Health Manpower, 1930–75

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HEALTH manpower is a matter of increasing concern to the United States in view of the rapid rate of growth of the population. The number of persons in the 48 States and the District of Columbia in mid-1959 is estimated at 177,128,000; by 1975 it is predicted to be 235,246,000, an increase of 33 percent. Whether an adequate supply of physicians, dentists, nurses, and other health personnel can be provided for the future depends on immediate planning for increased numbers of graduates in the health professions within the next few years.

Current Physician (M.D.) Supply

With an estimated 235,000 physicians in mid-1959, excluding the graduates of that year, the ratio of physicians to population now is 132.7 per 100,000 persons. Over the past 30 years the ratio has ranged between 125 and 135.

The latest count of the number of physicians in the 1958 American Medical Directory (*1*) indicated that there were 226,625 physicians in the 48 States and the District of Columbia in mid-1957. This number of physicians includes all those in the Federal Government service regardless of their actual location. The ratio is 132.4 per 100,000 total population including the Armed Forces overseas.

In Alaska in mid-1957 there were 101 non-Federal physicians or 62 per 100,000 civilians; in Hawaii, 574 physicians or 104 per 100,000 civilians. Outlying areas had even relatively fewer physicians (excluding those in Federal Government service).

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Area	*Number of non-Federal physicians*	*Physicians per 100,000 civilians*
American Samoa	3	15
Canal Zone (and the Republic of Panama)	187	19
Caroline Islands	5	12
Guam	17	40
Mariana Islands	1	13
Marshall Islands	2	14
Puerto Rico	931	41
Virgin Islands	24	92

Physicians range in age from under 25 years to 90 and older. Among the 226,625 in the United States in mid-1957, about 800 were younger than age 25. At the other end of the scale were about 30,000 physicians aged 65 and over, of whom only 8,000 were reported in the directory as retired or not in the practice of medicine. (An additional 3,000 younger physicians were also counted as retired or not in practice.)

The detailed age distribution of the physicians is given below:

Age group	*Number*	*Percent*
All ages	226,625	100.0
Under 30 years	23,235	10.3
30–34	34,163	15.1
35–39	31,185	13.8
40–44	28,635	12.6
45–49	27,219	12.0
50–54	21,815	9.6
55–59	16,817	7.4
60–64	13,021	5.7
65–69	10,253	4.5
70–74	8,250	3.6
75–79	6,057	2.7
80 and over	5,388	2.4
Unknown	587	.3

NOTE: Age is as of the beginning of the year 1957, based on the year of birth shown on the individual physician punchcard supplied by the American Medical Association to the Public Health Service.

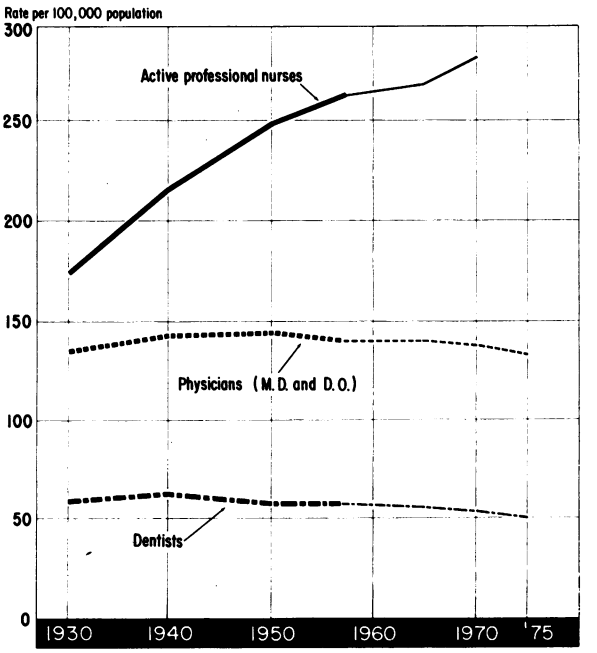
Of the physicians alive in 1957, about 86 percent may be expected to be still living in 1965 and about 68 percent, in 1975. This number of survivors at future dates is ascertained by applying the 1956 age-specific white male mortality rates to the number of physicians in each age group, on the assumption that physicians die at about the same rate as white males of similar age in the total population. The assumption is consistent with the number of deaths reported annually to the American Medical Association.

Deaths of physicians account for 3,500 to 4,000 annual losses to the profession. Each year about 7,400 to 7,800 newly licensed physicians—graduates from medical schools in the United States, Canada, and other foreign countries—are added to the profession. Thus the annual net gain in the number of physicians is about half the number of new licentiates.

