 from the active physician projections..

[d]Uses the same disability ratio as for all active physicians in Table 55, i.e., 17:1.

[e]Uses the ratio of 18:1 on the assumption that those active in research, administration teaching, etc., are more like the other specialists of Table 55 than like GP's or physicians taken as a whole.

Table 57

Projections of Replacement Due to Disability[a]

| Year | General Family Practice[b] | Internal Medicine | Pediatrics | General Surgery | Other Specialties | All Direct Care Physicians[c] | Physicians In Other Activities | All Active Physicians[d] |
|---|---|---|---|---|---|---|---|---|
| 1971[e] | 4 (6) | 2 | 1 | 2 | 14 | 23 (25) | 4 | 27 (29) |
| 1972 | 4 (6) | 2 | 1 | 2 | 14 | 23 (25) | 4 | 27 (29) |
| 1973 | 6 (6)[f] | 3 | 2 | 2 | 15 | 28 (28) | 4 | 32 (32) |
| 1974 | 4 (6) | 2 (3) | 2 | 3 | 15 | 26 (29) | 9 (5) | 35 (34) |
| 1975 | 6 (6) | 3 | 2 | 3 | 16 | 30 (30) | 0 (5) | 30 (35) |
| 1976 | 4 (6) | 2 (3) | 3 | 3 | 18 (17) | 30 (32) | 5 | 35 (37) |
| 1977 | 6 (6) | 3 | 3 | 3 | 17 (18) | 32 (32) | 5 | 37 (38) |
| 1978 | 6 (6) | 2 | 2 (3) | 4 | 19 | 34 (35) | 6 | 40 (41) |
| 1979 | 6 (6) | 3 | 3 | 3 (4) | 20 | 35 (36) | 6 | 41 (42) |
| 1980 | 8 (6) | 4 | 2 (3) | 4 | 20 | 38 (37) | 5 (6) | 43 (43) |
| Total | 54(60) | 2 (29) | 21(23) | 29(30) | 168(168) | 299(310) | 48(50) | 347(360) |

[a]Based upon Table 56, i.e., change in the number of disabled.

[b]Since the total are generally falling for these physicians, an erroneous disability figure is assumed to result since actually the median age is rising and the death rate is much higher. An arbitrary assumption of disability replacement at least twice that for internal medicine has, therefore, been made.

[c]A simple total of all preceding columns.

[d]The total of the last two columns.

[e]Since no 1970 disability totals are available in Table 56, the values for 1971 are simply assumed to be equal to the 1972 minus 1971 disable figure.

[f]The figures in parentheses are attempts to smooth the disabled growth figure and in the case of general and family practice, it is assumed to be constant at twice the average of the values in parentheses for internal medicine.

developing for a variety of reasons. First, the physician's income and general socioeconomic status now make it possible for him deliberately to plan for an early retirement through judicious investment and retirement insurance plans. Second, the increasingly leisure-oriented society of today might affect his decision to retire as it makes retirement less of a stigma than before. Third, the paperwork and high overhead of medical practice today makes part-time practice less practicable and desirable than in the past. Finally, the specialties may become sufficiently characterized by surplus or close to optimum physician ratios as to make the physician feel free to retire without feeling guilty about his services being badly needed.

For these reasons, the retirement estimates of this study have been set at a somewhat lower age of 70 and it is assumed, for the purpose of simplification, that all physicians, to all intents and purposes, retire at age 70. Of course, some continue to practice at a reduced level, but it is assumed that such physicians will be counterbalanced by those physicians retiring before the age of 70.

### Older Physician Age Distribution

In order to get a picture of the number of persons who are likely to be retired after age 70 during the next decade, it was necessary first to get an age distribution of physicians as of 1971, who were between the ages of 61 and 71 for each category of physician that was of interest. This data, from an analysis of the AMA tapes of November 26, 1971, is found in Table 58.

We then need to have the age 71 estimates of Table 58 modified to reflect what the age 70 total would have been the year before, i.e., in 1970, so that we could correct the retirement figures for attrition due to death between 1970 and 1971.To do this, Table 59 first lists the 1971 totals for age 71 for each category of physician. These *1971 incidence* figures are then corrected to give the number of physicians aged 70 years in 1970 by using the .0667 mortality rate for ages 65-69 (Tables 48 and 51). This was done by multiplying 1971's age 71 figures for each category in Table 59 by 6.7 per cent in order to get an approximation of the number of medical physicians aged 70 in 1970.

### Computation of Retirement Rates

The resulting 1970 (age 70) estimates were then divided by the total number of active physicians in that category in 1970 in order to ascertain the proportion of active physicians who would retire during 1970 although, admittedly, some of these would also die between 1970 and 1971. For all practical purposes, however, they must be replaced as though all had retired and not died during the year. The resulting proportions were then listed in Table 59 and labeled as estimates of the active physician retirement rate for each category of physician.

### Projections of Retirement 1971-1980

The active physician retirement rate of Table 59 was then applied to the growth projections of Table 35 in order to obtain the data of Table 60 which projects replacement demand due to retirement for the period 1971-80.

As indicated in Table 60, note a, the category *other activity* was derived by subtracting direct care totals from active physician totals in Table 35 and then multiplying the differences by 1.2 per cent, the other specialist retirement rate found in Table 59. It was assumed here that physicians not in direct patient care would be most like those in the more specialized areas of medicine.

The results of Table 60 indicate that we will have to produce or import approximately 2,236 physicians to meet the retirement-based demand for physicians from 1971-1980; 733 of these physicians will be family practice oriented (general practice) physicians. Their retirement rate is, as might be expected, substantially higher than that for other specialties. Pediatrics and general surgery have the lowest rate of retirement due to their rapid growth or recent growth.

### The Problem of Out-Migration

As with in-migration, the out-migration of physicians from the state could not be obtained by simply analyzing data on the present status of Pennsylvania's physicians as of November 26, 1971 (AMA tape). Instead, it was necessary to turn to two recent physician directories, published yearly by the AMA, and using a 10 per cent sample of the 1967 directory listings, to determine the whereabouts of these physicians in 1969, using a 1969 directory. Presumably, those physicians no longer listed in Pennsylvania but found to be listed in another state or overseas, or as in the Armed Services or Federal Goverment Services, represent out-migration. These figures are obtained when the sample figure is multiplied by 10 in order to approximate the number out-migrating from the total

Table 58

1971 M.D. Age Distribution for Retirement Estimates[a]

| Age | Retirement Year | GP/FP[b] | IM[c] | GS[d] | PD[e] | Other Specialties | All Physicians |
|---|---|---|---|---|---|---|---|
| 71 | 1970 | 59 | 20 | 7 | 5 | 78 | 169 |
| 70 | 1971 | 40 | 19 | 11 | 9 | 68 | 144 |
| 69 | 1972 | 67 | 13 | 16 | 4 | 86 | 186 |
| 68 | 1973 | 56 | 22 | 12 | 5 | 92 | 187 |
| 67 | 1974 | 61 | 17 | 18 | 6 | 108 | 210 |
| 66 | 1975 | 83 | 31 | 12 | 2 | 120 | 248 |
| 65 | 1976 | 108 | 34 | 17 | 10 | 126 | 295 |
| 64 | 1977 | 99 | 24 | 21 | 10 | 131 | 285 |
| 63 | 1978 | 110 | 33 | 21 | 11 | 153 | 328 |
| 62 | 1979 | 95 | 37 | 28 | 5 | 161 | 326 |
| 61 | 1980 | 95 | 21 | 28 | 12 | 140 | 296 |
| Totals | | 873 | 271 | 191 | 79 | 1,263 | 2,677 |

[a]Derived from AMA tapes dated as of November 26, 1971.

[b]General practice and family practice combined.

[c]Internal medicine.

[d]General surgery

[e]Pediatrics and associated pediatric specialties.

Table 59

Estimates of Active M. D. Retirement Rates Based on 1970 Classification of Physicians Data and the Number of Physicians of Age 71 (1971) Corrected for Mortality to 1970 Equivalents

| | 1971 Incidence[a] | Corrected to 1970[b] | Total Active 1970[c] | Active Physician Retirement Rate |
|---|---|---|---|---|
| General Practice | 59 | 63 | 3,327 | .0189 |
| Internal Medicine | 20 | 21 | 1,582 | .0133 |
| General Surgery | 7 | 8 | 796 | .0063 |
| Pediatrics | 5 | 5 | 1,104 | .0063 |
| Other Specialties | 78 | 83 | 6,919 | .0120 |
| All M.D.'s | 169 | 180 | 13,728 | .0131 |

[a] See Table 58.

[b] Each figure in the first column was increased by 6.7 per cent, the estimated probable loss due to mortality from 1970-71.

[c] Do not include interns and residents. Based on data taken from _Classification of Physicians in the United States, 1970_, a publication of the American Medical Association.

Table 60

Projections of Replacement Due to Retirement[a]

| Year | General/ Family Practice | Internal Medicine | Pediatrics | General Surgery | Other Specialties | Direct Care Physicians[b] | Other Activity | All Active Physicians[c] |
|---|---|---|---|---|---|---|---|---|
| 1971 | 75 | 19 | 4 | 7 | 75 | 180 | 21 | 201 |
| 1972 | 74 | 19 | 4 | 7 | 78 | 182 | 22 | 204 |
| 1973 | 74 | 19 | 4 | 8 | 81 | 186 | 22 | 208 |
| 1974 | 73 | 20 | 5 | 8 | 85 | 191 | 24 | 215 |
| 1975 | 73 | 20 | 5 | 8 | 88 | 194 | 24 | 218 |
| 1976 | 72 | 21 | 5 | 9 | 92 | 199 | 25 | 224 |
| 1977 | 72 | 22 | 5 | 9 | 96 | 204 | 26 | 230 |
| 1978 | 73 | 23 | 6 | 9 | 100 | 211 | 28 | 239 |
| 1979 | 73 | 23 | 6 | 10 | 104 | 216 | 29 | 245 |
| 1980 | 74 | 24 | 6 | 10 | 108 | 222 | 30 | 252 |
| Total | 733 | 210 | 50 | 85 | 907 | 1,985 | 251 | 2,236 |
| Rate[d] | .0189 | .0133 | .0063 | .0063 | .0120 | | .0120[d] | |

[a]Arbitrarily assumes no retirement before 70 years of age and that all physicians are, for all practical purposes, retired after 70 years of age. Based on the projections of Table 35 with other activity, the difference between the active and direct care projections above times 0.0120, the retirement rate of Table 59 (see note e below).

[b]Sum of previous columns.

[c]Sum of first two columns.

[d]See Table 59.

[e]Assumes the rate for other specialties to be applicable here, since these physicians are usually highly trained specialists other than basic care physicians.

1967 population of Pennsylvania physicians during the two year period of 1967 to 1969.

Table 61 corrects these findings by dividing by 2 in order to approximate the out-migration that occurred in one year (roughly 1968). Interns are not listed, but physicians-in-residenceare found in Table 61. Table 61 deals, however, primarily with the out-migration of active physicians who are in practice beyond the residency level.

We see in Table 61, for example, that approximately 25 Pennsylvania – trained general practitioners are estimated to have left the state in 1968. Of these 25, 15 went to another state, 5 went overseas temporarily and 5 entered government service of some kind. Ten general practitioners who were trained in a state other than Pennsylvania but who were practicing full time in Pennsylvania are estimated to have left the state in 1968 to practice in some other state. Of the five foreign-trained general practice physicians who left in 1968, all went to practice in another state. Altogether, Pennsylvania is estimated to have lost 40 general practice physicians in 1968, 30 to another state, 5 to temporary foreign residence and 5 to government service. It is interesting to note that the foreign-trained physicians who returned to their native soil tended to be highly specialized in their training, e.g., 95 returned and only 10 went to another state (see Section V of Table 61).

When all active medical physicians are considered, Table 61 indicates that Pennsylvania lost about 415 active physicians in 1968 (beyond the residency and in actual practice) with 130 of these Pennsylvania trained, 145 trained in another state and 140 trained in a foreign medical school. It should be noted that the number returning to foreign soil are actually figures based upon inference, since these figures represent foreign-trained physicians who were no longer listed by the AMA in 1969 and are presumed to have left the country.

## Net Migration

Although the out-migration estimates will be used separately from the in-migration estimates in the determination of physician need in Chapter XI, it is of interest to look at actual net migration estimates based on the data in Tables 15 (In-migration) and 61 (Out-migration).

The resulting migration figures are to be found in Table 62. They indicate that, on the whole, Pennsylvania attracts more practicing physicians than it loses. There are exceptions, however. Pediatrics, for example, indicates a net gain for Pennsylvania-trained pediatricians but an equal net loss for those pediatricians who are trained elsewhere. The net figure for physicians in residency is also zero, probably due to the hospitals pretty well filling the positions as they open. The only categories where the net migration is negative or zero in value were for Pennsylvania-trained general practice medical physicians (a zero value) and for active Pennsylvania-trained medical physicians who are not in direct patient care (Section VII of Table 62).

Apparently, we lose about as many Pennsylvania-trained general practitioners as we gain from those returning from the Armed Forces. In the case of physicians who are not in direct patient care, e.g., research, teaching, administration, etc., we are losing more than we attract, half going to another state and half taking up temporary foreign residence.

## Estimation of Migration Ratios

Table 63 used the findings of Table 62 and 1968 physician totals 16, in order to arrive at a ratio of the number of migrants to total physician population for a given category such as internal medicine. The results are tabled in the last column of Table 63 and give out-migration, in-migration and net migration ratios for physicians in each category.

## Projections of Physician Migration

Table 64 uses the ratio findings of Table 63 combined with the growth projections of Table 35 to arrive at tabled physician migration figures for each physician category. Out-in- and net-migration estimates are given. Since in-migration was already computed and included in the chapter on physician supply (Chapter VII), the out-migration estimates of Table 64 will be the estimates used to determine total physician demand in the next chapter.

## Out-migration

If the projections of Table 64 are correct, we will need at least 4,867 physicians from 1971 to 1980 to meet demand due to out-migration, but will import some 6,283 physicians to more than meet this need, i.e., a net increase in supply due to migration of 1,417. Only pediatrics shows no positive net in-migration and here there is no net loss indicated.

The findings on migration are, of course, based on

Table 61

A Summary of Out-Migration Estimates Derived From Original Counts Based on a 10 Per Cent Sample of All M.D.'s in the 1967 Directory of the American Medical Association[a]

| Destination | Place Received Medical Education: Pennsylvania | Other States | Foreign | Total |
|---|---|---|---|---|
| I. General Practice | | | | |
| Out-State | 15(3)[b] | 10(2) | 5(1) | 30(6) |
| Armed Forces | | | | |
| Temp. Foreign Residence[d] | 5(1) | | | 5(1) |
| Government Service | 5(1) | | | 5(1) |
| All Destinations | 25(5) | 10(2) | 5(1) | 40(8) |
| II. Internal Medicine | | | | |
| Out-State | 5(1)[b] | 25(5) | | 30(6) |
| Armed Forces | 5(1) | | | 5(1) |
| Government Service | | 5(1) | | 5(1) |
| All Destinations | 10(2) | 30(6) | | 40(8) |
| III. Pediatrics | | | | |
| Out-State | 10(2)[b] | 10(2) | 5(1) | 25(5) |
| All Destinations | 10(2) | 10(2) | 5(1) | 25(5) |
| IV. General Surgery | | | | |
| Out-State | | | 5(1) | 5(1) |
| Temp. Foreign Residence | 5(1)[b] | | | 5(1) |
| All Destinations | 5(1) | | 5(1) | 10(2) |
| V. Other Specialties | | | | |
| Out-State | 45(9)[b] | 20(4) | 10(2) | 75(15) |
| Armed Forces | 15(3) | 10(2) | | 25( 5) |
| Temp. Foreign Residence | | 5(1) | | 5( 1) |
| Return to Native Soil | | | 95(19) | 95(19) |
| All Destinations | 60(12) | 35(7) | 105(21) | 200(40) |
| VI. All Active Direct Care M.D.'s Combined | | | | |
| Out-State | 75(15)[b] | 65(13) | 25( 5) | 165(33) |
| Armed Forces | 20( 4) | 10( 2) | | 30( 6) |
| Temp. Foreign Residence | 10( 2) | 5( 1) | | 15( 3) |
| Government Service | 5( 1) | 5( 1) | | 10( 2) |
| Return to Native Soil | | | 95(19) | 95(19) |
| All Destinations | 110(22) | 85(17) | 120(24) | 315(63) |

Table 61
(continued)

| Destination | Place Received Medical Education Pennsylvania | Other States | Foreign | Total |
|---|---|---|---|---|
| VII. Active M.D.'s Not in Direct Patient Care | | | | |
| Out-State | 10( 2)[b] | 40( 8) | 15( 3) | 65(13) |
| Temp. Foreign Residence | 5( 1) | 15( 3) | | 20( 4) |
| Government Service | 5( 1) | 5( 1) | | 10( 2) |
| Return to Native Soil | | | 5( 1) | 5( 1) |
| All Destinations | 20( 4) | 60(12) | 20( 4) | 100(20) |
| VIII. All Active M.D.'s Combined | | | | |
| Out-State | 85(17)[b] | 105(21) | 40( 8) | 230(46) |
| Armed Forces | 20( 4) | 10( 2) | | 30( 6) |
| Temp. Foreign Residence | 15( 3) | 20( 4) | | 35( 7) |
| Government Service | 10( 2) | 10( 2) | | 20( 4) |
| Return to Native Soil | | | 100(20) | 100(20) |
| All Destinations | 130(26) | 145(29) | 140(28) | 415(83) |
| IX. Residents[c] | | | | |
| Out-State | 45( 9)[b] | 60(12) | 80(16) | 185(37) |
| Armed Forces | 70(14) | 40( 8) | 15( 3) | 125(25) |
| Temp. Foreign Residence | 5( 1) | 10( 2) | 5( 1)1 | 20( 4) |
| Government Service | 15( 3) | 10( 2) | 30( 6) | 55(11) |
| Return to Native Soil | | | 120( 6) | 120(24) |
| Unknown | 10( 2) | | | 10( 2) |
| All Destinations | 145(29) | 120(24) | 250(50) | 515(103) |

X. Not Subsequently Listed but U.S. Trained--Possible Deaths or Clerical Error

| Category | Place Received Medical Education Pennsylvania | Other States | Total |
|---|---|---|---|
| Active | 65(13) | 10( 2) | 75(15) |
| Residents | 10( 2) | 10( 2) | 20( 4) |

[a] Derived from a 10 per cent sample of physicians listed in the 1967 Directory of the American Medical Association and their subsequent location in the 1969 Directory.

[b] Data in parentheses indicates sample count. Data outside the parentheses represents estimate of total popualtion out-migration for a single year, 1968, e.g., if 9 in two years and, therefore, 4.5 in one year then 10 times 4.5 will give the estimate for the popualtion.

[c] Residents are summarized but not used to estimate replacement due to out-migration.

[d] Represents those physicians who are abroad temporarily residing.

Table 62

Estimated 1968 Net Migration Based on Tables 15 and 61

| | Place Received Medical Education | | | |
|---|---|---|---|---|
| | Pennsylvania | Another State | Foreign | Total |
| **I. General Practice** | | | | |
| In-Out State | - 5 | 0 | 5 | 0 |
| Armed Forces | 15 | 10 | - | 25 |
| From-To Temporary Foreign Residence | - 5 | - | - | - 5 |
| Government Service | - 5 | - | - | - 5 |
| Another Country | - | - | 15 | 15 |
| Combined | 0 | 10 | 20 | 30 |
| **II. Internal Medicine** | | | | |
| In-Out State | 5 | -20 | - | -15 |
| Armed Forces | 5 | 5 | | 10 |
| Government Service | 10 | - 5 | | 5 |
| Another Country | | | 15 | 15 |
| Combined | 20 | -20 | 15 | 15 |
| **III. Pediatrics** | | | | |
| In-Out State | 5 | -10 | - 5 | -10 |
| Armed Forces | 10 | - | - | 10 |
| Combined | 15 | -10 | - 5 | 0 |
| **IV. General Surgery** | | | | |
| In-Out State | 10 | 10 | 0 | 20 |
| Armed Forces | 10 | 5 | - | 15 |
| From-To Temporary Foreign Residence | - 5 | - | - | - 5 |
| Government Service | 5 | - | - | 5 |
| Another Country | - | - | 10 | 10 |
| Combined | 20 | 15 | 10 | 45 |
| **V. Other Specialties** | | | | |
| In-Out State | 5 | 15 | 15 | 35 |
| Armed Forces | 25 | 0 | - | 25 |
| From-To Temporary Foreign Residence | 5 | - 5 | - | 0 |
| Government Service | 10 | 10 | | 20 |
| Another Country | - | - | -55 | -55 |
| Combined | 45 | 20 | -40 | 25 |

Table 62 (continued)

VI. All Active Direct Care M.D.'s Combined

| | Place Received Medical Education | | | |
|---|---|---|---|---|
| | Pennsylvania | Another State | Foreign | Total |
| In-Out State | 20 | - 5 | 15 | 30 |
| Armed Forces | 65 | 20 | - | 85 |
| From-To Temporary Foreign Residence | - 5 | - 5 | - | -10 |
| Government Service | 20 | 5 | - | 25 |
| Another Country | - | - | -15 | -15 |
| Combined | 100 | 15 | 0 | 115 |
| **VII. Active M.D.'s Not in Direct Care** | | | | |
| In-Out State | - 5 | 5 | -10 | -10 |
| Armed Forces | | 10 | 10 | 20 |
| From-To Foreign Residence | - 5 | -10 | | -15 |
| Government Service | 0 | 10 | | 10 |
| Another Country | | | 10 | 10 |
| Combined | -10 | 15 | 10 | 15 |
| **VIII. All Active M.D.'s Combined** | | | | |
| In-Out State | 15 | 0 | 5 | 20 |
| Armed Forces | 65 | 30 | | 95 |
| From-To Foreign Residence | -10 | -15 | | -25 |
| Government Service | 20 | 15 | | 35 |
| Another Country | | | - 5 | - 5 |
| Combined | 90 | 30 | 0 | 120 |
| **IX. Residents** | | | | |
| In-Out State | 10 | -40 | - 5 | -35 |
| Armed Forces | -10 | 20 | -15 | - 5 |
| From-To Foreign Residence | 0 | -10 | 0 | -10 |
| Government Service | - 5 | - 5 | -30 | -40 |
| Another Country | | | 100 | 100 |
| Unknown | -10 | | | -10 |
| Combined | -15 | -35 | 50 | 0 |

Table 63

Estimation of Migration Ratios

I. Out-Migration

| | 1968 M.D. Totals[a] | 1968 M.D. Migration[b] | Ratio |
|---|---|---|---|
| All Active M.D.'s | 13,416 | 415 | .0309 |
| Direct Care M.D.'s | 11,580 | 315 | .0272 |
| General/Family Practice | 3,487 | 40 | .0115 |
| Internal Medicine | 1,270 | 40 | .0315 |
| Pediatrics | 541 | 25 | .0462 |
| General Surgery | 985 | 10 | .0102 |
| Other Specialties | 5,297 | 200 | .0378 |

II. In-Migration

| | | | |
|---|---|---|---|
| All Active M.D.'s | 13,416 | 535 | .0399 |
| Direct Care M.D.'s | 11,580 | 430 | .0371 |
| General/Family Practice | 3,487 | 70 | .0201 |
| Internal Medicine | 1,270 | 55 | .0431 |
| Pediatrics | 541 | 25 | .0462 |
| General Surgery | 985 | 55 | .0558 |
| Other Specialties | 5,297 | 225 | .0425 |

III. Net Migration

| | | | |
|---|---|---|---|
| All Active M.D.'s | 13,416 | 120 | .0090 |
| Direct Care M.D.'s | 11,580 | 115 | .0099 |
| General/Family Practice | 3,487 | 30 | .0086 |
| Internal Medicine | 1,270 | 15 | .0116 |
| Pediatrics | 541 | 0 | .0000 |
| General Surgery | 985 | 45 | .0456 |
| Other Specialties | 5,297 | 25 | .0047 |

[a]Figures derived from "Distribution of Physicians in the United States, 1968," published by the American Medical Association (inactive, interns and residents excluded).

[b]Derived from Tables 15 and 61.

Table 64

Projections of Physician Migration During the 1970s[a]

I. Out-Migration

| Year | All Active Physicians | Direct Care Physicians | General/ Family Practice | Internal Medicine | Pediatrics | General Surgery | Other Specialties |
|---|---|---|---|---|---|---|---|
| 1971 | 430 | 331 | 37 | 42 | 29 | 11 | 224 |
| 1972 | 440 | 339 | 36 | 43 | 31 | 11 | 233 |
| 1973 | 451 | 346 | 35 | 44 | 32 | 12 | 243 |
| 1974 | 463 | 355 | 34 | 45 | 34 | 12 | 253 |
| 1975 | 476 | 364 | 34 | 46 | 36 | 13 | 263 |
| 1976 | 490 | 374 | 33 | 48 | 38 | 13 | 274 |
| 1977 | 505 | 385 | 33 | 49 | 40 | 14 | 286 |
| 1978 | 521 | 396 | 32 | 51 | 42 | 15 | 298 |
| 1979 | 537 | 408 | 32 | 52 | 45 | 15 | 310 |
| 1980 | 554 | 419 | 31 | 54 | 47 | 16 | 322 |
| Total | 4,867 | 3,717 | 337 | 474 | 374 | 132 | 2,706 |

II. In-Migration

| Year | All Active Physicians | Direct Care Physicians | General/ Family Practice | Internal Medicine | Pediatrics | General Surgery | Other Specialties |
|---|---|---|---|---|---|---|---|
| 1971 | 555 | 451 | 64 | 58 | 29 | 60 | 252 |
| 1972 | 568 | 462 | 63 | 58 | 31 | 63 | 262 |
| 1973 | 582 | 472 | 62 | 60 | 32 | 65 | 273 |
| 1974 | 598 | 484 | 60 | 62 | 34 | 68 | 284 |
| 1975 | 614 | 496 | 59 | 64 | 36 | 70 | 296 |
| 1976 | 633 | 510 | 58 | 65 | 38 | 73 | 308 |
| 1977 | 652 | 525 | 57 | 67 | 40 | 76 | 321 |
| 1978 | 672 | 540 | 56 | 70 | 42 | 80 | 335 |
| 1979 | 694 | 556 | 55 | 72 | 45 | 83 | 348 |
| 1980 | 715 | 572 | 54 | 74 | 47 | 86 | 362 |
| Total | 6,283 | 5,068 | 588 | 650 | 374 | 724 | 3,041 |

III. Net Migration[b]

| Year | All Active Physicians | Direct Care Physicians | General/ Family Practice | Internal Medicine | Pediatrics | General Surgery | Other Specialties |
|---|---|---|---|---|---|---|---|
| 1971 | 125 | 120 | 28 | 16 | 0 | 49 | 28 |
| 1972 | 128 | 123 | 27 | 16 | 0 | 51 | 29 |
| 1973 | 131 | 126 | 26 | 16 | 0 | 53 | 30 |
| 1974 | 135 | 129 | 26 | 17 | 0 | 55 | 32 |
| 1975 | 139 | 132 | 25 | 17 | 0 | 57 | 33 |
| 1976 | 143 | 136 | 25 | 18 | 0 | 60 | 34 |
| 1977 | 147 | 140 | 24 | 18 | 0 | 62 | 36 |
| 1978 | 152 | 144 | 24 | 19 | 0 | 65 | 37 |
| 1979 | 156 | 148 | 24 | 19 | 0 | 68 | 39 |
| 1980 | 161 | 153 | 23 | 20 | 0 | 70 | 40 |
| Total | 1,417 | 1,351 | 252 | 176 | 0 | 590 | 338 |

[a]Derived from Tables 35 and 63 where the total M.D. projection for a given year is multiplied times the appropriate ratio of Table 63, e.g., in the case of active practice physicians in 1971, 13,846 + 54 times 0.0309 equals 430. Data from the doctors of osteopathy indicated no net migration either way and so the projected total in Table 35 for M.D.'s and D.O.'s combined was not used.

[b]The net figures are a result of using the ratios of Table 63 rather than a subtraction of the values for sections I and II of this table. A small difference between the two methods is therefore possible.

medical doctors only but there is no reason to believe that the doctors of osteopathy would not follow a similar pattern. It is also likely that the osteopaths would not make an appreciable difference in view of their relatively small numbers.

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# CHAPTER XI

## PENNSYLVANIA'S PROJECTED 1971-80 PHYSICIAN NEEDS

### Demand Due to Growth

Table 65 summarizes projections of demand due to growth for the various categories of physician with which this study has been primarily concerned, i.e., all active physicians, physicians in direct patient care, physicians in general practice, internal medicine, pediatrics, general surgery and other specialties in general.

These estimates of growth demand are simply statements of the amount of projected year-to-year change in the growth figures of Table 35 the change estimates for 1971 are based upon the 1971 projections of Table 35 minus actual 1970 figures from the physician distribution series of the American Medical Association or the 1971 directory of the American Osteopathic Association.[2]

It is clear in Table 65 that, as mentioned in Chapter VIII, general practice will end its historic decline and begin to grow around 1977. General surgery is projected as becoming relatively stable in growth from 1977 on, while relatively continuous growth is projected for the other specialties. If correct, the yearly demand due to growth figures will increase over the period 1971-80 by 1978 per cent for active physicians, 156 per cent for physicians in direct patient care, 56 per cent for general and family practice, 118.5 per cent for internal medicine, 550 per cent for pediatrics, 52.5 per cent for general surgery and 92 per cent for other specialties.

The projected growth of the pediatric profession may seem to be excessively high in light of Pennsylvania's declining birth rate, e.g., in 1960 Pennsylvania had 241,099 births,[4] and in 1970,192,154 births.[5] It is further estimated (unpublished) by the Bureau of Educational Statistics, that the figures for 1972 and 1973 will be about 163,838 and 154,000, respectively. Other factors, however, are also playing a role. Parents are, more and more, choosing to take their children to a pediatrician; general practice physicians are becoming increasingly short in numbers relative to the needs; family medicine is too new a specialty to have much impact for some time and, finally, the discrepancy between the presumed optimum care figure for the prepaid group plans and the present population per physician ratio is quite large, suggesting that the standard care ratio arrived at by Medical Economics[3] may be too conservative relative to optimum care needs. In light of the latter considerations, the growth estimate of 550 per cent was accepted as likely to be a valid figure.

### Projections of Physician Need

Projections of Pennsylvania's 1971 through 1980 physician needs are found in Tables 66-72. The methodology used in developing these tables was simply that of combining all of the previous estimates of supply, growth demand and replacement needs due to death, retirement, disability and out-migration in such a way as to derive several different estimates of need.

Each of the tables shows first the number of physicians projected based on Table 35. The next column then lists the demand due to growth figures of Table 65. Death, retirement, disability and out-migration estimates are then listed in successive columns, by year, from Tables 53, 60, 57 and 64, respectively. The figures of the next column, estimated demand, are a summation of the growth, death, retirement, disability and out-migration estimates from the preceding column, e.g., 231 + 189 + 201 + 29 + 430 = 1,080.

The supply column lists yearly estimates of supply taken from Table 22a and assumes that the medical schools will grow as projected in their responses to the survey conducted by the author (Appendix D).

The unmet need column that follows is actually a statement of minimum physician need and is based upon the subtraction of supply from the demand estimates (two preceding columns). These unmet need projections are limited in that they assume that the growth demand figure reflects all of the demand that exists, i.e., that the supply is unconstricted and is capable of filling any existing demand, a questionable assumption in the case of physicians.

As pointed out in Chapter IX, the actual need for physicians, beyond the number available from the present supply sources, can possibly be approximated by the use of optimum physician ratios based upon a survey conducted by the journal Medical Economics.[3] The estimates of optimum care unmet need derived

Table 65

Estimates of Physician Replacement Due to Growth[a]

| Year | Active Physicians | Direct Patient Care | General Practice | Internal Medicine | Pediatrics | General Surgery | Other Specialties |
|---|---|---|---|---|---|---|---|
| 1971 | 231[b] | 210 | - 46[c] | 27 | 8 | 40 | 184 |
| 1972 | 365 | 301 | - 58 | 31 | 32 | 39 | 264 |
| 1973 | 351 | 330 | - 35 | 35 | 35 | 45 | 260 |
| 1974 | 496 | 274 | - 29 | 37 | 39 | 49 | 280 |
| 1975 | 464 | 482 | - 25 | 44 | 41 | 50 | 287 |
| 1976 | 526 | 438 | - 8 | 48 | 46 | 52 | 313 |
| 1977 | 554 | 466 | 1 | 52 | 47 | 61 | 321 |
| 1978 | 609 | 509 | 11 | 54 | 50 | 64 | 343 |
| 1979 | 639 | 534 | 23 | 56 | 52 | 68 | 353 |
| 1980 | 643 | 538 | 26 | 59 | 52 | 61 | 354 |
| Total | 4,878 | 4,082 | -140 | 443 | 402 | 529 | 2,959 |

[a]Based upon the growth projections of Table 35 plus estimates of the number of physicians in 1970 as a base (using the projections of Table 33 for 1970 plus the actual counts in the 1970 edition of the "Distribution of Physicians" published by the AMA with interns and residents excluded).

[b]The 1971 growth replacement was derived by subtracting the 1970 figure from the 1971 figure, i.e., 15,125 (Table 35) minus 13,728 M.D.'s (1970 AMA "Distribution of Physicians") minus 1,166 doctors of osteopathy (direct patient care figure from Table 33). Subsequent replacement due to growth estimates were obtained by a similar subtraction process using the projections of Table 35, e.g., 15,490 - 15,125 = 365 for 1972.

[c]A negative figure represents negative growth, i.e., a net loss in numbers.

Table 66

Projected Active Physician Needs (1971-80)

| Year | Projected Physicians[a] | Growth[b] | Deaths[c] | Retire-ment[d] | Dis-ability[e] | Out-migration[f] | Estimated Demand | Supply[g] | Unmet Need | Optimum Care Unmet Need[h] | Total Unmet Need | Possible Foreign Trained Re-placement[g] | Maximum Possible Need |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 15,125 | 231 | 189 | 201 | 29 | 430 | 1,080 | 676 | 404 | 166 | 570 | 157 | 727 |
| 1972 | 15,490 | 365 | 194 | 204 | 29 | 440 | 1,232 | 744 | 488 | 166 | 654 | 171 | 825 |
| 1973 | 15,841 | 351 | 199 | 208 | 32 | 451 | 1,241 | 766 | 475 | 166 | 641 | 174 | 815 |
| 1974 | 16,337 | 496 | 204 | 215 | 34 | 463 | 1,412 | 819 | 593 | 166 | 759 | 187 | 946 |
| 1975 | 16,801 | 464 | 210 | 218 | 35 | 476 | 1,403 | 838 | 565 | 166 | 731 | 192 | 923 |
| 1976 | 17,327 | 526 | 217 | 224 | 37 | 490 | 1,494 | 907 | 587 | 166 | 753 | 206 | 959 |
| 1977 | 17,881 | 554 | 224 | 230 | 38 | 505 | 1,551 | 945 | 606 | 166 | 772 | 212 | 984 |
| 1978 | 18,490 | 609 | 231 | 239 | 41 | 521 | 1,641 | 1,000 | 641 | 166 | 807 | 223 | 1,030 |
| 1979 | 19,129 | 639 | 239 | 245 | 42 | 537 | 1,702 | 1,042 | 660 | 166 | 826 | 229 | 1,055 |
| 1980 | 19,772 | 643 | 247 | 252 | 43 | 554 | 1,739 | 1,056 | 683 | 170 | 853 | 233 | 1,086 |
| Total | - | 4,878 | 2,154 | 2,236 | 360 | 4,867 | 14,495 | 8,793 | 5,702 | (1,664) | 7,366 | 1,984 | 9,350 |

[a]See Table 35.
[b]See Table 64.
[c]See Table 53.
[d]See Table 60.
[e]See Table 57.
[f]See Table 64.
[g]See Table 22a (Includes in-migration).
[h]See Table 41 where 1,664 will be needed by 1980 or about 166 per year plus 4 more or 170 the last year, i.e., 1,664 ÷ 10 = 166.4 per year.

Table 67

Projected Direct Patient Care Physician Needs (1971-80)

| Year | Projected Physicians[a] | Growth[b] | Deaths[c] | Retirement[d] | Disability[e] | Out-Migration[f] | Estimated Demand | Supply[g] | Unmet Need | Optimum Care Unmet Need[h] | Total Unmet Need | Possible Foreign Trained Replacement[g] | Maximum Possible Need |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 13,392 | 210 | 167 | 180 | 25 | 331 | 913 | 544 | 369 | 166 | 535 | 135 | 670 |
| 1972 | 13,693 | 301 | 171 | 182 | 25 | 339 | 1,018 | 614 | 404 | 166 | 570 | 148 | 718 |
| 1973 | 14,023 | 330 | 175 | 186 | 28 | 346 | 1,065 | 631 | 434 | 166 | 600 | 150 | 750 |
| 1974 | 14,297 | 274 | 179 | 191 | 29 | 355 | 1,028 | 676 | 352 | 166 | 518 | 161 | 679 |
| 1975 | 14,779 | 482 | 185 | 194 | 30 | 364 | 1,255 | 689 | 566 | 166 | 732 | 164 | 896 |
| 1976 | 15,217 | 438 | 190 | 199 | 32 | 374 | 1,233 | 750 | 483 | 166 | 649 | 178 | 827 |
| 1977 | 15,683 | 466 | 196 | 204 | 32 | 385 | 1,283 | 783 | 500 | 166 | 666 | 184 | 850 |
| 1978 | 16,192 | 509 | 202 | 211 | 35 | 396 | 1,353 | 829 | 524 | 166 | 690 | 192 | 882 |
| 1979 | 16,726 | 534 | 209 | 216 | 36 | 408 | 1,403 | 864 | 539 | 166 | 705 | 197 | 902 |
| 1980 | 17,264 | 538 | 216 | 222 | 37 | 419 | 1,432 | 877 | 555 | 170 | 725 | 201 | 926 |
| Total | - | 4,082 | 1,890 | 1,985 | 309 | 3,717 | 11,983 | 7,257 | 4,726 | (1,664) | 6,390 | 1,710 | 8,100 |

[a]See Table 35.

[b]See Table 64.

[c]See Table 53.

[d]See Table 60

[e]See Table 57

[f]See Table 64.

[g]See Table 22a (Includes in-migration)

[h]See Note h in Table 66.

Table 68

Projected Direct Patient Care General/Family Practice Physician Needs (1971-80)

| Year | Projected Physicians[a] | Growth[b] | Deaths[c] | Retirement[d] | Disability[e] | Out-migration[f] | Estimated Demand | Supply[g] | Unmet Need | Optimum Care Unmet Need[h] | Total Unmet Need | Possible Foreign Trained Replacement[g] | Maximum Possible Need |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 3,987 | -46 | 78 | 75 | 6 | 37 | 196 | 138 | 58 | 245 | 303 | 25 | 328 |
| 1972 | 3,929 | -58 | 79 | 76 | 7 | 36 | 198 | 153 | 45 | 257 | 302 | 25 | 327 |
| 1973 | 3,894 | -35 | 80 | 76 | 8 | 35 | 199 | 164 | 35 | 234 | 269 | 29 | 298 |
| 1974 | 3,865 | -29 | 80 | 77 | 8 | 34 | 199 | 172 | 27 | 228 | 255 | 29 | 284 |
| 1975 | 3,840 | -25 | 81 | 77 | 9 | 34 | 201 | 176 | 25 | 224 | 249 | 29 | 278 |
| 1976 | 3,832 | - 8 | 81 | 78 | 9 | 33 | 201 | 194 | 7 | 207 | 214 | 33 | 247 |
| 1977 | 3,833 | 1 | 81 | 78 | 9 | 33 | 202 | 205 | ( 3)[i] | 199 | 196 | 33 | 229 |
| 1978 | 3,844 | 11 | 81 | 77 | 9 | 32 | 210 | 220 | (10) | 199 | 189 | 33 | 222 |
| 1979 | 3,867 | 23 | 80 | 77 | 8 | 32 | 220 | 234 | (14) | 199 | 185 | 33 | 218 |
| 1980 | 3,893 | 26 | 80 | 76 | 8 | 31 | 221 | 240 | (19) | 200 | 181 | 38 | 219 |
| Total | | 61 | 801 | 767 | 81 | 337 | 2,047 | 1,896 | 151 | 2,192 | 2,343 | 307 | 2,650 |

[a]See Table 35.

[b]See Table 34. Negative figures indicate a decrement rather than growth which is reflected in the Optimum Care Unmet Need column as in Note h, below.

[c]Based on Table 53 but represents arbitrary estimates based on knowledge that average age is rising as total declines.

[d]Based on Table 60 but represents an arbitrary estimate as in Note c, above.

[e]Based on Table 57 but represents an arbitrary estimate as in Notes c and d, above.

[f]See Table 64.

[g]See Table 22a (includes in-migration).

[h]See Table 41 where 2,192 will be needed by 1980 or about 199 to 200 per year plus the number needed to compensate negative growth, i.e., 199 + 46 = 245, 199 + 58 = 257, etc.

[i]Indicates supply exceeds demand if no effort to move to optimum level or to recoup loss in numbers is made. Loss alone is 201 physicians so 352 or 35 more per year is needed just to maintain projected growth.

Table 69

Projected Direct Patient Care Internal Medicine Needs (1971-80)

| Year | Projected Physicians[a] | Growth[b] | Death[c] | Retirement[d] | Disability[e] | Out-migration[f] | Estimated Demand | Supply[g] | Unmet Need | Optimum Care Unmet Need[h] | Total Unmet Need | Possible Foreign Trained Replacement[g] | Maximum Possible Need |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 1,393 | 27 | 16 | 19 | 2 | 42 | 106 | 65 | 41 | 62 | 103 | 18 | 121 |
| 1972 | 1,424 | 31 | 16 | 19 | 2 | 43 | 111 | 72 | 39 | 62 | 101 | 21 | 122 |
| 1973 | 1,459 | 35 | 16 | 19 | 3 | 44 | 117 | 75 | 42 | 62 | 104 | 21 | 125 |
| 1974 | 1,496 | 37 | 17 | 20 | 3 | 45 | 122 | 79 | 43 | 62 | 105 | 24 | 129 |
| 1975 | 1,540 | 44 | 17 | 20 | 3 | 46 | 130 | 86 | 44 | 62 | 106 | 24 | 130 |
| 1976 | 1,588 | 48 | 18 | 21 | 3 | 48 | 138 | 90 | 48 | 62 | 110 | 24 | 134 |
| 1977 | 1,640 | 52 | 18 | 22 | 3 | 49 | 144 | 93 | 51 | 62 | 113 | 26 | 139 |
| 1978 | 1,694 | 54 | 19 | 23 | 3 | 51 | 150 | 99 | 51 | 62 | 113 | 27 | 140 |
| 1979 | 1,750 | 56 | 20 | 23 | 3 | 52 | 154 | 101 | 53 | 62 | 115 | 28 | 143 |
| 1980 | 1,809 | 59 | 20 | 24 | 4 | 54 | 161 | 104 | 57 | 67 | 124 | 30 | 154 |
| Total | | 443 | 177 | 210 | 29 | 474 | 1,333 | 864 | 469 | 625 | 1,094 | 243 | 1,337 |

[a]See Table 35.

