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Projecting the Number of Professional Nurses Required for In-Hospital, Direct Care of Older People, 1970-2050[1]

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Old people are more likely to be hospitalized and require higher intensity nursing care. As the baby boom generation ages, both the numbers and the proportions of older people will increase. The need for hospital-based RNs with gerontological expertise will grow substantially, but no figures have yet been produced at either national or local levels to estimate the number of nurses with the gerontological expertise needed in various service settings. The one available estimate places nurses in a category with physicians' assistants and uses a model based on physician delegation (Kane, Solomon, Beck, Keeler, & Kane, 1980). The study reported here quantifies the impact on nursing personnel needs of the changing age structure when combined with older people's greater use of nursing care. The model used in the calculations can be used for regional, state, or local educational planning, grant propsals, and institutional personnel projections to establish requirements for care of the elderly.

Although data are occasionally available in more detail, national statistical sources categorizing people by age generally show a single category for those 65 years of age and older. To parallel these sources,

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age 65 and older has been adopted in this article as a definition of "older" people.

STATEMENT OF THE PROBLEM

In the 1970s national survey data showed that older people experienced 50% more short-stay hospital days per person per year, 14.9, as compared with 9.7 days for the total population (National Center for Health Statistics, 1978). Higher hospital utilization rates were due largely to age differences in surgical procedures. For instance, there were 3,436 operations on the eye for every 10,000 people aged 65 and older, five times the rate for the total population. Operations on the respiratory, cardiovascular, hemic and lymphatic, digestive, and urinary systems were three times more common among those 65 and older than among all people. Older people had lower rates only for operations on the ear, on the nose, mouth or larynx, and on female genital organs. As a result, short-term hospital discharge rates per 100 persons were twice as high among older people. People 65 years and over experienced 39.9 discharges per 100 persons per year, compared with 16.8 for the total population surveyed (National Center for Health Statistics, 1983).

In 1970 there were 20 million people over age 65 in the United States, 9.9% of the population. According to Census Bureau projections for the year 2000, the number of people over 65 is projected to be more than 35 million, 13.1% of the total. By 2050, these projections indicate that older people may number 67 million, 22% of the population (Bureau of the Census, 1982).

THE MODEL

Projecting the future supply and planning the future number of nurses required by the health care system was legislatively mandated by the Nurse Training Act of 1975 (P.L. 94-63, Title IX) and the Health Planning and Resources Development Act of 1974 (P.L. 993-641). Under contract from the Division of Nursing, the Western Interstate Commission for Higher Education (WICHE) developed what has come to be called the WICHE model for projecting both supply and requirements. The requirements part of this model is a listing of the relevant practice, educational, and research settings for nursing personnel and a

series of equations stating relationships among the variables. Particular assumptions about the values to be assigned to each variable in each nursing care setting can differ. WICHE itself has applied the model to national and state levels, with lower and upper bound values for the amount of nursing care per patient (WICHE, 1978; Gray & Sauer, n.d.; Department of Health and Human Services, 1981). In addition, several state nursing associations and other groups have used all or part of the model. For instance, the Alaska, New Hampshire, and Pennsylvania Nurses Associations have applied the model using their own assumptions and emphasizing local needs (McLaurin, 1981; Carnaby, Coletta, Farley, & Vines, 1979, 1980; Ozbolt, 1980). In the state of Michigan, the Governor's Department of Management and Budget has used the WICHE model in analyzing nursing personnel resources for a new State Health Plan (Office of Health and Medical Affairs, 1982).

It appears that the WICHE model is one acceptable way to project nursing requirements and resources for the future. By applying an adaptation of the model to the desired population age groups, the number of nurses required to care for older people can be derived. The model could also be used to project supply if current and future numbers of nurses with gerontological educational preparation were known. In this article, only requirements are discussed because a separate survey would be required to determine the supply projection.

In the requirements portion of the WICHE model there are direct care, supervisory and administrative, and educational segments. Within each there are hospital-based and community-based components. For purposes of the example presented here, only the in-hospital, direct care component will be discussed. Most professional (RN) nursing care of the elderly is delivered in long- and short-term hospitals rather than in community health settings. Within this in-hospital, direct care component, the beds and services required per 10,000 population are based on expert calculations and judgments. In this study the original WICHE specifications for utilization of short-term hospitals by the total population were multiplied by a factor of 2.8 because national data show that people over 65 use approximately that many more bed-days and services than the total population (National Center for Health Statistics, 1982). A factor of 6.2 was used for long-term care (Bureau of the Census, 1978).

