

The Projected Supply of Registered Nurses, 1990

MARGARET D. WEST

This is an abbreviated version of a background paper prepared for the Institute of Medicine Committee on Nursing and Nursing Education, whose final report, "Nursing and Nursing Education: Public Policies and Private Actions," was published in January 1983. This paper is an expression of the author and does not represent or reflect opinions of the study committee or the Institute of Medicine.

The Study of Nursing and Nursing Education was supported by Contract No. 282-80-0043-SW, Task Order 7, Modification No. 3, from the Department of Health and Human Services.

Mrs. West was statistical consultant to the Institute of Medicine Study of Nursing and Nursing Education. She is now a consultant to the ASTHO Foundation. Before her retirement she was Chief of the Manpower Resources staff of the Bureau of Health Professions, Health Resources Administration. Requests for tearsheets should be addressed to Margaret D. West, 397 Forelands Road, Annapolis, Md. 21401.

Appendix tables with historical detail on admissions, graduations, and so forth, are available from the author. These appendix tables are listed at the end of the paper.

Synopsis

The number of employed registered nurses (RNs) in the United States stood at an all-time high of 1.3 million in

1980. This paper, using life table techniques, develops a population base of all living graduates from data on graduations from basic nursing education programs between 1928 and 1980, and estimates that there are some 1.9 million graduates now living. The number of graduates is projected to rise to some 2.4 million by the end of 1990, of whom 1.7 million will be active in the profession.

Factors taken into account include recent increases in admissions, which rose from 79,000 in 1970 to 112,000 in 1980; the extent to which older women are entering the profession; the rapid growth of 2-year associate degree programs, which now account for half of all admissions; and increased labor force participation, with 68 percent of all living graduates in the labor force in 1980, compared to 60 percent in 1970.

It is projected that the movement to advanced education among RNs will continue so that, by 1990, the proportion with baccalaureate or higher degrees will have risen from 29 to 36 percent of the employed RNs.

By 1990 the largest number of active RNs will be in their 30s. Graduates with diplomas will have a median age of 45; those with associate degrees, 35; and those with baccalaureate or higher degrees, 32 years.

THE SUPPLY OF EMPLOYED REGISTERED nurses (RNs), in the United States in 1980 stood at an all-time high of 1,273,000, as estimated by the November 1980 National Sample Survey (1). This paper projects a range of comparable supply figures for 1990.

The labor force participation rates of registered nurses can be measured either by the ratio of employed RNs to all currently licensed RNs, or by the ratio of employed RNs to all living graduates of nursing schools. The two methods provide complementary information. The former is of particular value in estimating the market and employment potential, and it is a necessary approach in making State-by-State projections. But since it takes no account of those graduates who have never been licensed or who have not maintained their licenses, it overstates the proportion of graduates in the labor force. And because the proportion of RNs who maintain current licensure decreases with age, it masks the extent to which older women leave the labor force. Further, the ratio of employed to currently licensed RNs does not provide a

good basis for comparisons of labor force participation by graduates of nursing education programs with other population groups for whom such data are available—comparisons which are essential to the evaluation of RN labor force participation. Finally, in looking to the future, it is the proportion of the *graduates* of the 1980s who will be in the labor force which is of present concern.

A life table methodology, based on the ratio of employed RNs to living graduates, gives a broader picture of the changes which have taken place over time, and thus a better base for projecting the future national supply. This methodology was first used in 1927 by the Committee on Grading of Schools of Nursing. In that year the Committee constructed a professional life table for nurses, based on the records of the graduates of 420 schools of nursing (2). The Committee found that almost half of all graduates were still active 10 years after finishing school and that, during the next 25 years, they dropped out of the profession at an average annual rate of

'The changing employment patterns of nurses reflect the changing working patterns of all women. Between 1950 and 1981 the labor force participation of women aged 25–34 rose from 24 percent to 67 percent. But of RNs in that age group, 80 percent were employed in 1980.'

1 percent, so that by age 55 only about 20 percent were still active in nursing. Thus, for graduates of all ages, only about one-third were employed in 1927.

A 1949 study by West (3) used life table techniques applied to the number of living graduates of the classes 1909 to 1949 as a basis for calculating activity rates. That study found that 40 percent of the graduates were employed in nursing, with older nurses staying active much longer than in 1927.

An analysis of the labor force participation of RNs in 1960, made by Altman (4), showed that some 55 percent were employed, with a marked increase in the proportion of nurses in their 40s and 50s coming back into the labor force after their children had grown.

1980 Population of RN Graduates

Graduates. For this study the first step was to calculate the 1980 population of RNs, defined as all living graduates, by age group and by type of program which provided the initial entry into nursing—diploma, associate degree, or baccalaureate degree. The base figures used were the number of graduations from schools offering basic preparation for RN licensure from 1928 through 1980, by type of program and by estimated age distribution at time of graduation.

Mortality. For each age group mortality rates were applied to arrive at the number alive in 1980. For this purpose, mortality rates for white females for the appropriate decades, as shown in Vital Statistics of the United States, 1978 were used (5).

Foreign graduates. Estimates of RN graduates of foreign schools were derived from several sources (6–8). The 1974 Source Book (8) contained information on nurses from annual reports of the Immigration and Naturalization Service, Department of Justice, but it was not possible to identify foreign graduates by type of basic preparation. Ages at the time of first licensing were estimated from data from the Committee on Graduates of Foreign Nursing Schools (9). Mortality rates were applied as with U.S. graduates.