[b]See Table 64.

[c]See Table 53.

[d]See Table 60.

[e]See Table 57.

[f]See Table 64.

[g]See Table 22a (includes in-migration).

[h]See Table 41 where 625 will be needed by 1980 or about 62 more per year on the average plus 5 more or 67 the last year, i.e., 625 ÷ 10 = 62.5 per year.

Table 70

Projected Direct Patient Care Pediatric Physician Needs (1971-80)

| Year | Projected Physicians[a] | Growth[b] | Deaths[c] | Retirement[d] | Disability[e] | Out-migration[f] | Estimated Demand | Supply[g] | Unmet Need | Optimum Care Unmet Need[h] | Total Unmet Need | Possible Foreign Trained Replacement[g] | Maximum Possible Need |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 631 | 8 | 5 | 4 | 1 | 29 | 47 | 43 | 4 | 19 | 23 | 6 | 29 |
| 1972 | 663 | 32 | 6 | 4 | 1 | 31 | 74 | 45 | 29 | 19 | 48 | 6 | 54 |
| 1973 | 698 | 35 | 6 | 4 | 2 | 32 | 79 | 49 | 30 | 19 | 49 | 6 | 55 |
| 1974 | 737 | 39 | 6 | 5 | 2 | 34 | 86 | 51 | 35 | 19 | 54 | 6 | 60 |
| 1975 | 778 | 41 | 6 | 5 | 2 | 36 | 90 | 55 | 35 | 19 | 54 | 6 | 60 |
| 1976 | 824 | 46 | 7 | 5 | 3 | 38 | 99 | 58 | 41 | 19 | 60 | 6 | 66 |
| 1977 | 871 | 47 | 7 | 5 | 3 | 40 | 102 | 61 | 41 | 19 | 60 | 6 | 66 |
| 1978 | 921 | 50 | 8 | 6 | 3 | 42 | 109 | 62 | 47 | 19 | 66 | 6 | 72 |
| 1979 | 973 | 52 | 8 | 6 | 3 | 45 | 114 | 66 | 48 | 19 | 67 | 6 | 73 |
| 1980 | 1,025 | 52 | 9 | 6 | 3 | 47 | 117 | 66 | 51 | 21 | 72 | 7 | 79 |
| Total | | 402 | 68 | 50 | 23 | 374 | 917 | 556 | 361 | 192 | 553 | 61 | 614 |

[a]See Table 35.

[b]See Table 64.

[c]See Table 53.

[d]See Table 60.

[e]See Table 57.

[f]See Table 64.

[g]See Table 22a (includes in-migration).

[h]See Table 41 where 192 will be needed by 1980 or about 19 per year (21 the last year) on the average, i.e., 192 ÷ 10 = 19.2.

Table 71

Projected Direct Patient Care General Surgery Needs (1971-80)

| Year | Projected Physicians[a] | Growth[b] | Deaths[c] | Retirement[d] | Disability[e] | Out-migration[f] | Estimated Demand | Supply[g] | Unmet Need | Optimum Care Unmet Need[h] | Total Unmet Need | Possible Foreign Trained Replacement[g] | Maximum Possible Need |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 1,146 | 40 | 13 | 7 | 2 | 11 | 73 | 68 | 5 | ( 41)[i] | ( 36)[i] | 14 | ( 22)[i] |
| 1972 | 1,185 | 39 | 14 | 7 | 2 | 11 | 73 | 71 | 2 | ( 41) | ( 39) | 15 | ( 24) |
| 1973 | 1,230 | 45 | 14 | 8 | 2 | 12 | 81 | 75 | 6 | ( 41) | ( 35) | 15 | ( 20) |
| 1974 | 1,279 | 49 | 15 | 8 | 3 | 12 | 87 | 80 | 7 | ( 41) | ( 34) | 15 | ( 19) |
| 1975 | 1,329 | 50 | 16 | 8 | 3 | 13 | 90 | 80 | 10 | ( 41) | ( 31) | 15 | ( 16) |
| 1976 | 1,381 | 52 | 16 | 9 | 3 | 13 | 93 | 83 | 10 | ( 41) | ( 31) | 15 | ( 16) |
| 1977 | 1,442 | 61 | 17 | 9 | 3 | 14 | 104 | 92 | 12 | ( 41) | ( 29) | 15 | ( 14) |
| 1978 | 1,506 | 64 | 18 | 9 | 4 | 15 | 110 | 94 | 16 | ( 41) | ( 25) | 15 | ( 10) |
| 1979 | 1,574 | 68 | 18 | 10 | 4 | 15 | 115 | 99 | 16 | ( 41) | ( 25) | 15 | ( 10) |
| 1980 | 1,635 | 61 | 19 | 10 | 4 | 16 | 110 | 99 | 11 | ( 49) | ( 38) | 17 | ( 21) |
| Total | | 529 | 153 | 85 | 30 | 132 | 929 | 841 | 88 | (418) | (330) | 152 | (178) |

[a]See Table 35.

[b]See Table 64.

[c]See Table 53.

[d]See Table 60.

[e]See Table 57.

[f]See Table 64.

[g]See Table 22a (includes in-migration).

[h]See Table 41 where there will be a surplus of 418 physicians by 1980 or 41 per year surplus (49 in 1980).

[i]Parentheses indicate surplus physicians over optimum.

Table 72

Projected Direct Patient Care Physician Need In Other Specialties (1971-80)

| Year | Projected Physicians[a] | Growth[b] | Deaths[c] | Retire-ment[d] | Dis-ability[e] | Out-migration[f] | Estimated Demand | Supply[g] | Unmet Need | Optimum Care Unmet Need[h] | Total Unmet Need | Possible Foreign Trained Re-placement[g] | Maximum Possible Need |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 6,238 | 184 | 69 | 75 | 14 | 224 | 566 | 274 | 292 | ( 104) | 188 | 72 | 260 |
| 1972 | 6,502 | 264 | 72 | 78 | 14 | 233 | 661 | 304 | 357 | ( 104) | 253 | 80 | 333 |
| 1973 | 6,762 | 260 | 74 | 81 | 15 | 243 | 673 | 310 | 363 | ( 104) | 259 | 81 | 340 |
| 1974 | 7,042 | 280 | 77 | 85 | 15 | 253 | 710 | 333 | 377 | ( 104) | 273 | 87 | 360 |
| 1975 | 7,329 | 287 | 81 | 88 | 16 | 263 | 735 | 338 | 397 | ( 104) | 293 | 88 | 381 |
| 1976 | 7,642 | 313 | 84 | 92 | 17 | 274 | 780 | 367 | 413 | ( 104) | 309 | 96 | 405 |
| 1977 | 7,963 | 321 | 88 | 96 | 18 | 286 | 809 | 380 | 429 | ( 104) | 325 | 99 | 424 |
| 1978 | 8,306 | 343 | 91 | 100 | 19 | 298 | 851 | 400 | 451 | ( 104) | 347 | 103 | 450 |
| 1979 | 8,659 | 353 | 95 | 104 | 20 | 310 | 882 | 414 | 468 | ( 104) | 364 | 106 | 470 |
| 1980 | 9,013 | 354 | 99 | 108 | 20 | 322 | 903 | 423 | 480 | ( 112) | 368 | 108 | 476 |
| Total | | 2,959 | 830 | 907 | 168 | 2,706 | 7,570 | 3,543 | 4,027 | (1,048) | 2,979 | 920 | 3,899 |

[a]See Table 35.

[b]See Table 64.

[c]See Table 53.

[d]See Table 60.

[e]See Table 57.

[f]See Table 64.

[g]See Table 22a (includes in-migration).

[h]See Table 41 where there will be a surplus of 1,048 physicians by 1980 or an average excess of 104 per year (112 the last year).

[i]Parentheses indicate surplus physicians.

from the Medical Economics data found in Table 41 of Chapter IX have been entered into the need tables of this chapter, i.e., into the column entitled optimum care unmet need.

The total unmet need column of Tables 66 to 72 is then a result of summing the values of the preceding two columns. The figures in this column represent an estimate of our physician needs, if we continue to depend upon foreign-trained physicians and wish to optimize our medical care system.

These tables, in effect, assume that no geographic maldistribution problem exists and, therefore, specify only the number needed to redress the specialty maldistribution problem.

The last two columns of Tables 66 to 72 represent an attempt to estimate the maximum possible need that might result if we wished to optimize our medical care but could no longer utilize foreign-trained physicians to meet our active physician needs, either as a result of a policy decision on our part or a shutoff of supply by the foreign nations involved. For example, in Table 66 we see that we would need to produce or import, during the period 1971-80, 5,702 physicians in order to maintain the estimated probable growth, 7,366 physicians in order to meet optimum care standards, and 9,350 physicians would have to be produced or imported from other states if we ended our dependence on foreign-trained physicians. Such physicians now supply around 20 per cent of our new physicianseach year. For example, in Table 66, the number of foreign-trained physicians who would either enter medical practice between 1971 and 1980 is 1,984. This figure is simply added to the total unmet need figure of the preceding column to arrive at the maximum possible need figure found in the last column of the table.

## Implications of Need Estimates For Medical Schools

Tables 73 through 79 are an attempt to estimate the increase in class size that would be needed for Pennsylvania to meet the optimum care standards of the total unmet need columns of Tables 66 to 72 or the maximum probable growth standards of the unmet need columns of Tables 66 to 72, i.e., how much larger would the classes have to be in order to meet these estimates of need without recourse to increased importation of foreign- and other state-trained physicians.

In general, these tables suggest that we would have to increase class sizes to 2.5 to 3 times their present size to meet the need or else find ways to, at a minimum, get some 87 per cent of our students to remain in the state and enter the various specialties according to our true needs (Table 73). To meet optimum care standards the state would have to get 100 per cent of its students to remain in Pennsylvania plus a concommitant 2 per cent increase in the projected graduate output (Table 73). This assumes that we will train doctors in specialties according to our actual specialty needs.

An increase in retention rate (holding power) seems likely to be feasible, but these figures suggest that we will also require some increase in class size. The required increase will shrink as the retention or holding power of the state is increased from the present figure of 35 per cent (Table 6).

The tables for physician subcategories assume that the present holding power of the state will remain the same. They also indicate where the training needs for increased specialty output and retention lie. General surgery, for example, would require virtually no increase in the present graduate output or the holding rate of Table 6.

## Summary of Need Findings

The medical schools will have to be expanded more than is now projected if we are to meet our needs. The degree of expansion required will vary as the ability of the state to hold its graduates as practitioners within the state increases. At a minimum, we would have to produce or import around 2.5 to 3 times as many physicians as we now project in order to meet our needs unless we can increase our holding power with regard to our own graduates by, for example, increasing the proportion of Pennsylvania resident graduates or by increasing the number of medical students with a rural background.

Table 73

Active Physician Implications of Table 66 for Pennsylvania's Medical School Class Size or Physician Retention Rate

| Year | Projected Pa. Graduates[a] | Projected Pa. Trained Supply[b] | Projected Total Unmet Need[c] | Total Needed | Class Size Increase for Optimum Care | Percentage of Projected Pa. Graduates Needed | Projected Minimum Unmet Need[c] | Minimum Total Need | Class Size Increase Required | Percentage of Projected Pa. Graduates Needed |
|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 847 | 297 | 570 | 867[d] | 2.9[e] | 102[f] | 404 | 701[d] | 2.4[e] | 83[f] |
| 1972 | 935 | 328 | 654 | 982 | 3.0 | 105 | 488 | 816 | 2.5 | 87 |
| 1973 | 963 | 339 | 641 | 980 | 2.9 | 102 | 475 | 814 | 2.4 | 85 |
| 1974 | 1,031 | 362 | 759 | 1,121 | 3.1 | 109 | 593 | 955 | 2.6 | 93 |
| 1975 | 1,053 | 370 | 731 | 1,101 | 3.0 | 105 | 565 | 935 | 2.5 | 89 |
| 1976 | 1,143 | 402 | 753 | 1,155 | 2.9 | 101 | 587 | 989 | 2.5 | 87 |
| 1977 | 1,196 | 421 | 772 | 1,193 | 2.8 | 100 | 606 | 1,027 | 2.4 | 86 |
| 1978 | 1,264 | 447 | 807 | 1,254 | 2.8 | 99 | 641 | 1,088 | 2.4 | 86 |
| 1979 | 1,320 | 468 | 826 | 1,294 | 2.8 | 98 | 660 | 1,128 | 2.4 | 85 |
| 1980 | 1,340 | 474 | 853 | 1,327 | 2.8 | 99 | 683 | 1,157 | 2.4 | 86 |
| Total | 11,092 | 3,908 | 7,366 | 11,274 | 2.9 | 102 | 5,702 | 9,610 | 2.5 | 87 |

[a]See Table 4.

[b]See Table 22a (M.D. and D.O. final estimates).

[c]See Table 66, Total Unmet Need and/or Unmet Need.

[d]E.g., 297 + 570 = 867 or 404 + 297 = 701.

[e]E.g., 867 ÷ 297 = 2.9 or 701 ÷ 297 = 2.4.

[f]E.g., 867 ÷ 847 = 1.02 (1.02 per cent) or 701 ÷ 847 = 0.83 (83 per cent).

Table 74

Direct Patient Care Implications of Table 67 for Pennsylvania's Medical School Class Size or Physician Retention Rate

| Year | Projected Pa. Graduates[a] | Projected Pa. Trained Supply[b] | Projected Total Unmet Need[c] | Total Needed | Class Size Increase for Optimum Care | Percentage of Projected Pa. Graduates Needed | Projected Minimum Unmet Need[c] | Minimum Total Need | Class Size Increase Required | Percentage of Projected Pa. Graduates Needed |
|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 847 | 280 | 535 | 815[d] | 2.9[e] | 96[f] | 369 | 649[d] | 2.3[e] | 77[f] |
| 1972 | 935 | 311 | 570 | 881 | 2.8 | 94 | 404 | 715 | 2.3 | 76 |
| 1973 | 963 | 321 | 600 | 921 | 2.7 | 91 | 434 | 755 | 2.4 | 78 |
| 1974 | 1,031 | 343 | 518 | 861 | 2.5 | 84 | 352 | 695 | 2.0 | 67 |
| 1975 | 1,053 | 350 | 732 | 1,082 | 3.1 | 103 | 566 | 916 | 2.6 | 87 |
| 1976 | 1,143 | 381 | 649 | 1,030 | 2.7 | 90 | 483 | 864 | 2.3 | 76 |
| 1977 | 1,196 | 399 | 666 | 1,065 | 2.7 | 89 | 500 | 899 | 2.3 | 75 |
| 1978 | 1,264 | 424 | 690 | 1,114 | 2.6 | 88 | 524 | 948 | 2.2 | 75 |
| 1979 | 1,320 | 444 | 705 | 1,149 | 2.6 | 87 | 539 | 979 | 2.2 | 74 |
| 1980 | 1,340 | 450 | 725 | 1,175 | 2.6 | 88 | 555 | 1,005 | 2.2 | 75 |
| Total | 11,092 | 3,703 | 6,390 | 10,093 | 2.7 | 91 | 4,726 | 8,429 | 2.3 | 76 |

[a] See Table 4.

[b] See Table 22a (M.D. and D.O. final estimates).

[c] See Table 67, Total Unmet Need and/or Unmet Need.

[d] E.g., 280 + 535 = 815 or 280 + 369 = 649.

[e] E.g., 815 ÷ 280 = 2.9 or 649 ÷ 280 = 2.3.

[f] E.g., 815 ÷ 847 = 0.96 (96 per cent) or 649 ÷ 847 = 0.77 (77 per cent).

Table 75

Direct Care General/Family Practice Implications of Table 68 for Pennsylvania's Medical School Class Size of Physician Retention Rate

| Year | Projected Pa. Graduates[a] | Projected Pa. Trained Supply[b] | Projected Total Unmet Need[c] | Total Needed | Class Size Increase For Required Optimum Care | Percentage of Projected Pa. Graduates Needed | Projected Minimum Unmet Need[d] | Minimum Total Need | Class Size Increase Required | Percentage of Projected Pa. Graduates Needed |
|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 847 | 76 | 303 | 379[e] | 5.0[f] | 45[g] | 242 | 318[e] | 4.2[f] | 38[g] |
| 1972 | 935 | 87 | 302 | 389 | 4.5 | 42 | 256 | 343 | 3.9 | 37 |
| 1973 | 963 | 91 | 269 | 360 | 4.0 | 37 | 234 | 325 | 3.6 | 34 |
| 1974 | 1,031 | 97 | 255 | 352 | 3.6 | 34 | 228 | 325 | 3.4 | 32 |
| 1975 | 1,053 | 99 | 249 | 348 | 3.5 | 33 | 226 | 325 | 3.3 | 31 |
| 1976 | 1,143 | 109 | 214 | 323 | 3.0 | 28 | 209 | 318 | 2.9 | 28 |
| 1977 | 1,196 | 117 | 196 | 313 | 2.7 | 26 | 202 | 319 | 2.7 | 26 |
| 1978 | 1,264 | 127 | 189 | 316 | 2.5 | 25 | 210 | 337 | 2.7 | 27 |
| 1979 | 1,320 | 136 | 185 | 321 | 2.4 | 24 | 220 | 356 | 2.6 | 27 |
| 1980 | 1,340 | 137 | 181 | 318 | 2.3 | 24 | 221 | 358 | 2.6 | 27 |
| Total | 11,092 | 1,076 | 2,343 | 3,419 | 3.2 | 31 | 2,047 | 3,123 | 2.9 | 28 |

[a] See Table 4.

[b] See Table 22a (M.D. and D.O. final estimates).

[c] See Table 68, Total Unmet Need.

[d] Derived from Table 68 but assumes maintenance of the 1970 status quo and therefore, includes the decremental growth figures from the replacement due to Growth column.

[e] E.g., 703 + 303 = 379 or 242 + 76 = 318.

[f] E.g., 379 ÷ 76 = 5.0 or 318 ÷ 76 = 3.9.

[g] E.g., 379 ÷ 847 = 0.45 (45 per cent) or 318 ÷ 847 = 0.37 (37 per cent).

Table 76

Direct Care Internal Medicine Implications of Table 69 for Pennsylvania's Medical School Class Size or Physician Retention Rate

| Year | Projected Pa. Graduates[a] | Projected Pa. Trained Supply[b] | Projected Total Unmet Need[c] | Total Needed | Class Size Increase for Optimum Care | Percentage of Projected Pa. Graduates Needed | Projected Minimum Unmet Need[c] | Minimum Total Need | Class Size Increase Required | Percentage of Projected Pa. Graduates Needed |
|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 847 | 34 | 103 | 137[d] | 4.0[e] | 16[f] | 41 | 75[d] | 2.2[e] | 9[f] |
| 1972 | 935 | 37 | 101 | 138 | 3.7 | 15 | 39 | 76 | 2.1 | 8 |
| 1973 | 963 | 39 | 104 | 143 | 3.7 | 15 | 42 | 81 | 2.1 | 8 |
| 1974 | 1,031 | 40 | 105 | 145 | 3.6 | 14 | 43 | 83 | 2.1 | 8 |
| 1975 | 1,053 | 43 | 106 | 149 | 3.5 | 14 | 44 | 87 | 2.0 | 8 |
| 1976 | 1,143 | 47 | 110 | 157 | 3.3 | 14 | 48 | 95 | 2.0 | 8 |
| 1977 | 1,196 | 47 | 113 | 160 | 3.4 | 13 | 51 | 98 | 2.1 | 8 |
| 1978 | 1,264 | 50 | 113 | 163 | 3.3 | 13 | 51 | 101 | 2.0 | 8 |
| 1979 | 1,320 | 51 | 115 | 166 | 3.3 | 13 | 53 | 104 | 2.0 | 8 |
| 1980 | 1,340 | 52 | 124 | 176 | 3.4 | 13 | 57 | 109 | 2.1 | 8 |
| Total | 11,092 | 440 | 1,094 | 1,534 | 3.5 | 14 | 469 | 909 | 2.1 | 8 |

[a] See Table 4.

[b] See Table 22a (M.D. and D.O. final estimates).

[c] See Table 69, Total Unmet Need and/or Unmet Need.

[d] E.g., 34 + 103 = 137 or 34 + 41 = 75.

[e] E.g., 137 ÷ 34 = 4.0 or 75 ÷ 34 = 2.2.

[f] E.g., 137 ÷ 847 = 0.16 (16 per cent) or 75 ÷ 847 = 0.08 (8 per cent).

Table 77

Direct Care Pediatric Physician Implications of Table 70 for Pennsylvania's Medical School Class Size or Physician Retention Rate

| Year | Projected Pa. Graduates[a] | Projected Pa. Trained Supply[b] | Projected Total Unmet Need[c] | Total Needed | Class Size Increase for Optimum Care | Percentage of Projected Pa. Graduates Needed | Projected Minimum Unmet Need[c] | Minimum Total Need | Class Size Increase Required | Percentage of Projected Pa. Graduates Needed |
|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 847 | 25 | 23 | 48[d] | 1.9[e] | 6[f] | 4 | 29[d] | 1.2[e] | 3[f] |
| 1972 | 935 | 27 | 48 | 75 | 2.8 | 8 | 29 | 56 | 2.1 | 6 |
| 1973 | 963 | 29 | 49 | 78 | 2.7 | 8 | 30 | 59 | 2.0 | 6 |
| 1974 | 1,031 | 30 | 54 | 84 | 2.8 | 8 | 35 | 65 | 2.2 | 6 |
| 1975 | 1,053 | 31 | 54 | 85 | 2.7 | 8 | 35 | 66 | 2.1 | 6 |
| 1976 | 1,143 | 33 | 60 | 93 | 2.8 | 8 | 41 | 74 | 2.2 | 6 |
| 1977 | 1,196 | 35 | 60 | 95 | 2.7 | 8 | 41 | 76 | 2.2 | 6 |
| 1978 | 1,264 | 36 | 66 | 102 | 2.8 | 8 | 47 | 83 | 2.3 | 7 |
| 1979 | 1,320 | 38 | 67 | 105 | 2.8 | 8 | 48 | 86 | 2.3 | 7 |
| 1980 | 1,340 | 38 | 72 | 110 | 2.9 | 8 | 51 | 89 | 2.3 | 7 |
| Total | 11,092 | 306 | 553 | 853 | 2.8 | 8 | 361 | 667 | 2.2 | 6 |

[a] See Table 4.

[b] See Table 22a (M.D. and D.O. final estimates).

[c] See Table 70, Total Unmet Need and/or Unmet Need.

[d] E.g., 25 + 23 = 48 or 25 + 4 = 29.

[e] E.g., 48 ÷ 25 = 1.9 or 29 ÷ 25 = 1.2.

[f] E.g., 48 ÷ 847 = 0.06 (6 per cent) or 29 ÷ 847 = 0.03 (3 per cent).

Table 78

Direct Care General Surgery Implications of Table 71 for Pennsylvania's Medical School Class Size or Physician Retention Rate

| Year | Projected Pa. Graduates[a] | Projected Pa. Trained Supply[b] | Projected Total Unmet Need[c] | Total Needed | Class Size Increase for Optimum Care | Percentage of Projected Pa. Graduates Needed | Projected Minimum Unmet Need[c] | Minimum Total Need | Class Size Increase Required | Percentage of Projected Pa. Graduates Needed |
|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 847 | 31 | (36)[d] | (-5)[e] | 0.0[f] | 0.0[g] | 0(-41)[d] | (-10)[e] | 0.0[f] | 0[g] |
| 1972 | 935 | 34 | (39) | (-5) | 0.0 | 0.0 | 0(-41) | (- 7) | 0.0 | 0 |
| 1973 | 963 | 36 | (35) | 1 | 0.0 | 0.0 | 0(-41) | (- 5) | 0.0 | 0 |
| 1974 | 1,031 | 38 | (34) | 4 | 0.1 | 0.4 | 0(-41) | (- 3) | 0.0 | 0 |
| 1975 | 1,053 | 38 | (31) | 7 | 0.2 | 0.7 | 0(-41) | (- 3) | 0.0 | 0 |
| 1976 | 1,143 | 39 | (31) | 8 | 0.2 | 0.7 | 0(-41) | (- 2) | 0.0 | 0 |
| 1977 | 1,196 | 42 | (29) | 13 | 0.3 | 1.1 | 0(-41) | 1 | 0.0 | 0 |
| 1978 | 1,264 | 44 | (25) | 19 | 0.4 | 1.5 | 0(-41) | 3 | 0.1 | 0 |
| 1979 | 1,320 | 47 | (25) | 22 | 0.5 | 1.7 | 0(-41) | 6 | 0.1 | 0 |
| 1980 | 1,340 | 47 | (38) | 9 | 0.2 | 0.7 | 0(-49) | (- 2) | 0.0 | 0 |
| Total | 11,092 | 396 | (323) | 73 | 0.6 | 0.2 | 0(-418) | (-22) | 0.0 | 0 |

[a]See Table 4.

[b]See Table 22a (M.D. and D.O. final estimates).

[c]See Table 71, Total Unmet Need and/or Unmet Need.

[d]Parentheses indicate surplus rather than Need.

[e]E.g., 31 + (-36) = (-5) or 31 + (-41) = (-10).

[f]E.g., (-5) + 31 = 0 increase (actually fewer are needed) or (-10) + 31 = 0.

[g]E.g., (-5) + 847 = -0.006 (0 per cent increase) or (-10) + 847 = 0.012 (0 per cent increase).

Table 79

Other Specialty Direct Care Implications of Table 72 for Pennsylvania's Medical School Class Size or Physician Retention Rate

| Year | Projected Pa. Graduates[a] | Projected Pa. Trained Supply[b] | Projected Total Unmet Need[c] | Total Needed | Class Size Increase for Optimum Care | Percentage of Projected Pa. Graduates Needed | Projected Minimum Unmet Need[c] | Minimum Total Need | Class Size Increase Required | Percentage of Projected Pa. Graduates Needed |
|---|---|---|---|---|---|---|---|---|---|---|
| 1971 | 847 | 134 | 188 | 322[d] | 2.4[e] | 38[f] | 188 | 322[d] | 2.4[e] | 38[f] |
| 1972 | 935 | 148 | 253 | 401 | 2.7 | 43 | 253 | 401 | 2.7 | 43 |
| 1973 | 963 | 151 | 259 | 410 | 2.7 | 43 | 259 | 410 | 2.7 | 43 |
| 1974 | 1,031 | 162 | 273 | 435 | 2.7 | 42 | 273 | 435 | 2.7 | 42 |
| 1975 | 1,053 | 165 | 293 | 458 | 2.8 | 43 | 293 | 458 | 2.8 | 43 |
| 1976 | 1,143 | 179 | 309 | 488 | 2.7 | 43 | 309 | 488 | 2.7 | 43 |
| 1977 | 1,196 | 186 | 325 | 511 | 2.7 | 43 | 325 | 511 | 2.7 | 43 |
| 1978 | 1,264 | 196 | 347 | 543 | 2.8 | 43 | 347 | 543 | 2.8 | 43 |
| 1979 | 1,320 | 203 | 364 | 567 | 2.8 | 43 | 364 | 567 | 2.8 | 43 |
| 1980 | 1,340 | 207 | 368 | 575 | 2.8 | 43 | 368 | 575 | 2.8 | 43 |
| Total | 11,092 | 1,731 | 2,979 | 4,710 | 2.7 | 43 | 2,979 | 4,710 | 2.7 | 43 |

[a] See Table 4.

[b] See Table 22a (M.D. and D.O. final estimates).

[c] Total Unmet Need. Also defines Minimum Unmet Need for this table since a surplus over the optimum exists.

[d] E.G., 134 + 188 = 322.

[e] E.G., 322 ÷ 134 = 2.7.

[f] E.G., 322 ÷ 847 = 0.38 (38 per cent).

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3. *How Many People to Support a Specialist?* Medical Economics, Oradell, N. J., October 30, 1967.

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# CHAPTER XII

# PENNSYLVANIA'S PHYSICIAN MALDISTRIBUTION PROBLEM

The intent of the present chapter is to examine available data concerning the issue of physician maldistribution and, if possible, estimate the current (1971) physician needs for each county and higher education planning region of the state. This should suggest the magnitude of the geographical distribution problem and identify the areas of greatest need with reference to the optimum care standards cited earlier.

In addition, some data regarding expressed preferences of recent Hershey Medical School graduates will be examined to see if any favorable trends can be observed that would suggest an improvement in the situation posed by the state's geographic maldistribution problem.

## Age Maldistribution

Since physicians tend to avoid rural practice, it seems probable that some areas of the state will have a much higher median age for their physicians than would others. Table 80 gives the age distribution for physicians (male) by county and for the state as a whole. Table 81 then lists the number of physicians in each county, their median age and the ranking of each county with regard to median age. A rank of 1 indicates the highest median age (Sullivan County, 64.5 years) and a rank of 67 indicates the county with the lowest median age (Montour County, 37.44 years). The median age for all Pennsylvania physicians is given as 45.85, a figure that is close to the national average of 46 years.[7]

Table 81 also lists, as of 1971, by county, the number of physicians who appear likely to be engaged in full-time medicine (ages 30-74), their median age and their ranking by county. Sullivan County still ranks first with a median age of 64.5 years, but Forest County now ranks 67th with a median age of 39.5 years.

These figures may be seen as indirectly reflecting the severity of need for each county. They suggest that the high ranking counties will lose a higher proportion of their physicians through death, disability and retirement than will the lower ranking counties. They also suggest that these high ranking (high median age) counties will have more difficulty than others in attracting physicians to meet their needs. Table 81 further indicates that seven of the counties have a median age above 59.0 years (Adams, Cameron, Clarion, Pike, Sullivan, Wayne and Wyoming) and will, therefore, lose half of their 1971 male medical physicians through death, retirement or disability by 1980 or so. In addition 12 others will lose somewhere between 25 and 49 per cent of their male medical physicians (median age 55 to 59). These 12 are Bedford, Butler, Carbon, Crawford, Fayette, Franklin, Indiana, Jefferson, Lackawanna, Luzerne, Northumberland and Schuylkill.

## Physician Regional Distribution

Table 82 summarizes for each higher education planning region and for each county in the region, the number of direct patient care medical physicians and doctors of osteopathy in each of the specialty categories emphasized in this report, i.e., general/family practice, internal medicine, general surgery, pediatrics and collectively the other specialties. Only those physicians in direct patient care are tabled since they are the crucial physicians in the problem of maldistribution.

The table also gives a 1972 population estimate (physician data is almost that of 1972, i.e., November 26, 1971) followed by a population per physician ratio for each county and region. For example, the general/family practice population to physician ratio for Bucks County is given as 2,963:1, the Region 1 (Delaware) overall ratio is 2,644:1 and the state's ratio at the end of the table is 2,936:1.

Estimates of the number of physicians needed by the counties and regions in 1972 were computed using the optimum Medical Economics ratios of Table 38.[1] These optimum level estimates are given in Table 82 for each county and region by specialty category. For example, the optimum number of general/family practice physicians for Bucks County would be 215, for Region 1 (Delaware), 1,958 and for the state as a whole, 2,936 direct patient care family physicians. The difference between the optimum number of physicians for a given region or county is, of course, an estimate of the region or county's unmet physician need as of 1972.

The optimum ratios of Table 38 could be applied to county population projections by Senier and Mulvihill[2] in order to estimate the optimum number of physicians needed for any county or region in 1980,

Table 80

Male Physician Age Distribution By County and State[a]

| County | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 | 75-79 | 80-84 | 85-89 | 90-94 | 95-99 | 100-104 | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adams | 0 | 0 | 0 | 2 | 2 | 3 | 6 | 3 | 6 | 3 | 4 | 2 | 2 | 1 | 1 | 0 | 0 | 35 |
| Allegheny | 9 | 375 | 415 | 329 | 361 | 40 | 286 | 224 | 216 | 164 | 90 | 52 | 26 | 17 | 3 | 0 | 0 | 2,907 |
| Armstrong | 0 | 1 | 0 | 5 | 2 | 3 | 10 | 3 | 6 | 4 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 38 |
| Beaver | 0 | 2 | 6 | 18 | 17 | 21 | 21 | 23 | 19 | 11 | 6 | 2 | 2 | 3 | 0 | 0 | 0 | 151 |
| Bedford | 0 | 1 | 0 | 3 | 0 | 3 | 3 | 2 | 4 | 3 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 23 |
| Berks | 0 | 16 | 24 | 51 | 37 | 56 | 40 | 38 | 41 | 32 | 16 | 2 | 8 | 4 | 1 | 1 | 0 | 367 |
| Blair | 0 | 13 | 19 | 33 | 17 | 17 | 15 | 21 | 18 | 7 | 13 | 1 | 6 | 1 | 2 | 0 | 0 | 183 |
| Bradford | 1 | 11 | 10 | 15 | 20 | 12 | 4 | 7 | 6 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 93 |
| Bucks | 0 | 12 | 37 | 56 | 68 | 43 | 41 | 21 | 17 | 15 | 5 | 7 | 0 | 1 | 1 | 0 | 0 | 324 |
| Butler | 0 | 2 | 3 | 9 | 12 | 10 | 6 | 12 | 11 | 8 | 9 | 2 | 2 | 1 | 1 | 0 | 0 | 88 |
| Cambria | 1 | 18 | 21 | 24 | 19 | 32 | 17 | 17 | 24 | 12 | 11 | 3 | 4 | 2 | 2 | 0 | 0 | 207 |
| Cameron | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| Carbon | 0 | 0 | 1 | 3 | 4 | 4 | 3 | 8 | 5 | 3 | 3 | 0 | 1 | 2 | 1 | 0 | 0 | 38 |
| Centre | 0 | 0 | 3 | 8 | 8 | 9 | 11 | 7 | 13 | 9 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 73 |
| Chester | 0 | 8 | 50 | 46 | 50 | 55 | 32 | 28 | 32 | 19 | 12 | 3 | 5 | 3 | 1 | 0 | 0 | 344 |
| Clarion | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 8 |
| Clearfield | 0 | 1 | 1 | 1 | 5 | 11 | 3 | 8 | 8 | 0 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 43 |
| Clinton | 0 | 2 | 0 | 3 | 2 | 6 | 2 | 8 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| Columbia | 0 | 1 | 3 | 3 | 8 | 2 | 8 | 7 | 4 | 2 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 41 |
| Crawford | 0 | 0 | 3 | 10 | 4 | 7 | 6 | 15 | 8 | 6 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 63 |
| Cumberland | 0 | 5 | 21 | 38 | 21 | 24 | 16 | 17 | 16 | 13 | 7 | 2 | 3 | 0 | 0 | 0 | 0 | 84 |
| Dauphin | 3 | 58 | 44 | 60 | 56 | 55 | 34 | 38 | 35 | 25 | 19 | 7 | 6 | 0 | 1 | 0 | 0 | 441 |
| Delaware | 3 | 79 | 104 | 88 | 121 | 113 | 104 | 104 | 44 | 47 | 33 | 13 | 6 | 4 | 4 | 0 | 0 | 867 |
| Elk | 0 | 0 | 2 | 3 | 5 | 5 | 5 | 5 | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 28 |
| Erie | 1 | 11 | 22 | 27 | 33 | 41 | 41 | 31 | 18 | 16 | 12 | 5 | 4 | 1 | 0 | 0 | 0 | 263 |
| Fayette | 0 | 4 | 10 | 1 | 8 | 9 | 15 | 11 | 19 | 6 | 2 | 3 | 6 | 3 | 0 | 0 | 0 | 97 |
| Forest | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| Franklin | 0 | 1 | 5 | 6 | 9 | 8 | 10 | 10 | 17 | 4 | 6 | 3 | 2 | 0 | 0 | 0 | 0 | 81 |
| Fulton | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Greene | 0 | 0 | 1 | 0 | 2 | 2 | 7 | 4 | 2 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 23 |
| Huntingdon | 0 | 0 | 0 | 3 | 2 | 5 | 4 | 4 | 4 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| Indiana | 0 | 0 | 0 | 8 | 3 | 7 | 4 | 4 | 10 | 8 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 47 |
| Jefferson | 0 | 2 | 1 | 1 | 4 | 5 | 2 | 4 | 5 | 4 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 31 |
| Juniata | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 8 |
| Lackawanna | 0 | 1 | 16 | 40 | 19 | 28 | 21 | 32 | 41 | 33 | 9 | 10 | 4 | 3 | 1 | 1 | 0 | 259 |
| Lancaster | 1 | 9 | 23 | 48 | 33 | 46 | 33 | 40 | 30 | 21 | 11 | 7 | 2 | 3 | 2 | 0 | 0 | 309 |
| Lawrence | 0 | 0 | 0 | 8 | 11 | 13 | 9 | 6 | 12 | 8 | 5 | 4 | 0 | 1 | 0 | 0 | 0 | 77 |
| Lebanon | 0 | 1 | 8 | 9 | 11 | 19 | 10 | 19 | 13 | 8 | 7 | 3 | 1 | 0 | 0 | 1 | 0 | 110 |
| Lehigh | 0 | 30 | 32 | 50 | 41 | 38 | 26 | 32 | 30 | 25 | 12 | 11 | 3 | 1 | 1 | 0 | 0 | 332 |
| Luzerne | 0 | 6 | 18 | 36 | 34 | 38 | 37 | 46 | 66 | 35 | 26 | 15 | 6 | 7 | 3 | 0 | 0 | 373 |
| Lycoming | 0 | 2 | 4 | 12 | 15 | 24 | 19 | 13 | 16 | 9 | 3 | 3 | 1 | 0 | 1 | 0 | 0 | 122 |
| McKean | 0 | 0 | [illegible] | 1 | 4 | 7 | 3 | 4 | 6 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 |
| Mercer | 0 | 1 | [illegible] | 10 | 12 | 20 | 17 | 18 | 9 | 5 | 0 | 2 | 6 | 0 | 2 | 0 | 0 | 110 |
| Mifflin | 0 | 0 | 0 | 1 | 4 | 7 | 7 | 3 | 6 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 32 |
| Monroe | 0 | 0 | 6 | 7 | 8 | 4 | 7 | 8 | 5 | 4 | 4 | 3 | 1 | 0 | 0 | 0 | 0 | 57 |
| Montgomery | 1 | 110 | 162 | 190 | 206 | 203 | 140 | 117 | 106 | 92 | 49 | 36 | 14 | 8 | 1 | 0 | 0 | 1,435 |
| Montour | 0 | 30 | 33 | 23 | 17 | 16 | 15 | 5 | 7 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 153 |
| Northampton | 1 | 6 | 26 | 28 | 39 | 41 | 29 | 35 | 32 | 11 | 9 | 5 | 4 | 2 | 0 | 0 | 0 | 268 |
| Northumberland | 0 | 1 | 3 | 2 | 4 | 9 | 7 | 5 | 7 | 10 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 55 |
| Perry | 0 | 0 | 0 | 0 | 2 | 0 | 4 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 10 |
| Philadelphia | 18 | 11,077 | 954 | 627 | 531 | 477 | 420 | 390 | 362 | 262 | 146 | 99 | 55 | 19 | 4 | 4 | 1 | 5,446 |
| Pike | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 7 |
| Potter | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 9 |
| Schuylkill | 0 | 5 | 10 | 11 | 14 | 19 | 10 | 12 | 27 | 15 | 7 | 13 | 4 | 0 | 0 | 0 | 1 | 148 |
| Snyder | 0 | 0 | 1 | 2 | 0 | 7 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| Somerset | 0 | 2 | 2 | 4 | 6 | 5 | 5 | 2 | 6 | 2 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 38 |
| Sullivan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Susquehanna | 0 | 2 | 1 | 1 | 1 | 2 | 4 | 2 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 |
| Tioga | 0 | 0 | 1 | 3 | 2 | 1 | 5 | 1 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 20 |
| Union | 0 | 2 | 1 | 2 | 6 | 2 | 1 | 4 | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 24 |
| Venango | 0 | 0 | 6 | 4 | 6 | 8 | 1 | 5 | 7 | 3 | 5 | 0 | 3 | 0 | 0 | 0 | 0 | 48 |
| Warren | 0 | 3 | 5 | 8 | 8 | 10 | 7 | 6 | 3 | 6 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 62 |
| Washington | 0 | 8 | 14 | 13 | 27 | 17 | 19 | 23 | 18 | 13 | 8 | 3 | 4 | 1 | 0 | 0 | 0 | 168 |
| Wayne | 0 | 2 | 0 | 0 | 2 | 4 | 1 | 1 | 3 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 20 |
| Westmoreland | 0 | 8 | 15 | 41 | 38 | 42 | 31 | 26 | 25 | 24 | 11 | 5 | 0 | 2 | 1 | 0 | 0 | 269 |
| Wyoming | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| York | 0 | 36 | 35 | 36 | 32 | 24 | 31 | 19 | 24 | 24 | 8 | 3 | 2 | 2 | 0 | 0 | 0 | 276 |
| Pennsylvania | 39 | 1,967 | 2,196 | 2,075 | 2,038 | 2,042 | 1,680 | 1,565 | 1,487 | 1,074 | 603 | 360 | 202 | 100 | 35 | 7 | 2 | 17,472 |

[a]Data from AMA tapes November 26, 1971. Data for median intervals are underlined.

