Illustrative
UNITED STATES
POPULATION
PROJECTIONS

by

T. N. E. GREVILLE

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FOREWORD

Actuarial Study No. 46 presents the two population projections that will underlie the long-range cost estimates for the Old-Age, Survivors, and Disability Insurance program, which are now being made and will be completed in the next few months. In addition, four other population projections are set forth in order to suggest the possible range in the total population and its distribution by age and sex over the long-range future.

In this study it has been attempted, for the first time, to integrate the population projections of the Division of the Actuary, Social Security Administration, into the general framework of the population projections of the Bureau of the Census, and the underlying assumptions have been developed in consultation with the technical staff of that organization. This does not mean that the two agencies will show the same figures in their population projections. This will not be the case because the projections of the Bureau of the Census are for only the continental United States and armed forces overseas, while those of the Division of the Actuary include also Alaska, Hawaii, Puerto Rico, the Canal Zone, the Virgin Islands, and certain civilians overseas, and also contain an allowance for net census underreporting. Furthermore, the Division of the Actuary wishes to bring out the effect of possible variations in mortality and has used "high-mortality" and "low-mortality" assumptions, while the Bureau of the Census may employ a single mortality projection intermediate between these two. Nevertheless, the cooperation of the two agencies will result in a degree of consistency in population projections issued by the Federal government which has not previously existed.

The projections given in this Study extend farther into the future than those presented elsewhere, because the actuarial techniques employed in preparing cost estimates for the Old-Age, Survivors and Disability Insurance program require population projections over a long period. With regard to the figures given for the more distant future, it should be pointed out that the Bureau of the Census has given the Division of the Actuary a relatively free hand in formulating assumptions for the period 2010-2050. Any demographic assumptions for a period so far in the future are highly conjectural, and in making a choice from the wide range of plausible assumptions, some consideration has been given to convenience in the preparation of the long-range cost estimates for the Old-Age, Survivors, and Disability Insurance program and consistency with the actuarial techniques employed therein. Thus the figures shown for the period 2010-2050 are not necessarily the most suitable projections for other purposes.

In particular, the birth rate, as has been evidenced in the past three decades, is subject to wide variations, and its future trend cannot be predicted with any degree of precision. Therefore, estimates of the population of the country a century hence can well be subject to a very wide range of variation.

The Division of the Actuary wishes to express its thanks to Dr. Harold F. Dorn, Dr. I. M. Moriyama, and Miss Lillian Guralnick of the Public Health Service for their assistance in developing the mortality projections, and to members of the staff of the Bureau of the Census, especially Dr. Henry S. Shryock, Jr., Mr. Jacob S. Siegel, and Mr. Meyer Zitter, for their assistance in developing the fertility and migration assumptions underlying the population projections. However, the responsibility for the assumptions decided on, and the projections developed from them, rests solely with the Division of the Actuary.

Robert J. Myers
Chief Actuary

A. Introduction

The first step in preparing long-range cost estimates for the Old-Age, Survivors, and Disability Insurance program is a projection into the future of the United States population by age and sex. These projections must be carried far into the future, since, even with stationary demographic conditions, the Old-Age, Survivors, and Disability Insurance program would require many years to reach a stage of even relative maturity.

In 1934-35 when the Committee on Economic Security made its original cost estimates for the old-age benefits program to be incorporated in the Social Security Act, no population projection was available in the particular form necessary, so that development of a projection was of primary importance. The resulting projection was based on rather simple assumptions, namely, the continuance of mortality rates according to 1920-29 patterns and birth rates such that the total population would follow an arbitrary growth curve leveling off at 150 million after 1975. This projection is summarized on page 207 of Issues in Social Security, A Report to the Committee on Ways and Means of the House of Representatives by the Committee's Social Security Technical Staff, January 1946.

After the passage of the Social Security Act, cost studies made in 1937 were based on a set of more comprehensive population projections made by Thompson and Whelpton for the National Resources Committee (Population Statistics, National Data, October 1937). The published data were given in detail for six projections based on varying assumptions as to fertility, mortality and immigration. New cost estimates for the old-age insurance plan (presented in Actuarial Study No. 8) were developed on the basis of the "medium" NRC projection, which involved medium fertility, medium mortality, and 100,000 net annual immigration. These new cost estimates did not supersede the original ones but rather supplemented them by indicating the potential range in costs.

The various cost estimates made for the 1939 Amendments (Actuarial Study No. 14) and subsequently through the war years (Actuarial Study Nos. 17 and 19) were based on the two population projections developed for the original program. New cost estimates were developed in 1946 (Actuarial Study No. 23) to take into account recent wage trends and the latest population data. The population projections used were presented in Actuarial Study No. 24. The projections prepared by Thompson and Whelpton for the National Resources Planning Board (Estimates of Future Population of the United States, 1940-2000, August 1943) were not directly used because by 1946 considerable data as to combat losses and wartime fertility were available. Accordingly, the new projections of the Social Security Administration utilized the NRPB base but allowed for subsequent actual experience. Thompson and Whelpton's projections

were subsequently revised by themselves and the Bureau of the Census cooperatively to allow for actual wartime experience as to mortality and fertility (Population Special Reports, Series P-46, No. 7, September 1946). Subsequently, to take account of postwar experience, revised short-range estimates (up to 1960) were released (Current Population Reports, Series P-25, No. 18, February 1949, and No. 43, August 1950). In 1953 (Current Population Reports, Series P-25, No. 78, August 1953) The Bureau published four projections to 1975 involving four different fertility assumptions referred to as series A (the highest fertility assumed), B, C, and D (the lowest fertility). Two years later, these projections were revised (Current Population Reports, Series P-25, No. 123, October 1955), and series D was dropped, while a new series AA involving higher fertility than series A was added. These projections employed only a single set of mortality assumptions, which extrapolated to 1960 the mortality decline of the 1940's but assumed no further improvement after 1960.