Total. These calculations indicated that at the end of 1980 there were an estimated 1.9 million living graduates of RN programs who were between 19 and 70 years old, including 100,000 graduates of programs in other countries. The 1980 Sample Survey of RNs (1a) showed 1.7 million currently licensed RNs, of whom 1.3 million were employed. There were then an estimated 0.2 million graduates not currently licensed. In summary, in 1980, of all the living graduates of the past 50 years, about two-thirds were still in the labor force:

Status	Graduates	
	Number	Percent
Total	1,861,800	100.0
Employed as RNs ¹	1,272,900	68.4
Currently licensed, but not employed ¹	389,500	20.9
Not currently licensed	199,400	10.7

¹ Reference 1a.

Table 1. Population of graduates of RN programs, to age 70, November 1980—total, currently licensed, and employed, by age group (in thousands)

Age group	Sample survey of RNs					
	Total 1	Currently licensed ¹ 2	Employed ¹ 3	Employed as percent of licensed 3 ÷ 2	Employed as percent of total 3 ÷ 1	Licensed as percent of total 2 ÷ 1
Total	1,861.8	1,662.4	1,272.9	76.6	68.4	89.3
20–24	136.6	131.3	125.0	95.2	91.5	96.1
25–34	585.5	556.8	469.7	84.3	80.2	95.1
35–44	435.4	394.5	306.7	77.8	70.4	90.6
45–54	335.5	293.3	225.0	76.7	67.1	87.4
55–64	249.5	210.5	127.4	60.5	51.1	84.4
65–70	119.3	76.0	19.1	25.1	16.0	63.7

¹ Reference 1a. The totals in columns 2 and 3 have been adjusted to distribute proportionately those reported as age unknown.

The decrease in the proportion maintaining current licensure, and in labor force participation, of older age groups is shown in table 1.

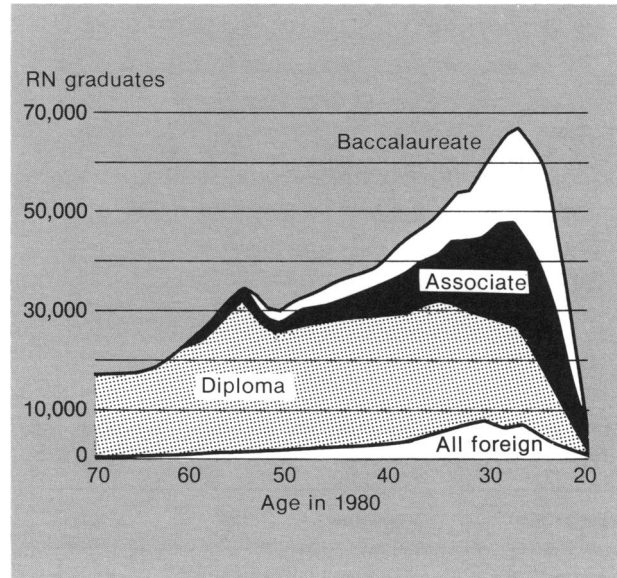
Figure 1 shows separately the graduates of diploma, associate degree, and baccalaureate programs in the United States and the foreign graduates. Ages in 1980 form the horizontal axis from those 70 years old (born in 1910) at the left to those 20 years old (born in 1960) at the right. The vertical axis shows the number of graduates in each year of age. Thus figure 1 shows there are about 18,000 nurses who were 70 years old, with the number rising to 35,000 at age 55 (reflecting the peak of the war-time Cadet Nurse Corps), dropping below 30,000 in the post-war baby boom years, and rising to a peak of about 67,000 at age 27. This peak reflects both the increase in the number of young people in the United States and the increased proportion who have entered RN programs in recent years. Figure 1 also shows the dramatic shift from the diploma programs that prepared the older graduates to the baccalaureate and associate degree programs that are together preparing more than 80 percent of the graduates today.

1990 Projected Population of RN Graduates

In making projections of the RN population and the number employed at the end of 1990, the factors taken into account included projected admissions to and graduations from basic programs, projected foreign graduates licensed in the United States, projected rates of preparation beyond the basic level, mortality rates, and labor force participation.

Admissions to basic RN programs. Admissions to basic RN programs rose from 79,000 in 1970 to 112,000 in 1980—an increase of more than 40 percent in 10 years. A most important contributor to this rise is the increasing numbers of older women who are entering these programs. The change between 1960 and 1975 was documented in the 1977 Inventory (10) and in more recent information on age at graduation reported by the National League for Nursing (11). While associate degree programs draw the highest proportion of older women, the change is also apparent in diploma and baccalaureate programs. This has come about with the social changes affecting the working patterns of women; that is, higher proportions of married women and women with small children are employed. The opportunity for a career made possible by a 2-year nursing education program has been an important factor. The incentives for a nursing career also have been strengthened by the decrease of opportunities in teaching and certain other careers that have attracted many women in the past.

Figure 1. The population of nurses, by age and basic preparation, 1980



The traditional base for projecting admissions to RN programs has been the number of female high school graduates. On this base, admissions to RN programs rose from 5.4 per 100 female high school graduates in 1970 to 7.1 per 100 in 1980.