Table 81

Total Number, Median Age and Rank Order of Physician Need Due to Death and Retirement for All Male Physicians in Pennsylvania and All Male Physicians in Active Independent Practice Age Range of 30-74 Years by County Residence

| County | Total Male M.D.'s | Median Age Male M.D.'s | M.D. Withdrawal Need Ranking[a] | Total Male M.D.'s 30-74 Years | Median Age M.D.'s 30-74 | 30-74 Years Withdrawal Need Ranking[b] |
|---|---|---|---|---|---|---|
| Pennsylvania | 17,472 | 45.85 | | 14,760 | 47.10 | |
| Adams | 35 | 60.75 | 3.5 | 29 | 57.00 | 4.5 |
| Allegheny | 2,907 | 44.00 | 62 | 2,425 | 46.10 | 59 |
| Armstrong | 33 | 53.50 | 23 | 34 | 53.00 | 23 |
| Beaver | 151 | 52.20 | 32 | 142 | 51.60 | 31 |
| Bedford | 23 | 58.25 | 8 | 18 | 54.50 | 13 |
| Berks | 367 | 49.45 | 43 | 335 | 49.45 | 38 |
| Blair | 183 | 47.29 | 51 | 160 | 47.74 | 51 |
| Bradford | 93 | 41.88 | 64 | 78 | 43.00 | 64 |
| Bucks | 324 | 43.69 | 63 | 303 | 43.80 | 63 |
| Butler | 88 | 54.83 | 19 | 80 | 54.50 | 13 |
| Cambria | 207 | 47.70 | 50 | 177 | 48.33 | 47 |
| Cameron | 2 | 59.50 | 6 | 1 | 42.00 | 65 |
| Carbon | 38 | 57.00 | 9 | 33 | 55.44 | 8 |
| Centre | 73 | 53.36 | 24 | 72 | 53.14 | 22 |
| Chester | 344 | 46.14 | 57 | 324 | 45.95 | 61 |
| Clarion | 8 | 62.00 | 2 | 6 | 57.00 | 4.5 |
| Clearfield | 43 | 53.67 | 22 | 40 | 52.83 | 24 |
| Clinton | 28 | 52.00 | 34 | 26 | 54.50 | 13 |
| Columbia | 41 | 51.69 | 36 | 38 | 51.38 | 33 |
| Crawford | 63 | 55.00 | 18 | 60 | 54.50 | 13 |
| Cumberland | 184 | 45.96 | 58 | 174 | 45.96 | 60 |
| Dauphin | 441 | 44.45 | 60 | 366 | 46.59 | 57 |
| Delaware | 867 | 46.20 | 56 | 758 | 47.42 | 52 |
| Elk | 28 | 48.50 | 47 | 27 | 48.00 | 49.5 |
| Erie | 263 | 49.07 | 44 | 241 | 49.20 | 40 |
| Fayette | 97 | 55.18 | 16 | 81 | 53.67 | 20 |
| Forest | 3 | 39.50 | 66 | 2 | 39.50 | 67 |
| Franklin | 81 | 55.25 | 14 | 75 | 54.25 | 16 |
| Fulton | 3 | 47.00 | 53 | 3 | 47.00 | 55.5 |
| Greene | 23 | 54.13 | 21 | 22 | 53.79 | 18 |
| Huntingdon | 25 | 52.62 | 29 | 25 | 52.62 | 25 |
| Indiana | 47 | 56.38 | 12 | 45 | 55.13 | 9 |
| Jefferson | 31 | 55.13 | 17 | 28 | 55.75 | 6 |
| Juniata | 8 | 54.50 | 20 | 6 | 49.50 | 37 |
| Lackawanna | 259 | 55.20 | 15 | 239 | 48.43 | 44 |
| Lancaster | 309 | 48.90 | 45 | 285 | 48.69 | 41 |
| Lawrence | 77 | 53.11 | 26 | 72 | 51.72 | 30 |
| Lebanon | 110 | 53.00 | 27 | 104 | 52.00 | 28 |
| Lehigh | 332 | 46.21 | 55 | 286 | 47.13 | 54 |
| Luzerne | 373 | 56.40 | 11 | 336 | 55.04 | 10 |
| Lycoming | 122 | 50.55 | 39 | 115 | 50.16 | 36 |
| McKean | 31 | 50.33 | 40 | 31 | 50.33 | 21 |
| Mercer | 110 | 50.67 | 38 | 99 | 49.38 | 39 |
| Mifflin | 32 | 52.36 | 31 | 32 | 52.36 | 26 |
| Monroe | 57 | 52.00 | 34 | 53 | 50.57 | 35 |
| Montgomery | 1,435 | 45.69 | 59 | 1,265 | 46.34 | 58 |
| Montour | 153 | 37.44 | 67 | 122 | 40.97 | 66 |
| Northampton | 268 | 48.65 | 46 | 250 | 48.40 | 45 |
| Northumberland | 55 | 56.00 | 13 | 52 | 55.50 | 7 |
| Perry | 10 | 53.25 | 25 | 8 | 52.00 | 28 |
| Philadelphia | 5,446 | 39.94 | 65 | 4,169 | 44.24 | 62 |
| Pike | 7 | 59.50 | 6 | 5 | 54.50 | 13 |
| Potter | 9 | 52.00 | 34 | 8 | 52.00 | 28 |
| Schuylkill | 148 | 56.58 | 10 | 125 | 53.75 | 19 |
| Snyder | 13 | 47.00 | 53 | 13 | 47.00 | 55.5 |
| Somerset | 38 | 49.50 | 41.5 | 32 | 48.50 | 43 |
| Sullivan | 2 | 64.50 | 1 | 2 | 64.50 | 1 |
| Susquehanna | 19 | 52.63 | 28 | 17 | 53.88 | 17 |
| Tioga | 20 | 52.50 | 30 | 18 | 51.50 | 32 |
| Union | 24 | 47.00 | 53 | 21 | 48.25 | 48 |
| Venango | 48 | 49.5 | 41.5 | 45 | 48.56 | 42 |
| Warren | 62 | 48.0 | 49 | 56 | 48.00 | 49.5 |
| Washington | 168 | 50.82 | 37 | 152 | 50.82 | 34 |
| Wayne | 20 | 59.50 | 6 | 17 | 60.33 | 3 |
| Westmoreland | 269 | 48.37 | 48 | 253 | 48.37 | 46 |
| Wyoming | 13 | 60.75 | 3.5 | 11 | 63.25 | 2 |
| York | 276 | 44.34 | 61 | 233 | 47.31 | 53 |

[a] This column represents a ranking of the counties based upon the deviation of the male M.D. median age for that county from the male M.D. median age for Pennsylvania as a whole. A ranking of one, for example, indicates a very high median age for male physicians in that county and by implication, a probably high need for physicians to replace those who die and retire over the next decade.

[b] This column is identical to that description in note "a" above but is based on those physicians who have completed training and are at the age of active practice, i.e., ages 30 to 74. It has been assumed that physicians retire late and that their ranking, therefore, best represents probable demand due to death and retirement of active practicing physicians in a given county.

Table 82

1970-71 Regional Distribution of Direct Care Physician (M.D. and D.O.)

| Region[b] and County | Population[c] | GP/FP[d] | Pop/GP/FP Ratio | GP/FP Optimum Number[e] | GP/FP Need[f] | IM | Pop/IM Ratio | IM Optimum Number[e] | IM Need[f] | GS | Pop/GS Ratio | GS Optimum Number[e] | GS Need[f] | PD | Pop/PD Ratio | PD Optimum Number[e] | PD Need[f] | Other Specialties | Pop/Other Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Region 1** (Delaware) | | | | | | | | | | | | | | | | | | | |
| Bucks | 429,621 | 145 | 2,963 | 215 | 70 | 21 | 20,458 | 86 | 65 | 26 | 16,524 | 43 | 17 | 22 | 19,528 | 43 | 21 | 32 | 13,426 |
| Chester | 287,233 | 89( 4) | 3,227 | 144 | 55 | 28 | 10,258 | 57 | 29 | 27 | 10,638 | 29 | 2 | 19 | 15,118 | 29 | 10 | 29 | 9,905 |
| Delaware | 606,890 | 237( 4) | 2,561 | 303 | 66 | 80 | 7,586 | 121 | 41 | 48 | 12,644 | 61 | 13 | 57 | 10,647 | 61 | 4 | 122 | 4,975 |
| Montgomery | 637,212 | 290(11) | 2,197 | 319 | 29 | 116 | 5,493 | 127 | 11 | 82 | 7,771 | 64 | (18) | 77 | 8,275 | 64 | (13) | 129 | 4,940 |
| Philadelphia | 1,954,469 | 720(10) | 2,715 | 977 | 257 | 443 | 4,412 | 391 | (52) | 236 | 8,282 | 195 | (41) | 228 | 8,572 | 195 | (33) | 450 | 4,343 |
| Total | 3,915,425 | 1,481(29) | 2,644 | 1,958 | 477 | 688 | 5,683 | 783 | 94 | 419 | 9,345 | 392 | (27) | 403 | 9,715 | 392 | (11) | 762 | 5,138 |
| Per Cent of Optimum[g] | | 76% | | | | 88% | | | | 107% | | | | 103% | | | | | |
| **Region 2** (Lehigh Valley) | | | | | | | | | | | | | | | | | | | |
| Berks | 299,440 | 132( 4) | 2,269 | 150 | 18 | 29 | 10,326 | 60 | 31 | 20 | 14,972 | 30 | 10 | 9 | 33,271 | 30 | 21 | 52 | 5,759 |
| Carbon | 50,449 | 17 | 2,968 | 25 | 8 | 5 | 10,090 | 10 | 5 | 4 | 12,612 | 5 | 1 | 1 | 50,449 | 5 | 4 | 5 | 10,090 |
| Lehigh | 259,093 | 119( 1) | 2,177 | 130 | 34 | 21 | 12,338 | 52 | 31 | 17 | 15,241 | 26 | 9 | 13 | 19,930 | 26 | 13 | 38 | 6,818 |
| Monroe | 46,106 | 17( 2) | 2,712 | 23 | 6 | 5 | 9,221 | 9 | 4 | 5 | 9,221 | 5 | 0 | 3 | 15,369 | 5 | 2 | 7 | 6,587 |
| Northampton | 216,346 | 84( 5) | 2,576 | 108 | 24 | 45 | 4,808 | 43 | ( 2) | 21 | 10,302 | 22 | 1 | 12 | 18,029 | 22 | 10 | 28 | 7,727 |
| Pike | 12,032 | 4 | 3,008 | 6 | 2 | -- | ** | 2 | 2 | -- | ** | 1 | 1 | -- | ** | 1 | 1 | 1 | 12,032 |
| Schuylkill | 159,455 | 62 | 2,572 | 80 | 18 | 11 | 14,496 | 32 | 21 | 13 | 12,266 | 16 | 3 | 2 | 79,728 | 16 | 14 | 14 | 11,390 |
| Total | 1,042,921 | 435(12) | 2,398 | 521 | 86 | 116 | 8,991 | 209 | 93 | 80 | 13,037 | 104 | 24 | 40 | 26,073 | 104 | 64 | 145 | 7,193 |
| Per Cent of Optimum[g] | | 83% | | | | 56% | | | | 77% | | | | 38% | | | | | |
| **Region 3** (Northeast) | | | | | | | | | | | | | | | | | | | |
| Lackawanna | 234,693 | 91 | 2,579 | 117 | 26 | 19 | 12,352 | 47 | 28 | 20 | 11,735 | 24 | 4 | 8 | 29,337 | 24 | 16 | 33 | 7,112 |
| Luzerne | 343,034 | 129( 2) | 2,659 | 172 | 43 | 39 | 8,796 | 69 | 30 | 35 | 9,801 | 34 | ( 1) | 9 | 38,115 | 34 | 25 | 40 | 8,576 |
| Susquehanna | 34,445 | 15( 1) | 2,296 | 17 | 2 | 3 | 11,482 | 7 | 4 | 2 | 17,223 | 3 | 1 | -- | ** | 3 | 3 | 1 | 34,445 |
| Wayne | 29,587 | 9 | 3,287 | 15 | 6 | 3 | 9,862 | 6 | 3 | 2 | 14,794 | 3 | 1 | -- | ** | 3 | 3 | 1 | 29,587 |
| Wyoming | 19,298 | 9 | 2,144 | 10 | 1 | 1 | 19,298 | 4 | 3 | 1 | 19,298 | 2 | 1 | -- | ** | 2 | 2 | -- | ** |
| Total | 661,057 | 253( 3) | 2,613 | 331 | 78 | 65 | 10,170 | 133 | 68 | 60 | 11,018 | 66 | 6 | 17 | 38,886 | 66 | 49 | 75 | 8,814 |
| Per Cent of Optimum[g] | | 76% | | | | 49% | | | | 91% | | | | 26% | | | | | |
| **Region 4** (Northern Tier) | | | | | | | | | | | | | | | | | | | |
| Bradford | 58,299 | 18 | 3,239 | 29 | 11 | 6 | 9,717 | 12 | 6 | 9 | 6,478 | 6 | ( 3) | 2 | 29,150 | 6 | 4 | 7 | 8,328 |
| Lycoming | 113,951 | 27 | 4,220 | 57 | 30 | 4 | 28,488 | 23 | 19 | 13 | 8,765 | 11 | ( 2) | 4 | 28,488 | 11 | 7 | 18 | 6,331 |
| Sullivan | 5,862 | 2 | 2,931 | 3 | 1 | -- | ** | 1 | 1 | -- | ** | 0 | 0 | -- | ** | 0 | 0 | -- | ** |
| Tioga | 40,092 | 14 | 2,864 | 20 | 6 | -- | ** | 8 | 8 | 3 | 13,364 | 4 | 1 | -- | ** | 4 | 4 | 1 | 40,092 |
| Total | 218,204 | 61 | 3,577 | 109 | 48 | 10 | 21,820 | 44 | 34 | 25 | 8,728 | 21 | ( 4) | 6 | 36,367 | 21 | 15 | 26 | 8,392 |
| Per Cent of Optimum[g] | | 56% | | | | 23% | | | | 119% | | | | 29% | | | | | |
| **Region 5** (Susquehanna) | | | | | | | | | | | | | | | | | | | |
| Centre | 105,746 | 28 | 3,777 | 53 | 25 | 5 | 21,149 | 21 | 16 | 6 | 17,624 | 11 | 5 | 4 | 26,437 | 11 | 7 | 10 | 10,575 |
| Clearfield | 74,250 | 16 | 4,641 | 37 | 21 | 4 | 18,563 | 15 | 11 | 8 | 9,281 | 7 | ( 1) | 1 | 74,250 | 7 | 6 | 5 | 14,850 |
| Clinton | 37,916 | 15 | 2,528 | 19 | 4 | -- | ** | 8 | 8 | 3 | 12,639 | 4 | 1 | -- | ** | 4 | 4 | 1 | 37,916 |
| Columbia | 55,451 | 16 | 3,466 | 28 | 12 | 2 | 27,726 | 11 | 9 | 4 | 13,863 | 6 | 2 | 1 | 55,451 | 6 | 5 | 6 | 9,242 |
| Montour | 16,444 | 8( 1) | 2,056 | 8 | 0 | 8 | 2,056 | 3 | ( 5) | 5 | 3,289 | 2 | ( 3) | 4 | 4,111 | 2 | ( 2) | 14 | 1,175 |
| Northumberland | 99,053 | 31( 1) | 3,195 | 50 | 19 | 2 | 49,527 | 20 | 18 | 5 | 19,811 | 10 | 5 | 1 | 99,053 | 10 | 9 | 9 | 11,006 |
| Snyder | 29,710 | 10 | 2,971 | 15 | 5 | -- | ** | 6 | 6 | -- | ** | 3 | 3 | 1 | 29,710 | 3 | 2 | -- | ** |
| Union | 29,074 | 9 | 3,230 | 15 | 6 | 2 | 14,537 | 6 | 4 | 3 | 9,691 | 3 | 0 | 1 | 29,074 | 3 | 2 | 3 | 9,691 |
| Total | 447,644 | 133( 2) | 3,366 | 225 | 92 | 23 | 19,463 | 90 | 67 | 34 | 13,166 | 46 | 12 | 13 | 34,434 | 46 | 33 | 48 | 9,326 |
| Per Cent of Optimum[g] | | 59% | | | | 26% | | | | 74% | | | | 28% | | | | | |

Table 82

(Continued)

| Region[b] and County | Population[c] | GP/FP[d] | Pop/GP/FP Ratio | GP/FP Optimum Number[e] | GP/FP Need[f] | IM | Pop/IM Ratio | IM Optimum Number[e] | IM Need[f] | GS | Pop/GS Ratio | GS Optimum Number[e] | GS Need[f] | PD | Pop/PD Ratio | PD Optimum Number[e] | PD Need[f] | Other Specialties | Pop/Other Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Regio[illegible] | | | | | | | | | | | | | | | | | | | |
| (Capi[illegible]) | | | | | | | | | | | | | | | | | | | |
| Adams | 57,474 | 23( 1) | 2,499 | 29 | 6 | 2 | 28,737 | 11 | 9 | 3 | 19,158 | 6 | 3 | -- | ** | 6 | 6 | 1 | 57,474 |
| Cumberland | 162,596 | 60( 2) | 2,710 | 81 | 21 | 14 | 11,614 | 32 | 18 | 13 | 12,507 | 16 | 3 | 10 | 16,260 | 16 | 6 | 22 | 7,391 |
| Dauphin | 225,257 | 94( 5) | 2,396 | 113 | 19 | 49 | 4,597 | 45 | ( 4) | 25 | 9,010 | 23 | ( 2) | 16 | 14,079 | 23 | 7 | 32 | 7,039 |
| Franklin | 102,328 | 31 | 3,301 | 51 | 20 | 3 | 34,109 | 20 | 17 | 7 | 14,618 | 10 | 3 | 3 | 34,109 | 10 | 7 | 7 | 14,618 |
| Lancaster | 324,667 | 158( 4) | 2,055 | 162 | 4 | 19 | 17,088 | 65 | 46 | 26 | 12,487 | 32 | 6 | 9 | 36,074 | 32 | 23 | 33 | 9,838 |
| Lebanon | 100,723 | 43( 1) | 2,342 | 50 | 7 | 11 | 9,157 | 20 | 9 | 10 | 10,072 | 10 | 0 | 2 | 50,362 | 10 | 8 | 10 | 10,072 |
| Perry | 28,835 | 11( 3) | 2,621 | 14 | 3 | -- | ** | 6 | 6 | -- | ** | 3 | 3 | -- | ** | 3 | 3 | 2 | 14,418 |
| York | 276,840 | 111( 4) | 2,494 | 138 | 27 | 24 | 11,535 | 55 | 31 | 16 | 17,303 | 28 | 12 | 8 | 34,505 | 28 | 20 | 33 | 8,389 |
| Total | 1,278,720 | 531(20) | 2,408 | 638 | 107 | 122 | 10,481 | 254 | 132 | 100 | 12,787 | 128 | 28 | 48 | 26,640 | 128 | 80 | 140 | 9,134 |
| Per Cent of Optimum[g] | | 83% | | | | 48% | | | | 78% | | | | 38% | | | | | |
| Region 7 | | | | | | | | | | | | | | | | | | | |
| (Turnpike) | | | | | | | | | | | | | | | | | | | |
| Bedford | 42,424 | 8 | 5,303 | 21 | 13 | 4 | 10,606 | 8 | 4 | 3 | 14,141 | 4 | 1 | -- | ** | 4 | 4 | 1 | 42,424 |
| Blair | 135,599 | 48( 3) | 2,825 | 68 | 20 | 13 | 10,431 | 27 | 14 | 14 | 9,686 | 14 | 0 | 6 | 22,600 | 14 | 8 | 21 | 6,457 |
| Cambria | 186,502 | 60( 3) | 3,108 | 93 | 33 | 14 | 13,322 | 37 | 23 | 18 | 10,361 | 19 | 1 | 5 | 37,300 | 19 | 14 | 25 | 7,460 |
| Fulton | 10,754 | 4 | 2,689 | 5 | 1 | -- | ** | 2 | 2 | 1 | 10,754 | 1 | 0 | -- | ** | 1 | 1 | -- | ** |
| Huntingdon | 39,200 | 11 | 3,564 | 20 | 9 | 3 | 13,067 | 8 | 5 | 4 | 9,800 | 4 | 0 | 1 | 39,200 | 4 | 3 | 4 | 9,800 |
| Juniata | 16,755 | 7 | 2,394 | 8 | 1 | -- | ** | 3 | 3 | -- | ** | 2 | 2 | -- | ** | 2 | 2 | -- | ** |
| Mifflin | 45,488 | 20 | 2,274 | 23 | 3 | 2 | 22,744 | 9 | 7 | 4 | 11,372 | 5 | 1 | 1 | 45,488 | 5 | 4 | 4 | 11,372 |
| Somerset | 76,094 | 16( 1) | 4,756 | 38 | 22 | 1 | 76,094 | 15 | 14 | 9 | 8,455 | 8 | ( 1) | -- | ** | 8 | 8 | 3 | 25,365 |
| Total | 552,816 | 174( 7) | 3,177 | 276 | 102 | 37 | 14,941 | 109 | 72 | 53 | 10,430 | 57 | 4 | 13 | 42,524 | 57 | 44 | 58 | 9,531 |
| Per Cent of Optimum[g] | | 63% | | | | 34% | | | | 93% | | | | 23% | | | | | |
| Region 8 | | | | | | | | | | | | | | | | | | | |
| (Southwest) | | | | | | | | | | | | | | | | | | | |
| Allegheny | 1,612,309 | 385(11) | 4,188 | 806 | 421 | 253 | 6,373 | 322 | 69 | 173 | 9,320 | 161 | (12) | 101 | 15,963 | 161 | 60 | 381 | 4,232 |
| Armstrong | 75,561 | 22( 1) | 3,435 | 38 | 16 | -- | ** | 15 | 15 | 4 | 18,890 | 8 | 4 | 1 | 75,561 | 8 | 7 | 3 | 25,187 |
| Beaver | 209,754 | 59( 1) | 3,555 | 105 | 46 | 12 | 17,480 | 42 | 30 | 13 | 16,135 | 21 | 8 | 5 | 41,951 | 21 | 16 | 15 | 13,984 |
| Butler | 129,711 | 30 | 4,324 | 65 | 35 | 9 | 14,412 | 26 | 17 | 9 | 14,412 | 13 | 4 | 3 | 43,237 | 13 | 10 | 9 | 14,412 |
| Fayette | 154,043 | 38 | 4,054 | 77 | 39 | 5 | 30,809 | 31 | 26 | 15 | 10,270 | 15 | 0 | 3 | 51,348 | 15 | 12 | 6 | 25,674 |
| Greene | 35,896 | 10( 1) | 3,590 | 18 | 8 | 3 | 11,965 | 7 | 4 | 4 | 8,974 | 4 | 0 | -- | ** | 4 | 4 | 2 | 17,948 |
| Indiana | 80,466 | 14( 2) | 5,748 | 40 | 26 | 3 | 26,822 | 16 | 13 | 9 | 8,941 | 8 | ( 1) | 2 | 40,233 | 8 | 6 | 5 | 16,093 |
| Lawrence | 107,523 | 26( 1) | 4,136 | 54 | 28 | 4 | 26,881 | 22 | 18 | 9 | 11,947 | 11 | 2 | 4 | 26,881 | 11 | 7 | 10 | 10,752 |
| Mercer | 127,746 | 41( 3) | 3,116 | 64 | 23 | 13 | 9,827 | 26 | 13 | 19 | 6,723 | 13 | ( 6) | 4 | 31,937 | 13 | 9 | 25 | 5,110 |
| Washington | 211,530 | 59( 1) | 3,585 | 106 | 47 | 12 | 17,628 | 42 | 30 | 15 | 14,102 | 21 | 6 | 7 | 30,219 | 21 | 14 | 10 | 21,153 |
| Westmoreland | 380,966 | 103( 3) | 3,699 | 190 | 87 | 28 | 13,606 | 76 | 48 | 26 | 14,653 | 38 | 12 | 8 | 47,621 | 38 | 30 | 27 | 14,110 |
| Total | 3,125,505 | 787(24) | 3,971 | 1,563 | 776 | 342 | 9,139 | 625 | 283 | 296 | 10,559 | 313 | 17 | 138 | 22,649 | 313 | 175 | 493 | 6,340 |
| Per Cent of Optimum[g] | | 50% | | | | 55% | | | | 95% | | | | 44% | | | | | |
| Region 9 | | | | | | | | | | | | | | | | | | | |
| (North Central) | | | | | | | | | | | | | | | | | | | |
| Cameron | 7,011 | 3 | 2,337 | 4 | 1 | -- | ** | 1 | 1 | -- | ** | 1 | 1 | -- | ** | 1 | 1 | -- | ** |
| Elk | 37,844 | 7 | 5,406 | 19 | 12 | 4 | 9,461 | 8 | 4 | 3 | 12,615 | 4 | 1 | 1 | 37,844 | 4 | 3 | 4 | 9,461 |
| McKean | 51,770 | 13 | 3,982 | 26 | 13 | 5 | 10,354 | 10 | 5 | 4 | 12,943 | 5 | 1 | 2 | 25,885 | 5 | 3 | 3 | 17,257 |
| Potter | 16,326 | 6 | 2,721 | 8 | 2 | -- | ** | 3 | 3 | 1 | 16,326 | 1 | 0 | -- | ** | 1 | 1 | 1 | 16,326 |
| Total | 112,951 | 29( 0) | 3,895 | 57 | 28 | 9 | 12,550 | 22 | 13 | 8 | 14,119 | 11 | 3 | 3 | 37,650 | 11 | 8 | 8 | 14,119 |
| Per Cent of Optimum[g] | | 51% | | | | 41% | | | | 73% | | | | 27% | | | | | |

Table 82

(Continued)

| Region[b] and County | Population[c] | GP/FP[d] | Pop/GP/FP Ratio | GP/FP Optimum Number[e] | GP/GP Need[f] | IM | Pop/IM Ratio | IM Optimum Number[e] | IM Need[f] | GS | Pop/GS Ratio | GS Optimum Number[e] | GS Need[f] | PD | Pop/PD Ratio | PD Optimum Number[e] | PD Need[f] | Other Specialties | Pop/Other Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Region 10 (Northwest) | | | | | | | | | | | | | | | | | | | |
| Clarion | 38,651 | 12 | 3,221 | 19 | 7 | -- | ** | 8 | 8 | 1 | 38,651 | 4 | 3 | -- | ** | 4 | 4 | -- | ** |
| Crawford | 81,787 | 24 | 3,408 | 41 | 17 | 7 | 11,684 | 16 | 9 | 9 | 9,087 | 8 | (1) | 1 | 81,787 | 8 | 7 | 7 | 11,684 |
| Erie | 266,091 | 83(3) | 3,206 | 133 | 50 | 20 | 13,305 | 53 | 33 | 39 | 6,823 | 27 | (12) | 8 | 33,261 | 27 | 19 | 25 | 10,644 |
| Forest | 4,876 | 2 | 2,438 | 2 | 0 | -- | ** | 0 | 0 | -- | ** | 0 | 0 | 1 | 4,876 | 0 | (1) | -- | ** |
| Jefferson | 43,481 | 17 | 2,558 | 22 | 5 | -- | ** | 9 | 9 | 6 | 7,247 | 4 | 4 | 1 | 43,481 | 4 | 3 | 1 | 43,481 |
| Venango | 62,480 | 17 | 3,675 | 31 | 14 | 5 | 12,496 | 13 | 8 | 4 | 15,620 | 6 | 2 | 2 | 31,240 | 6 | 4 | 6 | 10,413 |
| Warren | 48,009 | 14(1) | 3,429 | 24 | 10 | 1 | 48,009 | 10 | 9 | 5 | 9,602 | 5 | 0 | 2 | 24,004 | 5 | 3 | 6 | 8,002 |
| Total | 545,375 | 169(5) | 3,227 | 272 | 103 | 33 | 16,527 | 107 | 76 | 64 | 8,521 | 54 | (10) | 15 | 36,358 | 54 | 39 | 45 | 12,119 |
| Per Cent of Optimum[g] | | 62% | | | | 30% | | | | 119% | | | | 28% | | | | | |
| Pennsylvania | 11,900,608 | 4,053(102) | 2,936 | 5,950 | 1,897 | 1,446 | 8,230 | 2,380 | 934 | 1,139 | 10,448 | 1,190 | 51 | 696 | 17,099 | 1,190 | 494 | 1,800 | 6,611 |
| Per Cent of Optimum[g] | | 68% | | | | 61% | | | | 96% | | | | 58% | | | | | |
| Optimum Ratio Used | | | (2,000) | | | | (5,000) | | | | (10,000) | | | | (10,000) | | | | |

[a]Direct care physician data derived by the investigator from the following sources: American Medical Association physician tape as of November 26, 1971 and the 1970 Annual Directory of the American Osteopathic Association (non-member and members are listed).

[b]The regional breakdown is that of the Bureau of Higher Educational Planning and subsequently adopted by the Pennsylvania Department of Education as the accepted regional breakdown for the Office of Higher Education.

[c]From Senier and Mulvihill's (1972) projections.(5)

[d]Numbers in parentheses indicate the number of family practice physicians included in the total.

[e]The optimum number of physicians for the area in 1971 as defined by ratios given in the Journal of Medical Economics and found in Table 39 of this report.

[f]The discrepancy between the actual count and the optimum care number. A surplus is indicated by a number in parentheses. Basically a measure of absolute unmet need.

[g]An indication of relative need (based on optimum ratios) as indicated by what proportion of the optimum has been filled by existing physicians, i.e., the lower the percentage, the greater the relative need regardless of the number involved.

or in any year from 1972 to 1980. Unfortunately, no such projection of the probable growth of the number of physicians was achievable due to the lack of detailed historical physician data for the individual counties.

At the bottom of each regional data set is a percentage figure. For Region 1 it is 76 per cent for the category of general and family practice. This percentage figure is an estimate of the proportion of the optimum figure represented by the actual number of physicians in that region. As can be seen in Table 82. Regions 2 (Lehigh Valley) and 6 (Capitol) have the most favorable position since they have 83 per cent of the optimum number of general practice of family practice physicians. In contrast, Regions 8 (Southwest) and 9 (North Central) have the least favorable positions, with Region 8 having a 50 per cent of optimum figure and Region 9, a 51 per cent of optimum figure.

It should be noted here that the figures in parentheses for the GP/FP column of Table 82 indicate the portion of the total count that is represented by physicians certified as specialists in family practice. As can be seen, they were few in number in 1971 (102) and were found primarily in three highly urban regions, Region 1 (Philadelphia), Region 6 and Region 8 (Pittsburgh, Allegheny County). Apparently, this new type of basic care specialist, as with other specialists, is gravitating to the urban centers rather than the rural areas. This does not bode well with regard to their having an impact on the basic care physician geographic maldistribution problem.

### Basic Care Need by County and Region

The percentage of optimum approach used for the regions in Table 82, seems to be a potentially valuable way of expressing the severity of a county's needs. It also seems evident that the fundamental problem for the rural and urban center poor is the need for basic entry level medical care. The rural areas, at least, cannot readily provide or support the hospital and medical facilities necessary for the practice of the secondary (referral) type of specialty, e.g., neurosurgery. However, patients requiring such services can and do go to major medical centers, by preference, for such highly specialized treatment.

If we consider general practice (or family practice), internal medicine and pediatrics as basic entry level specialty areas and general surgery as, potentially, serving both entry level surgical needs, and where necessary, general medical care needs, then it becomes feasible to analyze the relative position of the counties and higher education planning regions of the state with regard to these specialties in combination.

Table 83 lists, as of November 26, 1971, the number of such basic care specialists in each county or region, gives the population per physician ratio for that county or region, lists for each county or region the 1971 optimum figure for these specialists, and finally indicates what percentage of the optimum figure the regional or county's actual basic entry (GP, IM, PD, GS) physician totals represent. The higher the percentage figure the less the relative need for physicians, the lower the percentage figure, the higher the need for these types of physician.

Table 84 then lists the counties in order of rank from lowest relative need to highest relative need based upon the percentage of optimum figures of Table 83. As can be seen, the top 10 counties, out of a total of 67, had enough basic entry physicians to reach or exceed 75 per cent of the optimum figure based on the optimum ratios derived from the survey data published by Medical Economics.[1]

In contrast, the bottom 11 (two counties were tied for rank of 10th from the bottom) counties did not have enough basic entry physicians to account for more than 46 per cent, at most, of the optimum ratio for the counties in question.

### Physician Need Area Maps

The percentage of the optimum number of physicians required as of 1971-72 are shown for each county in Figure 1 with shading designed to identify the counties and, generally, the area of the state where basic entry physician needs are the greatest and least or are moderately high or low.

As can be seen, when one includes general surgery as a basic entry specialty, the areas of major need (49 per cent of optimum or less) tend to be in the southwestern counties of Fayette, Somerset and Bedford along with a belt of counties running horizontally across the middle to upper portion of the state, i.e., Lawrence, Butler, Clarion, Armstrong, Indiana, Elk, Clearfield, Centre, Lycoming, Snyder, Northumberland and Sullivan. In addition, two other counties, Perry and Pike, fall into this severe need category. Apparently, many of the residents of these counties have to travel long distance to find the medical care that they lack in their own communities, but it is also true that every one of them has at least one adjoining county with an above average (59 per cent or better percentage population figure.)

Table 83

Estimates of M.D. and D.O. Basic Care Need by Region and County (G.P., F.P., I.M., G.S.) as Indicated by the Per Cent of the Optimum Number Actually Present in November 1971[a]

| Region and County | Population[b] | Total Basic Care[c] | Population/ Physician Basic Care Ratio | Optimum Number[d] | Per Cent of Optimum[e] |
|---|---|---|---|---|---|
| I. (Delaware) | | | | | |
| Bucks | 429,621 | 192 | 2,238 | 344 | 56 |
| Chester | 287,233 | 144 | 1,995 | 230 | 63 |
| Delaware | 606,890 | 365 | 1,663 | 486 | 75 |
| Montgomery | 637,212 | 488 | 1,306 | 510 | 96 |
| Philadelphia | 1,954,469 | 1,399 | 1,397 | 1,564 | 89 |
| Combined | 3,915,425 | 2,588 | 1,513 | 3,132 | 83 |
| County Median[f] | | | 1,663 | | 75 |
| II. (Lehigh Valley) | | | | | |
| Berks | 299,440 | 181 | 1,654 | 240 | 75 |
| Carbon | 50,449 | 26 | 1,940 | 40 | 65 |
| Lehigh | 259,093 | 157 | 1,650 | 207 | 76 |
| Monroe | 46,106 | 27 | 1,708 | 37 | 73 |
| Northampton | 216,346 | 150 | 1,442 | 173 | 87 |
| Pike | 12,032 | 4 | 3,008 | 10 | 40 |
| Schuylkill | 159,455 | 86 | 1,854 | 128 | 67 |
| Combined | 1,042,921 | 631 | 1,653 | 834 | 76 |
| County Median[f] | | | 1,708 | | 73 |
| III. (Northeast) | | | | | |
| Lackawanna | 234,693 | 130 | 1,805 | 188 | 69 |
| Luzerne | 343,034 | 203 | 1,690 | 274 | 74 |
| Susquehanna | 34,445 | 20 | 1,722 | 28 | 71 |
| Wayne | 29,587 | 14 | 2,113 | 24 | 58 |
| Wyoming | 19,298 | 11 | 1,754 | 15 | 73 |
| Combined | 661,057 | 378 | 1,749 | 529 | 71 |
| County Median[f] | | | 1,754 | | 71 |
| IV. (Northern Tier) | | | | | |
| Bradford | 58,299 | 33 | 1,767 | 47 | 70 |
| Lycoming | 113,951 | 44 | 2,590 | 91 | 48 |
| Sullivan | 5,862 | 2 | 2,931 | 5 | 40 |
| Tioga | 40,092 | 17 | 2,358 | 32 | 53 |
| Combined | 218,204 | 96 | 2,273 | 175 | 55 |
| County Median[f] | | | 2,474 | | 51 |

Table 83
(Continued)

| Region and County | Population[b] | Total Basic Care[c] | Population/ Physician Basic Care Ratio | Optimum Number[d] | Per Cent of Optimum[e] |
|---|---|---|---|---|---|
| V. (Lackawanna) | | | | | |
| Centre | 105,746 | 39 | 2,711 | 85 | 46 |
| Clearfield | 74,250 | 28 | 2,651 | 59 | 47 |
| Clinton | 37,916 | 18 | 2,106 | 30 | 60 |
| Columbia | 55,451 | 22 | 2,521 | 44 | 50 |
| Montour | 16,444 | 21 | 783 | 13 | 162 |
| Northumberland | 99,053 | 38 | 2,607 | 79 | 48 |
| Snyder | 29,710 | 10 | 2,971 | 24 | 42 |
| Union | 29,074 | 14 | 2,077 | 23 | 61 |
| Combined | 447,644 | 190 | 2,356 | 358 | 53 |
| County Median[f] | | | 2,564 | | 49 |
| VI. (Capitol) | | | | | |
| Adams | 57,474 | 28 | 2,053 | 46 | 61 |
| Cumberland | 162,596 | 87 | 1,869 | 130 | 67 |
| Dauphin | 225,257 | 168 | 1,341 | 180 | 93 |
| Franklin | 102,328 | 41 | 2,496 | 82 | 50 |
| Lancaster | 324,667 | 203 | 1,599 | 260 | 78 |
| Lebanon | 100,723 | 64 | 1,574 | 81 | 79 |
| Perry | 28,835 | 11 | 2,621 | 23 | 48 |
| York | 276,840 | 151 | 1,833 | 221 | 68 |
| Combined | 1,278,720 | 753 | 1,698 | 1,023 | 74 |
| County Median[f] | | | 1,851 | | 68 |
| VII. (Turnpike) | | | | | |
| Bedford | 42,424 | 15 | 2,828 | 34 | 44 |
| Blair | 135,599 | 75 | 1,808 | 108 | 69 |
| Cambria | 186,502 | 92 | 2,027 | 149 | 62 |
| Fulton | 10,754 | 5 | 2,115 | 9 | 56 |
| Huntingdon | 39,200 | 18 | 2,178 | 31 | 58 |
| Juniata | 16,755 | 7 | 2,394 | 13 | 54 |
| Mifflin | 45,488 | 26 | 1,750 | 36 | 72 |
| Somerset | 76,094 | 26 | 2,927 | 61 | 43 |
| Combined | 552,816 | 264 | 2,094 | 442 | 60 |
| County Median[f] | | | 2,147 | | 57 |

Table 83
(Continued)

| Region and County | Population[b] | Total Basic Care[c] | Population/ Physician Basic Care Ratio | Optimum Number[d] | Per Cent of Optimum[e] |
|---|---|---|---|---|---|
| VIII. (Southwest) | | | | | |
| Allegheny | 1,612,309 | 811 | 1,988 | 1,290 | 63 |
| Armstrong | 75,561 | 26 | 2,906 | 60 | 43 |
| Beaver | 209,754 | 84 | 2,497 | 168 | 50 |
| Butler | 129,711 | 48 | 2,702 | 104 | 46 |
| Fayette | 154,043 | 58 | 2,656 | 123 | 47 |
| Greene | 35,896 | 17 | 2,112 | 29 | 59 |
| Indiana | 80,466 | 26 | 3,095 | 64 | 41 |
| Lawrence | 107,523 | 39 | 2,757 | 86 | 45 |
| Mercer | 127,746 | 73 | 1,750 | 102 | 72 |
| Washington | 211,530 | 86 | 2,460 | 169 | 51 |
| Westmoreland | 380,966 | 157 | 2,427 | 305 | 51 |
| Combined | 3,125,505 | 1,425 | 2,193 | 2,500 | 57 |
| County Median[f] | | | 2,656 | | 50 |
| IX. (North Central) | | | | | |
| Cameron | 7,011 | 3 | 2,337 | 6 | 50 |
| Elk | 37,844 | 14 | 2,703 | 30 | 47 |
| McKean | 51,770 | 22 | 2,353 | 41 | 54 |
| Potter | 16,326 | 7 | 2,332 | 13 | 54 |
| Combined | 112,951 | 46 | 2,455 | 90 | 51 |
| County Median[f] | | | 2,345 | | 54 |
| X. (Northwest) | | | | | |
| Clarion | 38,651 | 13 | 2,973 | 31 | 42 |
| Crawford | 81,787 | 40 | 2,045 | 65 | 62 |
| Erie | 266,091 | 142 | 1,874 | 213 | 67 |
| Forest | 4,876 | 2 | 2,438 | 4 | 50 |
| Jefferson | 43,481 | 23 | 1,890 | 35 | 66 |
| Venango | 62,480 | 26 | 2,403 | 50 | 52 |
| Warren | 48,009 | 20 | 2,400 | 38 | 53 |
| Combined | 545,375 | 266 | 2,050 | 436 | 61 |
| County Median[f] | | | 2,400 | | 53 |
| Pennsylvania | 11,900,608 | 6,638 | 1,793 | 9,520 | 70 |
| County Median[f] | | | 2,112 | | 58 |

Table 83
(Continued)

[a]Data derived from Table 82.

[b]See Table 82.

[c]Sum of physician counts for general practice/family practice, internal medicine and general surgery in Table 82. Assumes that general surgeons may also act as basic care initial entry physicians where general practitioners are scarce.

[d]Based upon an optimum ratio of 1,250 persons to a basic care physician as defined in note c, above. The ratio is obtained by combining the optimum ratios of Table 82 for general practice (2,000:1), internal medicine (5,000:1) and general surgery (10,000:1).

[e]Basic care total divided by the number required for optimum care at a ratio of 1,250:1.

[f]Median value for the counties in this region, i.e., the median county.

Table 84

Ranking of Counties by Increasing Need as Indicated by Basic Care Decreasing Percentage of Optimum Values[a]

| Rank | County | Per Cent Optimum | Planning Region |
|---|---|---|---|
| 1 | Montour | 162 | 5 |
| 2 | Montgomery | 96 | 1 |
| 3 | Dauphin | 93 | 6 |
| 4 | Philadelphia | 89 | 1 |
| 5 | Northampton | 87 | 2 |
| 6 | Lebanon | 79 | 6 |
| 7 | Lancaster | 78 | 6 |
| 8 | Lehigh | 76 | 2 |
| 9.5 | Berks | 75 | 2 |
| 9.5 | Delaware | 75 | 1 |
| 11 | Luzerne | 74 | 3 |
| 12.5 | Monroe | 73 | 2 |
| 12.5 | Wyoming | 73 | 3 |
| 14.5 | Mercer | 72 | 8 |
| 14.5 | Mifflin | 72 | 7 |
| 16 | Susquehanna | 71 | 3 |
| 17 | Bradford | 70 | 4 |
| 18.5 | Blair | 69 | 7 |
| 18.5 | Lackawanna | 69 | 3 |
| 20 | York | 68 | 6 |
| 22 | Cumberland | 67 | 6 |
| 22 | Erie | 67 | 10 |
| 22 | Schuylkill | 67 | 2 |
| 24 | Jefferson | 66 | 10 |
| 25 | Carbon | 65 | 2 |
| 26.5 | Allegheny | 63 | 8 |
| 26.5 | Chester | 63 | 1 |
| 28.5 | Cambria | 62 | 7 |
| 28.5 | Crawford | 62 | 10 |
| 30.5 | Adams | 61 | 6 |
| 30.5 | Union | 61 | 5 |
| 32 | Clinton | 60 | 5 |
| 33 | Greene | 59 | 8 |
| 34.5 | Huntingdon | 58 | 7 |
| 34.5 | Wayne | 58 | 3 |
| 36.5 | Bucks | 56 | 1 |
| 36.5 | Fulton | 56 | 7 |
| 39 | Juniata | 54 | 7 |
| 39 | McKean | 54 | 9 |
| 39 | Potter | 54 | 9 |
| 41.5 | Tioga | 53 | 9 |
| 41.5 | Warren | 53 | 10 |
| 43 | Venango | 52 | 10 |
| 44.5 | Washington | 51 | 8 |

Table 84
(contd.)

| Rank | County | Per Cent Optimum | Planning Region |
|---|---|---|---|
| 44.5 | Westmoreland | 51 | 8 |
| 48 | Beaver | 50 | 8 |
| 48 | Cameron | 50 | 9 |
| 48 | Columbia | 50 | 5 |
| 48 | Forest | 50 | 10 |
| 48 | Franklin | 50 | 6 |
| 52 | Lycoming | 48 | 4 |
| 52 | Northumberland | 48 | 5 |
| 52 | Perry | 48 | 6 |
| 55 | Clearfield | 47 | 5 |
| 55 | Elk | 47 | 9 |
| 55 | Fayette | 47 | 8 |
| 57.5 | Butler | 46 | 8 |
| 57.5 | Centre | 46 | 5 |
| 59 | Lawrence | 45 | 8 |
| 60 | Bedford | 44 | 7 |
| 61.5 | Armstrong | 43 | 8 |
| 61.5 | Somerset | 43 | 7 |
| 63.5 | Clarion | 42 | 10 |
| 63.5 | Snyder | 42 | 5 |
| 65 | Indiana | 41 | 8 |
| 66.5 | Pike | 40 | 2 |
| 66.5 | Sullivan | 40 | 4 |
| – | Median County | 58 | – |
| – | Pennsylvania | 70 | – |

[a]Based on findings in Table 83 for basic care physicians, i.e., general practice, internal medicine and general surgery.