New population projections presented in Actuarial Study No. 33 were used as the basis for cost estimates for the Old-Age and Survivors Insurance system prepared in 1953 and 1954. These projections extend the coverage of the population projections to correspond to that of the Old-Age and Survivors Insurance system, which now extends to Alaska, Hawaii, Puerto Rico, and the Virgin Islands (and, in addition, to Americans employed outside the United States by American employers).

This study establishes a new population base for the actuarial cost estimates for the Old-Age, Survivors, and Disability Insurance system. New projections seem desirable in order to take into account recent mortality and fertility experience and to bring these projections into a closer relationship to those of the Bureau of the Census.

B. Methodology and Assumptions

The population projections presented in this report have been prepared by the same general method used by Thompson and Whelpton in their two reports cited previously and by this office in previous projections. This method begins with an enumerated or estimated population at a starting date, subdivided by quinquennial age groups and sex. No subdivision by race is made in these projections, as there is no need for such data for Old-Age, Survivors, and Disability Insurance cost estimates. Each of these population groups is then projected into the future by the use of quinquennial survival rates that give the proportion of persons in a particular quinquennial age group surviving for 5 years.

At the same time, the number of births within the next 5-year period is obtained by applying age-specific birth rates (i.e., births in a 1-year period per 1000 women of a specified 5-year age group) to the female population in the middle of the period (estimated as the arithmetic mean of the population at the beginning and end of the period) and multiplying the resulting annual births by 5. These births are then subdivided by sex according to a fixed sex ratio at birth (a very stable factor), and are projected by appropriate survival factors to the end of the 5-year period and then to the end of subsequent 5-year periods in the same fashion as the original population. Carrying these various steps forward, population estimates are developed by quinquennial age groups and sex for all quinquennial years in the future.

When some immigration is assumed, the survivors of the postulated immigrants during a 5-year period are added to the survivors (at the end of period) of the population existing at the beginning of the period. The combined total is then projected into the future.

Six separate projections have been made. They involve the same assumptions as to the staring population and almost the same as the net immigration, but differ in the mortality and fertility assumptions made (see Table 1).

Starting Population

The starting point for the projections is the estimated population on July 1, 1955. It includes Alaska, Hawaii, Puerto Rico, and the Virgin Islands, since these areas are covered by OASDI. Guam, American Samoa, and several other small islands are excluded since they are not covered by the system. An attempt has been made to include in the projections American citizens temporarily outside the covered areas. An adjustment for census underenumeration has also been added. The figures by area or category are as follows:

Table 1

GENERAL BASES OF ILLUSTRATIVE POPULATION PROJECTIONS

		Fertility	Mortality	Annual Net Immigration[a]
Projection	I	Low	Low	200,000
Projection	II	Low	High	200,000
Projection	III	High	Low	200,000
Projection	IV	High	High	200,000
Projection	V	Very High	Low	200,000
Projection	VI	Very High	High	200,000

a/ Actually, figures indicate net annual immigration over a 5-year period surviving to end of period. Annual net immigration of 240,000 was assumed for the period 1955-60. In the first four projections no net immigration was assumed after 2020, with 66,667 for 2010-15 and 33,333 for 2015-20.

Note: See text for detailed description of above bases and other ones used.

Area or Category	Estimated Population on July 1, 1955 (in thousands)
Continental United States	164,303
Armed forces overseas	968
Alaska	159
Hawaii	503
Puerto Rico	2,248
Virgin Islands	24
Civilians temporarily outside covered areas	219
Adjustment for underenumeration	4,209
Total	172,633

The figures shown for Alaska, Hawaii, Puerto Rico, and the Virgin Islands are the civilian populations, since armed forces stationed there are included in "Armed forces overseas." The category "Civilians temporarily outside covered areas," includes total civilian employees of the United States government (27,000), families of such employees and of armed forces (107,000), and crews of merchant vessels (46,000). This does not cover all who should be included; on the other hand, some permanent noncitizen residents of the Canal Zone are included. Also, no deduction is made for foreigners residing in the United States for relatively short periods.

The Bureau of the Census estimated the population of the continental United States and armed forces overseas by age and sex for July 1, 1955.[1] Inasmuch as this estimate does not provide any subdivision by age of the population aged 85 and over, the age distribution of this group was assumed to be the same as in the 1950 census. Estimates were also made by the Bureau of the Census of the total civilian population of Alaska, Hawaii, Puerto Rico, the Virgin Islands, and the Canal Zone.[2] It was assumed that the age and sex distribution for these areas was the same as in 1950. For the remaining population outside the covered area, the only available figure was a 1950 total. This total was used again for 1955 and was distributed by age and sex in the same proportion as the rest of the population.