The 85 medical schools in the United States graduated 6,895 physicians in the academic year 1958–59 (*2*). The average (median) age at graduation is now about 26 years, the same as prior to World War II (*3*, *4*). After this war and the Korean conflict the postponed education of veterans resulted in an increase to 28 years for median age at graduation for the class of 1950. By 1954, the median had declined to 27 years, with a further decline to 26 years by 1956. The tabulation based on recent graduates listed in the 1958 American Medical Directory shows that the disparity between ages at graduation has likewise declined. The middle 50 percent of the graduates covered a span of 5.3 years in 1950 as contrasted with 2.3 years for those graduated in 1956.

About 12 percent of the new additions to the profession in this country since 1950 were educated outside the United States. Of the physicians licensed to practice for the first time in this country in 1958, nearly 150 were graduates of Canadian schools and 1,166 were graduates of other foreign schools. The foreign school graduates include an estimated 400 American citizens who had gone to other countries for their medical education. A tabulation of recent licentiates graduated from Canadian and other foreign schools indicates that they are older, as a group, than those who enter the profession directly after graduation from U.S. medical

Trend in health manpower



schools. The median ages of the Canadian and other foreign school graduates are 30 and 36 years, respectively, when they obtain their first license to practice in the United States, as contrasted with age 26 for U.S. school graduates who are counted as entering the profession upon graduation rather than licensing.

Future Supply of Physicians (M.D.)

The future supply of physicians in the United States depends on (*a*) the current numbers now in the profession and their mortality, (*b*) the graduating classes of medical schools in this country, and (*c*) additions to the profession from Canadian and other foreign medical schools.

Of the 226,625 physicians (M.D.) in the United States in mid-1957, about 195,000 may be expected to be still alive in 1965. Between 1957 and 1965 the annual number of graduates of U.S. medical schools is planned to increase from about 6,800 to as many as 7,400. This reflects the development of new schools and expanded enrollment in existing schools, according to the American Association of Medical Colleges. During the same period the annual number of new licentiates graduated from Ca-

Table 1. Physician supply in 1975 based on number of graduates of U.S. medical schools at level currently planned and at level required for maintaining the 1957 national ratio of physicians to population in 1975

Year	Physicians (M.D.)		Graduates of U.S. medical schools [3]		New licentiates graduated from other medical schools [4]		Deaths among those in the profession [5]
	Number [1]	Per 100,000 population [2]					
	Level currently planned						
1957	226,625	132.4	6,796		1,164		
1958			6,861	20,552	1,316	3,680	11,507
1959			6,895		1,200		
1960	239,350	132.9	7,070		1,000		
1961			7,130		950		
1962			7,200	36,010	900	4,500	19,910
1963			7,270		850		
1964			7,340		800		
1965	259,950	132.8	7,410		750		
1966			7,410		750		
1967			7,410	37,050	750	3,750	21,750
1968			7,410		750		
1969			7,410		750		
1970	279,000	130.5	7,410		750		
1971			7,410		750		
1972			7,410	37,050	750	3,750	23,700
1973			7,410		750		
1974			7,410		750		
1975	296,100	125.9	7,410		750		
	Level required to maintain 1957 physician-population ratio						
1965	259,950	132.8	7,610		750		
1966			7,820		750		
1967			8,160	41,040	750	3,750	21,740
1968			8,540		750		
1969			8,910		750		
1970	283,000	132.4	9,120		750		
1971			9,430		750		
1972			9,690	48,570	750	3,750	23,820
1973			10,090		750		
1974			10,240		750		
1975	311,500	132.4	10,360		750		

[1] For 1957, number shown in American Medical Directory 1958, table 1. For future years, numbers computed by method outlined in "Physicians in the United States: Projections 1955–1975," by G. St.J. Perrott and Maryland Y. Pennell. J. M. Educ. 33: 638, September 1958.

[2] Rates based on total population of the United States, including Armed Forces overseas, as of July 1; U.S. Bureau of the Census, Current Population Reports, Population Estimates, Series P–25, No. 187, Nov. 10, 1958 (p. 16, Series II). Thousands of persons: 171,196 in 1957; 180,126 in 1960; 195,747 in 1965; 213,810 in 1970; 235,246 in 1975.