Twenty years ago, the median age at admission to nursing programs was 18. Now the median age is 20, with more than 70 percent of all new students between 18 and 24 years old. When a base of 18- to 24-year-old females is used to measure the change, admission rates rose from 0.65 per 100 in 1970 to 0.77 per 100 in 1980. Although rates are rising, the rise is offset by the drop in actual numbers of young people in the population. The number of females 18–24 is projected to fall from 14.6 million in 1980 to 12.7 million in 1989 (12).

Admission projections. If nursing continues to be an attractive career, and the financing of basic RN education programs remains at a level adequate to ensure the projected number of places, three series of admissions are projected through the academic year 1989–90:

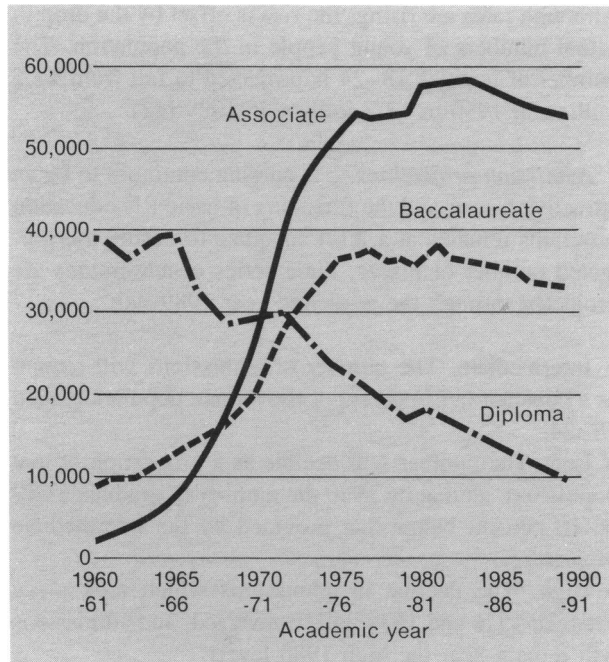
- Intermediate. The number of admissions will remain as a constant 0.77 percent of the female population aged 18–24.
- Low. The number will decline as a proportion of that population, so that by 1990 the number of graduates will be 10 percent below that provided by the intermediate projection.
- High. The decline in admissions which took place between 1976 and 1979 will be reversed, and admissions will remain near the high 1980 levels.

'There has been a widespread impression of a shortage of nurses—one attributed, by many commentators, to a situation in which nurses were leaving their professional positions for other activities. The truth of the matter has been not that nurses were failing to work in their profession, but that the demand for nurses has skyrocketed.'

Table 2. Admissions to basic RN programs, academic year 1980–81 and projected to 1989–90 under three assumptions

Academic year	Intermediate	Low	High
1980–81	112,057	112,057	112,057
Projected:			
1981–82	112,400	112,400	112,400
1982–83	112,200	112,200	112,200
1983–84	110,900	110,900	112,000
1984–85	108,800	106,500	112,000
1985–86	106,400	103,100	112,000
1986–87	103,900	96,900	112,000
1987–88	101,100	96,100	112,000
1988–89	99,700	90,000	112,000
1989–90	97,900	89,000	112,000

Figure 2. Admissions to basic RN programs, by type of program, 1960–80, and intermediate projection to 1989



The numbers of admissions in each academic year to 1989–90, under these alternative projections, are shown in table 2.

Admissions by program type. Until 1967 diploma programs accounted for more than half of each year's admissions (13). By 1970 the proportion had dropped to one-third, by 1973 to one-quarter, and by 1979 to 16 percent. While the number of admissions to these programs has stayed quite steady over the past 4 years, it can be expected to decline further as diploma programs continue to make a transition toward providing the clinical facilities for associate or baccalaureate programs, or themselves become degree-granting programs.

Admissions to basic baccalaureate programs showed a steady growth until 1977. Providing only 9 percent of the 1950 admissions, by 1970 they accounted for 25 percent and by 1977 for a third of the total. Since that time, however, admissions have shown a slight decline.

By far the fastest growth has been that of the associate degree programs. With fewer than 500 admissions in 1950, by 1967 they had as many admissions as did baccalaureate programs, and by 1970 as many as those awarding diplomas. In 1980 they admitted 52 percent of all new students. Although admissions to associate programs passed those of baccalaureate programs by 1968, the rates for both types have leveled off since 1975.

The following projections of admissions by program type are based on assumptions that:

- Diploma programs will continue past trends, so that admissions to these programs will drop from 16 percent of the total to 10 percent by 1989;
- Associate degree programs will continue to draw the highest proportion of new students, more than half of the total;
- Baccalaureate programs will continue to draw about one-third of the total; and
- Associate and baccalaureate programs will take up proportionately the drop in diploma admissions.

Under these assumptions admissions for the year 1989–90, compared to those for 1980–81, would be as follows:

Type of program	1980–81	1989–90 projected		
		Intermediate	Low	High
Total	112,057	97,900	89,000	112,000
Baccalaureate	36,775	33,400	30,000	38,800
Associate	57,788	54,500	49,000	63,200
Diploma	17,494	10,000	10,000	10,000

Annual admissions for each type of program, from 1960 to 1980, and projected to 1989, are shown in figure 2.