Further changes were made by adjusting the full-time equivalent (FTE) RNs required to care for older people. The WICHE group of experts had proposed both a lower and a higher bound set of specifica-

TABLE 1 Model Projections of RN FTE's Required to Care for the Population Aged 65 and Older 1970-2050: Direct Care In-Hospital Services

Year	Lower Bound[a]	Upper Bound
1970	249,467	269,282
1980	318,257	343,536
1990	393,570	424,831
2000	433,634	468,077
2025	725,726	783,370
2050	829,989	895,914

a. Assumptions are from Western Interstate Commission on Higher Education, 1978.

tions for nursing care FTE requirements. The lower bound represents a minimum necessary number of RNs; the upper bound represents a more nearly optimal number. Both provide expert guidance to ratios required, on average, for the total population. It is generally felt that older patients require more nursing care, but there is little documentation to support a conclusion about exactly how much more is required. The range available from largely unpublished, local studies indicates that the true figure may be between 5% and 15% more (Hospital Corporation of America, n.d.; Wolfe & Young, 1965; Adams & McIlwraith, 1963, cited in Wells, 1975). DRGs acknowledge this greater complexity by considering multiple diagnoses, which are found among a high proportion of older people. In an attempt to be conservative, and because earlier federal reimbursement patterns allowed an 8% differential for care of the elderly, a factor of 1.08 was used for FTE RNs in all appropriate settings for both the lower and upper bound FTE specifications.

The procedure then simply requires applying the adjusted utilization and nursing care FTE ratios to the projected population aged 65 and older.

RESULTS

Table 1 shows the dramatic increase in the number of professional nurse in-hospital, direct care FTEs needed to care for the elderly, from an estimated 318,000 in 1980 to 434,000 in the year 2000 if WICHE's lower bound assumptions were reality, or 468,000 if the upper bound ratios could be achieved—increases in just 20 years of 36% and 47%,

TABLE 2 Model Projections of RN FTEs by Specialty 2000: Direct Care In-Hospital Services for Persons 65 Years and Older

	Lower Bound		Upper Bound	
Specialty	Number	Percentage	Number	Percentage
Critical care and emergency	64,412	14.8	66,012	14.1
Extended care	7,759	1.8	8,840	1.9
Medical-surgical	287,403	66.3	307,351	65.7
Psychiatric	70,108	16.2	81,625	17.4
Rehabilitation	3,952	0.9	4,249	0.9
Total	433,634	100.0	468,077	100.0

respectively. The figures for 2050 are shown as illustrative, not as predictions because there will be many changes in the health care system, affecting both utilization patterns and provider ratios. Still, looking ahead to 2050 does allow quantification of long-term implications.

According to these calculations, in 1980 just over 40% of direct care, in-hospital RN FTEs were required to care for people aged 65 and older. By the year 2000, almost one-half, 47%, will be required for care of the elderly; and by the year 2050, the model shows that nearly 80% would be required for care of the elderly.

Table 2 shows the projected gerontological specialty distributions in the year 2000 for the higher and lower levels of nursing intensities. The largest proportion of in-hospital, direct care RNs needing gerontological expertise are in the medical-surgical specialties, no matter what the assumptions about upper or lower bounds of nursing care.

DISCUSSION

The age structure effects on the compositional requirements for the professional nursing labor force support current moves within the profession for sufficient educational preparation to deal with the additional complexities of care required by older people. The baccalaureate may actually be a bare minimum. The Institute of Medicine study on nursing and nursing education (1983) called for an emphasis on graduate programs for nurses as one way to provide adequate background for care needed by older people. Further, in their assessment, the Institute found that "neither basic nor advanced nursing education programs yet focus

sufficiently on academic preparation and clinical experience in geriatrics" (p. 14).

In planning for geriatric content in educational programs, whether graduate or undergraduate, it should be kept in mind that the numbers provided here are for only one subset of the professional nursing service needed to care for our aging population. However, even this subset should be compared to the far smaller numbers of geriatric nurse practitioners/physician assistants projected by Kane et al. (1980). Using the medical model only 20,398 FTEs were thought to be needed by the year 2010, even assuming primary care and maximal delegation of physician functions. The current calculations incorporate purely nursing functions, certainly a more appropriate approach for direct, in-hospital care.

The results reported here may also facilitate a more realistic approach to hospital care of the elderly. By the year 2000, the results presented here suggest that approximately 50% of nursing care time will be spent in care of people aged 65 and older. Although Kane et al.'s call for the development of geriatricians might be appropriate for physicians and a limited number of nurse practitioners, most hospital-based nurses may need special knowledge about care of the elderly. If at least half of the hospital-based, direct care professional nursing FTEs are to be devoted to nursing older people, and if hospitals do not segregate those over and under 65 years of age, then every nurse caring for adult patients will need specialized training to give the very best care to the multiple, complex nursing needs of those 65 and older.

NOTE

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