Evidence has recently been presented[3] of an appreciable amount of underenumeration in the census. It has been strongly suggested that this is by no means confined to the age group 0-4, where underenumeration has long been known to occur, but may be as great (or almost as great) in some other age groups. For some years it has been the practice of the Bureau of the Census in its population estimates to show

[1] Current Population Reports, Series P-25, No. 146.
[2] Current Population Reports, Series P-25, No. 145.
[3] Ansley J. Coale, "The Population of the United States in 1950 Classified by Age, Sex, and Color--A Revision of Census Figures," Journal of the American Statistical Association, Vol. 50.

two different figures for the population at ages 0-4; a figure corresponding to the number which would be enumerated in a current census, and a corrected figure derived from births of the preceding 5 years (adjusted for underregistration). The census estimate of the population aged 5-9 in 1955 is based on projection from births (and not on enumerated figures), and presumably has been adjusted in effect for underenumeration. There are also available[4] correction factors for adjusting for net undercount the cohorts 10-14 and 15-19 in 1955. For older age groups there is no precise indication of the extent of undercount, but only indirect evidence that its magnitude may be substantial.

Accordingly, it was decided arbitrarily to adjust the estimated 1955 populations in each age group from 20-24 on by adding 3% for males and 2% for females. These adjustments were decided upon after examination of the suggested corrections to the 1950 census age and sex distribution published by Coale.[3] For the combined white and nonwhite population aged 20 and over, Coale's corrections imply an upward adjustment of 4.0% for males and 3.1% for females. As Coale's corrections seem to be widely regarded as the upper limit to the extent of underenumeration likely to have occurred in the 1950 census, it was decided to use somewhat smaller adjustments but to maintain about the same differential between males and females.

Fertility Assumptions

Making assumptions as to fertility is the greatest problem in making population projections. Fertility rates have fluctuated widely in the past and could vary over a wide range in the future with correspondingly great variation in the resulting populations. Table 2 shows crude birth rates (live births divided by mid-year population) and birth rates by age of mother (live births to mothers of given ages divided by total mid-year female population of those ages) for various past years and the assumed rates for future years. Fertility rates are subject to error because of underregistration of births. Those for years before 1940 are shown without adjustment for such error; for years after 1940, they have been adjusted on the basis of tests of completeness of registration made in conjunction with the censuses of 1940 and 1950. The rates are also subject to error in the opposite direction because of census underenumeration. Those for years since 1940 have been adjusted on the assumption of 2% underenumeration of females.

Examination of past rates is not of much help in forming hypotheses about the future. Fertility rates for the entire population of the United States are available only since 1933. Those for 1915-32 relate to the gradually increasing Birth Registration Area. Fertility

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4/ Current Population Reports, Series P-25, No. 146. It should be noted that the ages mentioned in that report are the ages of the cohorts in 1950, which are 5 years younger than their ages in 1955.

Table 2

ACTUAL PAST AND PROJECTED FUTURE FERTILITY RATES PER 1000

Year	Crude Birth Rate	Rates by Age of Mother					
		15-19	20-24	25-29	30-34	35-39	40-44

Actual Rates, Unadjusted [a]

Year	Crude Birth Rate	15-19	20-24	25-29	30-34	35-39	40-44
1915	25.0	[b]	[b]	[b]	[b]	[b]	[b]
1920	23.7	48.5	151.8	150.5	115.5	78.4	31.1
1925	21.3	50.1	134.7	131.1	103.9	69.3	27.2
1930	18.9	49.1	124.9	117.3	87.7	56.1	21.8
1935	16.9	44.7	114.7	107.0	73.5	45.4	17.6
1940	17.9	48.9	125.3	114.4	77.4	41.9	13.9

Actual Rates, Adjusted [c]

Year	Crude Birth Rate	15-19	20-24	25-29	30-34	35-39	40-44
1940	18.9	53.0	132.9	120.4	81.8	45.4	15.3
1943	22.1	60.5	160.8	144.9	97.5	51.8	15.4
1945	19.9	50.1	136.2	129.6	98.2	55.8	16.3
1947	26.0	77.7	205.6	172.5	109.7	57.7	16.3
1949	23.9	81.8	196.2	162.2	100.1	52.5	15.0
1951	24.3	85.2	207.8	170.8	106.2	53.0	15.0
1952	24.5	83.7	213.8	176.9	110.9	55.0	15.0
1953	24.4	85.8	220.1	180.2	110.8	56.2	15.2
1954	24.7	88.0	231.0	184.8	114.1	57.6	15.5
1955	24.3	87.9	235.7	187.1	113.5	58.3	15.4

High Fertility Assumptions [d]

Year	Crude Birth Rate	15-19	20-24	25-29	30-34	35-39	40-44
1955-60	24.6 [e]	90.1	239.3	200.7	125.8	62.0	17.0
1970-75	23.4 [e]	86.2	209.2	172.5	107.4	55.1	16.8
2005-10	18.4 [e]	60.0	149.3	132.7	79.5	38.0	11.2
2045-50	14.2 [e]	52.3	130.2	115.7	69.3	33.1	9.8