Graduations. Close to 70 percent of the students admitted to basic RN programs complete the program. The proportion is slightly higher for diploma and slightly lower for associate degree students. Over the 4 years 1978–81 the average rates, assuming admissions 4, 2, and 3 years earlier, have been:

Program type	Average completion rate (percent)
Baccalaureate	68.6
Associate degree	68.1
Diploma	70.9

Based on the projected admission levels and completion rates shown previously, graduations have been projected for each type of program for the years to 1990. The totals for all programs are shown in table 3, as well as the separate totals for baccalaureate, associate, and diploma programs. In each projection, the number of graduates would rise to 77,800 in 1984. By 1990, graduations would drop in the low projection to 63,000, in the intermediate to 70,000, and in the high to 76,900.

For baccalaureate programs, graduations through 1985 reflect admissions already reported to the National League for Nursing (10), and the 1986 class is already enrolled. Thus, the estimated range of baccalaureate graduates for 1990 is quite narrow—between 21,100 and 25,800—with the total for the 10 years 1981–90 placed at between 242,300 and 250,800 (table 3).

For associate degree programs, the possible range is much wider. Only the classes of 1983 and 1984 are already in school, so that there are 6 years of graduates that can reflect changes in educational patterns. Thus, the 1990 graduate projections range from 33,400 to 42,600, and the 10 year total ranges from 377,200 to 406,400 (table 3).

For diploma programs, with 1985 graduates already enrolled as students, the 1990 graduates are projected at 8,500 in each of the three series, with a 10-year total of 111,300 (table 3).

Foreign graduates. Graduates of nursing schools in other countries who have been licensed in the United States reached a peak of 6,850 in 1972, then declined to 3,779 in 1978 (8,9). The Department of Health and Human Services, in its projections, assumed a constant inflow of 3,700 foreign graduates a year (14a). This number has been used in these projections.

Mortality. To project the number of living graduates in 1990, mortality rates for white females, using the appropriate values for 1978, were used for the 1980 survivors and for the new graduates from 1981 through 1990. The estimated 1990 survivors of the classes 1928–80, to and including those age 70, would number 1.6 million (table 4).

Table 3. Graduations from baccalaureate, associate degree, and diploma programs, academic year 1980–81 and projected to 1989–90, three projections

Academic year	Intermediate	Low	High
All programs			
1980–81	74,890	74,890	74,890
Projected:			
1981–82	76,400	76,400	76,400
1982–83	76,900	76,900	76,900
1983–84	77,800	77,800	77,800
1984–85	77,100	77,100	77,600
1985–86	75,700	74,700	77,200
1986–87	74,400	73,100	77,000
1987–88	72,500	70,000	76,900
1988–89	71,000	66,900	76,900
1989–90	70,000	63,000	76,900
10-year total ..	746,700	730,800	768,500
Baccalaureate programs			
1980–81	24,804	24,804	24,804
Projected:			
1981–82	24,800	24,800	24,800
1982–83	24,700	24,700	24,700
1983–84	25,200	25,200	25,200
1984–85	25,000	25,000	25,000
1985–86	24,800	24,800	24,800
1986–87	24,800	24,800	25,000
1987–88	24,400	23,900	25,200
1988–89	24,100	23,200	25,500
1989–90	23,900	21,100	25,800
10-year total ..	246,500	242,300	250,800
Associate degree programs			
1980–81	37,183	37,183	37,183
Projected:			
1981–82	39,600	39,600	39,600
1982–83	39,800	39,800	39,800
1983–84	40,200	40,200	40,200
1984–85	40,000	40,000	40,500
1985–86	39,600	38,600	41,100
1986–87	39,000	37,700	41,400
1987–88	38,200	36,200	41,800
1988–89	37,700	34,500	42,200
1989–90	37,600	33,400	42,600
10-year total ..	388,900	377,200	406,400
Diploma programs			
1980–81	12,903	12,903	12,903
Projected:			
1981–82	12,000	12,000	12,000
1982–83	12,400	12,400	12,400
1983–84	12,400	12,400	12,400
1984–85	12,100	12,100	12,100
1985–86	11,300	11,300	11,300
1986–87	10,600	10,600	10,600
1987–88	9,900	9,900	9,900
1988–89	9,200	9,200	9,200
1989–90	8,500	8,500	8,500
10-year total ..	111,300	111,300	111,300

'Admissions to basic RN programs rose from 79,000 in 1970 to 112,000 in 1980—an increase of more than 40 percent in 10 years. A most important contributor to this rise is the increasing numbers of older women who are entering these programs.'

Table 4. 1990 survivors of 1980 population of graduates of RN programs, to age 70

Age in 1990	Number
Total	1,648,600
29–34 years	186,000
35–44 years	582,900
45–54 years	420,700
55–64 years	313,400
65–70 years	145,600

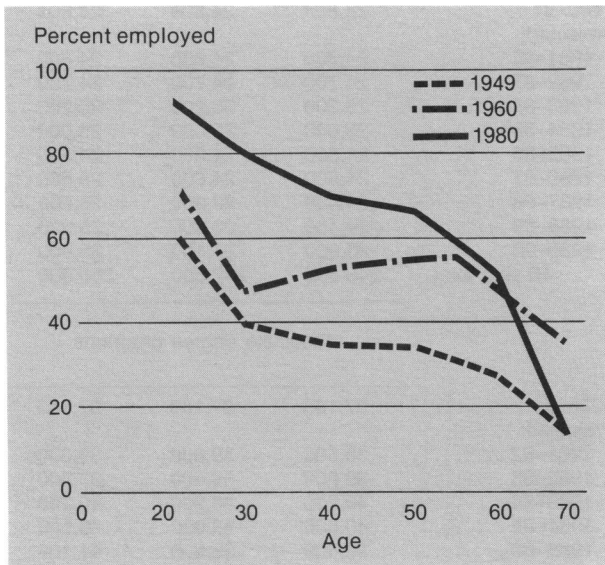
Table 5. 1990 survivors of 1981–90 graduates—three projections of U.S. graduates and foreign graduates