[3] Figures for 1957 and 1958 published in J.A.M.A. (Education Number) 168: 1503, Nov. 15, 1958; preliminary number for 1959. Figures for 1960–64 estimated by Public Health Service on basis of current enrollments. Figure for 1965 furnished by American Medical Association to House of Representatives Committee on Interstate and Foreign Commerce (85th Cong., 1st sess.); see Medical School Inquiry, p. 243. Figures for 1966–75 estimated by Public Health Service.

[4] New licentiates graduated from foreign schools: 1,014 in 1957 and 1,166 in 1958; J.A.M.A. (State Board Number) 170: 603, May 30, 1959. Licentiates of Canadian schools not reported by A.M.A. estimated as 150 per year. Figures for 1959–75 estimated by Public Health Service.

[5] Deaths computed on basis of 1956 age-specific white male mortality; National Office of Vital Statistics, Special Reports 6: 48, June 19, 1958 (table 2). Age distributions of physicians in 1957 of recent graduates of American medical schools and of recent licentiates graduated from Canadian and foreign medical schools were obtained from individual physician punchcards supplied to Public Health Service by American Medical Association.

nadian and other foreign medical schools may decrease. A conservative estimate for the year 1965 is 750, of whom 100 to 150 are graduates of Canadian schools and the balance are graduates of other foreign schools.

As shown in table 1, the number of physicians is expected to be nearly 260,000 in 1965, with a ratio of 132.8 physicians per 100,000 population (*5*). This 1965 ratio is almost the same as that of 1957 but shows a decline from the 134.9 level of 1949.

From 1965 to 1975, the annual number of graduates of U.S. medical schools may continue at the level of about 7,400 in accordance with the currently planned output of these schools. These graduates may be supplemented by an average of 750 graduates of Canadian and other foreign schools newly licensed each year. After death has taken its toll from both those already in the profession and the new additions, the number of physicians is expected to be about 279,000 in 1970 and 296,000 in 1975. The physician-population ratio will decline from the 1965 level of 132.8 physicians per 100,000 population to 130.5 in 1970 and still further to 125.9 in 1975.

If it is assumed that the ratio of physicians to population which prevailed in 1957 is the appropriate goal for 1975, there will be need for 311,500 physicians, instead of the 296,100 expected on the basis of the level of U.S. school output currently in sight. To obtain this total will require about 10,360 graduates of U.S. medical schools in the year 1975. This number of graduates is nearly 3,000 above the number now expected under current plans. Such an increase will have to be met through the expansion of existing schools and the construction of about 25 new schools, some with 2-year and some with 4-year programs.

Physicians (D.O.)

In 1930, the United States had approximately 10,300 doctors of osteopathy. By 1959 the number had increased to 14,100, giving a ratio of 8.0 per 100,000 population (table 2).

The six schools of osteopathic medicine graduated 469 physicians (D.O.) in 1959 (*6,7*). Currently planned enrollments indicate that by 1965 the annual graduating class may be increased to about 525.

If the output of these schools continues at the same level during the following decade, the supply of osteopathic physicians is expected to reach 16,700 by 1975, with the ratio declining to 7.1 doctors per 100,000 persons.

Dentists

Increases in dentist supply have been lagging behind population growth for more than a generation. From fewer than 75,000 dentists in 1930, the total supply in the 48 States and the District of Columbia has grown to almost 100,000 at the present time. Yet there are now only 56 dentists per 100,000 persons as compared with a ratio of 59 in 1930.

The dentist totals (table 2) include those in the Federal Government service and those retired or not in practice, but exclude graduates of the years concerned (*8*). While nearly all of the dentists of 1930 were of working age and active in the profession, today's dentist supply includes a large proportion who are inactive. As a result, the number of active dentists in relation to population has fallen even more steeply, dropping to only 49 per 100,000 persons in 1959, according to estimates prepared by the Public Health Service, Division of Dental Resources.

In mid-1957, one-quarter of the dentists were 60 years of age or older (*9*), as shown below:

Age group	*Number*	*Percent*
All ages	97,610	100.0
Under 30 years	7,492	7.7
30–34	12,539	12.8
35–39	13,137	13.4
40–44	9,752	10.0
45–49	9,249	9.5
50–54	10,556	10.8
55–59	10,355	10.6
60–64	9,651	9.9
65–69	6,233	6.4
70–74	3,720	3.8
75–79	2,714	2.8
80 and over	2,212	2.3

Alaska had 47 non-Federal dentists, or 28 per 100,000 civilians in 1958. With 356 non-Federal dentists in Hawaii, the ratio was 62 per 100,000 civilians.