Low Fertility Assumptions [d]

Year	Crude Birth Rate	15-19	20-24	25-29	30-34	35-39	40-44
1955-60	20.3 [f]	79.1	193.0	161.8	99.9	50.5	15.2
1970-75	18.6 [f]	62.7	155.5	136.9	82.4	39.8	11.8
2005-10	14.4 [f]	52.3	130.2	115.7	69.3	33.1	9.8

a/ No adjustment for underregistration of births or underenumeration of the population. Rates are for the Birth Registration Area, which in 1933 first included the entire United States.
b/ Not available.
c/ Births adjusted for underregistration and population for underenumeration.
d/ To allow for the small number of births to mothers at ages under 15 and over 45, the rate for 15-19 represents births to mothers under age 20 divided by population 15-19 and the rate for 40-44 represents births to mothers aged 40 and over divided by population 40-44.
e/ With high mortality.
f/ With low mortality.

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declined from 1915 to a minimum in the middle 1930's. Since then, fertility rates have increased greatly except at the oldest ages of mothers. The increase has not been uniform, but declines have been followed by increases to still higher levels. Preliminary figures for 1956 indicate even higher rates than in 1955.

Previous estimates of future fertility have generally been too low. In the 1930's it was believed that fertility would remain at then current levels or go even lower. The increase in the 1940's was regarded as a temporary phenomenon resulting from the war. It seems clear that a decrease must eventually occur, since the population cannot go on increasing indefinitely. If present fertility rates continued to the year 2050, the total United States population would be over a billion. The important question is when a decline will begin and how rapid it will be.

The assumptions made in this study were developed in collaboration with the staff of the Bureau of the Census, and are intended to be approximately consistent with some of the series to be used in its next set of projections planned for publication by late fall. Some of the series used in earlier projections[5] of the Bureau are incorporated in the new assumptions. Series AA rates are at about the 1954-55 level, Series A represents about the level of 1950-53, and Series C is a decreasing series interpolated between 1950-53 rates and postulated 1975 rates which, on the whole, are at about the level of the early 1940's. The earlier series ended in 1975. In using these series as described in the following paragraph all figures were divided by 1.02 so that the 2% adjustment for underenumeration of females would not result in a larger number of births than in the Bureau's projections.

In the low fertility assumptions, the rates for 1955-75 are Series C, and for 2005-10 and later, rates were used which produce a gross reproduction rate of 1, with linear interpolation between 1970-75 and 2005-10. With a gross reproduction rate of 1 if all females survived to the end of the childbearing period, they would, on the average, have one female child. Using such rates after 2005 in the low fertility assumptions produces a population almost constant in size and age distribution by 2050. In the high fertility assumptions, rates for 1955-60 are 105% of Series AA, for 1970-75 those of Series A, for 2005-10 the 1975 rates of Series C, and for 2045-50 rates which produce a gross reproduction rate of 1. For 5-year periods intermediate between the four periods mentioned above, rates were obtained by linear interpolation.

In the very high fertility assumptions (which are very unlikely to eventuate, but the results of which are shown in summary form for illustrative purposes), rates for 1955-60 are 110% of Series AA, with 100% of Series AA for all subsequent periods to 2050.

5/ Current Population Reports, Series P-25, No. 123

It was assumed that the sex distribution of births in the future would be the same as in 1953-55, 51.265% males and 48.735% females. The percentage of males tends to decrease slightly with increasing age of mother, but for simplicity the same percentage was used for all births.

The relatively simple procedure of projecting fertility rates by attained age of mother has been strongly criticized by Whelpton. He advocates[6] a cohort method, wherein a separate projection is made for the females born in each year and the completed fertility of the cohorts can be made to follow what is regarded as a reasonable trend. He believes that the high fertility of recent years is due to the earlier average age at marriage and to a trend toward earlier childbearing, rather than to a movement toward larger families, and that the cohort approach is necessary to properly allow for this. The cohort method was not used in this study, however, because of the considerable additional work it would require and because it would require assumptions quite as arbitrary as those actually made, and it seemed doubtful that it had any important advantages. It seems possible that the recent high fertility rates may mean considerably larger families for females who have recently entered the childbearing period. The possibility that Whelpton is right in believing that these cohorts will have low fertility in the later part of their childbearing period to balance the high fertility in the early part is, in effect, provided for in the low fertility assumption by the general decline in fertility rates in later years.

Mortality Assumptions

Two sets of mortality rates varying by age, sex, and calendar year have been developed. Hypothetical low mortality rates and high mortality rates by sex for the year 2000 and after were first obtained, and the corresponding 5-year survival rates were computed. The 5-year survival rates on each basis for periods between 1955 and 2000 were obtained by mathematical interpolation between survival rates based on the mortality of 1949-51, 1953-55, and those for 2000 and after. The procedure is described in detail in the following paragraphs.