Age group	U.S. graduates			Foreign graduates
	Intermediate	Low	High	
Total	740,800	726,200	763,400	36,800
20–24	163,000	159,800	167,900	8,100
25–34	451,900	443,000	465,700	22,700
35–44	96,300	94,400	99,300	4,500
45 or older	29,600	29,000	30,500	1,500

Table 6. The population of graduates of RN programs, to age 70, December 1990, three projections

Age group	Intermediate	Low	High
Total	2,426,200	2,411,600	2,448,800
20–24	171,100	167,900	176,000
25–34	660,600	651,700	674,400
35–44	683,700	681,800	686,700
45–54	451,800	451,200	452,700
55–64	313,400	313,400	313,400
65–70	145,600	145,600	145,600

Figure 3. Nursing labor force participation, all graduates in 1949, 1960, and 1980



SOURCE: Reference 3 for 1949, reference 4 for 1960.

For the classes of 1981 through 1990, the estimated numbers of 1990 survivors under the three series of projected graduates are shown by age in table 5. The sum of the figures in tables 4 and 5 gives the total population of survivors in 1990 for each of the three projection series. These are shown in table 6.

Labor force participation. Of the total population of nurses—the living graduates of schools in the United States and the licensed graduates of schools of other countries—about two-thirds are active in the profession. This proportion has been rising for many years. In 1927 it stood at one-third. By 1950, it had risen to 40 percent; by 1960, to 55 percent; by 1970, to about 60 percent; and by 1980, to 68 percent. Figure 3 shows that in 1960, as

compared with 1949, the greatest increase in labor force participation was among older nurses; between 1960 and 1980 the greatest increase was among younger nurses.

The changing employment patterns of nurses reflect the changing working patterns of all women. Between 1950 and 1981 the labor force participation of women aged 25-34 rose from 24 percent to 67 percent (15,16). But of RNs in that age group, 80 percent were employed in 1980. Similar but smaller differences continued as women reached their 60s.

An important factor in the working patterns of women is their educational preparation. Women with college education enter the labor force at higher rates, and stay in it longer, than those with less educational preparation. RNs now participate at rates similar to those for women

with 4 years of college. Over a period of time there has been a steady rise in labor force participation by both women with 4 years of college and RNs. If this trend continues, it is quite possible that by 1990 RNs will have moved closer to the participation level now achieved by women with 5 years of collegiate preparation. If that should be the case, the participation rates of RNs might increase from the 1980 level, 68.4 percent of all graduates to age 70 (as shown in table 1), to a level of 70.5 percent by 1990.

The present and projected labor force participation rates for RNs, by age group, follow:

Age group	Participation rates	
	1980	1990 projected
All ages	68.4	70.5
20-24	91.5	91.5
25-34	80.2	80.9
35-44	70.4	74.4
45-54	67.1	72.3
55-64	51.1	51.1
65-70	16.0	16.0

The Projected Supply of Active RNs, 1990

In this paper, the 1990 supply of active RNs is defined as the number who would be employed in that year assuming that conditions of opportunity, work, financing, and so forth are comparable to those of 1980. The following assumptions are based on the three projections by age shown in table 6 and the labor force participation rates just presented.

Supply projection	Base population	Labor force participation
High	High	High
Intermediate	Intermediate	High
Low	Low	1980 level

The intermediate projection is for a supply of 1,710,000 active RNs at the end of 1990, with a high projection of 1,728,200 and a low of 1,642,500 (table 7). These projections represent an increase of between 29 and 36 percent over the 1980 supply.

The 1980 Sample Survey showed that among employed RNs, 13 percent had advanced after basic preparation to a higher educational level—14.6 percent of those with diplomas, 13.2 percent of those with baccalaureate degrees, and 9.0 percent of those with associate degrees (*1b*). Schulte, in his analysis of the 1977 Inventory (*10*), showed age-specific rates for such upgrading, for each type of program. These give the slope of the curve, but since they reflect conditions before 1977, they are too low for projections to 1990. By then it can be expected that the upgrading rates for each type of program will rise in response to the expanded programs

for preparing post-RN baccalaureate, master's, and doctoral candidates. Taking age distributions into account, the 1980 rates (*1b*) and the projected 1990 percentages of active nurses reaching a higher level of educational preparation are as follows:

Basic preparation	1980	1990
Diploma	14.6	14.6
Associate	9.0	13.9
Baccalaureate	13.2	18.0

Using 1980 data on the supply of RNs with master's and doctoral degrees, projected educational preparation rates, the present numbers of nurses with post-RN baccalaureates, and projected baccalaureate output rates, adjustments for upgrading were applied to the figures on employed RNs by basic educational preparation to arrive at totals by highest educational preparation.

Post-RN baccalaureate degrees. There has been rapid growth in the number of nurses with diplomas or associate degrees who have completed requirements for the baccalaureate degree. From 2,200 a year in 1971, the total reached 8,416 in 1981 (*11*). Should the number continue to rise, following recent trends and in response to concerted efforts to encourage educational mobility as a means to career advancement, there could be 14,000 such graduations in 1990. This number would translate to a total of about 100,000 additions to the supply of RNs with baccalaureate degrees.