The U.S. dental schools number 47, having risen from 39 at the end of the war. In the

academic year 1957–58 they graduated 3,083 dentists (*10*). The median age at graduation is now about 26 years, having been 28 years in the period 1950–54 and 25 years prior to World War II (*9*).

Although the annual number of graduates is nearly 80 percent more than the number graduated 10 years earlier, this expansion has not produced enough new dentists to maintain the pre-war dentist-population ratio. Furthermore, at currently planned levels of school output the ratio of dentists to population will continue its steady decline, as illustrated in the accompanying chart.

The annual number of graduates is expected to increase to nearly 3,500 by 1965. Unless there are further increases, however, the total number of dentists in the United States in 1975 will reach about 118,000. This number will be equivalent to only 50 dentists per 100,000 persons, of whom 46 will be active in the profession.

To regain the 1958 dentist-population ratio will require 133,250 dentists in 1975. An addi-

Table 2. Supply of physicians, dentists, and active professional nurses: United States, 1930–59, with projections to 1975

Year	Physicians			Dentists [3]	Active professional nurses [4]
	Total	M.D. [1]	D.O. [2]		
	Estimated number				
1930	164, 900	154, 600	10, 300	73, 100	214, 300
1940	187, 600	175, 200	12, 400	81, 700	284, 200
1950	216, 200	203, 500	12, 700	86, 900	375, 000
1957	240, 300	226, 600	13, 700	97, 600	445, 000
1958	244, 500	230, 600	13, 900	98, 540	460, 000
1959	249, 100	235, 000	14, 100	99, 400	467, 000
1965	274, 800	259, 900	14, 900	106, 700	526, 000
1970	294, 900	279, 000	15, 900	112, 900	608, 000
1975	312, 800	296, 100	16, 700	118, 100	----------
	Rate per 100,000 population [5]				
1930	133. 9	125. 5	8. 4	59	175
1940	142. 0	132. 6	9. 4	62	216
1950	142. 5	134. 2	8. 3	57	249
1957	140. 4	132. 4	8. 0	57	263
1958	140. 5	132. 5	8. 0	57	268
1959	140. 5	132. 7	8. 0	56	267
1965	140. 4	132. 8	7. 6	55	269
1970	137. 9	130. 5	7. 4	53	284
1975	133. 0	125. 9	7. 1	50	----------

[1] Number of M.D.'s for 1957 from American Medical Directory, 1958; data for prior years based on earlier directories; projections by Public Health Service (see metholodogy in table 1).

[2] Number of D.O.'s for 1957 from A Statistical Study of the Osteopathic Profession, December 31, 1957; data for prior years based on survival of graduates of U.S. schools of osteopathy; projections by Public Health Service.

[3] Number of D.D.S.'s for 1950–58 from Distribution of Dentists in the United States by State, Region, District and County (annual issues), adjusted to exclude graduates of years concerned; data for prior years based on survivals of graduates of U.S. dental schools; projections by Public Health Service.

[4] Number of nurses for 1958 from Facts About Nursing, 1959 edition; 1957 figure is midpoint between 1956 and 1958 totals; data for prior years based on census enumerations, adjusted to exclude student nurses; projections by Public Health Service.

[5] Rates for physicians and dentists based on total population including Armed Forces overseas since persons in Federal service outside the U.S. are included. Rates for nurses based on total population excluding Armed Forces overseas since nurses in Federal service outside the U.S. are excluded.

tional 2,700 graduates will be needed that year above the 3,500 currently planned for existing schools. This means a 75 percent increase in training capacity.

Professional Nurses

The nurse-population ratio in the United States has increased almost fivefold since 1910, according to the Public Health Service's Division of Nursing Resources. The ratio now is 267 per 100,000 population, with an estimated 467,000 active professional nurses in the 48 States and the District of Columbia in mid-1959 (table 2). The total number of graduate professional nurses probably exceeds 800,000 including those who are inactive for any reason.

In Hawaii there were 1,681 active registered nurses, or 320 per 100,000 civilians in 1956 (*11*). Data for Alaska are not available.

The 1,145 schools of professional nursing enrolled about 113,000 students and graduated 30,410 nurses in the academic year 1957–58 (*12*). Admissions to these schools may increase markedly by the mid-sixties, with the annual number of graduations up to 37,000 by 1965 and still going higher.