Figure 2, gives essentially the same findings but reports on the percentage of optimum figures for the 10 higher education planning regions of the state. These regions, in order of their percentage of optimum figures from high to low, are as follows: Region 1, Delaware Valley, 83 per cent; Region 2, Lehigh Valley, 76 per cent; Region 6, Capitol, 74 per cent; Region 3, Northeast, 71 per cent; Region 10, Northwest, 61 per cent; Region 7, Turnpike, 60 per cent; Region 8, Southwest, 57 per cent; Region 4, Northern Tier, 55 per cent; Region 5, Susquehanna, 53 per cent and Region 9, North Central, 51 per cent.

Four regions had an average percentage of optimum figure that was at or below the county median of 58 per cent, i.e., the Southwestern Region with a percentage of 57 per cent, the Northern Tier Region with a percentage of 55 per cent, the Susquehanna Region with figure of 53 per cent and the North Central Regi n with a percentage of 51 per cent. It should be noted that the figure for the Susquehanna Region would be much lower were it not for the effect of Montour County. This county is the site of the Geisinger Medical Center which is a major medical center of considerable national prestige. Any figures for Montour County are likely to reflect the large number of physicians serving this center. As a consequence, we see this small, relatively rural county with an incredible 162 per cent of the optimum number of physicians required to meet the needs of its population (see Figure 1). Geisinger Medical Center serves individuals from a large area of the state and possibly from outside the state. In addition, it provides a medical center that makes practice in other areas of Montour County more attractive to a basic care physician. Were it not for Montour County, the Susquehanna Region would be the most physician poor region of the state since most of the counties in this region are below the median county figure of 58 per cent. Actually, the most disadvantaged counties of the state, based on Figure 1, are Clarion, Armstrong, Elk, Clearfield, Fayette, Somerset and Bedford since these counties are surrounded by counties that have 70 per cent or less of the optimum ratio.

It is obvious that these maps (Figures 1 and 2) are closely related to what we would find if the maps had been based upon simple population per physician figures but they also reflect the degree to which the population per physician ratio approximates the presumed optimum figures. In contrast, Figures 3 and 4 are an attempt to illustrate the pattern of physician availability based upon a simple population per physician ratio.

Figure 3 gives the overall population per direct patient care physician (medical physician and doctors of osteopathy) ratios for each county as of 1971. As can be seen Figure 3, the median ratio for the counties is 1,411 people per direct care physician. For the state as a whole it is only 842 to 1. If we were to look at the state only, we would have come to the conclusion that Pennsylvania is in pretty good shape in regard to direct care physicians, especially since the state optimum is estimated at 643 people per direct patient care physician. The state ratio of 842 is only 31 per cent higher than the optimum. In contrast, the median county ratio is 119 per cent higher than the optimum ratio, or more than twice as high. This, of course, illustrates a basic fact. There is a high concentration of physicians, particularly specialists, in the more urban areas of the state.

In order to best evaluate the real needs of the counties, the basic entry level population to physician ratio seems likely to be the most revealing, particularly if we exclude the general surgeons who seem to be relatively plentiful and the pediatricians whose services may be met by family or general practice physicians. Figure 4 maps the population per basic entry physician ratios (GP, FP, and IM) for these three types of basic entry physician combined.

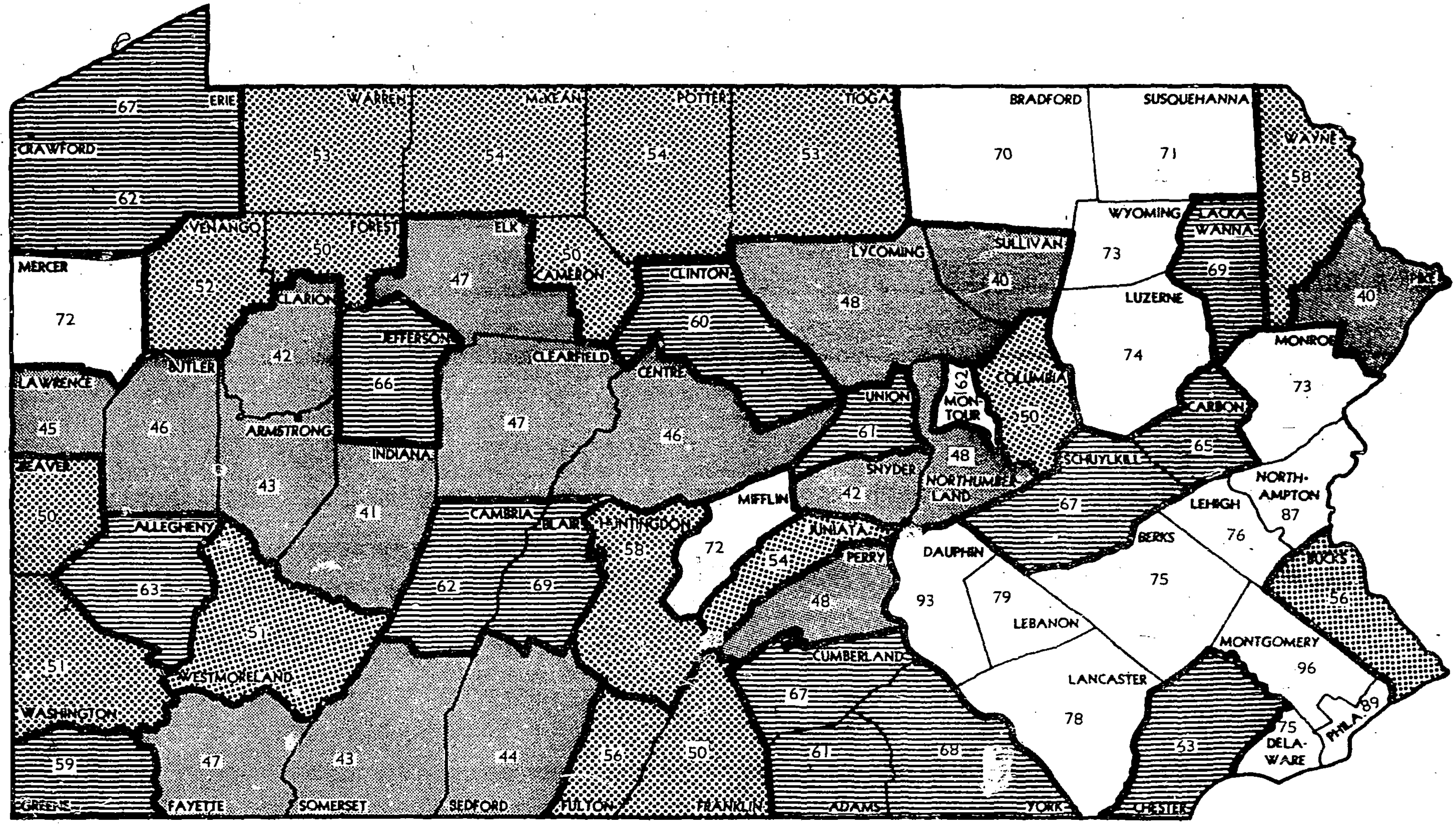
As can be seen in Figure 4, the findings are much like those of Figure 1 with the Susquehanna Region and the Turnpike Region having some of the most unfavorable physician ratios. The statewide ratio for these physicians is 2,164 people per physician while the median county ratio is 2,586 per physician. The optimum figure, according to the Medical Economics survey[1] for these physicians combined is 1,429 to 1.

As might be expected, Montour County had a better than optimum ratio of 1,0182:1 and Dauphin, Montgomery, Northampton, Philadelphia, Lancaster, Lehigh, Berks, Susquehanna, Delaware, Wyoming and Mifflin approximated the optimum, in that order, ranging from Dauphin which had a ratio only 10 per cent above the optimum to Mifflin which was 45 per cent above the optimum.

In contrast, the 10 most disadvantaged counties, beginning with the most disadvantaged, were Indiana (4,733), Somerset (4,476), Lycoming (3,676), Lawrence (3,584), Fayette (3,582), Bedford (3,535), Armstrong (3,435), Butler (3,326), Clarion (3,221) and Warren (3,201). Indiana (4,733:1) had a population per physician figure that was 231 per cent higher than the

**FIGURE 1**

Areas of Physician Concentration and Need Based Upon the Percentage of Optimum Basic Care Physicians as Listed in Tables 83 and 84




Percentage of Optimum is 70% or better (N-17)[a]

Percentage of Optimum is 59 - 69% (N-16)

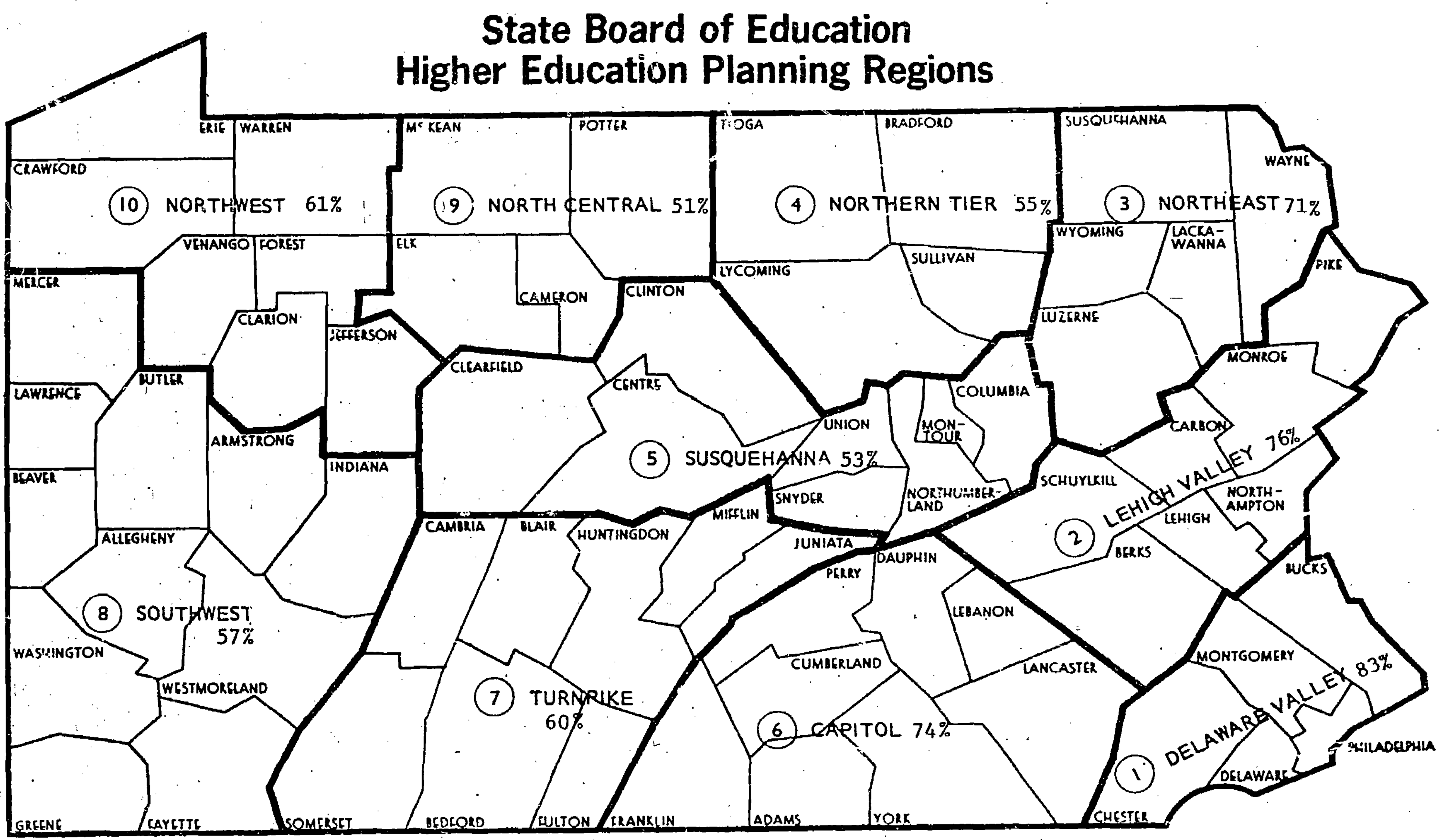
Percentage of Optimum is 50 - 58% (N-17)

Percentage of Optimum is 49% or less (N-17)

[a]Since the percentage value for Pennsylvania as a whole is 70% and the median of the counties if 58% it is interesting to note how well the four quartile ranges match these values as cutoff points.

FIGURE 2

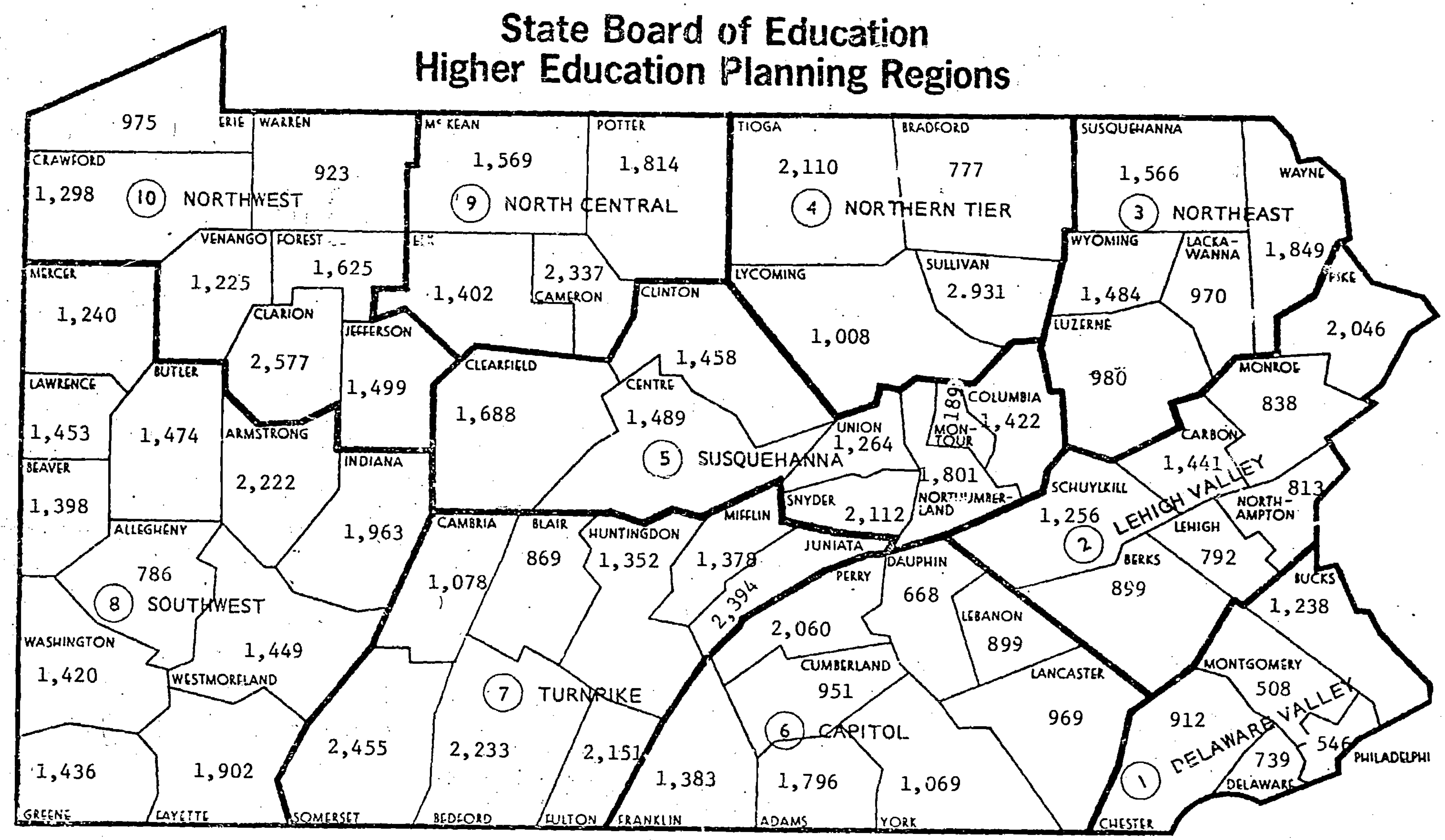
Physician Concentration and Need for Each Higher Education Planning Region
With the Overall Percentage of the Optimum Basic Care (GP, FP, IM, GS) Figure Given for Each Region[a]




[a]Based on Table 83.

FIGURE 3

Direct Patient Care Population Per Physician Ratios[a]



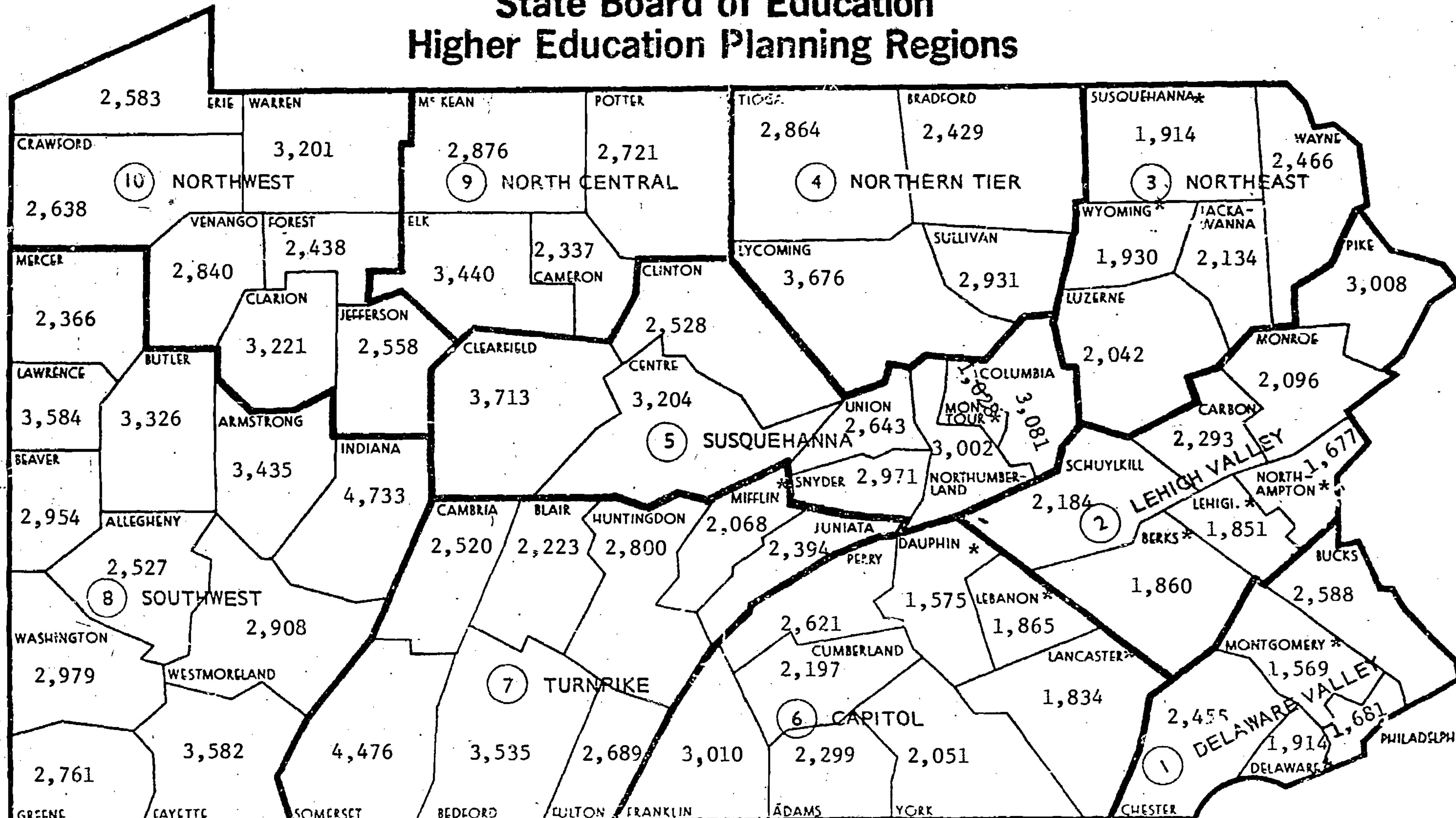

[a]Based on a count of osteopaths by the Bureau of the Budget, Program Audit Division and AMA physician tape count (November 26, 1971) in combination with population projections for 1971 by Senier and Mulvihill[2]

The overall ratio for Pennsylvania is: 842 to 1, the median county figure is: 1,411 to 1 and the optimum ratio is: 643 to 1.

FIGURE 4

Basic Care (GP, FM, IM) Population Per Physician Ratios[a]

## State Board of Education
## Higher Education Planning Regions




[a]The overall ratio for Pennsylvania is: 2,164 to 1, the median county ratio is: 2,586 to 1 and the optimum ratio for this combination of specialties is 1,429 to 1. All entries are based on Table 82 of this report.

*Ratios approaching the optimum ratio of 1,429:1

optimum figure and 83 per cent higher than the county median figure of 2,586:1. The 10th ranking county, Warren (3,201:1), had a population per physician figure that was still 124 per cent larger than the optimum figure of 1,429:1. Warren was also 24 per cent higher than the median county figure of 2,586:1 and 48 per cent higher than the overall average state ratio of 2,164:1.

### The Future of the Maldistribution Issue

It seems clear from the data presented that the basic problem for Pennsylvania lies at least as much in the maldistribution of physicians, especially basic entry level physicians, as it does in the overall need for physicians. As suggested in Chapter I, the state will have to take steps to encourage physicians to enter practice in the needed specialties and to settle in the rural and other impacted areas of the state.

How this is to be done remains an open issue and a difficult problem to solve within our free choice, entrepreneur-oriented medical system. As pointed out in Chapter III, it seems doubtful that loan repayment forgiveness for practice in needed areas or increased enrollment of Pennsylvania's rural medical school applicants will really solve the problem unless we also make practice in rural areas satisfying and attractive in the long run. The question is, are our medical students likely to respond to such efforts? Would they prefer rural practice, other things being equal? Is group practice, which may be the best approach to rural needs, attractive to them?

### A Survey of Hershey Medical School Graduates

The Hershey Medical School of Pennsylvania carried out a survey of its 33 graduates of 1971 in order to determine, one year later, the location of their residency (in-state, out-of-state), the specialty area of the residency and the change, if any, in their specialty choice since graduation a year before.

In addition, questions were asked as to their preferred geographic location upon completion of their residency and reasons for their choice.

The medical school officials were kind enough to make the raw data available to the author of this report. These data have been analyzed and pertinent findings for the purposes of this study are found in Tables 85 to 88. Hopefully, the results will not be untypical of those for graduates of other medical schools.

### Location of Residency Training

Table 85 indicates the locale of the residencies of 25 of the 33 graduates of 1971. Presumably, eight either did not respond or were not in a residency position at that time.

As can be seen in Part A of Table 85, 60 per cent of the basic care specialists (family practice, internal medicine, pediatrics, general surgery, ophthalmology, eye, nose and throat) went out of the state for their residency training. To a somewhat greater extent, the other specialties (neurology, pathology, psychiatry, anesthesiology, gastro-intestinal, nuclear medicine, research) also left the state (70 per cent).

The basic care specialists who tended to remain in Pennsylvania for residency training (Part B, Table 85) were the family medicine practitioners, the general surgeons and, to some extent (50 per cent), the pediatricians. Of the other specialists (Part C, Table 85), only the psychiatrists and the anesthesiologist tended to remain in the state for residency training. Whether these findings are a matter of preference or a symptom of a lack of high quality residency training opportunities in the state could not be ascertained from the responses.

### Changes in Medical Practice Plans

Since the survey was a one-year follow-up and data as to the original choice of the graduates was included, it was possible to analyze the change in plans that took place in the graduates during the year following graduation. Table 86 summarizes the basic data regarding the graduation and postgraduation preferences of the respondents.

We can see from Table 86 that, overall, the basic care specialties lost ground to medical-surgical- and research-oriented activity with the exception of family practice which gained by one physician, i.e., from 3 to 4, or an increase from 9 per cent of the graduating class to 12 per cent. This is, of course, a hopeful finding in that the long-term percentage holding power of the state has been, in the 1960s, only 8 per cent for general practice. We can hope that this higher and increasing proportion of entry into family practice and the tendency to remain in the state for training will generalize to the graduates of other medical schools and permit a larger retention of such specialists for practice in the state than we have been able to project in this study.

Table 85

An Analysis of Location of Residency for Hershey 1971 Graduates for Whom Data Was Available

A. Basic Care vs. Specialties

| | Basic Care | Specialties | Total |
|---|---|---|---|
| Penna. | 6( 40%) | 3( 30%) | 9( 36%) |
| Out-State | 9( 60%) | 7( 70%) | 16( 64%) |
| Total | 15(100%) | 10(100%) | 25(100%) |

B. Basic Care

| | Family Practice | Internal Medicine | Pediatrics | General Surgery | Ophthal-mology | Eye, Nose & Throat | Total |
|---|---|---|---|---|---|---|---|
| Penna. | 4(100%) | 0 | 1( 50%) | 1(100%) | 0 | 0 | 6( 40%) |
| Out-State | 0 | 6(100%) | 1( 50%) | 0 | 1(100%) | 1(100%) | 9( 60%) |
| Total | 4(100%) | 6(100%) | 2(100%) | 1(100%) | 1(100%) | 1(100%) | 15(100%) |

C. Specialties

| | Neurology | Path-ology | Psychiatry | Anesthe-siology | Gastro-Intest. | Nuclear Medicine | Research | Total |
|---|---|---|---|---|---|---|---|---|
| Penna. | 0 | 0 | 2( 67%) | 1(100%) | 0 | 0 | 0 | 3( 30%) |
| Out-State | 1(100%) | 2 | 1( 33%) | 0 | 1(100%) | 1(100%) | 1(100%) | 7( 70%) |
| Total | 1(100%) | 2 | 3(100%) | 1(100%) | 1(100%) | 1(100%) | 1(100%) | 10(100%) |

Table 86

An Analysis of the Change in Medical Practice Plans of the 1971 Graduating Class at the Hershey Medical School

| Specialty Area | Number at Graduation | Distribution Per Cent | Number One Year Later | Distribution Per Cent | Percentage Distribution Change |
|---|---|---|---|---|---|
| Basic Care | 22 | 67 | 17 | 52 | -15 |
| Family Practice | 3 | 9 | 4 | 12 | + 3 |
| Internal Medicine | 12 | 37 | 8 | 25 | -12 |
| FP and IM Combined | 15 | 46 | 12 | 37 | - 9 |
| Pediatrics | 4 | 12 | 3 | 9 | - 3 |
| General Surgery | 2 | 6 | 1 | 3 | - 3 |
| Ophthalmology | 1 | 3 | 1 | 3 | 0 |
| Medical-Surgical | 9 | 27 | 11 | 33 | + 6 |
| Neurology | 1 | 3 | 1 | 3 | 0 |
| Pathology | 1 | 3 | 0 | 0 | - 3 |
| Psychiatry | 3 | 9 | 3 | 9 | 0 |
| Plastic Surgery | 1 | 3 | 0 | C | - 3 |
| Other | 0 | 0 | 4 | 12 | +12 |
| Research and Academic | 2 | 6 | 5 | 15 | + 9 |
| No Response | 3 | 9 | (3)[a] | 9 | 0 |
| Combined | 33 | 100 | 33 | 100 | - |

[a]No response was received to the second survey. We assume here that no change has taken place.

### Choice of Geographic Location and Type of Practice

Table 87 summarizes the respondents indication of the type of geographic location in which they would prefer to practice and the type of practice preferred (solo, group, hospital) broken down by basic care and medical specialties other than basic care. As can be seen, only one of the four family practice specialists indicated an urban choice. It is not clear whether this choice of urban practice is based upon a desire to work in the inner-city (ghetto area) environment or is simply a preference for the larger city. It is perhaps significant in this connection that a suburban practice was not chosen. The pediatricians, on the other hand, chose the urban locale. This is interesting, to say the least. It is, possibly, a confirmation of the comments made by Dr. Nicholas M. Nelson, a pediatrician at Hershey Medical School, to the effect that a pediatrician is so badly needed in rural areas that he is swamped by the sheer physical labor demanded and that, therefore, rural pediatric practice is often avoided or eventually abandoned.[3] Presumably such practice will continue to be avoided until the supply of pediatricians becomes such that enough are available to provide optimum levels of care even in rural areas. Group practice by two or more pediatricians in a strategically located rural area might avoid the excessive demand (no vacations, night calls) problem described by Dr. Nelson.[3]

The more specialized basic care physicians (internal medicine, opthalmology, and eye, nose, throat) were the ones who chose a suburban location. Although only 25 per cent of the internal medicine respondents chose a suburban location, 100 per cent of the opthalmologists and otolaryngologists did indicate a preference for suburban practice. It is interesting to note, also, that 12 of the 13 basic care physicians who indicated their choice of type of practice chose group practice. None of them indicated their choice as the solo practice of medicine. A similar pattern was observed for the other than basic care specialties where we find (Part B., Table 87) that 67 per cent indicated group practice as their preference and not one listed solo practice. The remaining 33 per cent chose the hospital as their work locale. As might be expected, the other than basic care specialists indicated an urban or suburban locale as their preference (13 per cent suburban, 62 per cent urban) rather than a rural practice. The 25 per cent rural preference is less than half of that for the basic care physicians as a whole, where 57 per cent indicated a preference for rural practice.

Altogether, we find (Part C, Table 87) that 46 per cent of the respondents preferred rural practice and 84 per cent anticipated that they would be engaged in group practice of some kind. Furthermore, none of the respondents anticipated a solo practice despite the fact that solo practice is still very much the normal type of practice in Pennsylvania among older physicians.

### Reasons Given for Choices

Table 88 summarizes the reasons typically given by the respondents for choosing a given locale (rural, suburban, urban) or a given type of practice.

In general, the basis for their choice of locale was one or more of the following factors: good climate, good recreational facilities, safety of person or family, good schools, pleasant environment (trees, ocean, etc.), adequate to excellent cultural opportunities and activities, physician need of the area, adequacy of the population base for a practice to succeed, good hospital facilities, competent medical colleagues to associate with, the type of community (rural, suburban, etc.), nearby medical center for continuing education, preferences of wife and children, the openings available, near a medium-sized city, though prefer a semi-rural residence. Rural areas, of course, would have trouble meeting all of these requirements.

Those who chose a rural location gave these reasons: I like rural people; I prefer natural surroundings, their peace and tranquility; I was born and reared in a rural area; I am aware of the needs of rural residents for medical care; I wish to be near the ocean; I want a pleasant place to live in; I hate cities; no smog, more land available, more room, family likes rural setting; I like outdoor recreation (hunting, fishing, etc). Apparently, those who have been reared in a rural setting or who have experienced rural life prefer this locale, but there is evidence, also, of a disillusionment with cities and urban congestion on the part of the urban raised.

The urban location was chosen because: more facilities, in general, good transportation, quality of its medical centers, large teaching hospitals, spouse preferred urban life, constraints of the chosen specialty require a full-time position in research or in an urban hospital, more opportunities for practice in chosen specialty, practice in a large group practice setting is possible, greater variety of patients to treat, better medical facilities and good opportunities for continuing education. Apparently, the prime motives here are the requirements of a highly specialized hospital- and research-oriented medical specialty and the intellectual challenge of such a practice.

Table 87

An Analysis of Choice of Future Geographic Location and Type of Practice by Those Hershey 1971 Graduates Who Indicated a Preference One Year After Their Graduation

| Proposed Area of Specialization | Desired Geographic Location | | | Anticipated Type of Practice | | |
|---|---|---|---|---|---|---|
| | Rural | Suburbs | Urban | Solo | Group | Hospital |
| A. Basic Care Areas | | | | | | |
| Family Practice | 3 | 0 | 1 | 0 | 4 | 0 |
| Internal Medicine | 4 | 1 | 0 | 0 | 6 | 0 |
| Pediatrics | 0 | 0 | 2 | 0 | 1 | 1 |
| General Surgery | 1 | 0 | 0 | 0 | 0 | 0 |
| Opthalmology | 0 | 1 | 0 | 0 | 0 | 0 |
| Eye, Nose, Throat | 0 | 1 | 0 | 0 | 1 | 0 |
| Total Basic Care | 8 | 3 | 3 | 0 | 12 | 1 |
| % Total | 57% | 21.5% | 21.5% | 0% | 92% | 8% |
| B. Medical Specialties Other Than Basic Care | | | | | | |
| Neurology | | | 1 | | | 1 |
| Psychiatry | 1 | | 2 | | 1 | 1 |
| Gastro-Intestinal | | | 1 | | 1 | |
| Anesthesiology | 1 | | | | 1 | |
| Nuclear Medicine | | | | | 1 | |
| Clinical Research | | 1 | 1 | | | |
| Total Non-Basic Care | 2 | 1 | 5 | 0 | 4 | 2 |
| % Total Non-Basic | 25% | 13% | 62% | 0% | 67% | 33% |
| C. All Hershey Respondents | | | | | | |
| Basic Care | 8 | 3 | 3 | 0 | 12 | 1 |
| Other | 2 | 1 | 5 | 0 | 4 | 2 |
| Combined | 10 | 4 | 8 | 0 | 16 | 3 |
| % of Combined | 46% | 18% | 36% | 0% | 84% | 16% |

Table 88

A Summary of Reasons Given By Some Respondents for Their Choice of Location and/or Practice

A. General Reasons for Choice of Location

1. Desirability of the geographic location

   a. Climate
   b. Recreation
   c. Safety
   d. Good Schools
   e. Environment–trees, ocean, etc.
   f. Cultural Opportunities

2. Need for physicians in an area, generally, i.e., adequate population base and availability of a position

3. *"Need of the population for good comprehensive medical care–a challenge to change the system"*

4. Good hospital facilities

5. Competent physicians to associate with

6. Type of community

7. Medical center for continuing education nearby

8. Wife and children's preference

9. Location is not important, offers are

10. Must be near a medium-size city (semi-rural setting)

B. Reasons Given for a Choice of Rural Location

1. *"Like rural people"*

2. Prefer natural surroundings (mountains, lakes, rivers, trees) and their peace and tranquility, i.e., good environment

3. Born and raised in rural area

4. Aware of needs of rural residents

5. Wish to be near ocean

6. More pleasant place to live

7. *"I hate cities"*

8. No smog

9. More land available, more room

10. Family likes rural setting.

11. Outdoor recreational interests

Table 88
(continued)

C. Reasons Given for a Choice of an Urban Location

1. More facilities generally
2. Good transportation
3. Medical centers of quality
4. Large teaching hospital
5. Spouse prefers urban life
6. Seeking full-time hospital, or academic medicine position
7. More opportunities for practice in my specialty
8. Large group practice possible
9. More medical challenges in variety of patients
10. Better medical facilities
11. Better for continuing education

D. Reasons Given for Choice of Suburban Location

1. Good hospital and other medical facilities
2. Dislike of cities
3. Medical center for continuing education nearby
4. Recreational, educational and cultural facilities tend to be good and readily available or nearby
5. Type of community
6. Need for a community of colleagues
7. Academic positions available
8. Desirable patient population
9. Family and personal considerations

E. Reasons Given for a Choice of Group Practice

1. *"Medicine of the future will probably be provided by specialists in a group practice setting."* One man can't gain any more than a small amount of knowledge needed to treat the whole person
2. Group practice desirable
3. I anticipate group practice to be probable (i.e., typical of the future).

The reasons given for the suburban location are largely a mixture of the advantages of the rural and urban locale, i.e., good hospital and medical facilities, dislike of cities and love of a more natural setting, nearby medical center (urban) for continuing education, pleasant community life with amenities like country clubs, etc., a community of colleagues, academic positions available in nearby medical schools, desirable patient population, good schools, etc., for the family.

Obviously, those who choose a hospital setting do so out of career necessity considerations. The unanimous choice of group practice over solo practice as their anticipated type of practice is not so clear as to the reasons involved. Part E of Table 88 gives a summary of the kinds of reasons given for a group practice preference. Apparently, these young physicians see group practice as both desirable and as probably typical of future medical practice. They see the medicine of the future as based upon groups of specialists who provide the overall care that an individual physician once gave but can no longer give. This could possibly be seen as due to the incredible proliferation of medical knowledge and skills that no one man could master and, indeed, some respondents so indicated.

Although the respondents did not mention it and, indeed, they may not be aware of it, the available data on group versus solo practice indicate that, on the average, the net income of the physician is substantially higher in a group practice setting than for solo practice.[4] The higher net income seems to be due to the cost efficiencies inherent in group practice with its sharing of the cost of commonly utilized personnel and capital equipment, in addition to the use of auxiliary personnel to augment the productivity of the physicians involved.

These findings of a preference for group practice and a rural location by most physicians lend some hope that any effort by the state or federal government to institute a system of regional group practice centers in rural and other impacted areas, such as described in Chapter III, will result in ameliorating or even bring to an end the present plight of the rural and central city populations, since many of the objections to rural practice can be met by the use of such group practice settings (see Chapter III).

The answer, then, to the questions posed earlier about whether today's medical graduates would be acceptive of group practice and willing to enter basic care practice in a rural setting seems to be yes, depending, of course, upon the generalizability of Hershey Medical School survey findings for only one graduating class to the future graduating classes of all eight of the medical schools of Pennsylvania.

In summary then, we find that a maldistribution of physicians does, indeed, characterize Pennsylvania's medical picture with a great disparity between the counties existing in terms of the average age of their physicians and the number of people served by each physician, particularly basic care physicians. We also find, however,that the past tendency for physicians to prefer solo practice to group practice, an urban or suburban practice, to a rural practice and specialization to basic care may be changing to a pattern of preferring a group practice setting, preferably in a rural setting, along with a possible increased interest in basic care in the form of a specialization in family medicine.

It would seem possible, then, that despite current dissatisfactions and problems connected with solo rural practice,[5] the state may be able to develop a delivery alternative that will meet the expressed needs of physicians who are seeking a place of practice that offers collegiality, good medical facilities, less night call duty, etc.

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# CHAPTER XIII

# FINDINGS

The findings of this study may be summarized as follows:

**Pennsylvania Ranking with Regard to Other States**

1. Pennsylvania compares well with most other states.

   a. It ranked 11th in population per physician in 1970.

   b. It now has the most favorable population per physician ratio in this century, if not before.

2. Pennsylvania is a medical powerhouse with regard to its production of physicians producing more than its share population-wise.

   a. Pennsylvania produced 9.6 per cent of all American trained graduates from 1950 to 1959 while its population ranged from 6 to 7 per cent of the total population of Continental U.S.A.

   b. Only New York produced more physicians from 1950-59, 12.3 per cent of all graduates with 9.8 per cent of U.S. population.

3. During 1950-59, Pennsylvania ranked 25th among the states with regard to the number of graduates who were residents of the state in which trained at the time of enrollment.

**Supply--Pennsylvania Residents vs. Out-of-State**

1. Around 69 per cent of Pennsylvania's first year medical classes of the 1960s have been residents of the state.

2. During the 1960s, the percentage of state residents in the first year has varied widely from school-to-school, i.e., from 30.7 per cent and 39.4 per cent for the University of Pennsylvania and the Medical College of Pennsylvania, respectively, to 78.1 per cent, 74.5 per cent and 71.1 per cent for Temple, Jefferson and the University of Pittsburgh medical schools, respectively.

3. The percentage of Pennsylvania applicants accepted by the medical schools varies from 20.5 per cent for the Philadelphia College of Osteopathic Medicine to 2.8 per cent for the Pennsylvania State University Medical School at Hershey.

4. About 6.25 per cent of all applicants (institutional median) are being accepted but, again, the schools vary widely.

   a. Applicants to Hahnemann, the University of Pennsylvania and Hershey Medical School find it harder to gain admission, 4.2 per cent, 5.6 per cent and 2.8 per cent of all applicants, respectively.

   b. Jefferson and Temple are about average for the state at around 6 per cent, while applicants to the Medical College of Pennsylvania, The University of Pittsburgh and the Philadelphia College of Osteopathic Medicine find admission to be relatively easier, 9.1 per cent, 6.7 per cent and 20.5 per cent acceptances, respectively.

5. Pennsylvania applicants find it much easier to be accepted than do out-of-state applicants, i.e., 11.7 per cent of Pennsylvanians are accepted to 6.2 per cent of out-of-state applicants, not counting those for the Philadelphia College of Osteopathic Medicine for whom data were not available.

6. There has been a steady drop in the proportion of Pennsylvania residents applying for admission to the medical schools of Pennsylvania.

   a. Hershey in 1971-72 had the highest proportion of Pennsylvania applicants (44.3 per cent) although only 2.8 per cent were accepted into the first year class.

   b. The University of Pennsylvania, on the other hand, had the lowest (22.8 per cent) proportion of Pennsylvania applicants.

7. The proportion of female applicants has been rising rapidly (22.5 per cent per year) in all institutions with the sole exception of Hahnemann where the male rise exceeds the female rise in applicants, i.e., males 26.8 per cent per year, females 7.8 per cent per year.

8. Overall, 6 per cent of female applicants and 6 per cent of male applicants are accepted, but Jefferson (9.6 per cent), the University of Pennsylvania (6.6 per cent) and the Medical College of Pennsylvania (8.3 per cent) give females more acceptances proportionately.