Master's degrees. In 1980 there were 55,000 RNs with master's degrees in nursing, of whom 44,700, or 81 percent, were employed in nursing. In 1971 there were 2,100 master's degrees granted in nursing; in 1981 the number granted rose 5,000. These figures represented some 2 percent of all employed nurses with the baccalaureate as the highest degree. If the proportion should remain at an annual rate of 2 percent, the number of master's degrees granted in nursing would continue to rise by about 500 a year. This would result in a total of

Table 7. The projected supply of active RNs, December 1990, by age group

Age group	Intermediate	Low	High
Total	1,710,000	1,642,500	1,728,200
20-24	156,600	153,600	161,000
25-34	534,400	522,700	545,600
35-44	508,700	480,000	510,900
45-54	326,800	302,800	327,300
55-64	160,200	160,100	160,100
65-70	23,300	23,300	23,300

Table 8. Active RNs, 1980 and projected to end of 1990, by highest educational preparation (intermediate projection)

Highest educational preparation	1980		1990	
	Number	Percent	Number	Percent
Total	1,272,900	100.0	1,710,000	100.0
Diploma	645,500	50.7	614,000	35.9
Associate	256,200	20.1	475,000	27.8
Baccalaureate . .	296,200	23.3	491,000	28.7
Master's	65,200	5.1	124,200	7.3
Doctorate	3,000	0.2	5,800	0.3
Unknown	6,800	0.5

Appendix Tables Available from the Author

- A. Graduations from basic RN programs, by type of program, 1928–1981
- B. Age at graduation from basic registered nurse programs—percent distribution, diploma, associate degree, and baccalaureate, selected years
- C. Foreign graduates licensed as RNs in the United States, 1950–1978
- D. Ages of foreign graduates tested by Committee on Graduates of Foreign Nursing Schools 1978–80
- E. Admissions to basic registered nurse programs as proportion of females ages 18–24. Actual, 1968–1980; and projected, 1981–1989, intermediate projection
- F. Admissions to basic registered nurse programs; by type of program 1960–80, and projected 1981–90, intermediate projection
- G. Admissions to basic registered nurse programs, 1980–89, low projections
- H. Admissions to basic registered nurse programs, 1980–89, high projections
- I. Labor force participation rates of women, by age, 1950–1981 (selected years)
- J. Labor force participation rates: registered nurses, 1980; women with college, 1981; and registered nurses projected, 1990
- K. Registered nurses with diplomas or associate degrees who subsequently earned BSN degrees, 1971–81, with projections to 1990
- L. Graduate degrees in nursing, 1971–81, and projected to 1990

9,500 such degrees granted in 1990, or a total of 68,000 over the decade. At activity rates of 81 percent, this would give a total of 100,000 nurses with master's degrees in nursing.

To this number must be added those RNs with master's degrees in other fields. This number stood at 25,000 in

1980, of whom 19,600 were active (78 percent). There are not adequate data to project this portion of the total, but if the active number in 1990 were assumed to be 25,000, the total number of active nurses with master's degrees would stand close to 125,000.

Doctoral degrees. In 1980 there were 4,100 RNs with doctoral degrees, of whom close to 3,000 were employed in nursing. Fewer than 1,000 doctoral degrees in nursing have been granted in the past 20 years; the remainder have been earned in education, administration, public health, or other fields.