The postulated mortality rates for 2000 and after were arrived at by considering 1953[7] death rates by age, sex, and ten broad groups of causes of death, as obtained from tabulations by the National Office of Vital Statistics. To these were applied certain assumed percentages of reduction to obtain high and low mortality rates for 2000 for each group of causes. The latter were totaled to obtain age-sex-specific rates for all causes combined. The groups of causes of

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6/ Pascal K. Whelpton, Cohort Fertility. Native White Women in the United States, Princeton University Press, 1954.
7/ These were the latest available when the work was started. It is believed that the use of 1954 death rates, now available, would have resulted in only small differences.

death considered and the corresponding code numbers in the International Statistical Classification of Diseases, Injuries, and Causes of Death are as follows:

I. Tuberculosis (all forms) (001-019)
II. Other infective and parasitic diseases (020-138)
III. Malignant neoplasms (140-205)
IV. Diabetes (260)
V. Major cardiovascular-renal diseases (330-334, 400-468, 592-594)
VI. Influenza and pneumonia (480-493)
VII. Gastritis, duodenitis, enteritis, and diseases of early infancy (543, 571, 572, 760-776)
VIII. Congenital malformations (750-759)
IX. Accident, suicide, and homicide (E800-E964, E970-E985)
X. All other causes

Tables 3-L and 3-H show the postulated age-sex-specific death rates for 2000 for each group of causes of death as a percentage of the 1953 rates, under the low-mortality and high-mortality assumptions, respectively. These percentages were arrived at in consultation with statisticians of the National Office of Vital Statistics and the National Institutes of Health, Public Health Service, but the responsibility for their adoption for the present purpose rests entirely with the Division of the Actuary. Needless to say, they are highly conjectural; in general terms, the low-mortality projection is intended to reflect a definitely optimistic view as to the future course of mortality rates, while the high-mortality projection is intended to reflect a pessimistic view, particularly with regard to the possibility of reduction in death rates for the diseases typical of old age. However, the high-mortality projection does contemplate some future improvement in mortality. It will be noted that the percentages assumed involve a greater relative decline in mortality rates for females than in those for males. This implies continuation to the year 2000 of a trend which has been observed for many years. Applying these percentages to the 1953 rates and totaling the results for the different groups of causes of death gave hypothetical age-sex-specific death rates for 2000 for all causes. Tables 3-L and 3-H show the latter rates as percentages of the corresponding 1953 rates for all causes.

These death rates were regarded, in the subsequent computations, as values of the central death rate for the corresponding age group

(in actuarial notation, $_n m_x = \dfrac{_n d_x}{_n L_x} = \dfrac{l_x - l_{x+n}}{T_x - T_{x+n}}$). The values desired

for projection purposes were 5-year survival ratios for 5-year age

Table 3-L

POSTULATED AGE-SEX-SPECIFIC DEATH RATES FOR 2000 AS PERCENTAGE OF 1953 RATES

Low-Mortality Assumption

Age	Group of Causes of Deaths[a]										All Causes
	I	II	III	IV	V	VI	VII	VIII	IX	X	
Males											
Under 1	0	20	50	50	50	20	20	90	60	60	35
1-4	0	20	50	50	50	20	20	90	60	60	50
5-9	0	20	50	50	50	20	20	90	60	60	53
10-14	0	20	50	50	50	20	20	90	60	60	55
15-19	0	20	50	50	50	20	20	90	70	60	63
20-24	0	20	60	50	50	20	20	90	70	60	64
25-29	0	20	60	50	50	20	20	90	70	60	61
30-34	0	20	60	50	50	20	20	90	60	60	54
35-39	0	20	60	50	50	20	20	90	60	60	53
40-44	0	20	60	50	50	20	20	90	60	60	52
45-49	0	20	60	50	50	20	20	90	60	60	52
50-54	0	20	60	50	50	20	20	90	60	60	51
55-59	0	20	60	50	50	20	20	90	50	60	51
60-64	0	20	60	50	50	20	20	90	50	60	51
65-69	0	20	60	50	50	20	20	90	50	60	51
70-74	0	20	70	60	60	20	20	90	50	70	60
75-79	0	20	80	70	70	20	20	90	50	80	69
80-84	0	20	90	80	80	20	20	90	50	90	78
85 and over	0	20	90	90	90	20	20	90	50	90	84
Females											
Under 1	0	20	50	50	50	20	20	90	50	60	35
1-4	0	20	50	50	50	20	20	90	50	60	47
5-9	0	20	50	50	50	20	20	90	50	60	48
10-14	0	20	50	50	50	20	20	90	50	60	49
15-19	0	20	50	50	50	20	20	90	70	60	57
20-24	0	20	50	50	50	20	20	90	70	60	54
25-29	0	20	50	50	50	20	20	90	70	60	52
30-34	0	20	50	50	50	20	20	90	50	60	48
35-39	0	20	50	50	50	20	20	90	50	60	49
40-44	0	20	50	50	50	20	20	90	50	60	49
45-49	0	20	50	50	50	20	20	90	50	60	50
50-54	0	20	50	50	50	20	20	90	50	60	50
55-59	0	20	50	50	50	20	20	90	50	60	50
60-64	0	20	50	50	50	20	20	90	50	60	50
65-69	0	20	50	50	50	20	20	90	50	60	50
70-74	0	20	60	60	60	20	20	90	50	70	59
75-79	0	20	75	70	70	20	20	90	50	80	69
80-84	0	20	75	80	80	20	20	90	50	90	76
85 and over	0	20	75	90	80	20	20	90	50	90	76

a/ For explanation see text.