Supply--Pennsylvania's Holding Power and In-migration

1. As of 1967, the proportion of our graduates (1950-59) remaining in Pennsylvania as practitioners of medicine was 41 per cent, but as of 1971, this figure had dropped to 35 per cent (1961-63 graduates).

   a. Pennsylvania ranked 17th in terms of its holding power (41 per cent) for the 1950-59 graduates, and the state ranking for the 1961-73 graduates is not yet available.

   b. Five of our medical schools, 1961-63, had a comparable holding power which averaged around 40 per cent or better but this average was lowered to 35 per cent statewide by Jefferson Medical School (36 per cent), the University of Pennsylvania Medical School (29 per cent) and the Medical College of Pennsylvania (19.5 per cent).

   c. The low state holding power of the Medical College of Pennsylvania may be explained partly on the basis that only 45 per cent of female graduates actually enter practice and, if this were not true, the holding power of the Medical College of Pennsylvania might be nearer 43 per cent.

2. In comparison to other states, Pennsylvania ranked 5.5 in the percentage of 1950-59 out-of-state trained graduates who entered Pennsylvania to practice, i.e., 2.1 per cent of all graduates trained in other states.

   a. Only California (10 per cent), New York (3.7 per cent), Florida (3.4 per cent), New Jersey (2.8 per cent) and Texas (2.4 per cent) attracted more.

   b. Pennsylvania has, therefore, been highly competitive in attracting physicians.

3. One of every six Pennsylvania physicians in 1971 was trained in a foreign medical school (identical to that for the United States as a whole.)

4. Around 20 per cent of all new Pennsylvania physicians during the 1960s were foreign trained.

5. Pennsylvania held, in 1971, the following proportions of its 1961-63 graduates (holding power): 8 per cent in general or family medicine, 4 per cent in internal medicine, 2 per cent in pediatrics, 2 per cent in general surgery, 19 per cent in other specialties or 35 per cent in all.

6. Of all U.S. graduates, 0.005 per cent, 1961-63, became family medicine practitioners in Pennsylvania, 0.29 per cent became general practitioners, 0.27 per cent became internists, 0.13 per cent became pediatricians, 0.09 per cent became general surgeons and 1.08 per cent became practitioners of other specialties. In sum, 1.865 per cent of the U.S. graduates became practitioners in Pennsylvania.

7. Of all Pennsylvania medical doctors, 82.92 per cent were trained in the United States.

8. Of all Pennsylvania medical doctors, 58.31 per cent were trained in Pennsylvania.

9. Of all Pennsylvania medical doctors, 24.61 per cent were trained in another state.

10. Of all Pennsylvania medical doctors, 17.01 per cent were trained outside of the United States as follows:

    a. 4.96 per cent were trained in Europe (29.02 per cent of all foreign-trained medical doctors in Pennsylvania)

b. 6.69 per cent were trained in an Asiatic country (39.18 per cent of all foreign-trained medical doctors in Pennsylvania)

c. 2.14 per cent were trained in South America (12.56 per cent of all foreign trained in Pennsylvania)

d. 1.81 per cent were trained in the Middle East (10.58 per cent of all foreign trained in Pennsylvania)

e. 1.20 per cent were trained in Canada (7.01 per cent of all foreign trained in Pennsylvania)

f. 0.12 per cent were trained in Australia or New Zealand (0.7 per cent of all foreign trained in Pennsylvania)

g. 0.09 per cent were trained in South Africa (0.52 per cent of all foreign trained in Pennsylvania)

11. Pennsylvania's holding power pattern for its osteopathic graduates differs markedly from that of its medical doctor graduates.

| Specialty | M.D. | D.O. | Combined |
|---|---|---|---|
| General Practice | 6% | 30% | 8% |
| Family Medicine | 1% | - | - |
| Internal Medicine | 4% | 1% | 4% |
| Pediatrics | 2% | 1% | 2% |
| General Surgery | 2% | 2% | 2% |
| Other Specialties | 20% | 8% | 19% |
| Total | 34% | 42% | 35% |

### Projected Growth in Supply

1. The output of Pennsylvania's medical schools in terms of graduates should rise by 78 per cent over the 1970 figure of 752 with Hershey, Hahnemann and the Philadelphia College of Osteopathic Medicine projecting the most growth, i.e., 167 per cent, 147 per cent and 191 per cent, respectively. Projected output of graduates by 1980 will be 1,340 per year (Table 4).

2. Between 1971 and 1980, it is projected (Table 22a) that 8,793 active physicians will enter practice in Pennsylvania beyond the residency level of practice.

The projections for each area of practice account for about 7,700 direct care physicians (Table 22a); with approximately 1,896 in general family practice, 864 in internal medicine, 556 in pediatrics, 925 in general surgery and 3,543 in other specialties.

Projecting the separate areas contained in general estimate of total direct care physicians because of rounding percentages and particularly the other specialties category produce some discrepancy in totals for direct care.

### Medical School Enrollment Growth

1. Interest in medicine as a career is on the increase, 4.8 per cent of college freshmen indicated such plans in 1966 but 5.5 per cent had done so in 1972.

2. Increased interest in medicine is likely since medicine is now the highest paid of the professions and professional unemployment in other areas has been higher than in the past. For example: Physicians netted a median income, after expenses but before taxes, of $22,100 in 1959. This rose to $40,550 in 1969 and a linear projection would raise this to around $63,580 by 1980, assuming a three-year freeze of income during 1971-74. Much of this increase will be due to inflation.

3. Our Pennsylvania medical schools' first year enrollments grew at a rate of 1.9 per cent per annum while the applications grew at a 22.52 per cent annum rate which also suggests increasing interest in medicine as a career.

### Characteristics of Pennsylvania Medical Students

1. Over the decade of the 1960s, some Pennsylvania medical schools have increased their proportion of Pennsylvania residents in their first year classes, notably the Medical College of Pennsylvania, with an increase from 33.3 per cent in 1960-61 to 60.6 per cent in 1971-72.

2. There are, however, expectations. The University of Pennsylvania dropped from 56 per cent to 47.5 per cent, the University of Pittsburgh dropped from 81 per cent to 72 per cent and the Philadelphia College of

Osteopathic Medicine dropped from 77.5 per cent to 64 per cent.

3. Of all Pennsylvania medical students, 0.7 per cent are foreign students.

4. Of the medical students in the state-related medical schools, 77.2 per cent are Pennsylvania residents while only 58.7 per cent of the students in the state-aided medical schools are residents of Pennsylvania.

5. In 1971-71, 63.1 per cent of the 1971-72 graduating class were residents.

Medical School Applicant and Acceptance Patterns

1. Pennsylvania ranked third, behind California and New York, in the number of accepted applicants and ranks second in the number of applicants to U.S. medical schools.

2. In contrast, Pennsylvania ranks 40th in the percentage (39.5 per cent) of its applicants who were accepted even though the applicants ranked 10th in the number of applications made.

3. California, however, is even lower with only 35.2 per cent of its applicants accepted, but New York does better than Pennsylvania since 43 per cent of its applicants are accepted.

4. Pennsylvania's female applicants do somewhat better in the proportion of acceptances with a rank of 30 among the states.

5. Nationally, and in Pennsylvania, the mean medical college aptitude test scores for successful applicants and, to a lesser degree, unsuccessful applicants are constantly rising indicating increasing selectivity for verbal intelligence and scientific and mathematical aptitude.

6. This latter finding suggests that some rural and inner-city students with a lower quality educational background are being excluded even though they might be more inclined to practice in a rural or in inner-city area where the need for physicians is likely to be acute.

Physician Growth

1. The future growth of physicians, often unpredicatable, is likely to be determined by the following factors:

   a. Increase in population, especially in the aged.

   b. Rising health consciousness of public resulting in increased demand for services.

   c. Higher standards of health care than those now current.

   d. Probable expansion of prepaid group medical care.

   e. Continued or increased care for members of the Armed Forces, their families and for veterans.

   f. Continued growth in public health, rehabilitation, industrial medicine and mental health programs and facilities.

   g. Increased need for research personnel and medical school faculty as we seek to develop biomedical medicine or find the basic causes of diseases such as cancer, arteriosclerosis, hypertension and osteoarthritis as well as redress the physician shortage problem.

2. By 1980 Pennsylvania is projected to have somewhere between 23,850 and 26,510 physicians with 25,900 as the official projection arrived at in this study.

3. The number of general practitioners will continue to decline until about 1977 when they they will start to increase in numbers largely due to the impact of growth in the output of osteopathic physicians.

4. The growth of and impact of the new specialty of family medicine is not now ascertainable but may well supplant general practice or the primary area of medicine.

5. Currently, however, specialists in family medicine in Pennsylvania (102) are largely practicing in major urbanized regions of the state.

6. Pennsylvania has only 3.1 per cent of the family medicine practitioners in the country although Pennsylvania has around 4.5 per cent of the U.S. population.

7. Hershey Medical School (Penn State) graduated 33 students in 1971, but only 4 of the 33 (12 per cent) have since entered the specialty of family medicine despite the emphasis upon this area at Hershey.

8. If the preceding 12 per cent figure was true of all of Pennsylvania medical schools rather than the 8 per cent rate of the 1960s for general practice, then accessibility to family medicine would rapidly increase.

9. Approximate physician totals (M.D. and D.O.) by 1980 (Table 35) are projected as: (a) total active practice physicians, 19,772 and (b) direct patient care physicians, 17,264. Areas of direct patient care are projected as: general and family practice, 3,893; internal medicine, 1,809; pediatrics, 1,025; general surgery, 1,635 and other specialties, 9,013, for a total of 17,375. This is a discrepancy of 111 over the total direct care projections, about 11 physicians per year, which may be explained by rounding of percentages.

Need Over and Above Projected Growth

1. Ideally, Pennsylvania, by 1980, should have 6,085 direct patient care general or family medicine specialists rather than 3,893; 2,434 internists rather than 1,809; 1,217 pediatricians rather than 1,025 and 1,217 general surgeons rather than 1,635.

2. General surgeons will definitely be a surplus specialty by 1980.

3. A large unmet need for general practitioners and internists (basic care) is expected to remain a problem in 1980 and, in fact, the situation could be worse than in 1971.

4. In effect the state by 1980 will be short 2,200 general practitioners and 625 internists. At the same time a surplus could occur of some 400 general surgeons and around 1,000 other specialists.

5. Gastroenterology, pulmonary disease, radiology, thoracic surgery, urology and pathology should be adequately covered, while cardiology, neurology, neurosurgery, obstetrics and gynecology, opthalmology, orthopedics and psychiatry are likely to be in a surplus state by 1980.

6. The need areas for 1980 are expected to be (in addition to general/family practice, internal medicine and pediatrics) allergy, anesthesiology, colon and rectal surgery, dermotology, otolaryngology and plastic surgery.

Possible Impact of Prepaid Group Medical Care

1. Prepaid plans may become more commonplace and result in a changing need picture.

2. The prepaid group plans use general practitioners and internalists interchangeably at a more efficient ratio of 2,441 people per physicians as compared with an optimum ratio of 1,429 people per physicians for the conventional delivery system, that is, 1,012 more people for each physician.

3. Prepaid group plans use fewer general surgeons since they have a ratio of 17,117 people per surgeon as compared with the conventional delivery system's optimum ratio of 10,000 people per surgeon, i.e., 7,727 more people per physician.

4. The lower need for surgeons is probably due to efforts to reduce unnecessary surgery and increase preventative care.

5. Prepaid group plans use more pediatricians than are considered optimum in the conventional delivery system or 3,952 fewer people.

6. A shift toward prepaid plans might, therefore, increase our need for pediatricians but it might also decrease our need for the other types of specialty.

### Physician Mortality

1. Pennsylvania will need approximately 2,000 active practice physicians between 1971 and 1980 to replace those who die.

2. Pennsylvania will need approximately:

   a. 739 general practitioners between 1971 and 1980 or 84 per year on the average.

   b. 177 internists between 1971 and 1980 or 20 per year.

   c. 68 pediatricians between 1971 and 1980 or 8 per year.

   d. 153 general surgeons between 1971 and 1980 or 17 per year.

   e. 830 other specialists between 1971 and 1980 or 92 per year.

### Physician Disability and Retirement

1. On the average, about six general practitioners per year will become disabled for a lengthy period of time along with 3 internists, 2 pediatricians, 3 general surgeons, 17 specialists in other areas and 5 in other than patient care activities.

2. Thirty-five active physicians including 30 direct patient care physicians will be required to replace disabled physicians.

3. Physicians now retire around 72 years of age although some continue to practice into their 90's.

4. Retirement probably will come earlier in the 1970s and 1980s due to a higher income level with expectations of the good life, increasing costs of maintaining a part-time practice as one ages, increasing paper work, increasing influence of the leisure-oriented society of today and decreased feelings of being sorely needed as the physician ratios near the optimum levels for our delivery system.

5. On the average, 438 active physicians will retire each year. Retirees per year in direct patient care will include approximately 80 in general practice, 23 internists, 6 pediatricians, 9 general surgeons, 100 in other specialties and 28 in other than patient care.

### Migration

1. On the average, Pennsylvania will lose about 540 actively practicing (beyond the residency) physicians a year but will gain around 700 per year for an overall net gain of about 160 per year.

2. All of the specialties show this trend of net gain with the exception of pediatrics which was found to have a net gain of zero.

### Projections of Total Need

1. It is projected that between 1971 and 1980 Pennsylvania will require between 5,670 and 7,380 more physicians than the supply will provide. Each year we will have to produce or import 630 to 820 more physicians over and above the projected supply in order to meet our minimal needs or make our medical care closer to the optimum.

2. The largest need will be for general practitioners with up to 260 more per year being required, i.e., up to 2,340 more between 1971 and 1980 than produced or imported.

3. Approximately 50 to 120 more internists per year will be needed,i.e., some 450 to more internists between 1971 and 1980.

4. Approximately 40 to 60 pediatricians per year will be needed, around 360 to 540 more from 1971 to 1980.

5. Need for general surgeons cannot actually be said to exist beyond those Pennsylvania produces and imports.

6. On the average, Pennsylvania will need to produce or import around 330 more specialists per year in other areas; 2,970 more between 1971 and 1980.

7. Our needs would be even greater if the supply of foreign physicians were to slacken.

### Implications for Pennsylvania's Medical Schools

1. The number of students could be increased by 2.5 to 3 times the projected class size. This assumes that practice in Pennsylvania will not be any more attractive to out-of-state and foreign-trained physicians or to our own graduates than during the 1960s.

2. Emphasis on less costly solutions is likely to be more fruitful since a large increase in class size is more likely to result in a surplus of specialists who will leave the state.

3. Strong incentives to remain in Pennsylvania should be sought. Also, appropriate training, legislative and other actions should be taken to further the use of paramedical personnel. Other means should be devised to make physicians more productive especially group practice designed to meet rural patient needs.

4. Medical schools should consider putting an emphasis on basic care (family medicine), on research in rural and urban delivery system alternatives, on research and training in the effective use of physicians assistants and other paraprofessionals and on the sociology of medicine in their curriculum and research efforts.

### The Physician Maldistribution Problem

1. The various regions and counties of the state vary widely in median age from 64.5 years in Sullivan County to 37.4 years in Montour County compared to 46 years for the entire state and nation.

2. Seven of the Pennsylvania counties are projected to lose one-half or more of their physicians by 1980, due to death or retirement. The counties are: Adams, Cameron, Clarion, Pike, Sullivan, Wayne and Wyoming.

3. Twelve more counties may lose 25 to 49 per cent of their physicians by 1980. They are: Bedford, Butler, Carbon, Crawford, Fayette, Franklin, Indiana, Jefferson, Lackawanna, Luzerne, Northumberland and Schuylkill.

4. Forty-five out of 67 counties have enough basic care physicians (G.P., F.M., I.M., G.S.) to reach or exceed 50 per cent of the optimum number for those counties (see Table 84).

5. Seventeen counties have 70 per cent or more of the optimum number of basic care physicians with the top 10 having 75 per cent or more or the optimum number of basic care physicians (see Table 84).

6. Twenty-two counties on the other hand have less than 50 per cent of the number regarded as optimum and this goes down to 40 per cent of the optimum for Pike and Sullivan counties (see Table 84).

7. The median percentage of optimum for the counties is 58 per cent while the percentage figure for Pennsylvania is 70 per cent.

8. Fifty of the 67 counties are below the state median and 35 are below the county median.

9. Maldistribution by specialty and by geographic area with its consequent physician-age maldistribution is Pennsylvania's basic problem and is not subject to the simple solutions of producing more physicians.

### Hope for the Future

1. Data from a survey of Hershey Medical School graduates of 1971 lends some credence to the possibility that young physicians may be more willing to enter basic care in rural or urban areas of need and may be more willing to enter into group practice rather than solo practice.

2. The Hershey graduates unanimously chose group or hospital practice over solo practice.

3. Twelve per cent of the graduates chose family medicine as a specialty, more than chose it one year before at their graduation.

4. Rural practice may continue to be frequently rejected. Graduates indicated that they

selected the location of practice on the basis of the following considerations, many of which are difficult for a rural area to meet: climate, good recreational facilities, safety of family or person, quality of the schools, pleasant environment (trees, ocean, etc.), cultural opportunities, physician needs of area, adequacy of the population base for practice, good hospital facilities, type of community (rural, urban, etc.), medical center for continuing education nearby, preferences of wife and children, availability of openings and a medium-sized city nearby if rural location.

5. Those who did indicate preference for rural practice gave the following reasons: Liking for rural people, preference for natural surroundings, sense of peace and tranquility, born and raised in rural area, awareness of rural needs, hatred of cities, avoidance of smog, crime, more land available, more room in rural area, family prefers rural life and love of outdoor recreation such as hunting and fishing.

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# APPENDICES

## Appendix A

### Historical Data Based Linear Projections of Growth in the Medical Specialties Using AMA Data Corrected for the 1968 Change in Classification or Data from the American Osteopathic Association

### Table 1.a.

Projections of Growth for Physicians (M.D.) in Administration
(r = 0.9220, Regression Equation = 12.6789 x -24,366.7713)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimates | Error |
|---|---|---|---|---|---|
| 1963 | 146 | 3.5625 | 520 | 522 | 0.00 |
| 1964 | 151 | 3.5625 | 538 | 535 | -0.01 |
| 1965 | 149 | 3.5625 | 531 | 547 | 0.03 |
| 1966 | 160 | 3.5625 | 570 | 560 | -0.02 |
| 1967 | 166 | 3.5625 | 591 | 573 | -0.03 |
| 1968 | 570 | 1.0000 | 570 | 585 | 0.03 |
| 1969 | 610 | 1.0000 | 610 | 598 | -0.02 |
| 1970 | 601 | 1.0000 | 601 | 611 | 0.02 |
| | | | Projected Totals | | |
| 1971 | | | 623 | | |
| 1972 | | | 636 | | |
| 1973 | | | 649 | | |
| 1974 | | | 661 | | |
| 1975 | | | 674 | | |
| 1976 | | | 687 | | |
| 1977 | | | 699 | | |
| 1978 | | | 712 | | |
| 1979 | | | 725 | | |
| 1980 | | | 737 | | |

Appendix A-Contd.

Table 2.a.

Projections of Growth for Direct Patient Care M.D.'s in Aerospace Medicine (Median Incidence of 3 Used to Project to 1980)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals |
|---|---|---|---|
| 1963 | 4 | 1.6667 | 7 |
| 1964 | 2 | 1.6667 | 3 |
| 1965 | 2 | 1.6667 | 3 |
| 1966 | 2 | 1.6667 | 3 |
| 1967 | 3 | 1.6667 | 5 |
| 1968 | 5 | 1.0000 | 5 |
| 1969 | 3 | 1.0000 | 3 |
| 1970 | 2 | 1.0000 | 2 |
| | | Projected Totals[a] | |
| 1971 | | 3 | |
| 1972 | | 3 | |
| 1973 | | 3 | |
| 1974 | | 3 | |
| 1975 | | 3 | |
| 1976 | | 3 | |
| 1977 | | 3 | |
| 1978 | | 3 | |
| 1979 | | 3 | |
| 1980 | | 3 | |

[a] A linear regression based projection would have gone to a value of 3 in 1971, 2 in 1972; 1 in 1975 and 0 in 1978. This did not seem reasonable so the median value of the historical data (3) was used instead.

Appendix A-Contd.

Table 3.a.

Projections of Growth for Direct Patient care M.D.'s in the Specialty of Allergic Diseases (r = 0.9435, Regression Equation = 2.6667 x -5,134.7467)

| Year | Uncorrected Totals[a] | Correction Factor[b] | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 52<br>3 | 1.6441<br>6.0000 | 85<br>18 (103) | 100 | -0.03 |
| 1964 | 50<br>3 | 1.6441<br>6.0000 | 82<br>18 (100) | 103 | 0.03 |
| 1965 | 52<br>3 | 1.6441<br>6.0000 | 85<br>18 (103) | 105 | 0.02 |
| 1966 | 55<br>3 | 1.6441<br>6.0000 | 90<br>18 (108) | 108 | 0.00 |
| 1967 | 57<br>3 | 1.6441<br>6.0000 | 94<br>18 (112) | 111 | -0.01 |
| 1968 | 97<br>18 | 1.0000<br>1.0000 | 97<br>18 (115) | 113 | -0.02 |
| 1969 | 99<br>14 | 1.0000<br>1.0000 | 99<br>14 (113) | 116 | 0.03 |
| 1970 | 105<br>15 | 1.0000<br>1.0000 | 105<br>15 (120) | 119 | -0.01 |
| | | | Projected Totals[c] | | |
| 1971 | | | 121 | | |
| 1972 | | | 124 | | |
| 1973 | | | 127 | | |
| 1974 | | | 129 | | |
| 1975 | | | 132 | | |
| 1976 | | | 135 | | |
| 1977 | | | 137 | | |
| 1978 | | | 140 | | |
| 1979 | | | 143 | | |
| 1980 | | | 146 | | |

[a] Second figure for each year represents the total for Pediatric allergy.

[b] Upper figure represents "allergy total" correction factor and lower figure represents the "Pediatric allergy" correction factor.

[c] Projections based upon total of the allergy and Pediatric allergy figures during 1963-70.

Appendix A-Contd.

Table 4.a.

Projections of Growth for Direct Patient Care M.D.'s in Anesthesiology
(r = 0.9931, Regression Equation = 12.7024 x -24,655.8553)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 262 | 0.9785 | 256 | 259 | 0.01 |
| 1964 | 283 | 0.9785 | 277 | 272 | -0.02 |
| 1965 | 291 | 0.9785 | 285 | 284 | 0.00 |
| 1966 | 302 | 0.9785 | 296 | 297 | 0.00 |
| 1967 | 317 | 0.9785 | 310 | 310 | 0.00 |
| 1968 | 318 | 1.0000 | 318 | 322 | 0.01 |
| 1969 | 332 | 1.0000 | 332 | 335 | 0.01 |
| 1970 | 353 | 1.0000 | 353 | 348 | -0.01 |
| | | | Projected Totals | | |
| 1971 | | | 361 | | |
| 1972 | | | 373 | | |
| 1973 | | | 386 | | |
| 1974 | | | 399 | | |
| 1975 | | | 411 | | |
| 1976 | | | 424 | | |
| 1977 | | | 437 | | |
| 1978 | | | 450 | | |
| 1979 | | | 462 | | |
| 1980 | | | 475 | | |

Appendix A-Contd.

Table 5.a.

Projections of Growth for Direct Patient Care M.D.'s in Cardiology and Pediatric Cardiology (r = 0.9999, Regression Equation = 14.1125 x -27,475.0526 for Years 1964, 1969-70)

| Year | Uncorrected Totals[a] | Correction Factor[b] | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 103<br>3 | 2.4248<br>2.2500 | 250<br>7 (257) | * | * |
| 1964 | 97<br>3 | 2.4248<br>2.2500 | 235<br>7 (242) | 242 | 0.00 |
| 1965 | 98<br>4 | 2.4248<br>2.2500 | 238<br>9 (247) | * | * |
| 1966 | 100<br>3 | 2.4248<br>2.2500 | 243<br>7 (250) | * | * |
| 1967 | 107<br>4 | 2.4248<br>2.2500 | 259<br>9 (268) | * | * |
| 1968 | 274<br>9 | 1.0000<br>1.0000 | 274<br>9 (283) | * | * |
| 1969 | 301<br>11 | 1.0000<br>1.0000 | 301<br>11 (312) | 313 | 0.00 |
| 1970 | 314<br>13 | 1.0000<br>1.0000 | 314<br>13 (327) | 327 | 0.00 |
| | | | Projected Totals[c] | | |
| 1971 | | | 341 | | |
| 1972 | | | 355 | | |
| 1973 | | | 369 | | |
| 1974 | | | 383 | | |
| 1975 | | | 397 | | |
| 1976 | | | 411 | | |
| 1977 | | | 425 | | |
| 1978 | | | 440 | | |
| 1979 | | | 454 | | |
| 1980 | | | 468 | | |

*Indicates data not used in computing regression equation.

[a] Upper figure represents Cardiology total, lower figure represents Pediatric Cardiology total.

[b] Upper figure represents correction factor for Cardiology and the lower figure, Pediatric Cardiology.

[c] Data points chosen for the regression were based upon a graphic analysis of the growth curve.

Appendix A-Contd.

Table 6.a.

Projections of Growth for Direct Patient Care M.D.'s in the Specialty of Colon and Rectal Surgery (r = -0.8226, Regression Equation = -0.8691 x +1,760.1689)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 54 | 1.0000 | 54 | 54 | 0.00 |
| 1964 | 54 | 1.0000 | 54 | 53 | -0.02 |
| 1965 | 54 | 1.0000 | 54 | 52 | -0.04 |
| 1966 | 51 | 1.0000 | 51 | 52 | 0.02 |
| 1967 | 48 | 1.0000 | 48 | 51 | 0.06 |
| 1968 | 50 | 1.0000 | 50 | 50 | 0.00 |
| 1969 | 48 | 1.0000 | 48 | 49 | 0.02 |
| 1970 | 50 | 1.0000 | 50 | 48 | -0.04 |
| | | | Projected Totals[a] | | |
| 1971 | | | 47 | | |
| 1972 | | | 46 | | |
| 1973 | | | 46 | | |
| 1974 | | | 44 | | |
| 1975 | | | 44 | | |
| 1976 | | | 43 | | |
| 1977 | | | 42 | | |
| 1978 | | | 41 | | |
| 1979 | | | 40 | | |
| 1980 | | | 39 | | |

[a] A possible alternative projection would be to assume that the figure would continue to hover between 40 and 50, i.e., a projection of 49 through 1980 based on the static pattern of 1967-70. However, the decrement projected here could possibly reflect an increasing use of chemotherapy as an alternative to surgery or a lessening of the incidence of colon and rectal diseases.

Appendix A - Continued

TABLE 6a

Projections of Growth for Direct Patient Care M.D.'s in the Specialty of Colon and Rectal Surgery (r = -0.8226, Regression Equation = -.0.8691 x +1,760.1689)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 54 | 1.0000 | 54 | 54 | 0.00 |
| 1964 | 54 | 1.0000 | 54 | 53 | -0.02 |
| 1965 | 54 | 1.0000 | 54 | 52 | -0.04 |
| 1966 | 51 | 1.0000 | 51 | 52 | 0.02 |
| 1967 | 48 | 1.0000 | 48 | 51 | 0.06 |
| 1968 | 50 | 1.0000 | 50 | 50 | 0.00 |
| 1969 | 48 | 1.0000 | 48 | 49 | 0.02 |
| 1970 | 50 | 1.0000 | 50 | 48 | -0.04 |
| | | | Projected Totals[a] | | |
| 1971 | | | 47 | | |
| 1972 | | | 46 | | |
| 1973 | | | 46 | | |
| 1974 | | | 44 | | |
| 1975 | | | 44 | | |
| 1976 | | | 43 | | |
| 1977 | | | 42 | | |
| 1978 | | | 41 | | |
| 1979 | | | 40 | | |
| 1980 | | | 39 | | |

[a]A possible alternative projection would be to assume that the figure would continue to hover between 48 and 50, i.e., a projection of 49 through 1980 based on the static pattern of 1967-70. However, the decrement projected here could possibly reflect an increasing use of chemotherapy as an alternative to surgery or a lessening of the incidence of colon and rectal diseases.

Appendix A-Contd.

Table 7.a.

Projections of Growth for Direct Patient Care M.D.'s in Dermatology (3 Per Cent Rise Estimate, Based upon Projected Pennsylvania Population Growth)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals |
|---|---|---|---|
| 1963 | 161 | 0.9188 | 148 |
| 1964 | 165 | 0.9188 | 152 |
| 1965 | 158 | 0.9188 | 145 |
| 1966 | 156 | 0.9188 | 143 |
| 1967 | 159 | 0.9188 | 146 |
| 1968 | 147 | 1.0000 | 147 |
| 1969 | 145 | 1.0000 | 145 |
| 1970 | 149 | 1.0000 | 149 |
| | Projected Totals | | |
| 1971 | 149 | | |
| 1972 | 149 | | |
| 1973 | 150 | | |
| 1974 | 150 | | |
| 1975 | 151 | | |
| 1976 | 151 | | |
| 1977 | 152 | | |
| 1978 | 152 | | |
| 1979 | 153 | | |
| 1980 | 153 | | |

Appendix A-Contd.

Table 8.a.

Projections of Growth for Direct Patient Care M.D.'s in Gastroenterology (r = 0.9895, Regression Equation = 4.4645 x -8,716.2218)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 27 | 1.8158 | 49 | 48 | -0.02 |
| 1964 | 28 | 1.8158 | 51 | 52 | 0.02 |
| 1965 | 32 | 1.8158 | 58 | 56 | -0.03 |
| 1966 | 32 | 1.8158 | 58 | 61 | 0.05 |
| 1967 | 36 | 1.8158 | 65 | 65 | 0.00 |
| 1968 | 69 | 1.0000 | 69 | 70 | 0.01 |
| 1969 | 76 | 1.0000 | 76 | 74 | -0.03 |
| 1970 | 79 | 1.0000 | 79 | 79 | 0.00 |
| | | | Projected Totals | | |
| 1971 | | | 83 | | |
| 1972 | | | 88 | | |
| 1973 | | | 92 | | |
| 1974 | | | 97 | | |
| 1975 | | | 101 | | |
| 1976 | | | 106 | | |
| 1977 | | | 110 | | |
| 1978 | | | 115 | | |
| 1979 | | | 119 | | |
| 1980 | | | 123 | | |

Appendix A-Contd.

Table 9.a.

Projections of Growth for Direct Patient Care M.D.'s in General Surgery ($r$ = 1.0000, Regression Equation = 29.3578 x -56,791.0171 for Years 1967, 1968 and 1970)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 1,018 | 0.8971 | 913 | * | * |
| 1964 | 1,045 | 0.8971 | 937 | * | * |
| 1965 | 1,054 | 0.8971 | 946 | * | * |
| 1966 | 1,068 | 0.8971 | 958 | * | * |
| 1967 | 1,066 | 0.8971 | 956 | 956 | 0.00 |
| 1968 | 985 | 1.0000 | 985 | 985 | 0.00 |
| 1969 | 980 | 1.0000 | 980 | * | * |
| 1970 | 1,044 | 1.0000 | 1,044 | 1,044(1,008) | 0.00 |
| | | | Projected Totals | | |
| 1971 | | | 1,073(1,020) | | |
| 1972 | | | 1,103(1,033) | | |
| 1973 | | | 1,132(1,045) | | |
| 1974 | | | 1,161(1,057) | | |
| 1975 | | | 1,191(1,069) | | |
| 1976 | | | 1,220(1,081) | | |
| 1977 | | | 1,249(1,093) | | |
| 1978 | | | 1,279(1,106) | | |
| 1979 | | | 1,308(1,118) | | |
| 1980 | | | 1,337(1,130) | | |

*Indicates those years not used in the determination of future trend. Alternately, (1) the years 1964, 1965, 1966 and 1968 could have been used or (2) the mean of both projections. The regression equation for these alternative years is 12.1714 x -22,969.4826, $r$ = 0.9966 and the projected alternative totals are shown in parenthesis along with the 1970 alternative total of 1,008. This was rejected in favor of the more recent trend pattern for 1967-68 and 1970.

Appendix A-Contd.

Table 10.a.

Projections of Growth for Direct Patient Care M.D.'s in General Practice (r = 0.9917, Regression Equation = -88.7023 + 178,020.1674)

| Year | Uncorrected Totals | Correction Factor[a] | Corrected Totals[b] | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 4,579 | 0.8536 | 3,909 | 3,898 | -0.05 |
| 1964 | 4,443 | 0.8536 | 3,793 | 3,809 | 0.04 |
| 1965 | 4,328 | 0.8536 | 3,694 | 3,720 | 0.01 |
| 1966 | 4,265 | 0.8536 | 3,641 | 3,631 | 0.00 |
| 1967 | 4,188 | 0.8536 | 3,575 | 3,543 | 0.00 |
| 1968 | 3,487 | 1.0000 | 3,487 | 3,454 | -0.01 |
| 1969 | 3,318 | 1.0000 | 3,318 | 3,365 | 0.01 |
| 1970 | 3,282 | 1.0000 | 3,282 | 3,277 | 0.00 |
| | | | Projected Totals | | |
| 1971 | | | 3,188 | | |
| 1972 | | | 3,099 | | |
| 1973 | | | 3,011 | | |
| 1974 | | | 2,922 | | |
| 1975 | | | 2,833 | | |
| 1976 | | | 2,744 | | |
| 1977 | | | 2,656 | | |
| 1978 | | | 2,567 | | |
| 1979 | | | 2,478 | | |
| 1980 | | | 2,390 | | |

[a] All correction factors in this appendix are based upon the ratio of the old pre-1968 classification schema to the near classification schema using 1968 data as found in the AMA publication.

[b] The corrected totals in this appendix represent an estimate only since we cannot be certain that the percentage change in the 1968 data due to reclassification would have been precisely the same for all prior years.

Appendix A-Contd.

Table 11.a.

Projections of Growth for Direct Patient Care M.D.'s in the Specialty of Internal Medicine (r = 0.9947, Regression Equation = 24.2642 x -46,489.6537 for Years 1964, 1965, 1967, 1968 and 1970)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 1,311 | 0.8535 | 1,119 | * | * |
| 1964 | 1,366 | 0.8535 | 1,166 | 1,165 | -0.01 |
| 1965 | 1,395 | 0.8535 | 1,191 | 1,189 | 0.00 |
| 1966 | 1,509 | 0.8535 | 1,288 | * | * |
| 1967 | 1,440 | 0.8535 | 1,229 | 1,238 | 0.01 |
| 1968 | 1,270 | 1.0000 | 1,270 | 1,262 | -0.01 |
| 1969 | 1,223 | 1.0000 | 1,223 | * | * |
| 1970 | 1,310 | 1.0000 | 1,310 | 1,311 | 0.00 |
| | | | Projected Totals | | |
| 1971 | | | 1,335 | | |
| 1972 | | | 1,359 | | |
| 1973 | | | 1,384 | | |
| 1974 | | | 1,408 | | |
| 1975 | | | 1,432 | | |
| 1976 | | | 1,456 | | |
| 1977 | | | 1,481 | | |
| 1978 | | | 1,505 | | |
| 1979 | | | 1,529 | | |
| 1980 | | | 1,553 | | |

* Indicates that the corrected total for that year was considered anomalous and was not used in deriving the regression equation.

Appendix A-Contd.

Table 12.a.

Projections of the Number of Inactive M.D.'s During the 1970s
(r = -0.9489, Regression Equation = -34.4763 x +68,912.5668)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 680 | 1.8213 | 1,238 | 1,236 | 0.00 |
| 1964 | 665 | 1.8213 | 1,211 | 1,201 | -0.01 |
| 1965 | 641 | 1.8213 | 1,167 | 1,167 | 0.00 |
| 1966 | 618 | 1.8213 | 1,126 | 1,132 | 0.01 |
| 1967 | 603 | 1.8213 | 1,098 | 1,098 | 0.00 |
| 1968 | 1,009 | 1.0000 | 1,009 | 1,063 | 0.05 |
| 1969 | 1,078 | 1.0000 | 1,078 | 1,029 | -0.05 |
| 1970 | 991 | 1.0000 | 991 | 994 | 0.00 |

| Year | Projected Totals |
|---|---|
| 1971 | 960 |
| 1972 | 925 |
| 1973 | 891 |
| 1974 | 856 |
| 1975 | 822 |
| 1976 | 787 |
| 1977 | 753 |
| 1978 | 718 |
| 1979 | 684 |
| 1980 | 649 |

Appendix A-Contd.

Table 13.a.

Projections of Growth for Pennsylvania Interns in the 1970s Based Upon the 1960s (r = 0.5979, Regression Equation = 9.8801 x -18,677.7293)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 688 | 1.0219 | 703 | 717 | 0.02 |
| 1964 | 719 | 1.0219 | 735 | 727 | -0.01 |
| 1965 | 697 | 1.0219 | 712 | 737 | 0.04 |
| 1966 | 749 | 1.0219 | 765 | 747 | -0.02 |
| 1967 | 741 | 1.0219 | 757 | 756 | 0.00 |
| 1968 | 792 | 1.0000 | 792 | 766 | -0.03 |
| 1969 | 821 | 1.0000 | 821 | 776 | -0.05 |
| 1970 | 727 | 1.0000 | 727 | 786 | 0.08 |
| | | | Projected Totals[a] | | |
| 1971 | | | 796 | | |
| 1972 | | | 806 | | |
| 1973 | | | 816 | | |
| 1974 | | | 826 | | |
| 1975 | | | 835 | | |
| 1976 | | | 845 | | |
| 1977 | | | 855 | | |
| 1978 | | | 865 | | |
| 1979 | | | 875 | | |
| 1980 | | | 885 | | |

[a]These projections are undoubtedly likely to be very conservative when compared to the actual figures in the 1970s but they do represent what the situation would be if we did not take steps to encourage our graduates to intern here and, if necessary, expand the programs. It is true, however, that internship may be on the way out and, if so, these figures may even be too high.

Appendix A - Contd.

TABLE 13.a.

Projections of Growth for Pennsylvania Interns in the 197s Based Upon the 1960s (r = 0.5979, Regression Equation = 9.8801 x -18,677.7293)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 688 | 1.0219 | 703 | 717 | 0.02 |
| 1964 | 719 | 1.0219 | 735 | 727 | -0.01 |
| 1965 | 697 | 1.0219 | 712 | 737 | 0.04 |
| 1966 | 749 | 1.0219 | 765 | 747 | -0.02 |
| 1967 | 741 | 1.0219 | 757 | 756 | 0.00 |
| 1968 | 792 | 1.0000 | 792 | 766 | -0.03 |
| 1969 | 821 | 1.0000 | 821 | 776 | -0.05 |
| 1970 | 727 | 1.0000 | 727 | 786 | 0.08 |
| | | | Projected Totals[a] | | |
| 1971 | | | 796 | | |
| 1972 | | | 806 | | |
| 1973 | | | 816 | | |
| 1974 | | | 826 | | |
| 1975 | | | 835 | | |
| 1976 | | | 845 | | |
| 1977 | | | 855 | | |
| 1978 | | | 865 | | |
| 1979 | | | 875 | | |
| 1980 | | | 885 | | |

[a]These projections are undoubtedly likely to be very conservative when compared to the actual figures in the 1970s,but they do represent what the situation would be if we did not take steps to encourage our graduates to intern here and, if necessary, expand the programs. It is true, however, that internship may be on the way out and, if so, these figures may even be too high.

Appendix A - Contd.

Table 14.a.

Projections of Growth for Physicians (M.D.) in Medical Teaching
(r = 0.9375, Regression Equation = 15.9289 x -31,045.1855)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 515 | 0.4077 | 210 | 223 | 0.06 |
| 1964 | 554 | 0.4077 | 226 | 229 | 0.01 |
| 1965 | 654 | 0.4077 | 267 | 255 | -0.04 |
| 1966 | 697 | 0.4077 | 284 | 271 | -0.05 |
| 1967 | 758 | 0.4077 | 309 | 286 | -0.07 |
| 1968 | 307 | 1.0000 | 307 | 303 | -0.01 |
| 1969 | 305 | 1.0000 | 305 | 319 | 0.05 |
| 1970 | 324 | 1.0000 | 324 | 335 | 0.03 |
| | | | Projected Totals | | |
| 1971 | | | 351 | | |
| 1972 | | | 367 | | |
| 1973 | | | 383 | | |
| 1974 | | | 398 | | |
| 1975 | | | 414 | | |
| 1976 | | | 430 | | |
| 1977 | | | 446 | | |
| 1978 | | | 462 | | |
| 1979 | | | 478 | | |
| 1980 | | | 494 | | |

Appendix A - Contd.

Table 15.a

Projections of Growth for Direct Patient Care M.D.'s in Neurology
(r = 0.9610, Regression Equation = 6.5 x -12,722 for Years 1967-70)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 61 | 1.0000 | 61 | * | * |
| 1964 | 58 | 1.0000 | 58 | * | * |
| 1965 | 62 | 1.0000 | 62 | * | * |
| 1966 | 67 | 1.0000 | 67 | * | * |
| 1967 | 63 | 1.0000 | 63 | 64 | 0.02 |
| 1968 | 69 | 1.0000 | 69 | 70 | 0.01 |
| 1969 | 80 | 1.0000 | 80 | 77 | -0.04 |
| 1970 | 81 | 1.0000 | 81 | 83 | 0.03 |
| | | | Projected Totals | | |
| 1971 | | | 90 | | |
| 1972 | | | 96 | | |
| 1973 | | | 103 | | |
| 1974 | | | 109 | | |
| 1975 | | | 116 | | |
| 1976 | | | 122 | | |
| 1977 | | | 129 | | |
| 1978 | | | 135 | | |
| 1979 | | | 142 | | |
| 1980 | | | 148 | | |

*Data not used for regression estimate.

Appendix A - Contd.

Table 16.a.

Projections of Growth for Direct Patient Care M.D.'s in Neurosurgery (r = 0.8239, Regression Equation = 2.2738 x -4,400.8165 for Years 1963-70 and r = 0.9253, Regression Equation = 5 x -9,767.5 for Years 1967-70)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | 1963-70 Regression Estimate | Error | 1967-70 Regression Estimate | Error |
|---|---|---|---|---|---|---|---|
| 1963 | 64 | 1.0000 | 64 | 63 | -0.02 | * | * |
| 1964 | 68 | 1.0000 | 68 | 65 | -0.04 | * | * |
| 1965 | 69 | 1.0000 | 69 | 67 | -0.03 | * | * |
| 1966 | 64 | 1.0000 | 64 | 70 | 0.09 | * | * |
| 1967 | 69 | 1.0000 | 69 | 72 | 0.04 | 68 | -0.01 |
| 1968 | 72 | 1.0000 | 72 | 74 | 0.03 | 73 | 0.01 |
| 1969 | 74 | 1.0000 | 74 | 76 | 0.03 | 78 | 0.05 |
| 1970 | 85 | 1.0000 | 85 | 79 | -0.07 | 83 | -0.02 |

| | Projected Totals | | |
|---|---|---|---|
| | 1963-70 | 1967-70 | Weighted Mean[a] |
| 1971 | 81 | 88 | 86 |
| 1972 | 83 | 93 | 90 |
| 1973 | 85 | 98 | 94 |
| 1974 | 88 | 103 | 98 |
| 1975 | 90 | 108 | 102 |
| 1976 | 92 | 113 | 106 |
| 1977 | 95 | 118 | 110 |
| 1978 | 97 | 123 | 114 |
| 1979 | 99 | 128 | 118 |
| 1980 | 101 | 133 | 122 |

*Indicates data not used in computation of the regression equation.