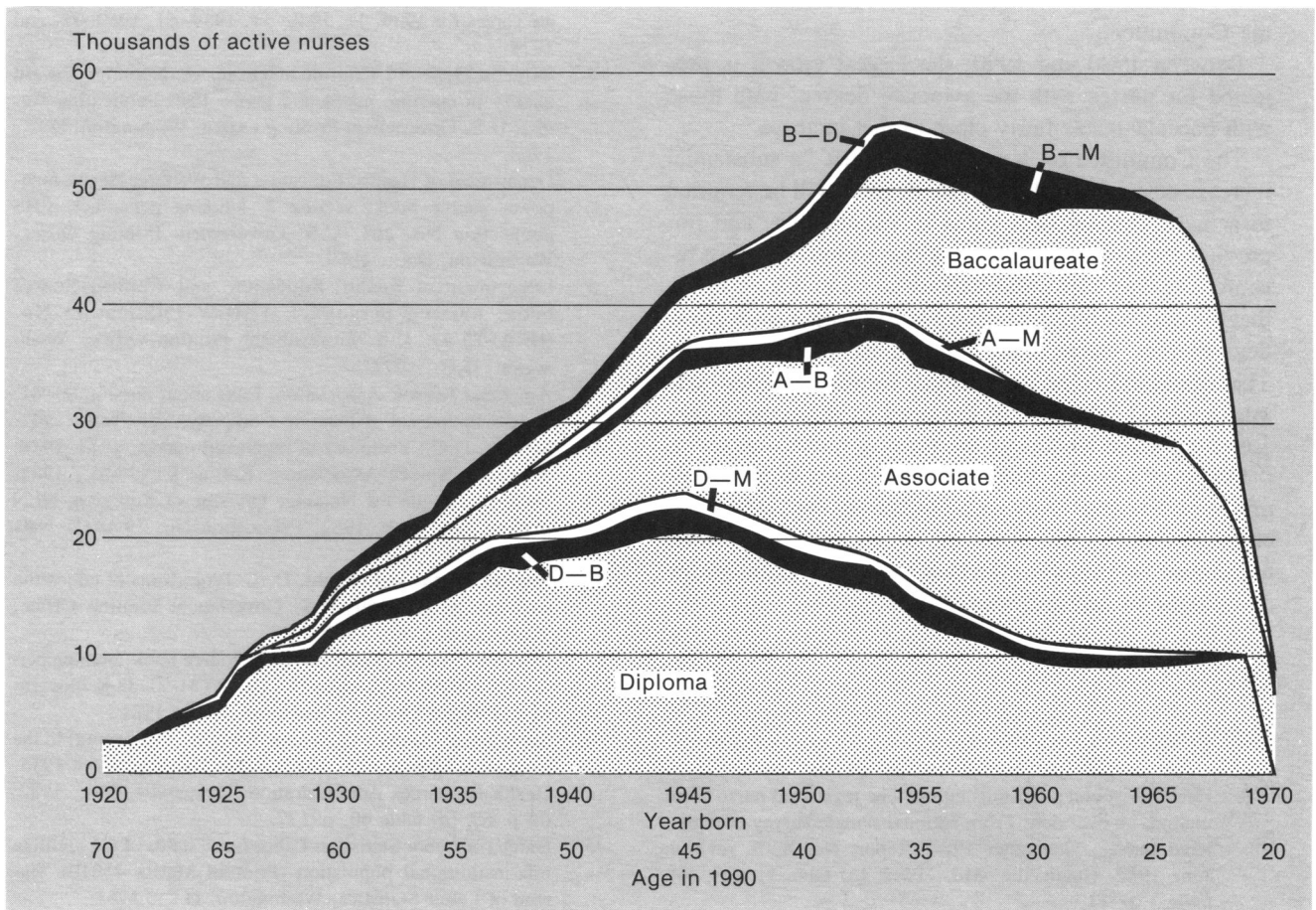
There were 125 doctoral degrees in nursing granted in 1980 (11). Enrollment in these graduate programs has jumped sharply. Growth rates over recent years suggest that the number of graduates will soon reach 200 a year, and it might reach 400 by 1990, if there are places and faculty adequate to increase output by 25 graduates a year. This would mean a total supply of 3,900 at the doctoral level in nursing in 1990, of whom 3,000 would be active in nursing. There might be another 2,800 active RNs with doctorates in other fields. In total, then, there would be an estimated 5,800 active RNs with doctoral degrees.

All levels of preparations. In 1980, half of the employed RNs held a diploma as the highest educational preparation, while 29 percent of the group held a baccalaureate or higher degree, and 20 percent held an associate degree. The intermediate projection (table 8) indicates a slight decrease in the number of active diploma graduates in 1990 as compared to 1980, with an increase of 219,000 with associate degrees, and more than 250,000 with baccalaureate or higher degrees. Within these totals, the number of RNs with master's or doctoral degrees would rise from 68,000 to 130,000, almost doubling that group.

As a result, although diploma graduates would still make up the largest group, they would account for only 36 percent of the total active supply, while associate degree graduates would increase from 20 percent to 29 percent, and those having baccalaureate or higher degrees would increase from 29 percent to 36 percent of the total.

This intermediate projection is shown in cross section in figure 4. It shows graphically the effect of changing educational patterns. It can be seen that in 1990 the largest numbers of active RNs will be in their 30s. Graduates with diplomas will be older, having a median age of 45 years. The median age of those with associate degrees will be 35 years, while that for graduates with baccalaureate degrees will be 32 years. Figure 4 also shows, in the narrow bands, the numbers who will have advanced preparation, moving from diploma or associate

Figure 4. Supply of active registered nurses in 1990, by age and educational preparation (intermediate projection)



NOTE: D—B identifies RNs who have moved from the diploma to the baccalaureate level. Similarly: D—M from diploma to master's or doctoral, A—B from

associate to baccalaureate, A—M from associate to master's or doctoral, B—M from baccalaureate to master's, and B—D from baccalaureate to doctoral.

degree to a post-RN baccalaureate degree (indicated by D-B and A-B), and from each type of basic preparation to a master's or doctoral level (D-M, A-M, B-M, and D-B).

Discussion

In recent years there has been a widespread impression of a shortage of nurses—one attributed, by many commentators, to a situation in which nurses were leaving their professional positions for other activities. The truth of the matter has been not that nurses were failing to work in their profession, but that the demand for nurses has skyrocketed.

Between 1970 and the end of 1980 the number of employed RNs rose from 722,000 to 1,273,000 (9,1). Expressed as a population ratio, the supply increased from 356 per 100,000 population in 1970 to an estimated 558 per 100,000 in 1980, an increase of 57 percent. At the same time, there was a dramatic growth in the demand for nurses in hospitals. Between 1970 and 1980, admissions to short-term general and allied special hospitals increased by 24 percent (and by 10 percent per

100,000 population) (17a). At the same time, the number of RNs (full time equivalents) in community hospitals rose by more than 70 percent (17b,18). A large part of this rise can be accounted for by the rapid growth of intensive care units, with their high staffing ratios.