Table 3- H

POSTULATED AGE-SEX-SPECIFIC DEATH RATES FOR 2000 AS PERCENTAGE OF 195 RATES

High-Mortality Assumption

Age	Group of Causes of Death [a]										All Causes
	I	II	III	IV	V	VI	VII	VIII	IX	X	
Males											
Under 1	10	40	100	90	70	40	40	100	80	80	53
1-4	10	40	100	90	70	40	40	100	80	80	71
5-9	10	40	100	90	70	40	40	100	80	80	77
10-14	10	40	100	90	70	40	40	100	80	80	77
15-19	10	40	100	90	70	40	40	100	100	80	92
20-24	10	40	100	90	70	40	40	100	100	80	92
25-29	10	40	100	90	70	40	40	100	100	80	89
30-34	10	40	100	90	70	40	40	100	80	80	75
35-39	10	40	100	90	75	40	40	100	80	80	76
40-44	10	40	100	90	80	40	40	100	80	80	78
45-49	10	40	100	90	80	40	40	100	80	80	79
50-54	10	40	100	90	85	40	40	100	80	80	83
55-59	10	40	100	90	85	40	40	100	80	80	84
60-64	10	40	100	90	90	40	40	100	80	80	87
65-69	10	40	100	90	90	40	40	100	80	80	87
70-74	10	40	100	90	90	40	40	100	80	80	88
75-79	10	40	100	90	90	40	40	100	80	90	89
80-84	10	40	100	90	90	40	40	100	80	90	88
85 and over	10	40	100	90	100	40	40	100	80	90	94
Females											
Under 1	10	40	100	90	70	40	40	100	80	80	54
1-4	10	40	100	90	70	40	40	100	80	80	71
5-9	10	40	100	90	70	40	40	100	80	80	75
10-14	10	40	100	90	70	40	40	100	80	80	76
15-19	10	40	100	90	70	40	40	100	100	80	83
20-24	10	40	80	90	70	40	40	100	100	80	78
25-29	10	40	80	90	70	40	40	100	100	80	75
30-34	10	40	80	90	70	40	40	100	80	80	71
35-39	10	40	80	90	70	40	40	100	80	80	73
40-44	10	40	80	90	70	40	40	100	80	80	73
45-49	10	40	80	90	70	40	40	100	80	80	74
50-54	10	40	80	90	70	40	40	100	80	80	74
55-59	10	40	80	90	70	40	40	100	80	80	74
60-64	10	40	80	90	70	40	40	100	80	80	73
65-69	10	40	80	90	75	40	40	100	80	80	76
70-74	10	40	80	90	80	40	40	100	80	80	79
75-79	10	40	85	90	80	40	40	100	80	90	80
80-84	10	40	95	90	90	40	40	100	80	90	88
85 and over	10	40	95	90	100	40	40	100	80	90	94

a/ For explanation, see text.

groups[8]/ (that is, $_5L_{x+5}/_5L_x$), and these ratios were obtained by a modification of the Reed-Merrell technique. The mathematical procedure followed is described in an appendix to this study.

One-year mortality rates and expectation of life values were calculated for certain ages by sex on the basis of the assumed low mortality and high mortality in 2000. These were obtained for comparative purposes only and no direct use was made of them in projecting the populations. They are shown in Tables 4 and 5, along with comparable figures from other sources. In Table 4 it will be noted that in most instances the mortality rates for males show a greater absolute decline between 1953 and 2000 than those for females, notwithstanding the assumption of a greater relative decline in the latter. Exceptions occur, however, under the high-mortality assumptions at ages 20, 30, 60, 70, and 80.

Under both mortality assumptions, mortality is assumed to remain constant after 2000. Accordingly, the survival ratios obtained for 2000 were used in the projections for the period 2000-2050. Survival ratios for the various quinquennia between 1955 and 2000 were computed by interpolation, using as pivotal points the ratios obtained for 2000 (separate interpolations being made for the low-mortality and high-mortality assumptions), the corresponding ratios based on the 1949-51 life tables, and those obtained from approximate abridged life tables for total males and total females in 1953-55 constructed by the Division of the Actuary for this specific purpose.

In general terms, a mathematical curve was fitted to the pivotal values for each age-sex group (for low mortality and high mortality separately) considering the 1949-51 ratios as applying to 1950, the 1953-55 ratios as applying to 1954, and the "ultimate" ratios as applying to 2000. The interpolated ratio for any quinquennium was taken to be the ordinate of the curve for the midpoint of the quinquennium (for example, $1967\frac{1}{2}$ for 1965-70). In most instances, the curve used was the third-degree curve determined by the four conditions that it pass through the three pivotal points and have a horizontal tangent at 2000 (consistent with the supposition of constant mortality after 2000); however, some exceptions were made to this general rule. The current population estimates of the Bureau of the Census have 85 and over as the final age group: therefore, the abridged life tables for 1953-55 terminated at age 85, and the last survival ratio that could be computed on this basis was $_5L_{80}/_5L_{75}$. Accordingly, in interpolating the survival ratios for higher ages, the 1954 pivotal point was dropped, and a second-degree curve passing through the other two points and having a horizontal tangent at 2000 was used.