[a]1963-70 projections given a weight of one and the 1967-70 projections a weight of two, e.g., 81 + 88 + 88 ÷ 3 = 86.

Appendix A-Contd.

Table 17.a.

Projections of Growth for Direct Patient Care M.D.'s in Obstetrics and Gynecology (r = 0.9975, Regression Equation = 10.871 x -20,607.53 for Years 1963, 1965-69 and r = 1.00, Regression Equation = 42 x -81,899 for 1969-70)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | 1963,1965-69 Regression Estimates | Error | 1969-70 Regression Estimate | Error |
|---|---|---|---|---|---|---|---|
| 1963 | 814 | 0.9016 | 734 | 732 | 0.00 | * | * |
| 1964 | 835 | 0.9016 | 753 | * | * | * | * |
| 1965 | 836 | 0.9016 | 754 | 754 | 0.00 | * | * |
| 1966 | 846 | 0.9016 | 763 | 765 | 0.00 | * | * |
| 1967 | 858 | 0.9016 | 774 | 776 | 0.00 | * | * |
| 1968 | 788 | 1.0000 | 788 | 787 | 0.00 | * | * |
| 1969 | 799 | 1.0000 | 799 | 798 | 0.00 | 799 | 0.00 |
| 1970 | 841 | 1.0000 | 841 | * | * | 841 | 0.00 |
| | | | | Projected Totals | | | |
| | | | | 1963,65-69 | 1969-70 | Mean[a] | |
| 1971 | | | | 819 | 883 | 851 | |
| 1972 | | | | 830 | 925 | 878 | |
| 1973 | | | | 841 | 967 | 904 | |
| 1974 | | | | 852 | 1,009 | 931 | |
| 1975 | | | | 863 | 1,051 | 957 | |
| 1976 | | | | 874 | 1,093 | 984 | |
| 1977 | | | | 884 | 1,135 | 1,010 | |
| 1978 | | | | 895 | 1,177 | 1,036 | |
| 1979 | | | | 906 | 1,219 | 1,063 | |
| 1980 | | | | 917 | 1,261 | 1,089 | |

*Indicates that the values for these years were not used in computing the indicated regression.

[a] The mean of the two predictions was used in aggregating the projections to arrive at a final projection of total Direct Patient Care Physicians in Obstetrics and Gynecology.

Appendix A - Contd.

Table 18.a.

Projections of Growth for Direct Patient Care M.D.'s in the Specialty of Occupational Medicine (r = -0.9517, Regression Equation = -3,5118 x +7,042.7203)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 130 | 1.6667 | 152 | 149 | -0.02 |
| 1964 | 123 | 1.6667 | 144 | 146 | 0.01 |
| 1965 | 121 | 1.6667 | 141 | 142 | 0.01 |
| 1966 | 119 | 1.6667 | 139 | 139 | 0.00 |
| 1967 | 115 | 1.6667 | 134 | 135 | 0.01 |
| 1968 | 126 | 1.0000 | 126 | 132 | 0.05 |
| 1969 | 130 | 1.0000 | 130 | 128 | -0.02 |
| 1970 | 127 | 1.0000 | 127 | 125 | -0.02 |
| | | | Projected Totals[a] | | |
| 1971 | | | 121 | | |
| 1972 | | | 117 | | |
| 1973 | | | 114 | | |
| 1974 | | | 110 | | |
| 1975 | | | 107 | | |
| 1976 | | | 103 | | |
| 1977 | | | 100 | | |
| 1978 | | | 96 | | |
| 1979 | | | 93 | | |
| 1980 | | | 89 | | |

[a]A possible alternative projection would be to assume that the somewhat stable trend of the period 1968-70 will continue, i.e., a projection of the median of this period, i.e., 127 for each year of the 1970s.

Appendix A - Contd.

Table 19.a.

Projections of Growth for Direct Patient Care M.D.'s in Ophthalmology
(r = 0.9908, Regression Equation = 8.4407 x -16,134.9368)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimates | Error |
|---|---|---|---|---|---|
| 1963 | 448 | 0.9675 | 433 | 434 | 0.00 |
| 1964 | 455 | 0.0675 | 440 | 443 | 0.01 |
| 1965 | 465 | 0.9675 | 450 | 451 | 0.00 |
| 1966 | 480 | 0.9675 | 464 | 460 | -0.01 |
| 1967 | 488 | 0.9675 | 472 | 468 | -0.01 |
| 1968 | 476 | 1.0000 | 476 | 476 | 0.00 |
| 1969 | 482 | 1.0000 | 482 | 485 | 0.01 |
| 1970 | 492 | 1.0000 | 492 | 493 | 0.00 |
| | | | Projected Totals | | |
| 1971 | | | 502 | | |
| 1972 | | | 510 | | |
| 1973 | | | 519 | | |
| 1974 | | | 527 | | |
| 1975 | | | 535 | | |
| 1976 | | | 544 | | |
| 1977 | | | 552 | | |
| 1978 | | | 561 | | |
| 1979 | | | 569 | | |
| 1980 | | | 578 | | |

Appendix A - Contd.

Table 20.a.

Projections of Growth for Direct Patient Care M.D.'s in Orthopedic Surgery (r = 0.9907, Regression Equation = 12.2386 x -23,792.3841)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 239 | 0.9575 | 229 | 232 | 0.01 |
| 1964 | 262 | 0.9575 | 251 | 244 | -0.03 |
| 1965 | 269 | 0.9575 | 258 | 256 | -0.01 |
| 1966 | 274 | 0.9575 | 262 | 269 | 0.03 |
| 1967 | 291 | 0.9575 | 279 | 281 | 0.01 |
| 1968 | 293 | 1.0000 | 293 | 293 | 0.00 |
| 1969 | 309 | 1.0000 | 309 | 305 | -0.01 |
| 1970 | 317 | 1.0000 | 317 | 318 | 0.00 |
| | | | Projected Totals | | |
| 1971 | | | 330 | | |
| 1972 | | | 342 | | |
| 1973 | | | 354 | | |
| 1974 | | | 367 | | |
| 1975 | | | 379 | | |
| 1976 | | | 391 | | |
| 1977 | | | 403 | | |
| 1978 | | | 416 | | |
| 1979 | | | 428 | | |
| 1980 | | | 440 | | |

Appendix A-Contd.

Table 21.a.

Projections of Growth for Doctors of Osteopathy Based upon Historical Figures Supplied by the American Osteopathic Association.

| Year | D.O.'s | Corrected Totals[c] | Estimated Direct Patient Care[d] |
|---|---|---|---|
| 1970 | 1,667[a] | 1,667 | 1,220 |
| 1971 | 1,662[b] | 1,694 | 1,239 |
| 1972 | 1,688 | 1,720 | 1,258 |
| 1973 | 1,715 | 1,747 | 1,278 |
| 1974 | 1,742 | 1,774 | 1,298 |
| 1975 | 1,768 | 1,800 | 1,317 |
| 1976 | 1,795 | 1,827 | 1,337 |
| 1977 | 1,821 | 1,853 | 1,356 |
| 1978 | 1,848 | 1,880 | 1,375 |
| 1979 | 1,874 | 1,906 | 1,394 |
| 1980 | 1,901 | 1,933 | 1,414 |

[a] Actual count from 1971 Directory of the American Osteopathic Association.

[b] This figure and succeeding figures are based upon a linear correlation between time (year) and historical data provided in a communication from the American Osteopathic Association.

[c] The linear projection for 1970 was 1,635 which is lower than the actual figure by a margin of 32. Since this represented the only large departure from the linear estimates for the 1960s it was used as a correction for the linear projections, e.g., 1,662 + 32 = 1,694.

[d] 73.16% estimate factor is used which is derived from 1971 American Osteopathic Association Directory findings as reported in "A Profile of Osteopathic Physicians in Pennsylvania" published by the Program Audit Division, Office of the Budget, Commonwealth of Pennsylvania, 1971, i.e., 1213 ÷ 1658 = 0.7316 (see page 5 of that study).

Appendix A - Contd.

Table 22.a.

Projections of Growth for Physicians (M.D.) in Other Non-Patient Care Activities (r = 0.9530, Regression Equation = 16.8928 x -33,129.1662)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | -[a] | Residual[b] | 42 | 31 | -0.26 |
| 1964 | - | " | 45 | 48 | 0.07 |
| 1965 | - | " | 64 | 65 | 0.02 |
| 1966 | - | " | 56 | 82 | 0.46 |
| 1967 | - | " | 106 | 99 | -0.07 |
| 1968 | 131 | 1.0000 | 131 | 116 | -0.14 |
| 1969 | 140 | 1.0000 | 140 | 133 | -0.05 |
| 1970 | 141 | 1.0000 | 141 | 150 | 0.06 |
| | | | Projected Totals | | |
| 1971 | | | 167 | | |
| 1972 | | | 183 | | |
| 1973 | | | 200 | | |
| 1974 | | | 217 | | |
| 1975 | | | 234 | | |
| 1976 | | | 251 | | |
| 1977 | | | 268 | | |
| 1978 | | | 285 | | |
| 1979 | | | 302 | | |
| 1980 | | | 319 | | |

[a]No figure is given because the category of physicians did not exist prior to the 1968 reclassification by the AMA.

[b]The estimate of the true figure, if the 1968 reclassification had been in effect, had to be arrived at by totaling all of the other estimates and subtracting the total from the corrected total of all physicians listed by the AMA that year, i.e., a residual.

Appendix A-Contd.

Table 23.a.

Projections of Growth for Direct Patient Care M.D.'s in Other Specialties (r = 0.9313, Regression Equation = 13.5874 x -26,651.7055 for Years 1963-70 With 1967 and 1969 Deleted as Anomalous)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate[a] | Error |
|---|---|---|---|---|---|
| 1963 | 24 | 1.1034 | 26 | 20 | -0.23 |
| 1964 | 34 | 1.1034 | 38 | 34 | -0.10 |
| 1965 | 40 | 1.1034 | 44 | 48 | 0.09 |
| 1966 | 56 | 1.1034 | 62 | 61 | -0.02 |
| 1967 | 55 | 1.1034 | 61 | * | * |
| 1968 | 64 | 1.0000 | 64 | 88 | 0.38 |
| 1969 | 215 | 1.0000 | 215 | * | * |
| 1970 | 133 | 1.0000 | 133 | 115 | -0.14 |
| | | | Projected Totals[b] | | |
| 1971 | | | 129 | | |
| 1972 | | | 143 | | |
| 1973 | | | 156 | | |
| 1974 | | | 170 | | |
| 1975 | | | 183 | | |
| 1976 | | | 197 | | |
| 1977 | | | 211 | | |
| 1978 | | | 224 | | |
| 1979 | | | 238 | | |
| 1980 | | | 251 | | |

*Indicates data not used for regression estimate.

[a]Remarkable fluctuation in figures for recent years and also a dramatic increase. Makes projection difficult but may well reflect an accelerating trend to increased specialization.

[b]If the figures for 1967 and 1969 had been included, the correlation would have fallen to 0.7812 because of the existence of anomalous data for these dates relative to overall trend. Even so, 133 for 1970 still represents a marked, somewhat nonlinear departure from the overall previous growth pattern.

Appendix A - Contd.

Table 24.a.

Projections of Growth for Direct Patient Care M.D.'s in Otolaryngology (r = -0.75, Regression Equation = -2.5485 x +5,273.9983 for 1963-70 and r = 0.9986, Regression Equation = 5.5 x -10,572.8333 for 1968-70)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | 1963-70 Regression Estimate | Error | 1968-70 Regression Estimate | Error |
|---|---|---|---|---|---|---|---|
| 1963 | 332 | 0.8367 | 278 | 271 | -0.03 | * | * |
| 1964 | 322 | 0.8367 | 269 | 269 | 0.00 | * | * |
| 1965 | 317 | 0.8367 | 265 | 266 | 0.00 | * | * |
| 1966 | 310 | 0.8367 | 259 | 264 | 0.02 | * | * |
| 1967 | 308 | 0.8367 | 258 | 261 | 0.01 | * | * |
| 1968 | 251 | 1.0000 | 251 | 259 | 0.03 | 251 | 0.00 |
| 1969 | 257 | 1.0000 | 257 | 256 | 0.00 | 257 | 0.00 |
| 1970 | 262 | 1.0000 | 262 | 253 | -0.03 | 262 | 0.00 |

| Year | Projected Totals 1963-70 | Projected Totals 1968-70 | Projected Totals Mean[a] |
|---|---|---|---|
| 1971 | 251 | 268 | 262 |
| 1972 | 248 | 273 | 265 |
| 1973 | 246 | 279 | 268 |
| 1974 | 243 | 284 | 270 |
| 1975 | 241 | 290 | 274 |
| 1976 | 238 | 295 | 276 |
| 1977 | 236 | 301 | 279 |
| 1978 | 233 | 306 | 282 |
| 1979 | 231 | 312 | 285 |
| 1980 | 228 | 317 | 287 |

*Indicates the figures for this date were not used in computing the regression equation.

[a]This is a series of a weighted means, actually, giving a weight of 2 to the 1968-70 figure and a weight of 1 to the 1963-70 projection, e.g., 268 + 268 + 251 = 262. These weighted mean values were later used to estimate the Direct Patient Care total by aggregation since it was assumed that they best represented probable future growth.

Appendix A-Contd.

Table 25.a.

Projections of Growth for Direct Patient Care M.D.'s in Pathology and Forensic Pathology (r = 0.9954, Regression Equation = 13.2148 x -25,729.1149 for Pathology and Median of 6 for Projections of Forensic Pathology)

| Year | Uncorrected Totals[a] | Correction Factor[b] | Corrected Totals | Regression Estimates | Error |
|---|---|---|---|---|---|
| 1963 | 267<br>4 | 0.7989<br>1.5000 | 213<br>6 (219) | 212<br>6 (218) | 0.00 |
| 1964 | 279<br>4 | 0.7989<br>1.5000 | 223<br>6 (229) | 225<br>6 (231) | 0.01 |
| 1965 | 302<br>4 | 0.7989<br>1.5000 | 241<br>6 (247) | 238<br>6 (244) | -0.01 |
| 1966 | 312<br>4 | 0.7989<br>1.5000 | 249<br>6 (255) | 251<br>6 (257) | 0.01 |
| 1967 | 324<br>3 | 0.7989<br>1.5000 | 259<br>5 (264) | 264<br>6 (270) | 0.02 |
| 1968 | 282<br>6 | 1.0000<br>1.0000 | 282<br>6 (288) | 278<br>6 (284) | -0.01 |
| 1969 | 291<br>5 | 1.0000<br>1.0000 | 291<br>5 (296) | 291<br>6 (297) | 0.00 |
| 1970 | 304<br>6 | 1.0000<br>1.0000 | 304<br>6 (310) | 304<br>6 (310) | 0.00 |

Projection Totals

| Year | Path. | F.Path. | Total |
|---|---|---|---|
| 1971 | 317 | 6 | 323 |
| 1972 | 330 | 6 | 336 |
| 1973 | 344 | 6 | 350 |
| 1974 | 357 | 6 | 363 |
| 1975 | 370 | 6 | 376 |
| 1976 | 383 | 6 | 389 |
| 1977 | 397 | 6 | 403 |
| 1978 | 410 | 6 | 416 |
| 1979 | 423 | 6 | 429 |
| 1980 | 436 | 6 | 442 |

[a] Figures are for the total of Pathologists (Upper) and Forensic Pathologists (Lower).

[b] Correction figures for the Pathologist total (Upper) and the Forensic Pathologist total.(Lower).

Appendix A-Contd.

Table 26.a.

Projection of Growth for Direct Patient Care M.D.'s in Pediatrics (r = 0.9982, Regression Equation = 27.5002 x -53,609.0281 for Years 1967-70)

| Years | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 529 | 0.8682 | 459 | * | * |
| 1964 | 552 | 0.8682 | 479 | * | * |
| 1965 | 542 | 0.8682 | 471 | * | * |
| 1966 | 538 | 0.8682 | 467 | * | * |
| 1967 | 555 | 0.8682 | 482 | 484 | 0.00 |
| 1968 | 514 | 1.0000 | 514 | 511 | 0.01 |
| 1969 | 540 | 1.0000 | 540 | 539 | 0.00 |
| 1970 | 565 | 1.0000 | 565 | 566 | 0.00 |
| | | | Projected Totals | | |
| 1971 | | | 594 | | |
| 1972 | | | 622 | | |
| 1973 | | | 649 | | |
| 1974 | | | 677 | | |
| 1975 | | | 704 | | |
| 1976 | | | 732 | | |
| 1977 | | | 759 | | |
| 1978 | | | 787 | | |
| 1979 | | | 814 | | |
| 1980 | | | 842 | | |

* Indicates that the corrected total for that year was considered as not representative of the more recent trend pattern and therefore could not be used in deriving the regression equation.

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Table 27.a.

Projections of Growth for Direct Patient Care M.D.'s in Physical Medicine and Rehabilitation (r = 0.9738, Regression Equation = 2.8331 x 5,514.2139)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 45 | 1.0333 | 47 | 47 | 0.00 |
| 1964 | 51 | 1.0333 | 53 | 50 | -0.06 |
| 1965 | 50 | 1.0333 | 52 | 53 | 0.02 |
| 1966 | 52 | 1.0333 | 54 | 56 | 0.04 |
| 1967 | 55 | 1.0333 | 57 | 58 | 0.02 |
| 1968 | 62 | 1.0000 | 62 | 61 | -0.02 |
| 1969 | 66 | 1.0000 | 66 | 64 | -0.03 |
| 1970 | 67 | 1.0000 | 67 | 67 | 0.00 |
| | | | Projected Totals | | |
| 1971 | | | 70 | | |
| 1972 | | | 73 | | |
| 1973 | | | 75 | | |
| 1974 | | | 78 | | |
| 1975 | | | 81 | | |
| 1976 | | | 84 | | |
| 1977 | | | 87 | | |
| 1978 | | | 90 | | |
| 1979 | | | 92 | | |
| 1980 | | | 95 | | |

Appendix A-Contd.

Table 28.a.

Projections of Growth for Direct Patient Care M.D.'s in Plastic Surgery (r = 0.9912, Regression Equation = 2.1787 x -4,233.4461)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 37 | 1.1250 | 42 | 43 | 0.02 |
| 1964 | 41 | 1.1250 | 46 | 45 | -0.02 |
| 1965 | 43 | 1.1250 | 48 | 48 | 0.00 |
| 1966 | 44 | 1.1250 | 50 | 50 | 0.00 |
| 1967 | 47 | 1.1250 | 53 | 52 | -0.02 |
| 1968 | 54 | 1.0000 | 54 | 54 | 0.00 |
| 1969 | 56 | 1.0000 | 56 | 56 | 0.00 |
| 1970 | 58 | 1.0000 | 58 | 59 | 0.02 |
| | | | Projected Totals | | |
| 1971 | | | 61 | | |
| 1972 | | | 63 | | |
| 1973 | | | 65 | | |
| 1974 | | | 67 | | |
| 1975 | | | 69 | | |
| 1976 | | | 72 | | |
| 1977 | | | 74 | | |
| 1978 | | | 76 | | |
| 1979 | | | 78 | | |
| 1980 | | | 80 | | |

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Table 29.a.

Projections of Growth for Direct Patient Care M.D.'s in General Preventative Medicine (Based on value for last three years, Median = 13)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals |
|---|---|---|---|
| 1963 | 17 | 1.0000 | 17 |
| 1964 | 19 | 1.0000 | 19 |
| 1965 | 21 | 1.0000 | 21 |
| 1966 | 22 | 1.0000 | 22 |
| 1967 | 16 | 1.0000 | 16 |
| 1968 | 14 | 1.0000 | 14 |
| 1969 | 13 | 1.0000 | 13 |
| 1970 | 13 | 1.0000 | 13 |
| | | | Projected Totals |
| 1971 | | | 13 |
| 1972 | | | 13 |
| 1973 | | | 13 |
| 1974 | | | 13 |
| 1975 | | | 13 |
| 1976 | | | 13 |
| 1977 | | | 13 |
| 1978 | | | 13 |
| 1979 | | | 13 |
| 1980 | | | 13 |

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Table 30.a.

Projections of Growth for Direct Patient Care M.D.'s in Psychiatry and Child Psychiatry (r = 0.9898, Regression Equation = 29.2143 x -56,817.4052 for Psychiatry and 4 = 0.9949, Regression Equation = 11.2501 x -22,036.3621 for Child Psychiatry)

| Year | Uncorrected Totals[a] | Correction Factor[b] | Corrected Totals | Regression Estimates | Error |
|---|---|---|---|---|---|
| 1963 | 611<br>30 | 0.8814<br>1.4521 | 539<br>44 (583) | 530<br>48 (578) | -0.01 |
| 1964 | 640<br>44 | 0.8814<br>1.4521 | 564<br>64 (628) | 560<br>59 (619) | -0.01 |
| 1965 | 654<br>48 | 0.8814<br>1.4521 | 576<br>70 (646) | 589<br>70 (659) | 0.02 |
| 1966 | 689<br>55 | 0.8814<br>1.4521 | 607<br>80 (687) | 618<br>81 (699) | 0.02 |
| 1967 | 734<br>62 | 0.8814<br>1.4521 | 647<br>90 (737) | 647<br>93 (740) | 0.00 |
| 1968 | 691<br>106 | 1.0000<br>1.0000 | 691<br>106 (797) | 676<br>104 (780) | -0.02 |
| 1969 | 595<br>116 | 1.0000<br>1.0000 | 695<br>116 (811) | 706<br>115 (821) | 0.01 |
| 1970 | 741<br>125 | 1.0000<br>1.0000 | 741<br>125 (866) | 735<br>126 (861) | -0.01 |

| | Projected Totals | | |
|---|---|---|---|
| | Psy. | Child Psy. | Total |
| 1971 | 764 | 138 | 902 |
| 1972 | 793 | 149 | 942 |
| 1973 | 822 | 160 | 982 |
| 1974 | 852 | 171 | 1,023 |
| 1975 | 881 | 183 | 1,064 |
| 1976 | 910 | 194 | 1,104 |
| 1977 | 939 | 205 | 1,144 |
| 1978 | 969 | 216 | 1,185 |
| 1979 | 998 | 228 | 1,226 |
| 1980 | 1,027 | 239 | 1,266 |

[a] Upper figure represents the Psychiatry total and the lower figure represents the Child Psychiatry total.

[b] Upper figure represents the Psychiatry total correction factor and the lower figure represents the Child Psychiatry total figure correction factor.

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Table 31.a.

Projections of Growth for Direct Patient Care M.D.'s in Public Health (Based Upon Median of Period 1966-70)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals |
|---|---|---|---|
| 1963 | 38 | 0.8929 | 34 |
| 1964 | 34 | 0.8929 | 30 |
| 1965 | 30 | 0.8929 | 27 |
| 1966 | 27 | 0.8929 | 24 |
| 1967 | 26 | 0.8929 | 23 |
| 1968 | 25 | 1.0000 | 25 |
| 1969 | 22 | 1.0000 | 22 |
| 1970 | 24 | 1.0000 | 24 |
| | | Projected Totals[a] | |
| 1971 | | 24 | |
| 1972 | | 24 | |
| 1973 | | 24 | |
| 1974 | | 24 | |
| 1975 | | 24 | |
| 1976 | | 24 | |
| 1977 | | 24 | |
| 1978 | | 24 | |
| 1979 | | 24 | |
| 1980 | | 24 | |

[a]Based upon the fact that the number of physicians in this specialty has apparently stabilized at approximately 24, i.e., the median figure for 1966-70.

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Table 32.2.

Projections of Growth for Direct Patient Care M.D.'s in the Specialty of Pulmonary Disease (r = -0.5112, Regression Equation = -0.7143 x +1,472.1945 for Years 1963-70 and r = 0.9135, Regression Equation = 2.2 x -4,265.2 for Years 1967-70)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | 1963-70 Regression Estimate | Error | 1967-70 Regression Estimate | Error |
|---|---|---|---|---|---|---|---|
| 1963 | 45 | 1.5714 | 71 | 70 | -0.01 | * | * |
| 1964 | 46 | 1.5714 | 72 | 69 | -0.04 | * | * |
| 1965 | 44 | 1.5714 | 69 | 69 | 0.00 | * | * |
| 1966 | 42 | 1.5714 | 66 | 68 | 0.03 | * | * |
| 1967 | 39 | 1.5714 | 61 | 67 | 0.10 | 65 | -0.03 |
| 1968 | 66 | 1.0000 | 66 | 66 | 0.00 | 65 | -0.02 |
| 1969 | 67 | 1.0000 | 67 | 66 | -0.02 | 67 | 0.02 |
| 1970 | 68 | 1.0000 | 68 | 65 | -0.04 | 67 | 0.03 |

| Year | Projected Totals[a] 1963-70 | 1967-70 | Mean |
|---|---|---|---|
| 1971 | 65 | 71 | 68 |
| 1972 | 65 | 73 | 69 |
| 1973 | 63 | 75 | 69 |
| 1974 | 62 | 78 | 70 |
| 1975 | 61 | 80 | 71 |
| 1976 | 61 | 82 | 72 |
| 1977 | 60 | 84 | 72 |
| 1978 | 59 | 86 | 73 |
| 1979 | 59 | 89 | 74 |
| 1980 | 58 | 91 | 75 |

*Indicates data for this year was not used to obtain regression equation.

[a]The mean of the overall 1963-70 trend and the more recent 1967-70 trend has been taken as most reasonable since there is a possibility that the incidence of pulmonary disease is rising somewhat despite the advances in treating Tuberculosis i.e., emphysema due to smoking, air pollution, etc.

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Table 33.a.

Projections of Growth for Direct Patient Care M.D.'s in Radiology, Therapeutic Radiology and Diagnostic Radiology (r = 0.9915, Regression Equation = 16.9768 x -32,978.6882 With Median 1968-70 Values of 32 and 59 for Therapeutic (TR) and Diagnostic Radiology (DR) Respectively)

| Year | Uncorrected Totals[a] | Correction Factor[a] | Corrected Totals | Regression Estimates | Error |
|---|---|---|---|---|---|
| 1963 | 435 | 0.80 | 348 | 347 | 0.00 |
| | 0 | 6.60 | 0(407) | * | * |
| | 2 | 29.50 | 59 | * | * |
| 1964 | 460 | 0.80 | 368 | 364 | -0.01 |
| | 0 | 6.60 | 0(457) | * | * |
| | 3 | 29.50 | 89 | * | * |
| 1965 | 472 | 0.80 | 378 | 381 | 0.01 |
| | 1 | 6.60 | 7(415) | * | * |
| | 1 | 29.50 | 30 | * | * |
| 1966 | 497 | 0.80 | 398 | 398 | 0.00 |
| | 1 | 6.60 | 7(435) | * | * |
| | 1 | 29.50 | 30 | * | * |
| 1967 | 516 | 0.80 | 413 | 415 | 0.01 |
| | 3 | 6.60 | 20(492) | * | * |
| | 2 | 29.50 | 59 | * | * |
| 1968 | 428 | 0.80 | 428 | 432 | 0.01 |
| | 33 | 6.60 | 33(520) | * | * |
| | 59 | 29.50 | 59 | * | * |
| 1969 | 441 | 0.80 | 441 | 449 | 0.02 |
| | 32 | 6.60 | 32(530) | * | * |
| | 57 | 29.50 | 57 | * | * |
| 1970 | 476 | 0.80 | 476 | 466 | -0.02 |
| | 32 | 0.60 | 32(572) | * | * |
| | 64 | 29.50 | 64 | * | * |

| | Projected Totals | | | |
|---|---|---|---|---|
| | Radiology | Ther. Radiology | Diag. Radiology | Total Estimate |
| 1971 | 483 | 32 | 59 | 574 |
| 1972 | 500 | 32 | 59 | 591 |
| 1973 | 517 | 32 | 59 | 608 |
| 1974 | 534 | 32 | 59 | 625 |
| 1975 | 551 | 32 | 59 | 642 |
| 1976 | 568 | 32 | 59 | 659 |
| 1977 | 585 | 32 | 59 | 676 |
| 1978 | 602 | 32 | 59 | 693 |
| 1979 | 619 | 32 | 59 | 710 |
| 1980 | 635 | 32 | 59 | 726 |

[a] Figures are for the correction factors and totals of Radiologists (upper figure), Therapeutic Radiologist (middle figure) and Diagnostic Radiologists (lower figure).

*Data not used for regression.

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Table 34.a.

Projections of Growth for Physicians (M.D.) Engaged in Research (r = 0.9595, Regression Equation = 95.3936 x -186,731.5224 for Years 1963-1967 and r = 0.9407, Regression Equation = -92.7032 x +183,223.5386 for Years 1967-70)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | 1963-67 Regression Estimate | Error | 1967-70 Regression Estimate | Error |
|---|---|---|---|---|---|---|---|
| 1963 | 154 | 3.3796 | 520 | 526 | 0.01 | * | |
| 1964 | 172 | 3.3796 | 580 | 622 | 0.07 | * | |
| 1965 | 229 | 3.3796 | 774 | 717 | -0.07 | * | |
| 1966 | 250 | 3.3796 | 845 | 812 | -0.04 | * | |
| 1967 | 256 | 3.3796 | 865 | 908 | 0.05 | 876 | 0.01 |
| 1968 | 828 | 1.0000 | 828 | * | | 784 | -0.05 |
| 1969 | 636 | 1.0000 | 636 | * | | 691 | 0.09 |
| 1970 | 620 | 1.0000 | 620 | * | | 598 | -0.04 |

| | Projected Totals 1963-67 | 1967-70 | Final Projection[a] |
|---|---|---|---|
| 1971 | 1,289 | 506 | 570 |
| 1972 | 1,385 | 413 | 570 |
| 1973 | 1,480 | 320 | 570 |
| 1974 | 1,575 | 227 | 570 |
| 1975 | 1,671 | 135 | 570 |
| 1976 | 1,766 | 42 | 570 |
| 1977 | 1,862 | -51 | 570 |
| 1978 | 1,957 | -143 | 570 |
| 1979 | 2,052 | -236 | 570 |
| 1980 | 2,148 | -329 | 570 |

*Indicates data not used to estimate regression.

[a]The two regression trends are both so extreme as to be meaningless for projection purposes. Even the mean (weighted or otherwise) of the two does not yield projections that seem reasonable. It was therefore decided that the mean of the 1963 and 1970 figures might be most representative of a suspected leveling off of medical research in the 1970s, i.e., 520 + 620 ÷ 2 = 570.

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Table 35.a.

Projections of Growth for Physicians (M.D.) in Residency in Pennsylvania Based Upon the 1960's (r = 0.9909, Regression Equation = 111.3612 x -216,978.5657)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimates | Error |
|---|---|---|---|---|---|
| 1963 | 1,782 | 0.9295 | 1,656 | 1,624 | -0.02 |
| 1964 | 1,826 | 0.9295 | 1,697 | 1,735 | 0.02 |
| 1965 | 2,042 | 0.9295 | 1,898 | 1,846 | -0.03 |
| 1966 | 2,052 | 0.9295 | 1,907 | 1,958 | 0.03 |
| 1967 | 2,225 | 0.9295 | 2,068 | 2,069 | 0.00 |
| 1968 | 2,148 | 1.0000 | 2,148 | 2,180 | 0.01 |
| 1969 | 2,302 | 1.0000 | 2,302 | 2,292 | 0.00 |
| 1970 | 2,430 | 1.0000 | 2,430 | 2,403 | -0.01 |
| | | | Projected Totals[a] | | |
| 1971 | | | 2,514 | | |
| 1972 | | | 2,626 | | |
| 1973 | | | 2,737 | | |
| 1974 | | | 2,848 | | |
| 1975 | | | 2,960 | | |
| 1976 | | | 3,071 | | |
| 1977 | | | 3,183 | | |
| 1978 | | | 3,294 | | |
| 1979 | | | 3,405 | | |
| 1980 | | | 3,517 | | |

[a]The projections shown here are purely those totals we might expect on the basis of past growth experience. Undoubtedly, they are too low if we expand our graduate output as anticipated and take steps to expand and make more attractive our residency offerings.

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Table 36.a.

Projections of Growth for Direct Patient Care M.D.'s in Thoracic Surgery (r = 0.9889, Regression Equation = 3.5358 x -6,896.1201)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 49 | 0.9403 | 46 | 45 | -0.02 |
| 1964 | 52 | 0.9403 | 49 | 48 | -0.02 |
| 1965 | 52 | 0.9403 | 49 | 52 | 0.06 |
| 1966 | 59 | 0.9403 | 55 | 55 | 0.00 |
| 1967 | 63 | 0.9403 | 59 | 59 | 0.00 |
| 1968 | 63 | 1.0000 | 63 | 62 | 0.02 |
| 1969 | 67 | 1.0000 | 67 | 66 | 0.02 |
| 1970 | 69 | 1.0000 | 69 | 69 | 0.00 |
| | | | Projected Totals | | |
| 1971 | | | 73 | | |
| 1972 | | | 77 | | |
| 1973 | | | 80 | | |
| 1974 | | | 84 | | |
| 1975 | | | 87 | | |
| 1976 | | | 91 | | |
| 1977 | | | 94 | | |
| 1978 | | | 98 | | |
| 1979 | | | 101 | | |
| 1980 | | | 105 | | |

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Table 37.a.

Projections of Growth for Direct Patient Care M.D.'s in Unspecified Specialty Areas (r = 0.9656, Regression Equation = 9.9424 x -19,497.0850 for the Years 1965-70)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 37 | 1.3400 | 50 | * | * |
| 1964 | 33 | 1.3400 | 44 | * | * |
| 1965 | 33 | 1.3400 | 44 | 40 | -0.09 |
| 1966 | 37 | 1.3400 | 50 | 50 | 0.00 |
| 1967 | 39 | 1.3400 | 52 | 60 | 0.15 |
| 1968 | 67 | 1.0000 | 67 | 70 | 0.04 |
| 1969 | 86 | 1.0000 | 86 | 80 | -0.07 |
| 1970 | 89 | 1.0000 | 89 | 89 | 0.00 |
| | | | Projected Totals | | |
| 1971 | | | 99 | | |
| 1972 | | | 109 | | |
| 1973 | | | 119 | | |
| 1974 | | | 129 | | |
| 1975 | | | 139 | | |
| 1976 | | | 149 | | |
| 1977 | | | 159 | | |
| 1978 | | | 169 | | |
| 1979 | | | 179 | | |
| 1980 | | | 189 | | |

*Indicates data not used to compute regression equation.

Appendix A-Contd.

Table 38.a.

Projections of Growth for Direct Patient Care M.D.'s in Urology
(r = 0.9783, Regression Equation = 6.8574 x -13,254.32907)

| Year | Uncorrected Totals | Correction Factor | Corrected Totals | Regression Estimate | Error |
|---|---|---|---|---|---|
| 1963 | 230 | 0.9064 | 208 | 207 | 0.00 |
| 1964 | 237 | 0.9064 | 215 | 214 | 0.00 |
| 1965 | 243 | 0.9064 | 220 | 221 | 0.00 |
| 1966 | 250 | 0.9064 | 227 | 227 | 0.00 |
| 1967 | 255 | 0.9064 | 231 | 234 | 0.01 |
| 1968 | 242 | 1.0000 | 242 | 241 | 0.00 |
| 1969 | 242 | 1.0000 | 242 | 248 | 0.02 |
| 1970 | 261 | 1.0000 | 261 | 255 | -0.02 |
| | | | Projected Totals | | |
| 1971 | | | 262 | | |
| 1972 | | | 269 | | |
| 1973 | | | 275 | | |
| 1974 | | | 282 | | |
| 1975 | | | 289 | | |
| 1976 | | | 296 | | |
| 1977 | | | 303 | | |
| 1978 | | | 310 | | |
| 1979 | | | 317 | | |
| 1980 | | | 323 | | |

## Appendix B

### Table 1b

Summary of Resident Physicians (November 26, 1971) Graduating From Pennsylvania Medical Schools, 1960-1971

| | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Family Practice** | | | | | | | | | | | | | |
| Direct Patient Care | 1 | 1 | 0 | 2 | 1 | 1 | 3 | 0 | 0 | 1 | 0 | 0 | 10 |
| Resident | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 7 | 2 | 13 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 1 | 1 | 0 | 2 | 1 | 1 | 4 | 0 | 0 | 4 | 7 | 2 | 23 |
| **General Practice** | | | | | | | | | | | | | |
| Direct Patient Care | 51 | 28 | 32 | 40 | 27 | 26 | 13 | 12 | 10 | 4 | 6 | 0 | 249 |
| Resident | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 5 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Other | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 3 |
| Total | 51 | 29 | 32 | 40 | 27 | 27 | 14 | 15 | 10 | 5 | 8 | 0 | 258 |
| **General Surgery** | | | | | | | | | | | | | |
| Direct Patient Care | 16 | 12 | 12 | 14 | 6 | 16 | 6 | 3 | 6 | 5 | 1 | 0 | 97 |
| Resident | 1 | 0 | 0 | 0 | 4 | 7 | 14 | 28 | 17 | 20 | 31 | 2 | 124 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 25 |
| Other | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 6 |
| Total | 17 | 14 | 12 | 14 | 10 | 23 | 22 | 31 | 23 | 26 | 33 | 27 | 252 |
| **Internal Medicine** | | | | | | | | | | | | | |
| Direct Patient Care | 31 | 27 | 21 | 17 | 14 | 4 | 8 | 5 | 16 | 7 | 4 | 0 | 154 |
| Resident | 0 | 2 | 1 | 1 | 0 | 2 | 12 | 30 | 21 | 51 | 59 | 3 | 182 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 94 | 94 |
| Other | 4 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 0 | 3 | 1 | 0 | 21 |
| Total | 35 | 32 | 24 | 20 | 16 | 8 | 21 | 36 | 37 | 61 | 64 | 97 | 451 |
| **Pediatrics** | | | | | | | | | | | | | |
| Direct Patient Care | 13 | 18 | 12 | 10 | 6 | 12 | 5 | 9 | 5 | 2 | 3 | 0 | 95 |
| Resident | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 8 | 4 | 23 | 14 | 5 | 60 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 21 |
| Other | 2 | 3 | 0 | 1 | 3 | 2 | 2 | 1 | 0 | 0 | 1 | 0 | 15 |
| Total | 15 | 21 | 12 | 11 | 10 | 15 | 11 | 18 | 9 | 25 | 18 | 26 | 191 |
| **Physicians Other Than Basic Care** | | | | | | | | | | | | | |
| Direct Patient Care | 97 | 111 | 102 | 113 | 95 | 70 | 45 | 38 | 29 | 14 | 23 | 0 | 737 |
| Resident | 2 | 3 | 3 | 7 | 21 | 35 | 71 | 102 | 116 | 105 | 90 | 6 | 561 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 182 | 184 |
| Other | 18 | 21 | 24 | 10 | 14 | 9 | 7 | 2 | 4 | 0 | 1 | 1 | 111 |
| Total | 117 | 135 | 129 | 130 | 130 | 114 | 123 | 142 | 150 | 119 | 115 | 189 | 1,593 |
| **Grand Total** | 236 | 232 | 209 | 217 | 194 | 188 | 195 | 242 | 229 | 240 | 245 | 341 | 2,768 |
| Direct Patient Care | 209 | 197 | 179 | 196 | 149 | 129 | 80 | 67 | 66 | 33 | 37 | 0 | 1,342 |
| Resident | 3 | 5 | 4 | 8 | 26 | 46 | 103 | 170 | 158 | 203 | 201 | 18 | 945 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 322 | 325 |
| Other | 24 | 30 | 26 | 13 | 19 | 13 | 12 | 5 | 4 | 4 | 5 | 1 | 156 |

Appendix B
(continued)

Table 2b

Summary of Resident Physicians (November 26, 1971) Graduating From Out-of-State Medical Schools, 1960-1971

| | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Family Practice | | | | | | | | | | | | | |
| Direct Patient Care | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 5 |
| Resident | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 6 | 2 | 14 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 0 | 3 | 3 | 7 | 2 | 20 |
| General Practice | | | | | | | | | | | | | |
| Direct Patient Care | 8 | 5 | 8 | 16 | 8 | 11 | 9 | 8 | 7 | 5 | 2 | 0 | 87 |
| Resident | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Other | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Total | 8 | 5 | 8 | 17 | 8 | 12 | 10 | 8 | 8 | 5 | 2 | 0 | 91 |
| General Surgery | | | | | | | | | | | | | |
| Direct Patient Care | 8 | 5 | 5 | 4 | 6 | 5 | 5 | 3 | 5 | 4 | 1 | 0 | 51 |
| Resident | 0 | 0 | 0 | 0 | 3 | 7 | 11 | 13 | 8 | 14 | 15 | 0 | 71 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 23 |
| Other | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 |
| Total | 10 | 5 | 5 | 5 | 9 | 12 | 16 | 17 | 13 | 18 | 16 | 23 | 149 |
| Internal Medicine | | | | | | | | | | | | | |
| Direct Patient Care | 4 | 16 | 4 | 8 | 5 | 7 | 6 | 7 | 10 | 8 | 3 | 0 | 78 |
| Resident | 0 | 1 | 0 | 0 | 0 | 2 | 8 | 14 | 15 | 30 | 34 | 1 | 105 |
| Intern | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 57 | 58 |
| Other | 4 | 1 | 6 | 4 | 2 | 2 | 2 | 1 | 2 | 1 | 0 | 0 | 25 |
| Total | 8 | 18 | 10 | 12 | 7 | 12 | 16 | 22 | 27 | 39 | 37 | 58 | 266 |
| Pediatrics | | | | | | | | | | | | | |
| Direct Patient Care | 4 | 5 | 6 | 10 | 4 | 7 | 5 | 3 | 0 | 1 | 0 | 0 | 45 |
| Resident | 0 | 0 | 0 | 1 | 1 | 0 | 3 | 2 | 5 | 12 | 18 | 0 | 42 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 17 |
| Other | 2 | 0 | 2 | 1 | 0 | 4 | 2 | 1 | 0 | 1 | 0 | 0 | 13 |
| Total | 6 | 5 | 8 | 12 | 5 | 11 | 10 | 6 | 5 | 14 | 18 | 17 | 117 |
| Physicians Other Than Basic Care | | | | | | | | | | | | | |
| Direct Patient Care | 53 | 49 | 48 | 57 | 51 | 34 | 32 | 20 | 32 | 13 | 10 | 0 | 399 |
| Resident | 6 | 7 | 7 | 12 | 23 | 48 | 44 | 70 | 86 | 77 | 49 | 11 | 440 |
| Intern | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 73 | 75 |
| Other | 12 | 20 | 18 | 17 | 18 | 12 | 15 | 13 | 4 | 3 | 5 | 1 | 138 |
| Total | 71 | 76 | 73 | 86 | 93 | 94 | 91 | 103 | 122 | 93 | 65 | 85 | 1,052 |
| Grand Total | 103 | 109 | 104 | 133 | 123 | 142 | 145 | 156 | 178 | 172 | 145 | 185 | 1,695 |
| Direct Patient Care | 77 | 80 | 71 | 96 | 75 | 65 | 58 | 41 | 54 | 31 | 17 | 0 | 665 |
| Resident | 6 | 8 | 7 | 13 | 27 | 57 | 67 | 99 | 117 | 136 | 122 | 14 | 673 |
| Intern | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 170 | 174 |
| Other | 20 | 21 | 26 | 24 | 20 | 19 | 20 | 16 | 6 | 5 | 5 | 1 | 183 |