Looking to 1990, the prospects are that the supply of RNs will continue to rise, both absolutely and in relation to the population. This paper projects a rise in the active supply from the 1,273,000 at the end of 1980 to between 1,642,000 and 1,728,000 at the end of 1990—an increase of between 29 and 36 percent. Expressed as a population ratio, this would mean an increase from 558 per 100,000 population in 1980 to between 657 and 692 in 1990.

The Committee on Nursing and Nursing Education, for which the foregoing projections were prepared, concluded that “in the future the demand for RNs can be expected to increase with technological advances in health care delivery, population growth, and aging at rates that will depend somewhat on the organization and financing of health care delivery” (19a). The supply projections presented in this paper all fall within the

wider range of the estimates of the 1990 demand made by the Committee.

Between 1980 and 1990, the largest growth is projected for nurses with the associate degree, with those with baccalaureates fairly close to that increase.

The Committee on Nursing found that "a substantial increase of nurses with graduate degrees will be required to achieve even modest gains in maintaining, and improving the leadership cadre of the nation's nursing resources" (19b). The projections detailed in this paper are that the number of active nurses with master's or doctoral degrees will almost double during the present decade. This would indeed be a substantial increase, although one which would fall short of the need as it has been projected by some leaders of the nursing profession (14b).

One final caution, again from the report of the Committee on Nursing: "Any such projections can, at best, be considered not as firm forecasts but as tools with which to examine the possible effects of alternative assumptions about policies and practices" (19c).

References

1. Health Resources Administration: The registered nurse population, an overview. From national sample survey of registered nurses, November 1980. Report No. 82-5, revised June 1982. Hyattsville, Md., 1982; (a) table 1, p. 9; (b) table 3, p. 11.
2. Committee on the Grading of Nursing Schools: Results of the first grading study of nursing schools. New York, 1929.
3. West, M.D.: Estimating the future supply of professional nurses. *Am J Nurs* 10: 656-658 (1950).
4. Altman, S.H.: Present and future supply of registered nurses. DHEW Publication No. (NIH) 73-134. U.S. Government Printing Office, Washington, D.C., 1971, pp. 73-134.
5. National Center for Health Statistics: Vital statistics of the United States, 1978, vol. 2, sec. 5. DHHS Publication No. (PHS) 81-1104. U.S. Government Printing Office, Wash-

ington, D.C., 1980, tables 5-2 and 5-4, using the appropriate values for 1939-41, 1949-51, 1959-61, 1969-71, and 1978.

6. Surgeon General's Consultant Group on Nursing: Toward quality in nursing: needs and goals. PHS Publication No. 992. U.S. Government Printing Office, Washington, D.C., 1963.
7. Department of Health, Education and Welfare: Health manpower source book, section 2. Nursing personnel. PHS publication No. 263. U.S. Government Printing Office, Washington, D.C., 1969.
8. Department of Health, Education, and Welfare: Source book: nursing personnel. DHEW Publication No. (HRA)-75-43. U.S. Government Printing Office, Washington, D.C., 1974.
9. American Nurses' Association: Facts about nursing 80-81. American Journal of Nursing Company, New York, 1982.
10. Schulte, D.C.: Inventory of registered nurses, 1977-1978. American Nurses Association, Kansas City, Mo., 1981.
11. National League for Nursing, Division of Research: NLN nursing data book, 1982. Publication No. 19-1915, New York, 1983.
12. Frankel, M.M. and Gerald, D.E.: Projections of education statistics to 1988-89. U.S. Government Printing Office, Washington, D.C., 1980.
13. Health Resources Administration: Source book-nursing personnel. DHHS Publication No. (HRA) 81-21. U.S. Government Printing Office, Washington, D.C., 1981.
14. Secretary of Health and Human Services: Third report to the Congress, February 17, 1982: Nurse Training Act of 1975. Health Resources Administration, Hyattsville, Md., 1982; (a) p. 68; (b) table 40, p. 177.
15. Bureau of Labor Statistics: Labor force status of the civilian non-institutional population (Printout Matrix 45010). Bureau of Labor Statistics, Washington, D.C., 1981.
16. U.S. Bureau of the Census: A statistical portrait of women in the United States. Series P-23, No. 58. U.S. Government Printing Office, Washington, D.C., 1976, p. 28.
17. American Hospital Association: Hospital statistics. Chicago, Ill., 1981; (a) table 1, p. 4 and (b) table 3, p.13.
18. American Hospital Association: Hospital statistics. Chicago Ill., 1972, table 3, p. 27.
19. Institute of Medicine, Division of Health Care Services: Nursing and nursing education: public policies and private actions. National Academy Press, Washington, D.C., 1983; (a) p. 74; (b) p. 146; (c) p. 63.

High Utilizers of Ambulatory Care Services: 6-Year Followup at Alaska Native Medical Center

THOMAS S. NIGHSWANDER, MD, MPH

Dr. Nighswander is Chief of Family Medicine Service, Alaska Native Medical Center, Anchorage, Alaska 99510. Gloria Park, MD, Director of Ambulatory Care at the Center, developed the original list of high utilizers of ambulatory care.

Tearsheet requests to Dr. Nighswander.

Synopsis

In a retrospective study, 100 randomly selected, high utilizers of ambulatory care services in 1972 were followed for a 6-year period, 1973-78. The 22 men and 78 women had visited the Alaska Native Medical Center in Anchorage 15 or more times in 1972. Each patient was matched by age and sex with a control patient who had made three or fewer visits.

There were predominately more women than men in all age groups in the high-utilizer group and in all but one