The number of nurses in relation to population will increase in accordance with the currently planned output of nursing schools. The ratio is expected to be 284 nurses per 100,000 persons in 1970, with about 608,000 professional nurses in active practice.

Summary

The future supply of physicians is not expected to keep up with the greatly accelerated rate of growth of the population. The predictions take into account estimates of the graduates of medical schools in the United States, new licentiates graduated from Canadian and other foreign medical schools, and deaths among those in the profession.

The number of graduates of U.S. medical schools currently predicted for existing and planned schools is expected to increase from about 6,900 in 1959 to 7,400 in 1965. The number of physicians (M.D.) in the latter year will be about 260,000, or 132.8 per 100,000 population which is about the present ratio.

If the number of graduates of U.S. medical schools were to remain at about 7,400 per year between 1965 and 1975, while the foreign-educated physicians entering practice in this country leveled off at 750 per year, the number of physicians (M.D.) in 1975 would be increased to 296,000. The ratio, however, will decrease to 125.9 physicians per 100,000 persons. If the annual number of U.S. graduates were to be increased sufficiently to maintain the present physician-population ratio in 1975, the 1975 graduating class would have to be increased to approximately 10,360, in order to have 311,500 physicians (M.D.) in that year.

The number of osteopathic physicians is about 14,000, with 469 graduates in 1959. If the annual graduating class is increased to about 525, by 1975 the supply of physicians (D.O.) may reach 16,700. The ratio to population will have declined, however, from 8.0 to 7.1 doctors per 100,000 population.

Increases in dentist supply have been lagging behind the population growth despite large gains in the numbers being graduated. The annual number of graduates is expected to increase from the present 3,100 to nearly 3,500 by 1965. Unless there are further increases, the number of dentists in 1975 will be about 118,000, or 50 per 100,000 population. To regain the 1958 ratio of 56 dentists per 100,000 population requires 133,000 dentists in 1975 and an additional 2,700 graduates that year above the number currently planned.

The supply of professional nurses has more than kept pace with the population growth. With 467,000 nurses now active, the ratio is 267 per 100,000 persons. The annual number of graduates is expected to increase from 30,400 in 1958 to 37,000 in 1965 and continue upward. On this basis, the ratio is expected to be 284 active professional nurses per 100,000 population in 1970.

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(10) American Dental Association, Council on Dental Education: Dental students' register, 1958–59. Chicago, 1959, tables 1 and 5.
(11) American Nurses Association: Facts about nursing: a statistical summary, 1959 edition. New York, p. 9.
(12) National League for Nursing: State approved schools of professional nursing, 1959 edition. New York, p. 40.

films

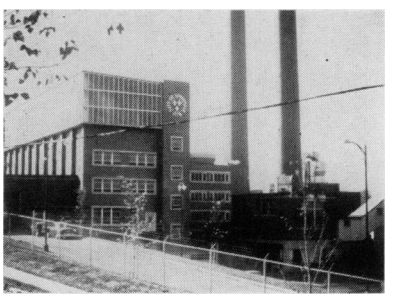
A Survey of Refuse Disposal Methods

16-mm. filmograph, color, sound, 358 feet, 10 minutes, 1959, cleared for television. (Order No. FG–328.)

Audience: Sanitarians and State and local officials responsible for refuse disposal facilities.

This filmograph demonstrates the advantages and disadvantages of all widely used methods of refuse disposal—ranging from open dumps, dumping in oceans and rivers, and backyard burning to metropolitan incineration and sanitary landfills.

The filmograph is available on short-term loan, in the United States only, from the Communicable Disease Center, Public Health Service, Post Office Box 185, Chamblee, Ga. It can be purchased from United World Films, Inc., 1445 Park Ave., New York 29, N.Y.



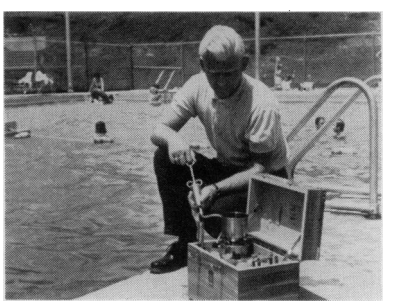
The Membrane Filter

35-mm. filmstrip, color, sound, 80 frames, 12 minutes, 1959, not cleared for television. (Order No. F–386.)

Audience: Anyone who might be expected to use the filter techniques.

Designed to familiarize audiences with the use of the membrane filter, this filmstrip depicts its advantages and disadvantages as compared with other methods of examining water, outlines the newest techniques and procedures, and shows the equipment required.