Appendix B
(Continued)

Table 3b

Summary of Resident Physicians (November 26, 1971) Graduating From Canadian Medical Schools, 1960-71

| | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Family Practice | | | | | | | | | | | | | |
| Direct Patient Care | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Resident | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| General Practice | | | | | | | | | | | | | |
| Direct Patient Care | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| Resident | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| General Surgery | | | | | | | | | | | | | |
| Direct Patient Care | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Resident | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 5 |
| Internal Medicine | | | | | | | | | | | | | |
| Direct Patient Care | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Resident | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 3 |
| Pediatrics | | | | | | | | | | | | | |
| Direct Patient Care | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Resident | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 2 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Total | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 6 |
| Physicians Other Than Basic Care | | | | | | | | | | | | | |
| Direct Patient Care | 4 | 5 | 3 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 16 |
| Resident | 0 | 1 | 0 | 2 | 1 | 2 | 3 | 2 | 6 | 3 | 1 | 0 | 21 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Other | 2 | 1 | 3 | 1 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 11 |
| Total | 6 | 7 | 6 | 5 | 1 | 5 | 4 | 4 | 6 | 3 | 1 | 2 | 50 |
| Grand Total | 6 | 7 | 7 | 8 | 3 | 8 | 6 | 5 | 8 | 3 | 3 | 3 | 67 |
| Direct Patient Care | 4 | 5 | 6 | 3 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 23 |
| Resident | 0 | 1 | 0 | 2 | 1 | 3 | 4 | 3 | 7 | 3 | 3 | 0 | 27 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| Other | 2 | 1 | 3 | 3 | 0 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 14 |

Appendix B
(Continued)

Table 4b

Summary of Resident Physicians (November 26, 1971) Graduating From Foreign Medical Schools

| | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Family Practice | | | | | | | | | | | | | |
| Direct Patient Care | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Resident | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| General Practice | | | | | | | | | | | | | |
| Direct Patient Care | 2 | 3 | 5 | 4 | 5 | 6 | 3 | 1 | 2 | 1 | 2 | 0 | 34 |
| Resident | 2 | 0 | 3 | 3 | 0 | 2 | 6 | 5 | 1 | 1 | 0 | 1 | 24 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Other | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Total | 4 | 3 | 8 | 8 | 6 | 9 | 9 | 7 | 3 | 2 | 2 | 1 | 62 |
| General Surgery | | | | | | | | | | | | | |
| Direct Patient Care | 7 | 5 | 9 | 7 | 5 | 4 | 0 | 1 | 2 | 1 | 0 | 0 | 41 |
| Resident | 2 | 6 | 12 | 6 | 16 | 22 | 25 | 29 | 15 | 10 | 4 | 0 | 147 |
| Intern | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 8 | 1 | 1 | 1 | 14 |
| Other | 0 | 1 | 2 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 7 |
| Total | 9 | 12 | 23 | 14 | 21 | 27 | 27 | 32 | 25 | 13 | 5 | 1 | 209 |
| Internal Medicine | | | | | | | | | | | | | |
| Direct Patient Care | 3 | 8 | 5 | 6 | 7 | 6 | 2 | 2 | 1 | 1 | 0 | 0 | 41 |
| Resident | 5 | 8 | 0 | 6 | 9 | 9 | 22 | 20 | 20 | 10 | 4 | 0 | 113 |
| Intern | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 4 | 3 | 1 | 4 | 5 | 21 |
| Other | 3 | 1 | 2 | 2 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 11 |
| Total | 12 | 17 | 7 | 14 | 16 | 18 | 25 | 27 | 25 | 12 | 8 | 5 | 186 |
| Pediatrics | | | | | | | | | | | | | |
| Direct Patient Care | 6 | 8 | 8 | 2 | 2 | 3 | 2 | 1 | 1 | 0 | 0 | 0 | 33 |
| Resident | 0 | 2 | 6 | 3 | 12 | 9 | 15 | 8 | 3 | 4 | 2 | 0 | 64 |
| Intern | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 2 | 1 | 7 |
| Other | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 6 | 10 | 14 | 6 | 14 | 13 | 17 | 10 | 4 | 6 | 4 | 1 | 105 |
| Physicians Other Than Basic Care | | | | | | | | | | | | | |
| Direct Patient Care | 58 | 56 | 67 | 47 | 42 | 39 | 20 | 11 | 1 | 3 | 1 | 0 | 345 |
| Resident | 14 | 37 | 26 | 41 | 59 | 87 | 102 | 69 | 50 | 27 | 17 | 1 | 530 |
| Intern | 0 | 1 | 5 | 4 | 14 | 16 | 21 | 27 | 21 | 45 | 78 | 9 | 241 |
| Other | 14 | 20 | 18 | 17 | 14 | 5 | 7 | 4 | 2 | 3 | 1 | 0 | 105 |
| Total | 86 | 114 | 116 | 109 | 129 | 147 | 150 | 111 | 74 | 78 | 97 | 10 | 1,221 |
| Grand Total | 117 | 156 | 168 | 151 | 186 | 214 | 228 | 187 | 131 | 111 | 116 | 18 | 1,783 |
| Direct Patient Care | 76 | 80 | 94 | 66 | 61 | 58 | 27 | 16 | 7 | 6 | 3 | 0 | 494 |
| Resident | 23 | 53 | 47 | 59 | 96 | 129 | 170 | 131 | 89 | 52 | 27 | 2 | 878 |
| Intern | 1 | 1 | 5 | 5 | 14 | 19 | 22 | 35 | 32 | 49 | 85 | 16 | 284 |
| Other | 17 | 22 | 22 | 21 | 15 | 8 | 9 | 5 | 3 | 4 | 1 | 0 | 127 |

Appendix B
(Continued)

Table 5b

Summary of Resident Physicians (November 26, 1971) Graduating From All Medical Schools Combined

| | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Family Practice | | | | | | | | | | | | | |
| Direct Patient Care | 1 | 1 | 1 | 3 | 2 | 2 | 4 | 0 | 0 | 1 | 1 | 0 | 16 |
| Resident | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 6 | 13 | 4 | 27 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 1 | 1 | 1 | 3 | 2 | 2 | 6 | 0 | 3 | 7 | 14 | 4 | 44 |
| General Practice | | | | | | | | | | | | | |
| Direct Patient Care | 61 | 36 | 45 | 60 | 40 | 44 | 26 | 21 | 19 | 10 | 10 | 0 | 372 |
| Resident | 2 | 0 | 3 | 3 | 0 | 3 | 8 | 7 | 1 | 2 | 0 | 1 | 30 |
| Intern | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 3 |
| Other | 0 | 1 | 0 | 2 | 1 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 8 |
| Total | 63 | 37 | 48 | 65 | 41 | 49 | 34 | 30 | 21 | 12 | 12 | 1 | 413 |
| General Surgery | | | | | | | | | | | | | |
| Direct Patient Care | 31 | 22 | 26 | 26 | 19 | 35 | 11 | 7 | 13 | 10 | 2 | 0 | 202 |
| Resident | 3 | 6 | 12 | 6 | 23 | 36 | 50 | 71 | 40 | 44 | 51 | 2 | 344 |
| Intern | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 8 | 1 | 1 | 49 | 62 |
| Other | 2 | 3 | 2 | 1 | 0 | 1 | 3 | 1 | 0 | 2 | 1 | 0 | 16 |
| Total | 36 | 31 | 40 | 34 | 42 | 72 | 64 | 81 | 61 | 57 | 55 | 51 | 624 |
| Internal Medicine | | | | | | | | | | | | | |
| Direct Patient Care | 38 | 51 | 30 | 31 | 26 | 17 | 16 | 14 | 27 | 16 | 7 | 0 | 273 |
| Resident | 5 | 11 | 1 | 7 | 9 | 14 | 42 | 64 | 57 | 91 | 97 | 4 | 402 |
| Intern | 1 | 0 | 0 | 0 | 0 | 3 | 1 | 4 | 3 | 1 | 4 | 157 | 174 |
| Other | 11 | 5 | 10 | 8 | 4 | 5 | 3 | 3 | 3 | 4 | 1 | 0 | 57 |
| Total | 55 | 67 | 41 | 46 | 39 | 39 | 62 | 85 | 90 | 112 | 109 | 161 | 906 |
| Pediatrics | | | | | | | | | | | | | |
| Direct Patient Care | 23 | 31 | 26 | 22 | 12 | 22 | 12 | 13 | 7 | 3 | 3 | 0 | 174 |
| Resident | 0 | 2 | 6 | 4 | 14 | 10 | 23 | 18 | 12 | 39 | 35 | 5 | 168 |
| Intern | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 2 | 39 | 45 |
| Other | 4 | 3 | 2 | 5 | 3 | 7 | 4 | 2 | 0 | 1 | 1 | 0 | 32 |
| Total | 27 | 36 | 34 | 31 | 29 | 40 | 39 | 34 | 19 | 45 | 41 | 44 | 419 |
| Physicians Other Than Basic Care | | | | | | | | | | | | | |
| Direct Patient Care | 212 | 221 | 220 | 219 | 188 | 144 | 97 | 70 | 62 | 30 | 34 | 0 | 1,497 |
| Resident | 22 | 48 | 36 | 62 | 104 | 172 | 220 | 243 | 258 | 212 | 157 | 18 | 1,552 |
| Intern | 0 | 1 | 5 | 4 | 15 | 16 | 21 | 27 | 22 | 45 | 80 | 266 | 502 |
| Other | 46 | 62 | 63 | 45 | 46 | 28 | 30 | 20 | 10 | 6 | 7 | 2 | 365 |
| Total | 280 | 332 | 324 | 330 | 353 | 360 | 368 | 360 | 352 | 293 | 278 | 286 | 3,916 |
| Grand Total | 462 | 504 | 488 | 509 | 506 | 562 | 573 | 590 | 546 | 526 | 509 | 547 | 6,322 |
| Direct Patient Care | 366 | 362 | 348 | 361 | 287 | 264 | 166 | 125 | 128 | 70 | 57 | 0 | 2,534 |
| Resident | 32 | 67 | 58 | 82 | 150 | 235 | 344 | 403 | 371 | 394 | 353 | 34 | 2,523 |
| Intern | 1 | 1 | 5 | 5 | 15 | 20 | 22 | 35 | 34 | 49 | 88 | 511 | 786 |
| Other | 63 | 74 | 77 | 61 | 54 | 43 | 41 | 27 | 13 | 13 | 11 | 2 | 479 |

Appendix C

Table 1c

Computations of Pennsylvania Medical School Graduate Physician Output

| Year of Grad. | Number Enter-ing (Y-1) | Number Surviv-ing to 2nd Year (Y-2) | Percentage Surviving From 1st Year | Number Surviving to 3rd Year (Y-3) | Percentage Surviving From 2nd Year | Number Surviving to 4th Year (Y-4) | Percentage Surviving From 3rd Year | Number Actually Gradu-ated. | Percentage Surviving From 4th Year | Estimated Graduate Output | Estimation Formula Used[b] (Grads =) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hahnemann Medical College Graduate Physician Output, 1961-1980 | | | | | | | | | | | |
| 1961 | | | | | | 93 | | 93 | 100.00 | 93 | Y-4 |
| 1962 | | | | 82 | | 81 | 98.78 | 80 | 98.77 | 81 | Y-4 |
| 1963 | | 97 | | 91 | 93.81 | 86 | 94.51 | 86 | 100.00 | 86 | Y-4 |
| 1964 | 110 | 99 | 90.00 | 92 | 92.93 | 92 | 100.00 | 92 | 100.00 | 92 | Y-4 |
| 1965 | 110 | 103 | 93.64 | 96 | 93.20 | 94 | 97.92 | 94 | 100.00 | 94 | Y-4 |
| 1966 | 110 | 96 | 87.27 | 93 | 96.88 | 92 | 98.92 | 91 | 98.91 | 92 | Y-4 |
| 1967 | 110 | 108 | 98.19 | 106 | 98.15 | 106 | 100.00 | 106 | 100.00 | 106 | Y-4 |
| 1968 | 110 | 109 | 99.09 | 103 | 94.50 | 102 | 99.03 | 102 | 100.00 | 102 | Y-4 |
| 1969 | 110 | 107 | 97.27 | 100 | 93.46 | 99 | 99.00 | 99 | 100.00 | 99 | Y-4 |
| 1970 | 110 | 107 | 97.27 | 101 | 94.39 | 101 | 100.00 | 100 | 99.01 | 101 | Y-4 |
| 1971 | 115 | 115 | 100.00 | 107 | 93.04 | 108 | 100.93 | 107 | 99.07 | 107 | Y-4 |
| 1972 | 115 | 114 | 99.13 | 116 | 101.75 | 117 | 100.86 | | | 116 | Y-4 |
| 1973 | 115 | 110 | 95.65 | 110 | 100.00 | | | | | 110 | 0.9986(Y-3) |
| 1974 | 118 | 117 | 99.15 | | | | | | | 117 | 0.9986(Y-2) |
| 1975 | 130 | | | | | | | | | 129 | 0.9899(Y-1) |
| 1976 | 150[a] | | | | | | | | | 148 | 0.9899(Y-1) |
| 1977 | 180 | | | | | | | | | 178 | 0.9899(Y-1) |
| 1978 | 220 | | | | | | | | | 218 | 0.9899(Y-1) |
| 1979 | 240 | | | | | | | | | 238 | 0.0999(Y-1) |
| 1980 | 250 | | | | | | | | | 247 | 0.0999(Y-1) |
| Sum of Percentages | | | 293.93 | | 294.79 | | 301.79 | | 298.08 | | |
| Mean Percentage | | | 0.9798 | | 0.9826 | | 1.0060 | | 0.9936 | | |
| Median Percentage | | | 0.9913 | | 1.0000 | | 1.0086 | | 0.9901 | | |
| Hershey Medical College Graduate Physician Output, 1971-1980 | | | | | | | | | | | |
| 1971 | 40 | 39 | 97.50 | 37 | 94.87 | 33 | 89.19 | 33 | 100.00 | 33 | Y-4 |
| 1972 | 48 | 48 | 100.00 | 16 | 95.83 | 42 | 91.30 | 42 | 100.00 | 42 | Y-4 |
| 1973 | 64 | 63 | 98.44 | 63 | 100.00 | | | | | 57 | 0.9025(Y-3) |
| 1974 | 69 | 68 | 98.55 | | | | | | | 59 | 0.8649(Y-2) |
| 1975 | 70 | | | | | | | | | 60 | 0.8519(Y-1) |
| 1976 | 81[a] | | | | | | | | | 69 | 0.8519(Y-1) |
| 1977 | 86 | | | | | | | | | 73 | 0.8519(Y-1) |
| 1978 | 92 | | | | | | | | | 78 | 0.8519(Y-1) |
| 1979 | 98 | | | | | | | | | 84 | 0.8519(Y-1) |
| 1980 | 103 | | | | | | | | | 88 | 0.8519(Y-1) |
| Sum of Percentages | | | 394.49 | | 290.70 | | 180.49 | | 200.00 | | |
| Mean Percentage | | | 98.62 | | 96.90 | | 90.25 | | 100.00 | | |
| Median Percentage | | | 98.50 | | 95.83 | | 90.25 | | 100.00 | | |
| Jefferson Medical School Graduate Physician Output, 1961-1980 | | | | | | | | | | | |
| 1961 | | | | | | 169 | | 167 | 98.82 | 169 | Y-4 |
| 1962 | | | | 147 | | 147 | 100.00 | 146 | 99.32 | 147 | Y-4 |
| 1963 | | 154 | | 150 | 97.40 | 148 | 98.67 | 148 | 100.00 | 148 | Y-4 |
| 1964 | 176 | 160 | 90.91 | 156 | 97.50 | 155 | 99.36 | 154 | 99.35 | 155 | Y-4 |
| 1965 | 176 | 162 | 92.05 | 158 | 97.53 | 157 | 99.37 | 157 | 100.00 | 157 | Y-4 |
| 1966 | 175 | 158 | 90.29 | 156 | 98.73 | 154 | 98.72 | 154 | 100.00 | 154 | Y-4 |
| 1967 | 178 | 164 | 92.13 | 165 | 100.61 | 161 | 97.58 | 161 | 100.00 | 161 | Y-4 |
| 1968 | 176 | 157 | 89.20 | 157 | 100.00 | 157 | 100.00 | 157 | 100.00 | 157 | Y-4 |
| 1969 | 176 | 169 | 96.02 | 168 | 99.41 | 168 | 100.00 | 167 | 99.40 | 168 | Y-4 |
| 1970 | 176 | 174 | 98.86 | 169 | 97.13 | 165 | 97.63 | 165 | 100.00 | 165 | Y-4 |
| 1971 | 186 | 188 | 101.08 | 185 | 98.40 | 186 | 100.54 | 184 | 98.92 | 186 | Y-4 |
| 1972 | 192 | 192 | 100.00 | 195 | 101.56 | 188 | 96.41 | | | 188 | 0.9936(Y-3) |
| 1973 | 192 | 186 | 96.88 | 193 | 103.76 | | | | | 192 | 0.9810(Y-2) |
| 1974 | 212 | 211 | 99.53 | | | | | | | 207 | 0.9764(Y-1) |
| 1975 | 212 | | | | | | | | | 207 | 0.9764(Y-1) |
| 1976 | 223[a] | | | | | | | | | 218 | 0.9764(Y-1) |
| 1977 | 223 | | | | | | | | | 218 | 0.9764(Y-1) |
| 1978 | 223 | | | | | | | | | 218 | 0.9764(Y-1) |
| 1979 | 223 | | | | | | | | | 218 | 0.9764(Y-1) |
| 1980 | 223 | | | | | | | | | 218 | 0.9764(Y-1) |
| Sum of Percentages | | | 1,046.95 | | 1,092.03 | | 1,088.28 | | 1,095.81 | | |
| Mean Percentage | | | 95.18 | | 99.28 | | 98.93 | | 99.62 | | |
| Median Percentage | | | 99.53[c] | | 98.73 | | 99.36 | | 100.00 | | |

Appendix C
(continued)

Table 1c

| Year of Grad. | Number Entering (Y-1) | Number Surviving to 2nd Year (Y-2) | Percentage Surviving From 1st Year | Number Surviving to 3rd Year (Y-3) | Percentage Surviving From 2nd Year | Number Surviving to 4th Year (Y-4) | Percentage Surviving From 3rd Year | Number Actually Graduated | Percentage Surviving From 4th Year | Estimated Graduate Output | Estimation Formula Used[b] (Grads =) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| The Medical College of Pennsylvania Graduate Physician Output, 1961-1980 | | | | | | | | | | | |
| 1961 | | | | | | 40 | | 40 | 100.00 | 40 | Y-4 |
| 1962 | | | | 48 | | 46 | 95.83 | 46 | 100.00 | 46 | Y-4 |
| 1963 | | 50 | | 40 | 80.00 | 40 | 100.00 | 40 | 100.00 | 40 | Y-4 |
| 1964 | 63 | 58 | 92.06 | 44 | 75.86 | 43 | 97.73 | 43 | 100.00 | 43 | Y-4 |
| 1965 | 62 | 58 | 93.55 | 49 | 84.48 | 46 | 93.88 | 46 | 100.00 | 46 | Y-4 |
| 1966 | 64 | 63 | 98.44 | 52 | 82.54 | 48 | 92.31 | 48 | 100.00 | 48 | Y-4 |
| 1967 | 64 | 58 | 90.63 | 42 | 72.41 | 38 | 90.48 | 38 | 100.00 | 38 | Y-4 |
| 1968 | 60 | 54 | 90.00 | 38 | 70.37 | 38 | 100.00 | 37 | 97.37 | 38 | Y-4 |
| 1969 | 64 | 63 | 98.44 | 60 | 95.24 | 57 | 95.00 | 57 | 100.00 | 57 | Y-4 |
| 1970 | 64 | 58 | 90.63 | 50 | 86.21 | 50 | 100.00 | 50 | 100.00 | 50 | Y-4 |
| 1971 | 66 | 63 | 95.45 | 51 | 80.95 | 50 | 98.04 | 51 | 102.00 | 50 | Y-4 |
| 1972 | 66 | 72 | 109.09 | 70 | 97.22 | 69 | 98.57 | 68 | 98.55 | 69 | Y-4 |
| 1973 | 66 | 71 | 107.58 | 73 | 102.82 | | | | | 71 | 0.9773(Y-3) |
| 1974 | 66 | 74 | 112.12 | | | | | | | 69 | 0.9308(Y-2) |
| 1975 | 66 | | | | | | | | | 67 | 1.0154(Y-1) |
| 1976 | 73[a] | | | | | | | | | 74 | 1.0154(Y-1) |
| 1977 | 73 | | | | | | | | | 74 | 1.0154(Y-1) |
| 1978 | 73 | | | | | | | | | 74 | 1.0154(Y-1) |
| 1979 | 73 | | | | | | | | | 74 | 1.0154(Y-1) |
| 1980 | 73 | | | | | | | | | 74 | 1.0154(Y-1) |
| Sum of Percentages | | | 1,077.99 | | 928.10 | | 1,061.84 | | 1,197.92 | | |
| Mean Percentage | | | 98.00 | | 84.37 | | 96.53 | | 99.83 | | |
| Median Percentage | | | 109.09[d] | | 95.24[e] | | 97.73 | | 100.00 | | |
| Philadelphia College of Osteopathic Medicine Graduate Physician Output, 1961-1980 | | | | | | | | | | | |
| 1961 | | | | | | 79 | | 79 | 100.00 | 79 | Y-4 |
| 1962 | | | | 67 | | 67 | 100.00 | 67 | 100.00 | 67 | Y-4 |
| 1963 | | 65 | | 63 | 96.92 | 63 | 100.00 | 63 | 100.00 | 63 | Y-4 |
| 1964 | 91 | 86 | 94.51 | 87 | 101.16 | 82 | 94.25 | 82 | 100.00 | 82 | Y-4 |
| 1965 | 88 | 74 | 84.09 | 73 | 98.65 | 73 | 100.00 | 73 | 100.00 | 73 | Y-4 |
| 1966 | 93 | 85 | 91.40 | 82 | 96.47 | 83 | 101.22 | 83 | 100.00 | 83 | Y-4 |
| 1967 | 89 | 86 | 96.63 | 85 | 98.84 | 83 | 97.65 | 83 | 100.00 | 83 | Y-4 |
| 1968 | 100 | 93 | 93.00 | 90 | 96.77 | 90 | 100.00 | 90 | 100.00 | 90 | Y-4 |
| 1969 | 93 | 94 | 101.08 | 94 | 100.00 | 91 | 96.81 | 91 | 100.00 | 91 | Y-4 |
| 1970 | 95 | 82 | 86.32 | 80 | 97.56 | 81 | 101.25 | 81 | 100.00 | 81 | Y-4 |
| 1971 | 113 | 113 | 100.00 | 108 | 95.58 | 106 | 98.15 | 106 | 100.00 | 106 | Y-4 |
| 1972 | 123 | 125 | 101.63 | 125 | 100.00 | 125 | 100.00 | 125 | 100.00 | 125 | Y-4 |
| 1973 | 145 | 143 | 98.62 | 137 | 95.80 | | | | | 137 | Y-3 |
| 1974 | 152 | 152 | 100.00 | | | | | | | 148 | 0.9756(Y-2) |
| 1975 | 160 | | | | | | | | | 151 | 0.9427(Y-1) |
| 1976 | 180[a] | | | | | | | | | 170 | 0.9427(Y-1) |
| 1977 | 200 | | | | | | | | | 189 | 0.9427(Y-1) |
| 1978 | 225 | | | | | | | | | 212 | 0.9427(Y-1) |
| 1979 | 250 | | | | | | | | | 236 | 0.9427(Y-1) |
| 1980 | 250 | | | | | | | | | 236 | 0.9427(Y-1) |
| Sum of Percentages | | | 1,047.28 | | 1,077.75 | | 1,089.33 | | 1,200.00 | | |
| Mean Percentage | | | 95.21 | | 97.98 | | 99.03 | | 100.00 | | |
| Median Percentage | | | 96.63 | | 97.56 | | 100.00 | | 100.00 | | |
| Temple University Medical School Graduate Physician Output, 1961-1980 | | | | | | | | | | | |
| 1961 | | | | | | 127 | | 125 | 98.43 | 127 | Y-4 |
| 1962 | | | | 128 | | 126 | 98.44 | 126 | 100.00 | 126 | Y-4 |
| 1963 | | 127 | | 129 | 101.57 | 124 | 96.12 | 124 | 100.00 | 124 | Y-4 |
| 1964 | 137 | 130 | 94.89 | 133 | 102.31 | 131 | 99.25 | 132 | 99.24 | 132 | Y-4 |
| 1965 | 136 | 124 | 91.18 | 125 | 100.81 | 124 | 99.20 | 124 | 100.00 | 124 | Y-4 |
| 1966 | 138 | 130 | 94.20 | 136 | 104.62 | 132 | 97.06 | 132 | 100.00 | 132 | Y-4 |
| 1967 | 137 | 131 | 95.62 | 132 | 100.76 | 131 | 99.24 | 129 | 98.47 | 131 | Y-4 |
| 1968 | 137 | 142 | 103.65 | 147 | 103.52 | 143 | 97.28 | 143 | 100.00 | 143 | Y-4 |
| 1969 | 137 | 133 | 97.08 | 134 | 100.75 | 134 | 100.00 | 134 | 100.00 | 134 | Y-4 |
| 1970 | 139 | 135 | 97.12 | 138 | 100.22 | 136 | 98.55 | 136 | 100.00 | 136 | Y-4 |
| 1971 | 137 | 134 | 97.81 | 134 | 100.00 | 134 | 100.00 | 134 | 100.00 | 134 | Y-4 |
| 1972 | 146 | 142 | 97.26 | 146 | 102.82 | 145 | 99.32 | | | 145 | Y-4 |
| 1973 | 146 | 144 | 98.63 | 145 | 100.69 | | | | | 144 | 0.9920(Y-3) |
| 1974 | 160 | 159 | 99.38 | | | | | | | 159 | Y-2 |
| 1975 | 160 | | | | | | | | | 155 | 0.9713(Y-1) |
| 1976 | 180[a] | | | | | | | | | 175 | 0.9713(Y-1) |
| 1977 | 180 | | | | | | | | | 175 | 0.9713(Y-1) |
| 1978 | 180 | | | | | | | | | 175 | 0.9713(Y-1) |
| 1979 | 180 | | | | | | | | | 175 | 0.9713(Y-1) |
| 1980 | 180 | | | | | | | | | 175 | 0.9713(Y-1) |
| Sum of Percentages | | | 1,066.82 | | 1,118.07 | | 1,084.46 | | 1,096.14 | | |
| Mean Percentage | | | 96.98 | | 101.64 | | 98.59 | | 99.65 | | |
| Median Percentage | | | 97.12 | | 100.81 | | 99.20 | | 100.00 | | |

Appendix C
(continued)

Table 1c

| Year of Grad. | Number Enter-ing (Y-1) | Number Surviv-ing to 2nd Year (Y-2) | Percentage Surviving From 1st Year | Number Surviving to 3rd Year (Y-3) | Percentage Surviving From 2nd Year | Number Surviving to 4th Year (Y-4) | Percentage Surviving From 3rd Year | Number Actually Gradu-ated | Percentage Surviving From 4th Year | Estimated Graduate Output | Estimation Formula Used[b] (Grads =) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| University of Pennsylvania Medical School Graduate Physician Output, 1961-1980 | | | | | | | | | | | |
| 1961 | | | | | | 130 | | 130 | 100.00 | 130 | Y-4 |
| 1962 | | | | 134 | | 134 | 100.00 | 134 | 100.00 | 134 | Y-4 |
| 1963 | | 125 | | 130 | 104.00 | 130 | 100.00 | 130 | 100.00 | 130 | Y-4 |
| 1964 | 125 | 116 | 92.80 | 120 | 103.45 | 120 | 100.00 | 120 | 100.00 | 120 | Y-4 |
| 1965 | 125 | 122 | 97.60 | 126 | 103.28 | 124 | 98.41 | 124 | 100.00 | 124 | Y-4 |
| 1966 | 129 | 128 | 99.22 | 134 | 104.69 | 132 | 98.51 | 124 | 93.94 | 132 | Y-4 |
| 1967 | 126 | 121 | 96.03 | 127 | 104.96 | 122 | 96.06 | 122 | 100.00 | 122 | Y-4 |
| 1968 | 127 | 127 | 100.00 | 129 | 101.57 | 129 | 100.00 | 129 | 100.00 | 129 | Y-4 |
| 1969 | 125 | 127 | 101.60 | 130 | 102.36 | 128 | 98.46 | 128 | 100.00 | 128 | Y-4 |
| 1970 | 125 | 125 | 100.00 | 129 | 103.20 | 129 | 100.00 | 125 | 96.90 | 129 | Y-4 |
| 1971 | 133 | 131 | 98.50 | 135 | 103.05 | 136 | 100.74 | 134 | 98.53 | 136 | Y-4 |
| 1972 | 132 | 133 | 100.76 | 136 | 102.26 | 146 | 107.35 | | | 146 | Y-4 |
| 1973 | 151 | 149 | 98.68 | 147 | 98.66 | | | | | 147 | Y-3 |
| 1974 | 150 | 147 | 98.00 | | | | | | | 152 | 1.0328(Y-2) |
| 1975 | 160 | | | | | | | | | 163 | 1.0192(Y-1) |
| 1976 | 160[a] | | | | | | | | | 163 | 1.0192(Y-1) |
| 1977 | 160 | | | | | | | | | 163 | 1.0192(Y-1) |
| 1978 | 160 | | | | | | | | | 163 | 1.0192(Y-1) |
| 1979 | 160 | | | | | | | | | 163 | 1.0192(Y-1) |
| 1980 | 160 | | | | | | | | | 163 | 1.0192(Y-1) |
| Sum of Percentages | | | 1,083.19 | | 1,131.48 | | 1,099.53 | | 1,089.37 | | |
| Mean Percentage | | | 98.47 | | 102.86 | | 109.05 | | 99.03 | | |
| Median Percentage | | | 98.68 | | 103.28 | | 100.00 | | 100.00 | | |
| University of Pittsburgh Medical School Graduate Physician Output, 1961-1980 | | | | | | | | | | | |
| 1961 | | | | | | 93 | | 91 | 97.85 | 92 | 0.9882(Y-4) |
| 1962 | | | | 78 | | 79 | 101.28 | 78 | 98.73 | 78 | 0.9882(Y-4) |
| 1963 | | 101 | | 93 | 92.08 | 91 | 97.85 | 88 | 96.70 | 90 | 0.9882(Y-4) |
| 1964 | 101 | 96 | 95.05 | 89 | 92.71 | 89 | 100.00 | 87 | 97.75 | 88 | 0.9882(Y-4) |
| 1965 | 101 | 96 | 95.05 | 87 | 90.63 | 95 | 97.70 | 84 | 98.82 | 84 | 0.9882(Y-4) |
| 1966 | 102 | 95 | 93.14 | 92 | 96.84 | 91 | 98.91 | 90 | 98.90 | 90 | 0.9882(Y-4) |
| 1967 | 102 | 91 | 89.22 | 87 | 95.60 | 84 | 96.55 | 82 | 97.62 | 83 | 0.9882(Y-4) |
| 1968 | 102 | 98 | 96.08 | 96 | 97.96 | 93 | 96.88 | 93 | 100.00 | 92 | 0.9882(Y-4) |
| 1969 | 101 | 93 | 92.08 | 90 | 96.77 | 89 | 98.89 | 88 | 98.88 | 88 | 0.9882(Y-4) |
| 1970 | 106 | 96 | 90.57 | 96 | 100.00 | 95 | 98.96 | 95 | 100.00 | 94 | 0.9882(Y-4) |
| 1971 | 108 | 98 | 90.74 | 97 | 98.98 | 97 | 100.00 | 96 | 98.97 | 96 | 0.9882(Y-4) |
| 1972 | 107 | 102 | 95.33 | 106 | 103.92 | 106 | 100.00 | | | 105 | 0.9882(Y-4) |
| 1973 | 109 | 108 | 99.08 | 107 | 99.07 | | | | | 105 | 0.9831(Y-3) |
| 1974 | 128 | 122 | 95.31 | | | | | | | 120 | 0.9875(Y-2) |
| 1975 | 130 | | | | | | | | | 121 | 0.9301(Y-1) |
| 1976 | 135[a] | | | | | | | | | 126 | 0.9301(Y-1) |
| 1977 | 135 | | | | | | | | | 126 | 0.9301(Y-1) |
| 1978 | 135 | | | | | | | | | 126 | 0.9301(Y-1) |
| 1979 | 142[f] | | | | | | | | | 132 | 0.9301(Y-1) |
| 1980 | 149[f] | | | | | | | | | 139 | 0.9301(Y-1) |
| Sum of Percentages | | | 1,031.65 | | 1,064.56 | | 1,087.02 | | 1,084.12 | | |
| Mean Percentage | | | 93.79 | | 96.78 | | 98.82 | | 98.56 | | |
| Median Percentage | | | 95.05 | | 96.84 | | 98.89 | | 98.82 | | |

[a]Data on entry from 1976 on is based on projections of size of entering class made by the medical schools in response to a survey item.

[b]See Table 2c of this Appendix for computation of the formulas used here. The formulas for Hahnemann are based on median values for the last three items in each column in order to reflect Hahnemann's recent policy of bringing in advanced standing students and foreign medical people to make the number graduating close to the number that originally entered, i.e., compensation for attrition. It is assumed here that the best projection is that which uses the size of the class nearest to graduation.

[c]Median based on last five entries due to apparent recent trend.

[d]The value of 109.09 represents the last three years as a probable recent trend (actual median for all years is 0.9545).

[e]The value of 95.24 represents the last five years as the probable newer trend (actual median for all years is 0.8254).

[f]Pittsburgh indicates continued enrollment of 135 unless "faculty and facilities are increased." Figures are modified here on assumption of a five per cent per annum increase due to Federal or State legislation impact.

Appendix C
(continued)

Table 2c

| School | Formulas* | |
|---|---|---|
| Formulas Used to Estimate Graduate Output | | |
| Hahnemann | Graduates = (0.9913) (1.0000) (1.0086) (0.9901) Y-1 = 0.9899(Y-1)<br>= (1.0000) (1.0086) (0.9901) Y-2 = 0.9986(Y-2)<br>= (1.0086) (0.9901) Y-3 = 0.9986(Y-3)<br>= 0.9901(Y-4) | |
| Hershey | Graduates = (0.9850) (0.9583) (0.9025) Y-1 = 0.8519(Y-1)<br>= (0.9583) (0.9025) Y-2 = 0.8649(Y-2)<br>= 0.9025(Y-3)<br>= Y-4 | |
| Jefferson | Graduates = (0.9953) (0.9873) (0.9936) (1.0000) Y-1 = 0.9764(Y-1)<br>= (0.9873) (0.9936) Y-2 = 0.9810(Y-2)<br>= 0.9936(Y-3)<br>= Y-4 | Note: (0.9953) based on last five entering classes since the retention rate is markedly greater than previously in this column. |
| Medical College of Pennsylvania | Graduates = (1.0909) (0.9524) (0.9773) (1.0000) Y-1 = 1.0154(Y-1)<br>= (0.9524) (0.9773) (1.0000) Y-2 = 0.9308(Y-2)<br>= (0.9773) (1.0000) Y-3 = 0.9773(Y-3)<br>= Y-4 | Note: (1.0909) based on last three years and (0.9524) based on last five years of data in column due to change in trend. |
| Philadelphia College of Osteopathic Medicine | Graduates = (0.9663) (0.9756) (1.0000) (1.0000) Y-1 = 0.9427(Y-1)<br>= (0.9811) (1.0000) (1.0000) Y-2 = 0.9811(Y-2)<br>= (1.0000) (1.0000) Y-3 = Y-3<br>= Y-4 | |
| Temple University | Graduates = (0.9712) (1.0081) (0.9920) (1.0000) Y-1 = 0.9713(Y-1)<br>= (1.0081) (0.9920) (1.0000) Y-2 = Y-2<br>= (0.9920) (1.0000) Y-3 = 0.9920(Y-3)<br>= Y-4 | |
| University of Pennsylvania | Graduates = (0.9868) (1.0328) (1.0000) (1.0000) Y-1 = 1.0192(Y-1)<br>= (1.0328) (1.0000) (1.0000) Y-2 = 1.0328(Y-2)<br>= Y-3<br>= Y-4 | |
| University of Pittsburgh | Graduates = (0.9505) (0.9954) (0.9948) (0.9882) Y-1 = 0.9301(Y-1)<br>= (0.9954) (0.9948) (0.9882) Y-2 = 0.9785(Y-2)<br>= (0.9948) (0.9882) Y-3 = 0.9831(Y-3)<br>= 0.9882(Y-4) | Note: (0.9954) is median value for last five entries and (0.9948) is median value of last four entries. Used because of apparent recent trends over all median value is, therefore, ignored. |

*(Y-1) = number entering 1st year (Y-3) = number entering 3rd year
(Y-2) = number entering 2nd year (Y-4) = number entering 4th year

Appendix D

PENNSYLVANIA PHYSICIAN MANPOWER SUPPLY SURVEY

Bureau of Educational Research
Department of Education
Commonwealth of Pennsylvania

Directions:

Below you will find data categories reflecting vitally needed data to complete a study in medical manpower being carried out by the Bureau of Educational Research at the request of the Bureau of Planning Services by the Office of the Commissioner for Higher Education and in cooperation with the Bureau of the Budget of the Governor's Office.

It will, therefore, be greatly appreciated if you will enter all available data appropriate to each item for the school years indicated. Where data are not available, please enter N.A. (Not Available) in the appropriate spot.

Name of School Responding Hahnemann Medical College

Name of Responding Official ______ Date October 26, 1971

| School Year | Total Number Applicants | Number Applicants from Pa. | Mean Applicant MCAT | Number Female Applicants | Size of First Year Class (Fall) | Number Penna. Students First Year |
|---|---|---|---|---|---|---|
| 1960/61 | | | | | 110 | |
| 1961/62 | | | | | 110 | |
| 1962/63 | 855 | 412 | 545 545*<br>535 535 | 173 | 110 | 69 |
| 1963/64 | 1473 | 689 | 515 545*<br>515 525 | 157 | 110 | 78 |
| 1964/65 | 1882 | 815 | 530 545*<br>555 555 | 190 | 110 | 74 |
| 1965/66 | 1821 | 788 | 545 535*<br>565 565 | 198 | 110 | 79 |
| 1966/67 | 1871 | 724 | 545 565*<br>565 545 | 213 | 110 | 77 |
| 1967/68 | 2015 | 832 | 555 575*<br>570 560 | 229 | 115 | 85 |
| 1968/69 | 2370 | 923 | 568 587*<br>578 575 | 262 | 115 | 85 |
| 1969/70 | 2692 | 1047 | 587 558*<br>573 586 | 287 | 115 | 80 |
| 1970/71 | 2834 | 1101 | 550 578<br>551 539 | 321 | 118 | 82 |
| 1971/72 | 2588 | 982 | 550 576<br>547 539 | 294 | 130 | 82 |

*Mean applicant MCAT scores not available for these years. Mean MCATs for the first year class have been substituted.

Appendix D
(continued)

| School Year | Number Female Students First Year | Mean MCAT First Year Class | Size of Second Year Class (Fall) | Size of Third Year Class (Fall) | Size of Fourth Year Class (Fall) |
|---|---|---|---|---|---|
| 1960/61 | 7 | - | 97 | 82 | 93 |
| 1961/62 | 4 | - | 99 | 91 | 81 |
| 1962/63 | 3 | 545 545<br>535 535 | 103 | 92 | 86 |
| 1963/64 | 5 | 515 545<br>515 525 | 96 | 96 | 92 |
| 1964/65 | 11 | 530 535<br>555 555 | 108 | 93 | 94 |
| 1965/66 | 6 | 545 535<br>565 565 | 109 | 106 | 92 |
| 1966/67 | 9 | 545 565<br>565 545 | 107 | 103 | 106 |
| 1967/68 | 8 | 555 575<br>570 560 | 107 | 100 | 102 |
| 1968/69 | 12 | 568 587<br>578 575 | 115 | 101 | 99 |
| 1969/70 | 19 | 587 598<br>533 586 | 114 | 107 | 101 |
| 1970/71 | 14 | 589 609<br>574 580 | 110 | 116 | 108 |
| 1971/72 | 10 | 582 605<br>565 586 | 117 | 110 | 117 |

| School Year | Number Grad-uated | Graduates Interning In Penna. | Graduates Meeting Residence Requirements in Penna. | Graduates Currently in Practice in Penna. | Outside Pa. |
|---|---|---|---|---|---|
| 1960/61 | 93 | 59 | | 38 | 45 |
| 1961/62 | 80 | 52 | | 37 | 41 |
| 1962/63 | 86 | 52 | | 39 | 44 |
| 1963/64 | 92 | 59 | | 41 | 42 |
| 1964/65 | 94 | 43 | | 36 | 51 |
| 1965/66 | 91 | 47 | | 33 | 53 |
| 1966/67 | 106 | 64 | | 41 | 52 |
| 1967/68 | 102 | 62 | | 40 | 46 |
| 1968/69 | 99 | 50 | | 34 | 57 |
| 1969/70 | 100 | 57 | | 57 | 39 |
| 1970/71 | 107 | 53 | N.A. | | |
| /72 | 117** | N.A. | | | |

Appendix D
(continued)

In addition to the above, please indicate the number of students you expect to be able to accept during the next decade. Place an asterisk in front of any figure that is purely an extrapolation rather than a relatively firm figure based on present plans or knowledge.

| School Year | Projected or Anticipated First Year Enrollments | |
|---|---|---|
| 1971/72 | 130 | |
| 1972/73 | 135(150)[a] | |
| 1973/74 | * 180 | |
| 1974/75 | * 220 | |
| 1975/76 | * 240 | |
| 1976/77 | * 250 | |
| 1977/78 | * 250 | |
| 1978/79 | * 250 | |
| 1979/80 | * 250 | |

[a]150 is correct according to information received later by phone.
*Indicates a projected value.