8/ Also needed were survival ratios to be applied to the population aged 90 and over at the beginning of a quinquennium to obtain the survivors (aged 95 and over) at the end (that is, T_{95}/T_{90}), and also survival ratios to be applied to the number of births during a quinquennium to obtain the survivors (at ages under 5) at the end of the quinquennium (that is, $_5L_0/5\,l_0$).

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Table 4

PROJECTED ANNUAL MORTALITY RATES (PER 1000) FOR THE YEAR 2000
COMPARED WITH OTHER MORTALITY RATES

Age	U.S. Population 1939-41	U.S. Population 1949-51	Lowest Country in Recent Life Tables a/	Low Mortality, 2000 Actuarial Study No. 33	Low Mortality, 2000 This Study	High Mortality, 2000 Actuarial Study No. 33	High Mortality, 2000 This Study
				Males			
0	52.38	33.39	25.0	5.37	12.19	13.39	18.69
1	5.53	2.44	2.0	.07	.95	1.32	1.35
5	1.45	.87	.8	.10	.43	.54	.61
10	1.05	.63	.5	.16	.27	.40	.38
20	2.46	1.79	1.2	.40	1.22	1.06	1.76
30	3.38	2.14	1.5	1.00	1.13	1.50	1.60
40	5.95	4.40	2.4	2.51	2.14	3.38	3.19
50	12.64	10.95	6.1	6.29	5.52	8.54	8.73
60	26.47	24.82	13.6	15.67	12.60	19.70	21.12
70	54.77	50.69	34.1	38.50	27.69	45.87	43.28
80	123.86	108.72	95.0	91.52	83.65	101.13	97.23
				Females			
0	41.52	25.94	20.0	3.66	9.52	9.70	14.59
1	4.89	2.15	1.8	.03	.76	1.12	1.14
5	1.20	.66	.5	.05	.30	.34	.47
10	.75	.42	.3	.07	.16	.24	.25
20	1.90	.92	.7	.20	.42	.52	.61
30	2.77	1.45	1.1	.55	.59	.90	.87
40	4.52	2.97	2.1	1.50	1.30	2.10	1.93
50	8.76	6.58	4.4	4.10	3.09	5.00	4.47
60	18.37	14.62	10.4	10.93	6.67	12.21	9.70
70	42.74	34.84	29.3	29.12	17.56	32.90	25.29
80	106.87	89.64	87.7	75.29	67.36	82.91	75.75

a/ Based on recent editions of the United Nations Demographic Yearbook. In most
instances, rate is for New Zealand (European population), Netherlands, or
Norway. Denmark, Sweden, and the United States are represented by one rate
each.

Table 5

EXPECTATIONS OF LIFE (IN YEARS) BASED ON PROJECTED MORTALITY RATES FOR
THE YEAR 2000 COMPARED WITH THOSE BASED ON OTHER MORTALITY RATES

| Age | U.S. Population | | Low Mortality, 2000 | | High Mortality, 2000 | |
	1939-41	1949-51	Actuarial Study No. 33	This Study	Actuarial Study No. 33	This Study
			Males			
0	61.60	65.47	73.20	73.97	69.62	68.92
1	64.00	66.73	72.60	73.88	69.56	69.23
5	60.76	63.12	68.62	70.09	65.79	65.51
10	56.12	58.35	63.66	65.20	60.92	60.66
20	46.91	48.92	53.80	55.58	51.29	51.16
30	38.13	39.78	44.10	46.21	41.86	41.99
40	29.57	30.79	34.71	36.79	32.65	32.74
50	21.72	22.59	25.88	27.86	24.10	24.17
60	14.99	15.68	17.97	19.78	16.67	16.86
65	12.07	12.74	14.50	16.11	13.45	13.80
70	9.46	10.11	11.44	12.66	10.65	11.10
			Females			
0	65.89	70.96	76.76	78.87	74.31	75.41
1	67.73	71.84	76.04	78.62	74.03	75.52
5	64.43	68.21	72.05	74.79	70.23	71.77
10	59.73	63.38	67.07	69.87	65.33	66.89
20	50.37	53.73	57.15	60.06	55.54	57.15
30	41.41	44.28	47.32	50.33	45.88	47.51
40	32.68	35.06	37.69	40.71	36.43	38.04
50	24.40	26.40	28.48	31.40	27.41	28.99
60	16.92	18.50	20.04	22.57	19.17	20.58
65	13.57	14.95	16.25	18.39	15.46	16.69
70	10.56	11.71	12.85	14.45	12.17	13.16

Furthermore, it was considered objectionable to have a survival ratio for any age group reach a peak before 2000 and then decline. In some instances, the third-degree curve previously described would have had this characteristic, and it was decided in such cases not to require the curve to pass through the 1950 pivotal point, but to use the second-degree curve passing through the 1954 and 2000 pivotal points and having a horizontal tangent at 2000. The resulting survival ratios are shown in Tables 6-L, 6-H, 7-L, and 7-H.