For short-term loan, in the United States only, the filmstrip is available from the Communicable Disease



Center, Public Health Service, Post Office Box 185, Chamblee, Ga. It can be purchased from United World Films, Inc., 1445 Park Ave., New York 29, N.Y.

Federal Publications

From Research to Classroom Laboratory, Part 2. A series of demonstrations on the science and engineering of man's environment for healthier living. *OM 1274; 1959; 52 pages.*

Eight experiments designed to bring an awareness of environmental health factors to high school students are reprinted from the *Science Teacher*.

Subjects investigated are fluoride contamination of food materials, additives in meat, taste and odor contaminants in drinking water, fluid metering, reducing evaporation of water by using hexadecanol, culturing bacteria on membrane filters, high-temperature, short-time pasteurization of milk, and determination of half-life.

Experiments given in part 1 are listed.

A Dental Society Reports on Budget Payment. A case study of the Kanawha Valley Dental Society payment plan. *PHS Publication No. 717; 1959; 28 pages.*

Organization, operation, and first year's utilization of a budget payment plan in which patients finance dental care through special bank loans at nominal interest rates are described.

The dentists' reasons for joining the plan, effects they believed it would have on dentist-patient relationships and financial aspects of practice, and the plan's possible contribution to better oral health standards for the community are discussed in relation to utilization patterns.

Principles for Planning the Future Hospital System. A report of proceedings of four regional conferences. *PHS Publication No. 721; 1959; 234 pages; $1.25.*

Regional conferences held in Chicago, New Orleans, Salt Lake City, and Washington, D.C., during April and May 1959 are recounted for groups or individuals concerned with hospital planning.

Divided into three parts, this report presents all the major speeches along with a condensation of each speech, a report from each of the 16 workshops and a summary of their activities, and a listing of registered participants.

The appendix contains background material used as a basis for discussion.

Patients in Mental Institutions, 1956. Part I. Public institutions for mental defectives and epileptics. Part II. Public hospitals for the mentally ill. Part III. Private hospitals for the mentally ill and general hospitals with psychiatric facilities. Part IV. Private institutions for mental defectives and epileptics. *PHS Publication No. 632; 1959; part I, 48 pages; part II, 72 pages; part III, 41 pages; part IV, 27 pages.*

Tabulations of basic statistical data on the movement of patient populations in mental institutions for each State and the United States are presented. The data were derived from the 30th annual census of patients in mental institutions.

Parts I and II contain detailed tables on first admissions and resident patient characteristics, on personnel, and on maintenance expenditures. Parts III and IV present characteristics of first admissions to private mental hospitals and private institutions for mental defectives. Part III also includes characteristics of patients discharged from psychiatric facilities of general hospitals. Scope and limitations of the data are discussed, and a section on definitions is included in each part.

Sources of Morbidity Data, Listing Number 7, 1959. *PHS Publication No. 716; 1959; 88 pages.*

Descriptions of 116 current morbidity statistics projects are grouped according to disease category or injury. Projects are indexed by type of data collection, organizations responsible for the research (by State), and principal investigators. Status of incompleted projects from previous listings is given in the section of supplementary notes.

The listings are published primarily for the use of research workers and persons planning public health programs. Tearsheets of the project descriptions are available for persons who inquire about studies of a particular type.

Proceedings, 1959 Annual Conference of the Surgeon General, Public Health Service, and the Chief, Children's Bureau, with State and Territorial Health Officers. *PHS Publication No. 722; 1960; 27 pages.*

Recommendations and actions of the Association of State and Territorial Health Officers are presented in separate sections for each of its standing and special committees and for the Long-Range Planning Subcommittee.

Committees cover Federal relations, environmental sanitation, hospitals and mental health, infectious diseases, long-term illness and health of the aging, maternal and child health, health and medical services, research, civil defense, Indian affairs, and migrant labor.

Resolutions adopted by the Association of State and Territorial Health Officers are also presented. Officers and executive committee members of the association are listed for 1958–59 and 1959–60.

This section carries announcements of new publications prepared by the Public Health Service and of selected publications prepared with Federal support.

Unless otherwise indicated, publications for which prices are quoted are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. Orders should be accompanied by cash, check, or money order and should fully identify the publication. Public Health Service publications which do not carry price quotations, as well as single sample copies of those for which prices are shown, can be obtained without charge from the Public Inquiries Branch, Office of Information, Public Health Service, Washington 25, D.C.

The Public Health Service does not supply publications other than its own.
