

Through the detailed descriptions offered in this study report, the reader gains a clear picture of a public health nursing service functioning in a complex and rather unusual framework. It does not attempt to relate this service to other public health nursing services in the community or to draw any conclusions in regard to community planning of public health nursing.

HORTENSE HILBERT



ESTIMATES OF FUTURE POPULATION OF THE UNITED STATES

DURING the past fifteen years or so, Thompson and Whelpton, of the Scripps Foundation for Research in Population Problems, have provided periodically revised estimates of the future population of this country on the basis of given assumptions regarding trends in fertility, mortality, and immigration. Their work has deservedly become a standard reference in discussions of future population trends. They have recently prepared their third set of estimates for the National Resources Planning Board or its antecedents. The work appears as a government publication under the title *ESTIMATES OF FUTURE POPULATION OF THE UNITED STATES, 1940-2000*.¹ The two preceding sets appeared in 1934 and 1937.²

In accounting for the somewhat early revision of the 1937 estimates the authors state that "it has become apparent that, quite apart from the war, certain changes have been taking place to alter the outlook for population in the United States. Among the new factors that are affecting the future size and composition of the population are the continuance through 1942 of the upward turn of the birth rate that began in the middle 1930's, the

¹ Thompson, Warren S. and Whelpton, P. K.: *ESTIMATES OF FUTURE POPULATION OF THE UNITED STATES, 1940-2000*. National Resources Planning Board, Washington, Government Printing Office, 1943, 137 pp. \$0.35

² (a) National Resources Board: *Estimates of Future Population by States*. Washington, 1934 (offset).

(b) National Resources Committee: *POPULATION STATISTICS. I. NATIONAL DATA*. Washington, Government Printing Office, 1937, 107 pp.

(c) National Resources Committee: *THE PROBLEMS OF A CHANGING POPULATION*. Washington, Government Printing Office, 1938, pp. 22-27.

introduction of the new chemotherapy with its promise of further reduction in mortality, the relatively favorable course of Negro mortality in recent years, the progressively greater concentration of childbearing in the earlier years of marriage, and considerable advances in the science of nutrition. These developments alone, without the intervention of the war, would have necessitated a revision of earlier estimates of future population.”

Concerning their estimates, the authors once stated that they make no claim to the infallibility of “the seventh son of a seventh son.” Their estimates are not presented as predictions of what will actually happen. They are rather to be regarded as projections made on the basis of given assumptions regarding trends in fertility, mortality, and immigration. In fact, the authors generally present not one but several sets of projections on the basis of varying assumptions.

Specifically, three alternative assumptions are made regarding trends in fertility: “high,” “medium,” and low.” The same is done regarding trends in mortality. Projections are carried out for the nine possible combinations of fertility-mortality assumptions. In addition, for three of these combinations the projections are carried out with the superimposed assumption of average net gains of 100,000 per year from immigration beginning in 1945. Thus, twelve series of projections are carried through at five-year intervals from 1945 to 2000. They are given not only for the total population but also by age and sex for the native-white, foreign-white, and colored populations separately. The basic tables give figures for the 0-4 age group with and without corrections for underenumeration of children. Finally, a special series of tables indicates the deductions that should be made from the estimates if given war losses are assumed.

Among the twelve series of estimates the projected population for the year 2000 extends from 129.1 million on the basis of “low fertility—high mortality—no immigration” assumptions to 198.7 million on the basis of “high fertility—low mortality—no immigration” assumption. The foregoing, however, are to be regarded as the two extreme limits of what seems possible on the basis of current conditions. The authors give an implicit blessing to the projections based upon “medium fertility—medium mortality” trends. With the assumption of no net gains from immigration, the “medium” projections yield a population peak of 161.4 million by 1985 and a subsequent decline to 159.4 million by 2000. With the assumption of 100,000 net immigration per year, the “medium” projec-

tions yield a population peak of 167.1 million in 1995 and a slight decline to 166.6 million by 2000.

The latest estimates for the total population run somewhat higher than the 1937 estimates. For instance, under "medium fertility—medium mortality—no immigration" assumptions the latest estimate for the year 1980 is 160.9 million as compared with 153.0 million estimated in 1937. Despite the somewhat higher estimates in 1943 than in 1937, however, the essential point brought out in both series is the slowing up of population growth.

Likewise, although the projected aging of the population is a little less marked in the 1943 than in the 1937 estimates, it continues to be a conspicuous characteristic of prospective trends. On the basis of the "medium" projections by age the outlook is for continued sharp declines in the proportionate importance of children and youth under 20, not much change in the proportionate importance of the younger working force (20-44), rather marked rise in the proportion in the older working ages (45-64), and a virtual doubling, by 1980, of the proportion of aged persons (65 and over).

A few other results may be mentioned. In 1940, the foreign whites constituted 8.7 per cent of our population, and the colored, 10.2 per cent. Under the "medium" fertility and mortality assumptions the foreign-born whites dwindle to 0.1 per cent by 2000 if there is no further immigration. With the assumption of 100,000 white immigrants per year the proportionate importance of foreign-born whites in 2000 is still only 2.9 per cent. On the other hand, the "medium" projections yield slight increases in the proportionate importance of the colored population. The colored population for 2000 forms 13.8 per cent of the projected total under assumptions of no white immigration, and 13.2 per cent if 100,000 white immigrants per year are assumed.

A general statement may be in order concerning the assumptions underlying the projections. To arrive at "high," "medium," and "low" assumptions of fertility and mortality, the general procedure was somewhat as follows. The authors first examined past trends in age-specific fertility and mortality rates for various countries and states. Deciding against the use of mathematical extrapolations, the authors proceeded by estimating the probable limits of the age-specific fertility and mortality rates for the United States in the year 2000. Thus "high" and "low" assumptions were made for the terminal year and the "medium" assump-

tions were placed approximately midway between the extremes. Having established the terminal points the next task was that of interpolating between 1940 and 2000. For high mortality assumptions the logistic curve (passing through the observed rates for 1929-1930 and 1939-1940, and the estimated rates for 2000) was used. For low mortality assumptions this form of curve was used for ages under 40 but modified empirically for older ages. The age-specific fertility rates for the years between 1940 and 2000 "were obtained by interpolation along a smooth curve," the specific shape of which was apparently dictated by judgment concerning the age group involved.

Perhaps some students will be bothered because the authors began their estimates with the year 2000. They may suggest that the estimates for the terminal year are subject to largest error and therefore should flow from, rather than precede, the estimates for the intermediate years. Apparently the same premise, however, led the authors to prefer to "anchor" the terminal points at the outset. Whether one selects some function to give a desired fertility or mortality trend, or whether one selects the end points first are matters of expediency. The exercise of good judgment is essential in either procedure. The same could be said with regard to the choice between mathematical and empirical methods of interpolation.

Some students may also feel that Thompson and Whelpton are influenced unduly by current conditions in their estimates regarding future trends in fertility and mortality. The rather frequent revision of the population estimates may give some basis for such belief. Heavy reliance on recent or current trends would be all to the good if the purpose of the projections were simply that of interpreting the force of current vital rates in terms of the future size and composition of the population. To make long-range projections on the basis of short-range observations, however, would seem to weaken the predictive value.

The foregoing criticism, however, is of small moment in view of the immense value of the projections. By virtue of the work of Thompson and Whelpton in this field, many laymen and public officials, as well as demographers, have gained an insight into the future dynamics of population. The essential story of the slowing up of our population growth and of the changes in age structure is not greatly altered by the periodic revision of the estimates.

CLYDE V. KISER