When completed, please return to:

Dr. George E. Brehman Jr.
Research Associate
Division of Higher Education Research
Bureau of Educational Research
Department of Education
P. O. Box 911
Harrisburg, Pa. 17126

Appendix D
(continued)

PENNSYLVANIA PHYSICIAN MANPOWER SUPPLY SURVEY

Bureau of Educational Research
Department of Education
Commonwealth of Pennsylvania

Directions:

Below you will find data categories reflecting vitally needed data to complete a study in medical manpower being carried out by the Bureau of Educational Research at the request of the Bureau of Planning Services by the Office of the Commissioner for Higher Education and in cooperation with the Bureau of the Budget of the Governor's Office.

It will, therefore, be greatly appreciated if you will enter all available data appropriate to each item for the school years indicated. Where data are not available, please enter N.A. (Not Available) in the appropriate spot.

Name of School Responding The Milton S. Hershey Medical Center The Pennsylvania State University

Name of Responding Official Mrs. Gaye W. Sheffler Date 11/22/71

| School Year | Total Number Appli-cants | Number Appli-cants from Pa. | Mean Appli-cant MCAT | Number Female Appli-cants | Size of First Year Class (Fall) | Number Penna. Students First Year |
|---|---|---|---|---|---|---|
| 1960/61 | | | | | | |
| 1961/62 | | | | | | |
| 1962/63 | | | | | | |
| 1963/64 | | | | | | |
| 1964/65 | | | | | | |
| 1965/66 | | | | | | |
| 1966/67 | | | | | | |
| 1967/68 | 1077 | 560 | | 89 | 40 | 31 |
| 1968/69 | 1906 | 905 | | 174 | 48 | 38 |
| 1969/70 | 2163 | 731 | | 213 | 64 | 44 |
| 1970/71 | 2461 | 1020 | | 282 | 69 | 38 |
| 1971/72 | 2339 | 1037 | | 341 | 70 | 55 |

(continued)

| School Year | Number Female Students First Year | Mean MCAT First Year Class | Size of Second Year Class (Fall) | Size of Third Year Class (Fall) | Size of Fourth Year Class (Fall) |
|---|---|---|---|---|---|
| 1960/61 | | | | | |
| 1961/62 | | | | | |
| 1962/63 | | | | | |
| 1963/64 | | | | | |
| 1964/65 | | | | | |
| 1965/66 | | | | | |
| 1966/67 | | | | | |
| 1967/68 | 3 | 587, 581, 581, 558 | | | |
| 1968/69 | 4 | 560, 584, 578, 567 | 39 | | |
| 1969/70 | 6 | 572, 613, 584, 579 | 48 | 37 | |
| 1970/71 | 7 | 580, 607, 568, 564 | 63 | 46 | 33 |
| 1971/72 | 7 | 598, 622, 584, 585 | 68 | 63 | 42 |

| School Year | Number Grad-uated | Graduates Interning In Penna. | Graduates Meeting Residence Requirements in Penna. | Graduates Currently in Practice in Penna. |
|---|---|---|---|---|
| 1960/61 | | | | |
| 1961/62 | | | | |
| 1962/63 | | | | |
| 1963/64 | | | | |
| 1964/65 | | | | |
| 1965/66 | | | | |
| 1966/67 | | | | |
| 1967/68 | | | | |
| 1968/69 | | | | |
| 1969/70 | | | | |
| 1970/71 | 33 | 14 | | |
| 1971/72 | 42 | | | |

In addition to the above, please indicate the number of students you expect to be able to accept during the next decade. Place an asterisk in front of any figure that is purely an extrapolation rather than a relatively firm figure based on present plans or knowledge.

| School Year | Projected or Anticipated First Year Enrollments | |
|---|---|---|
| 1971/72 | 70 | |
| 1972/73 | 81(81)* | |
| 1973/74 | 85 | |
| 1974/75 | 89 | |
| 1975/76 | 93(96) | |
| 1976/77 | 98 | |
| 1977/78 | 103 | |
| 1978/79 | 108 | |
| 1979/80 | 108(128) | |

*Figures in parentheses have been added and represent those given later by President Oswold of the Pennsylvania State University in the "Penn State Intercom" of August 3, 1972 concerning guidelines for development approved by the Board of Trustees.

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Appendix D
(continued)

# PENNSYLVANIA PHYSICIAN MANPOWER SUPPLY SURVEY

Bureau of Educational Research
Department of Education
Commonwealth of Pennsylvania

Directions:

Below you will find data categories reflecting vitally needed data to complete a study in medical manpower being carried out by the Bureau of Educational Research at the request of the Bureau of Planning Services by the Office of the Commissioner for Higher Education and in cooperation with the Bureau of the Budget of the Governor's Office.

It will, therefore, be greatly appreciated if you will enter all available data appropriate to each item for the school years indicated. Where data are not available, please enter N.A. (Not Available) in the appropriate spot.

Name of School Responding Jefferson Medical College

Name of Responding Official William F. Kellow, M. D. Dean Date November 19, 1971

| School Year | Total Number Applicants | Number Applicants from Pa. | Mean Applicant MCAT | Number Female Applicants | Size of First Year Class (Fall) | Number Penna. Students First Year |
|---|---|---|---|---|---|---|
| 1960/61 | 1,334 | 625 | Not Available | 0 | 176 | 118 |
| 1961/62 | 1,252 | 602 | | 38 | 176 | 115 |
| 1962/63 | 1,377 | 663 | | 35 | 175 | 126 |
| 1963/64 | 1,739 | 805 | | 71 | 178 | 138 |
| 1964/65 | 2,322 | 890 | | 152 | 176 | 117 |
| 1965/66 | 2,144 | 982 | | 158 | 176 | 106 |
| 1966/67 | 2,037 | 737 | | 153 | 176 | 105 |
| 1967/68 | 2,308 | 897 | | 170 | 186 | 119 |
| 1968/69 | 2,777 | 830 | | 203 | 192 | 138 |
| 1969/70 | 2,984 | 915 | | 212 | 192 | 134 |
| 1970/71 | 3,339 | 980 | | 272 | 212 | 158 |
| '72 | 3,194 | 1,123 | | 395 | 212 | 156 |

Appendix
(continued)

| School Year | Number Female Students First Year | Mean MCAT First Year Class | Size of Second Year Class (Fall) | Size of Third Year Class (Fall) | Size of Fourth Year Class (Fall) |
|---|---|---|---|---|---|
| 1960/61 | 0 | 544 | 154 | 147 | 169 |
| 1961/62 | 9 | 550 | 160 | 150 | 147 |
| 1962/63 | 10 | 555 | 162 | 156 | 148 |
| 1963/64 | 12 | 566 | 158 | 158 | 155 |
| 1964/65 | 11 | 583 | 164 | 156 | 157 |
| 1965/66 | 13 | 596 | 157 | 165 | 154 |
| 1966/67 | 13 | 594 | 169 | 157 | 161 |
| 1967/68 | 16 | 595 | 174 | 168 | 157 |
| 1968/69 | 22 | 606 | 188 | 169 | 168 |
| 1969/70 | 19 | 596 | 192 | 185 | 165 |
| 1970/71 | 26 | 593 | 186 | 195 | 186 |
| 1971/72 | 28 | 593 | 211 | 193 | 188 |

| School Year | Number Graduated | Graduates Interning In Penna. | Graduates Meeting Residence Requirements in Penna. | Graduates Currently in Practice in Penna. |
|---|---|---|---|---|
| 1960/61 | 167 | 95 | 120 | Not Available |
| 1961/62 | 146 | 97 | 104 | |
| 1962/63 | 148 | 85 | 104 | |
| 1963/64 | 154 | 87 | 105 | |
| 1964/65 | 157 | 94 | 100 | |
| 1965/66 | 154 | 82 | 107 | |
| 1966/67 | 161 | 91 | 132 | |
| 1967/68 | 157 | 81 | 107 | |
| 1968/69 | 167 | 80 | 101 | |
| 1969/70 | 165 | 69 | 99 | |
| 1970/71 | 184 | 84 | 117 | |
| 1971/72 | 188 | 85* | 140 | |

*Estimate

Appendix D
(continued)

In addition to the above, please indicate the number of students you expect to be able to accept during the next decade. Place an asterisk in front of any figure that is purely an extrapolation rather than a relatively firm figure based on present plans or knowledge.

| School Year | Projected or Anticipated First Year Enrollments | |
|---|---|---|
| 1971/72 | 212 | |
| 1972/73 | 223 | |
| 1973/74 | 223 | |
| 1974/75 | 223 | |
| 1975/76 | 223 | |
| 1976/77 | 223 | |
| 1977/78 | 223 | |
| 1978/79 | 223 | |
| 1979/80 | 223 | |

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Appendix D
(continued)

## PENNSYLVANIA PHYSICIAN MANPOWER SUPPLY SURVEY

Bureau of Educational Research
Department of Education
Commonwealth of Pennsylvania

Directions:

Below you will find data categories reflecting vitally needed data to complete a study in medical manpower being carried out by the Bureau of Educational Research at the request of the Bureau of Planning Services by the Office of the Commissioner for Higher Education and in cooperation with the Bureau of the Budget of the Governor's Office.

It will, therefore, be greatly appreciated if you will enter all available data appropriate to each item for the school years indicated. Where data are not available, please enter N.A. (Not Available) in the appropriate spot.

Name of School Responding The Medical College of Pennsylvania

Name of Responding Official Bernard Sigel, M.D. Date January 20, 1972

| School Year | Total Number Applicants | Number Applicants from Pa. | Mean Applicant MCAT | Number Female Applicants | Size of First Year Class (Fall) | Number Penna. Students First Year |
|---|---|---|---|---|---|---|
| 1960/61 | NA | NA | NA | NA | 63 | 21 |
| 1961/62 | NA | NA | NA | NA | 62 | 11 |
| 1962/63 | NA | NA | NA | NA | 64 | 16 |
| 1963/64 | 230 | NA | NA | 230 | 64 | 19 |
| 1964/65 | 338 | NA | NA | 338 | 60 | 16 |
| 1965/66 | 309 | NA | NA | 309 | 64 | 14 |
| 1966/67 | 306 | NA | NA | 306 | 64 | 18 |
| 1967/68 | 358 | NA | NA | 358 | 66 | 18 |
| 1968/69 | 350 | NA | 537 | 350 | 66 | 22 |
| 1969/70 | 379 | NA | 543 | 379 | 66 | 34 |
| 1970/71 | 727 | 172 | NA | 727 | 66 | 26 |
| 71/72 | 1247 | 420 | NA | 669 | 66 | 40 |

Appendix D
(continued)

| School Year | Number Female Students First Year | Mean MCAT First Year Class | Size of Second Year Class (Fall) | Size of Third Year Class (Fall) | Size of Fourth Year Class (Fall) |
|---|---|---|---|---|---|
| 1960/61 | 63 | NA | 50 | 48 | 40 |
| 1961/62 | 62 | NA | 58 | 49 | 46 |
| 1962/63 | 64 | NA | 58 | 44 | 40 |
| 1963/64 | 62 | 505 | 63 | 49 | 43 |
| 1964/65 | 60 | 543 | 58 | 52 | 46 |
| 1965/66 | 64 | 550 | 54 | 42 | 48 |
| 1966/67 | 64 | 563 | 63 | 38 | 38 |
| 1967/68 | 66 | 565 | 58 | 60 | 38 |
| 1968/69 | 66 | 576 | 63 | 50 | 57 |
| 1969/70 | 66 | 575 | 72 | 51 | 50 |
| 1970/71 | 60 | 588 | 71 | 70 | 50 |
| 1971/72 | 60 | NA | 74 | 73 | 69 |

| School Year | Number Graduated | Graduates Interning in Penna. | Graduates Meeting Residence Requirements in Penna. | Graduates Currently in Practice in Penna. |
|---|---|---|---|---|
| 1960/61 | 40 | 18 | | 19 |
| 1961/62 | 46 | 26 | | 8 |
| 1962/63 | 40 | 19 | | 8 |
| 1963/64 | 43 | 19 | | 10 |
| 1964/65 | 46 | 18 | NA | 7 |
| 1965/66 | 48 | 19 | | 16 |
| 1966/67 | 38 | 23 | | 12 |
| 1967/68 | 37 | 10 | | 9 |
| 1968/69 | 57 | 6 | | 9 |
| 1969/70 | 50 | 18 | | 14 |
| 1970/71 | 51 | 22 | | 20 |
| 1971/72 | 68 | 22 | | 20 |

Appendix D
(continued)

In addition to the above, please indicate the number of students you expect to be able to accept during the next decade. Place an asterisk in front of any figure that is purely an extrapolation rather than a relatively firm figure based on present plans or knowledge.

| School Year | Projected or Anticipated First Year Enrollments | |
|---|---|---|
| 1971/72 | 66 | |
| 1972/73 | 73 | |
| 1973/74 | 73 | |
| 1974/75 | 73 | |
| 1975/76 | 73 | |
| 1976/77 | 73 | |
| 1977/78 | 73 | |
| 1978/79 | 73 | |
| 1979/80 | 73 | |

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Appendix D
(continued)

PENNSYLVANIA PHYSICIAN MANPOWER SUPPLY SURVEY

Bureau of Educational Research
Department of Education
Commonwealth of Pennsylvania



Directions:

Below you will find data categories reflecting vitally needed data to complete a study in medical manpower being carried out by the Bureau of Educational Research at the request of the Bureau of Planning Services by the Office of the Commissioner for Higher Education and in cooperation with the Bureau of the Budget of the Governor's Office.

It will, therefore, be greatly appreciated if you will enter all available data appropriate to each item for the school years indicated. Where data are not available, please enter N.A. (Not Available) in the appropriate spot.

Name of School Responding Philadelphia College of Osteopathic Medicine

Name of Responding Official Dr. Sherwood R. Mercer Date March 6, 1972

| School Year | Total Number Applicants | Number Applicants from Pa. | Mean Applicant MCAT | Number Female Applicants | Size of First Year Class (Fall) | Number Penna. Students First Year |
|---|---|---|---|---|---|---|
| 1960/61 | 219 | N.A. | N.A. | N.A. | 91 | N.A. |
| 1961/62 | 251 | N.A. | N.A. | N.A. | 88 | N.A. |
| 1962/63 | 275 | N.A. | N.A. | N.A. | 93 | N.A. |
| 1963/64 | 365 | N.A. | N.A. | N.A. | 89 | 69 |
| 1964/65 | 400 | N.A. | N.A. | N.A. | 100 | 76 |
| 1965/66 | 443 | N.A. | N.A. | N.A. | 93 | 61 |
| 1966/67 | 424 | N.A. | N.A. | N.A. | 95 | 62 |
| 1967/68 | 432 | N.A. | N.A. | N.A. | 113 | 80 |
| 1968/69 | 581 | N.A. | N.A. | N.A. | 123 | 82 |
| 1969/70 | 717 | N.A. | N.A. | N.A. | 145 | 103 |
| 1970/71 | 742 | N.A. | N.A. | N.A. | 152 | 101 |
| 1971/72 | 908 | N.A. | N.A. | N.A. | 160 | 102 |

Appendix D
(continued)

| School Year | Number Female Students First Year | Mean MCAT First Year Class | Size of Second Year Class (Fall) | Size of Third Year Class (Fall) | Size of Fourth Year Class (Fall) |
|---|---|---|---|---|---|
| 1960/61 | 2 | N.A. | 65 | 67 | 79 |
| 1961/62 | 3 | N.A. | 86 | 63 | 67 |
| 1962/63 | 1 | N.A. | 74 | 87 | 63 |
| 1963/64 | 2 | N.A. | 85 | 73 | 82 |
| 1964/65 | 6 | N.A. | 86 | 82 | 73 |
| 1965/66 | 2 | N.A. | 93 | 85 | 83 |
| 1966/67 | 3 | N.A. | 94 | 90 | 83 |
| 1967/68 | 3 | N.A. | 82 | 94 | 90 |
| 1968/69 | 6 | N.A. | 113 | 80 | 91 |
| 1969/70 | 3 | 505 | 125 | 108 | 81 |
| 1970/71 | 3 | 508 | 143 | 125 | 106 |
| 1971/72 | 6 | 510 | 152 | 137 | 125 |

| School Year | Number Graduated | Graduates Interning In Penna. | Graduates Meeting Residenc Requirements in Penna. | Graduates Currently in Practice in Penna. |
|---|---|---|---|---|
| 1960/61 | 79 | 30 | 45 | Please see page 6 "1970 - A Profile of Osteopathic Physicians in Pennsylvania" |
| 1961/62 | 67 | 37 | 37 | |
| 1962/63 | 61 | 27 | 32 | |
| 1963/64 | 82 | 39 | 50 | 75% of the 1,658 osteopathic physicians practising in Penna. are graduates of P.C.O.M. |
| 1964/65 | 73 | 31 | 41 | |
| 1965/66 | 83 | 40 | 39 | |
| 1966/67 | 83 | 35 | 52 | |
| 1967/68 | 90 | 44 | 60 | |
| 1968/69 | 90 | 29 | 60 | |
| 1969/70 | 81 | 40 | 53 | |
| 1970/71 | 106 | 27 | 64 | |
| 1971/72 | 125 | Not yet known | 95 | |

Appendix D
(continued)

In addition to the above, please indicate the number of students you expect to be able to accept during the next decade. Place an asterisk in front of any figure that is purely an extrapolation rather than a relatively firm figure based on present plans or knowledge.

| School Year | Projected or Anticipated First Year Enrollments | |
|---|---|---|
| 1971/72 | 160 | |
| 1972/73 | 180 | |
| 1973/74 | 200 | |
| 1974/75 | 225 | |
| 1975/76 | 250 | |
| 1976/77 | 250 | |
| 1977/78 | 250 | |
| 1978/79 | 250 | |
| 1979/80 | 250 | |

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Appendix D
(continued)

## PENNSYLVANIA PHYSICIAN MANPOWER SUPPLY SURVEY

Bureau of Educational Research
Department of Education
Commonwealth of Pennsylvania

Directions:

Below you will find data categories reflecting vitally needed data to complete a study in medical manpower being carried out by the Bureau of Educational Research at the request of the Bureau of Planning Services by the Office of the Commissioner for Higher Education and in cooperation with the Bureau of the Budget of the Governor's Office.

It will, therefore, be greatly appreciated if you will enter all available data appropriate to each item for the school years indicated. Where data are not available, please enter N.A. (Not Available) in the appropriate spot.

Name of School Responding Temple University School of Medicine

Name of Responding Official M. Prince Brigham, M.D. Date January 20, 1972

Assistant Dean

| School Year | Total Number Applicants | Number Applicants from Pa. | Mean Applicant MCAT V. | Q. | Gen.I. | Sciences | Number Female Applicants | Size of First Year Class (Fall) | Number Penna. Students First Year |
|---|---|---|---|---|---|---|---|---|---|
| 1960/61 | | | 503 | 496 | 501 | 500 | | 137 | |
| 1961/62 | | | 511 | 505 | 497 | 504 | | 136 | |
| 1962/63 | | | 516 | 497 | 512 | 503 | | 138 | |
| 1963/64 | 1790 | | 525 | 520 | 535 | 511 | 177 | 137 | 105 |
| 1964/65 | 2079 | | 523 | 507 | 542 | 522 | 161 | 137 | 104 |
| 1965/66 | | | 528 | 549 | 553 | 518 | | 137 | |
| 1966/67 | 2051 | | 538 | 560 | 554 | 523 | | 139 | 102 |
| 1967/68 | | | 544 | 568 | 554 | 539 | 176 | 137 | 105 |
| 1968/69 | 2471 | 1021 | 544 | 574 | 558 | 554 | | 146 | 115 |
| 1969/70 | 2488 | 1018 | 549 | 576 | 558 | 551 | 187 | 146 | 110 |
| 1970/71 | 2572 | 1065 | | | | | 219 | 160 | 125 |
| 1971/72 | 3471 | 1224 | | | | | 392 | 160 | 126 |

(continued)

| School Year | Number Female Students First Year | Mean MCAT First Year Class | Size of Second Year Class (Fall) | Size of Third Year Class (Fall) | Size of Fourth Year Class (Fall) |
|---|---|---|---|---|---|
| 1960/61 | 5 | 520 534<br>514 541 | 127 | 128 | 127 |
| 1961/62 | 12 | 518 517<br>507 521 | 130 | 129 | 126 |
| 1962/63 | 9 | 542 515<br>529 555 | 124 | 133 | 124 |
| 1963/64 | 15 | 540 544<br>550 562 | 130 | 125 | 132 |
| 1964/65 | 14 | 562 543<br>572 577 | 131 | 136 | 124 |
| 1965/66 | 15 | 584 592<br>591 566 | 142 | 132 | 132 |
| 1966/67 | 10 | 555 591<br>569 568 | 133 | 147 | 131 |
| 1967/68 | 11 | 557 596<br>558 576 | 135 | 134 | 143 |
| 1968/69 | 14 | 561 590<br>566 593 | 134 | 138 | 134 |
| 1969/70 | 13 | 573 595<br>575 594 | 142 | 134 | 136 |
| 1970/71 | 13 | | 144 | 146 | 134 |
| 1971/72 | 24 | | 159 | 145 | 145 |

| School Year | Number Graduated | Graduates Interning In Penna. | Graduates Meeting Residence Requirements in Penna. | Graduates Currently in Practice in Penna. |
|---|---|---|---|---|
| 1960/61 | 125 | | | |
| 1961/62 | 126 | | | |
| 1962/63 | 124 | | | |
| 1963/64 | 131 | | | |
| 1964/65 | 124 | | | |
| 1965/66 | 132 | | | |
| 1966/67 | 129 | | | |
| 1967/68 | 143 | | | |
| 1968/69 | 134 | 71 | | |
| 1969/70 | 136 | 60 | | |
| 1970/71 | 134 | 68 | | |
| 1971/72 | | | | |

In addition to the above, please indicate the number of students you expect to be able to accept during the next decade. Place an asterisk in front of any figure that is purely an extrapolation rather than a relatively firm figure based on present plans or knowledge.

| School Year | Projected or Anticipated First Year Enrollments | |
|---|---|---|
| 1971/72 | 160 | |
| 1972/73 | 180 | |
| 1973/74 | | |
| 1974/75 | | |
| 1975/76 | | |
| 1976/77 | | |
| 1977/78 | | |
| 1978/79 | | |
| 1979/80 | | |

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Appendix D
(continued)

PENNSYLVANIA PHYSICIAN MANPOWER SUPPLY SURVEY

Bureau of Educational Research
Department of Education
Commonwealth of Pennsylvania

Directions:

Below you will find data categories reflecting vitally needed data to complete a study in medical manpower being carried out by the Bureau of Educational Research at the request of the Bureau of Planning Services by the Office of the Commissioner for Higher Education and in cooperation with the Bureau of the Budget of the Governor's Office.

It will, therefore, be greatly appreciated if you will enter all available data appropriate to each item for the school years indicated. Where data are not available, please enter N.A. (Not Available) in the appropriate spot.

Name of School Responding University of Pennsylvania School of Medicine

Name of Responding Official Hartwell G. Thompson, M.D Date 9 December 1971

| School Year | Total Number Appli-cants | Number Appli-cants from Pa. | Mean Appli-cant MCAT | Number Female Appli-cants | Size of First Year Class (Fall) | Number Penna. Students First Year |
|---|---|---|---|---|---|---|
| 1960/61 | 1360 | 414 | UNKNOWN | 93 | 125 | 70 |
| 1961/62 | 1279 | 359 | " | 80 | 125 | 67 |
| 1962/63 | 1383 | 455 | " | 85 | 129 | 74 |
| 1963/64 | 1475 | 473 | " | 122 | 126 | 73 |
| 1964/65 | 1757 | 559 | " | 154 | 127 | 66 |
| 1965/66 | 1656 | 490 | " | 141 | 125 | 56 |
| 1966/67 | 1682 | 466 | " | 158 | 125 | 53 |
| 1967/68 | 1750 | 437 | " | 167 | 133 | 48 |
| 1968/69 | 1998 | 504 | " | 168 | 132 | 48 |
| 1969/70 | 2304 | 501 | " | 221 | 151 | 46 |
| 1970/71 | 2690 | 491 | " | 273 | 150 | 46 |
| 1971/72 | 2565 | 585 | " | 333 | 160 | 76 |

(continued)

| School Year | Number Female Students First Year (Fall) | Mean MCAT First Year Class | Size of Second Year Class (Fall) | Size of Third Year Class (Fall) | Size of Fourth Year Class (Fall) |
|---|---|---|---|---|---|
| 1960/61 | 6 | SEE | 125 | 134 | 130 |
| 1961/62 | 4 | ATTACHED | 116 | 130 | 134 |
| 1962/63 | 6 | SHEET | 122 | 120 | 130 |
| 1963/64 | 5 | | 128 | 126 | 120 |
| 1964/65 | 8 | | 121 | 134 | 124 |
| 1965/66 | 6 (Spr) | | 127 | 127 | 132 |
| 1966/67 | 5 | | 127 | 129 | 122 |
| 1967/68 | 10 | | 125 | 130 | 129 |
| 1968/69 | 11 | | 131 | 129 | 128 |
| 1969/70 | 17 | | 133 | 135 | 129 |
| 1970/71 | 18 | | 149 | 136 | 136 |
| 1971/72 | 17 | | 147 | 147 | 140<br>6 (5th year) |

| School Year | Number Graduated | Graduates Interning In Penna. | Graduates Meeting Residence Requirements in Penna. at time of admission | Graduates Currently in Practice in Penna. |
|---|---|---|---|---|
| 1960/61 | 130 | 66 | ( 89 )* | 39 |
| 1961/62 | 134 | 64 | ( 78 ) | 40 |
| 1962/63 | 130 | 56 | ( 78 ) | 36 |
| 1963/64 | 120 | 44 | ( 70 ) | 65 |
| 1964/65 | 124 | 50 | ( 69 ) | 31 |
| 1965/66 | 124 | 51 | ( 74 ) | 42 |
| 1966/67 | 122 | 52 | ( 73 ) | 37 |
| 1967/68 | 129 | 48 | ( 66 ) | 47 |
| 1968/69 | 128 | 53 | ( 56 ) | 44 |
| 1969/70 | 125 | 53 | ( 53 ) | 47 |
| 1970/71 | 134 | 46 | ( 48 ) | unknown |
| 1971/72 | 131 | 49 | ( 48 ) | unknown |

(figures same as first-year class)

*an asterisk indicates data sent later and typed in.

Appendix D
(continued)

In addition to the above, please indicate the number of students you expect to be able to accept during the next decade. Place an asterisk in front of any figure that is purely an extrapolation rather than a relatively firm figure based on present plans or knowledge.

| School Year | Projected or Anticipated First Year Enrollments | |
|---|---|---|
| 1971/72 | 160 | This figure may be increased if support for basic science faculty salaries and teaching facilities are increased sufficiently enough to handle the increased teaching responsibilities. |
| 1972/73 | " | |
| 1973/74 | " | |
| 1974/75 | " | |
| 1975/76 | " | |
| 1976/77 | " | |
| 1977/78 | " | |
| 1978/79 | " | |
| 1979/80 | " | |

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Appendix D
(continued)

Mean MCAT - First Year Class

| School Year | Verbal | Quantitative | Gen. Info. | Science |
|---|---|---|---|---|
| 1966-67 | 600.43 | 631.53 | 611.29 | 580.11 |
| 1967-68 | 602.77 | 664.11 | 610.33 | 597.08 |
| 1968-69 | 624.24 | 647.95 | 629.16 | 628.86 |
| 1969-70 | 646.68 | 655.27 | 622.43 | 617.91 |
| 1970-71 | 623.73 | 672.90 | 619.86 | 604.73 |
| 1971-72 | 624.20 | 654.50 | 612.60 | 620.70 |

The mean MCAT scores are not available for years preceding 1966

Appendix D
(continued)

PENNSYLVANIA PHYSICIAN MANPOWER SUPPLY SURVEY

Bureau of Educational Research
Department of Education
Commonwealth of Pennsylvania

Directions:

Below you will find data categories reflecting vitally needed data to complete a study in medical manpower being carried out by the Bureau of Educational Research at the request of the Bureau of Planning Services by the Office of the Commissioner for Higher Education and in cooperation with the Bureau of the Budget of the Governor's Office.

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Name of School Responding University of Pittsburgh School of Medicine

Name of Responding Official Mrs. G. W. Barris Date Feb. 9, 1972

| School Year | Total Number Appli-cants | Number Appli-cants from Pa. | Mean Appli-cant MCAT | Number Female Appli-cants | Size of First Year Class (Fall) | Number Penna. Students First Year |
|---|---|---|---|---|---|---|
| 1960/61 | N.A. | N.A. | See Attached | N.A. | 101 | 82 |
| 1961/62 | 630 | N.A. | | 45 | 101 | 82 |
| 1962/63 | 717 | N.A. | | 42 | 102 | 70 |
| 1963/64 | 800 | N.A. | | 43 | 102 | 60 |
| 1964/65 | 922 | N.A. | | 43 | 102 | 72 |
| 1965/66 | 1279 | N.A. | | 69 | 101 | 64 |
| 1966/67 | 1364 | N.A. | | 112 | 106 | 60 |
| 1967/68 | 1082 | N.A. | | 80 | 108 | 77 |
| 1968/69 | 1250 | 457 | | 99 | 107 | 82 |
| 1969/70 | 1576 | 620 | | 113 | 109 | 81 |
| 1970/71 | 1918 | 739 | | 147 | 128 | 91 |
| 1971/72 | 2705 | 926 | | 306 | 130 | 94 |

Appendix D
(continued)

| School Year | Number Female Students First Year | Mean MCAT First Year Class | Size of Second Year Class (Fall) | Size of Third Year Class (Fall) | Size of Fourth Year Class (Fall) |
|---|---|---|---|---|---|
| 1960/61 | 7 | See Attached | 101 | 78 | 93 |
| 1961/62 | 6 | | 96 | 93 | 79 |
| 1962/63 | 5 | | 96 | 89 | 91 |
| 1963/64 | 8 | | 95 | 87 | 89 |
| 1964/65 | 6 | | 91 | 92 | 85 |
| 1965/66 | 11 | | 98 | 87 | 91 |
| 1966/67 | 7 | | 93 | 96 | 84 |
| 1967/68 | 13 | | 96 | 90 | 93 |
| 1968/69 | 10 | | 98 | 96 | 89 |
| 1969/70 | 4 | | 102 | 97 | 95 |
| 1970/71 | 9 | | 108 | 106 | 97 |
| 1971/72 | 31 | | 122 | 107 | 106 |

| School Year | Number Grad-uated | Graduates Interning In Penna. | Graduates Meeting Residence Requirements in Penna. | Graduates Currently in Practice in Penna. |
|---|---|---|---|---|
| 1960/61 | 91 | 50 | 77 | N.A. |
| 1961/62 | 78 | 39 | 69 | " |
| 1962/63 | 88 | 45 | 71 | " |
| 1963/64 | 87 | 48 | 68 | " |
| 1964/65 | 84 | 33 | 63 | " |
| 1965/66 | 90 | 52 | 64 | " |
| 1966/67 | 82 | 35 | 49 | " |
| 1967/68 | 93 | 49 | 63 | " |
| 1968/69 | 88 | 42 | 54 | " |
| 1969/70 | 95 | 31 | 53 | " |
| 1970/71 | 96 | 53 | 70 | " |
| 1971/72 | N.A. | N.A. | N.A. | " |

In addition to the above, please indicate the number of students you expect to be able to accept during the next decade. Place an asterisk in front of any figure that is purely an extrapolation rather than a relatively firm figure based on present plans or knowledge.

| School Year | Projected or Anticipated First Year Enrollments | |
|---|---|---|
| 1971/72 | 130 | |
| 1972/73 | 135 | |
| 1973/74 | 135 | |
| 1974/75 | 135 | |
| 1975/76 | 135* | |
| 1976/77 | 135* | |
| 1977/78 | 135* | |
| 1978/79 | 135* | |
| 1979/80 | 135* | |

* - Depends entirely on whether faculty and facilities are increased; if so, an increase in entering class size is possible; otherwise, not.

When completed, please return to:

Dr. George E. Brehman Jr.
Research Associate
Division of Higher Education Research
Bureau of Educational Research
Department of Education
P. O. Box 911
Harrisburg, Pa. 17126

## MEAN APPLICANT MCAT

| | Verbal | Quantitative | General Information | Science |
|---|---|---|---|---|
| 1960/61 | N. A. | N. A. | N. A. | N. A. |
| 1961/62 | 507 | 502 | 511 | 501 |
| 1962/63 | 517 | 511 | 514 | 511 |
| 1963/64 | 522 | 512 | 526 | 514 |
| 1964/65 | 520 | 527 | 536 | 512 |
| 1965/66 | 523 | 532 | 548 | 524 |
| 1966/67 | 527 | 555 | 557 | 525 |
| 1967/68 | 541 | 564 | 561 | 528 |
| 1968/69 | 547 | 579 | 563 | 549 |
| 1969/70 | 544 | 581 | 560 | 559 |
| 1970/71 | 555 | 584 | 566 | 561 |
| 1971/72 | 545 | 591 | 551 | 543 |

Appendix D
(continued)

## MEAN MCAT FIRST YEAR CLASS

| | Verbal | Quantitative | General Information | Science |
|---|---|---|---|---|
| 1960/61 | 523 | 509 | 531 | 507 |
| 1961/62 | 507 | 514 | 516 | 522 |
| 1962/63 | 537 | 547 | 531 | 539 |
| 1963/64 | 542 | 546 | 549 | 548 |
| 1964/65 | 556 | 558 | 578 | 547 |
| 1965/66 | 554 | 597 | 568 | 584 |
| 1966/67 | 576 | 605 | 600 | 584 |
| 1967/68 | 550 | 610 | 581 | 569 |
| 1968/69 | 578 | 631 | 603 | 601 |
| 1969/70 | 571 | 630 | 587 | 609 |
| 1970/71 | 577 | 626 | 583 | 597 |
| 1971/72 | 563 | 616 | 562 | 565 |

APPENDIX E

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
NATIONAL INSTITUTES OF HEALTH
BETHESDA, MARYLAND 20014

BUREAU OF HEALTH MANPOWER EDUCATION

JUN 25 1971

RECEIVED JUN 28 1971 BUREAU OF RESEARCH

George E. Brehman, Jr., Ph.D.
Department of Public Instruction
Box 911
Harrisburg, Pennsylvania 17126

Dear Dr. Brehman:

Your letter to Dr. Roger Egeberg of June 10 has been referred to this Division for reply.

The estimate of a 50,000 shortage of physicians originally appeared in the enclosed report entitled "Health Manpower Perspective: 1967." This report also includes a discussion of other estimates of shortages (pp. 9-15).

This 50,000 estimate was reviewed on the basis of 1969 data for physicians. The components of this estimate follow:

--The experience of large medical groups that provide prepaid medical care to specified and selected populations suggests that comprehensive family health services for a population of 100,000 can be provided by 100 physicians. Application of this ratio results in a need for 12,000 physicians in the 27 states that have less than 100 physicians (private practice and full-term hospital staff, excluding psychiatrists) for every 100,000 people;

--8,000 physicians to provide care in urban ghettos and other areas of special need (10 physicians for each of 800 community health centers serving 10,000 people);1/

--15,000 psychiatrists;2/

--10,000 physicians to fill vacancies in hospital internships and residencies;3/

--5,000 physicians in teaching, research, and administration, including 1,700 medical-school faculty positions that are now budgeted but not filled.4/

This method of estimating indicates a requirement for 371,000 physicians in 1970 and 413,000 in 1980.5/

This estimate appears to be relatively conservative for the following reasons:

...The ratio of 100 physicians per 100,000 population is based on an effective organization of medical services for a relatively healthy section of the population.

...Residents of inner cities and other low-income areas tend to be ill more often, and to have more serious illness, than more affluent populations.

...There are considerable supply variations among individual medical specialties. General surgeons appear to be in good supply while shortages exist in family or primary care medicine, internal medicine, pediatrics, obstetrics, physical medicine, radiology, pathology, and psychiatry.

...No allowance is made for replacing any of the 14,500 foreign-trained physicians now serving as interns and residents in hospitals in the United States.

...Requirements for additional physicians to teach students in the health related professions and occupations are growing. In recent years, faculties have been increasing, but vacancies remain high. Meanwhile, new schools of the health and allied health professions are opening, and existing schools are expanding enrollment.

...Staffing requirements for public-health physicians for the administration of community health institutions, agencies, and programs are rising. Health agencies have substantial needs; and medical administrators are needed in Federal programs, hospital administration, prepayment organizations, and union health-and-welfare programs.

...As long as physicians have a high degree of freedom to practice where they choose, it cannot be assumed that those added to the supply will practice in areas of greatest need.

A second method of estimating requirements for physicians is to assume that the country as a whole should have a physician-to-population ratio at least equal to the highest level existing in the nine geographic divisions of the United States as defined by the Bureau of the Census. The Middle Atlantic division (consisting of New Jersey, New York, and Pennsylvania) has the highest such ratio, and this results in an estimated requirement of 392,000 physicians in 1970 and 436,000 in 1980.6/

A third approach is to use the highest state ratio as a desirable goal. The state ratio of active physicians to population is highest in New York. There is no consensual evidence available that this State has more physicians than the numbers necessary to provide quality care to its citizens. Use of the highest state ratio produces an estimated requirement for 478,000 physicians in 1970 and 532,000 in 1980.7/

Other estimates of need have been developed on other bases including economic and income analysis by the Bureau of Labor Statistics, Department of Labor. These estimates project increasing numbers of physicians similar to the estimates derived from the first method outlined above.

It may be helpful to you to know the sources of the various components:

1/ Estimated by the Office of Economic Opportunity.

2/ A memorandum prepared by the National Institute of Mental Health, August 28, 1970, entitled, "Estimates of Unmet Needs With Respect of Mental Health Services," indicated a minimum estimated shortage of psychiatrists of 17,300 in 1970.

3/ There were 11,200 vacancies in 1968-69 in approved programs, as reported in the Directory of Approved Internships and Residencies, 1969-70, published by the American Medical Association.

4/ There were 1,691 budgeted unfilled full-time faculty positions in medical schools in 1968-69, as reported in the 1969-70 Education Number of the Journal of the American Medical Association, November 23, 1970.

5/ The 50,000 shortage added to the 1969 supply of active physicians (315,000) yields a requirement for 365,000 physicians or 177 per 100,000 population. Application of this ratio-to-population estimates based on the "D" series of the Bureau of the Census provides the requirement figures shown.

6/ The 1969 ratio of active non-Federal physicians to population in the Middle Atlantic division (adjusted to include Federal physicians) was 187 per 100,000 population. This ratio was applied to population estimates as above.

7/ The 1969 ratio of active non-Federal physicians to population in New York State (adjusted to include Federal physicians) was 228 per 100,000 population. This ratio was applied to population estimates as above.

We are also enclosing a copy of the most recent NIH publications list and a copy of the report of hearings on pending legislation in the field of health manpower.

I hope that this overview of the national estimates will be helpful to you as you proceed on estimates for Pennsylvania. In turn, we will be most interested in your results.

If we can be of further service to you, please call on us.

Sincerely yours,

WALybrand

William A. Lybrand, Ph.D.
Director
Division of Manpower Intelligence

Appendix F

State and Overall Cost For Equivalent Full Time Medical Student (M.D. and D.O.) Instruction as Budgeted For and Requested By the Medical Schools of Pennsylvania 1971-74[a]

I. State Related Medical Schools

Penn State-Hershey

| | 1971-72 Budget | 1972-73 Budget | 1973-74 Requested |
|---|---|---|---|
| State Share | 7,649 | 7,096 | 8,199 |
| Total Costs | 22,970 | 21,567 | 20,295 |
| State % Total | 33.3% | 32.9% | 40.4% |

University of Pittsburgh

| | 1971-72 Budget | 1972-73 Budget | 1973-74 Requested |
|---|---|---|---|
| State Share | 7,465 | 7,465 | 8,058 |
| Total Costs | 14,071 | 18,046 | 17,401 |
| State % Total | 53.1% | 41.4% | 46.3% |

Temple University

| | 1971-72 Budget | 1972-73 Budget | 1973-74 Requested |
|---|---|---|---|
| State Share | 7,465 | 7,465 | 7,912 |
| Total Costs | 14,608 | 13,836 | 14,568 |
| State % Total | 51.1% | 54.0% | 54.3% |

State Related Institutional Means

| | 1971-72 Budget | 1972-73 Budget | 1973-74 Requested |
|---|---|---|---|
| State Share | 7,526 | 7,342 | 8,056 |
| Total Costs | 17,216 | 17,816 | 17,421 |
| State % Total | 43.7% | 41.2% | 46.2% |

II. State Aided Medical Schools

Hahnemann

| | 1971-72 Budget | 1972-73 Budget | 1973-74 Requested |
|---|---|---|---|
| State Share | 4,106 | 4,055 | 4,322 |
| Total Costs | 11,900 | 14,278 | 14,264 |
| State % Total | 34.5% | 28.4% | 30.3% |

Medical College of Pennsylvania

| | 1971-72 Budget | 1972-73 Budget | 1973-74 Requested |
|---|---|---|---|
| State Share | N.A. | N.A. | N.A. |
| Total Costs | N.A. | N.A. | N.A. |
| State % Total | - | - | - |

## Philadelphia Osteopathic

| | 1971-72 Budget | 1972-73 Budget | 1973-74 Requested |
|---|---|---|---|
| State Share | 4,400 | 4,400 | 4,600 |
| Total Costs | 7,900 | 9,500 | 9,900 |
| State % Total | 55.7% | 46.3% | 46.5% |

## Thomas Jefferson

| | 1971-72 Budget | 1972-73 Budget | 1973-74 Requested |
|---|---|---|---|
| State Share | 4,320 | 4,290 | 5,000 |
| Total Costs | 20,500 | 24,200 | 25,470 |
| State % Total | 21.1% | 17.7% | 19.6% |

## University of Pennsylvania

| | 1971-72 Budget | 1972-73 Budget | 1973-74 Requested |
|---|---|---|---|
| State Share | 4,334 | 4,301 | 5,000 |
| Total Costs | 27,302 | 28,794 | 30,413 |
| State % Total | 15.9% | 14.9% | 16.4% |

## State Aided Institutional Means

| | 1971-72 Budget | 1972-73 Budget | 1973-74 Requested |
|---|---|---|---|
| State Share | 4,290 | 4,262 | 4,731 |
| Total Costs | 16,900 | 19,193 | 20,012 |
| State % Total | 25.4% | 22.2% | 23.6% |

## Overall Institutional Means

| | 1971-72 Budget | 1972-73 Budget | 1973-74 Requested |
|---|---|---|---|
| State Share | 5,677 | 5,582 | 6,104 |
| Total Costs | 17,036 | 18,603 | 18,902 |
| State % Total | 33.3% | 30.0% | 32.3% |

[a] Based upon data submitted by the medical schools to the Department of Education, Bureau of Budget and Evaluation, Division of College and University Budget.