Migration Assumptions

Migration was once a very important element in the growth of population, in addition to fertility and mortality. In 1910-15 there was a net immigration (excess of immigration over emigration) of about three million. It decreased greatly because of World War I, and then the adoption in 1921 of quotas based on national origin, restricting the number of immigrants from outside the Western Hemisphere, prevented a return to the former high level. The depression caused an additional but temporary decrease and in some years of the 1930's there was actually a net emigration. The Bureau of the Census assumed in its recent projections a net immigration of 1.4 million (about the level of 1950-55) in 1955-60 and of 1.2 million in each following 5-year period. In this study a net immigration of 1.2 million in 1955-60 and of 1.0 million in following quinquennial periods up to 2005-10, after allowing for deaths before the end of the period, is assumed. In other words, it is assumed that at the end of each 5-year period the survivors of net immigrants during the period will amount to 1.2 million for 1955-60 and 1.0 million for each subsequent 5-year period up to 2005-10.

These figures are smaller than those which have been recently assumed by the Bureau of the Census, in order to exclude immigrants from Puerto Rico to the continental United States. The Bureau's recent projections have extended only 25 or 30 years ahead. As the actuarial cost estimates for the Old-Age, Survivors, and Disability Insurance system are based on the theory that the population will eventually tend toward a stationary condition, it was decided to gradually eliminate assumed net immigration after 2010 (for 2010-15, $\frac{2}{3}$ million, for 2015-20, $\frac{1}{3}$ million, and none thereafter) in the low-fertility and high-fertility projections. In the "very high" fertility projections, the assumption of 1.0 million was continued to 2050. The age and sex distribution of the surviving net immigrants at the end of each 5-year period throughout the projections was based on that of the net immigrants in 1950-55, adjusted for change in age between the date of entry and the end of the 5-year period of entry. The following table shows the assumed age and sex distribution of the 1.0 million surviving net immigrants that were assumed in most instances. The same percentage distribution was used in those cases wher other totals were assumed.

Age	Number (in thousands)	
	Male	Female
Under 5	25	24
5-9	44	43
10-14	33	32
15-19	30	39
20-24	38	75
25-29	55	94
30-34	60	71
35-39	49	46
40-44	40	35
45-49	31	29
50-54	22	22
55-59	15	16
60-64	8	10
65-69	3	5
70-74	1	3
75-79	-	2
Total	454	546

Table 6-L

PROJECTED SURVIVAL RATIOS FOR 5-YEAR AGE GROUPS, MALE POPULATION, LOW MORTALITY

Age Group	1955-60	1960-65	1965-70	1970-75	1975-80	1980-85	1985-90	1990-95	1995-2000	2000-2005 and after
Birth to 0- 4	.97103	.97467	.97783	.98052	.98274	.98451	.98582	.98669	.98713	.98718
0- 4 to 5- 9	.99525	.99564	.99599	.99629	.99654	.99674	.99688	.99698	.99703	.99704
5- 9 to 10-14	.99731	.99751	.99769	.99784	.99797	.99807	.99815	.99820	.99823	.99823
10-14 to 15-19	.99538	.99575	.99606	.99632	.99653	.99670	.99681	.99689	.99693	.99693
15-19 to 20-24	.99139	.99158	.99194	.99241	.99294	.99347	.99395	.99433	.99454	.99457
20-24 to 25-29	.99041	.99073	.99118	.99169	.99223	.99275	.99321	.99356	.99375	.99378
25-29 to 30-34	.99099	.99185	.99254	.99308	.99348	.99377	.99395	.99406	.99411	.99411
30-34 to 35-39	.98866	.99002	.99106	.99182	.99235	.99269	.99287	.99296	.99298	.99298
35-39 to 40-44	.98277	.98481	.98640	.98759	.98844	.98901	.98935	.98952	.98958	.98958
40-44 to 45-49	.97191	.97487	.97732	.97930	.98085	.98201	.98283	.98333	.98356	.98359
45-49 to 50-54	.95396	.95774	.96128	.96452	.96737	.96979	.97170	.97304	.97374	.97383
50-54 to 55-59	.92967	.93523	.94053	.94545	.94986	.95365	.95667	.95881	.95994	.96009
55-59 to 60-64	.89485	.90197	.90934	.91664	.92354	.92972	.93483	.93857	.94059	.94086
60-64 to 65-69	.84271	.84929	.85846	.86924	.88065	.89172	.90148	.90894	.91314	.91371
65-69 to 70-74	.78433	.79363	.80537	.81852	.83205	.84492	.85612	.86460	.86933	.86997
70-74 to 75-79	.70635	.71931	.73263	.74574	.75808	.76908	.77817	.78479	.78838	.78885
75-79 to 80-84	.59010	.60120	.61312	.62523	.63690	.64750	.65639	.66293	.66651	.66699
80-84 to 85-89	.46694	.48231	.49576	.50729	.51690	.52458	.53035	.53419	.53611	.53635
85-89 to 90-94	.32953	.34538	.35925	.37114	.38105	.38897	.39492	.39888	.40086	.40111
90+ to 95+	.18558	.19358	.20058	.20658	.21158	.21558	.21858	.22058	.22158	.22170

Table 6-H

PROJECTED SURVIVAL RATIOS FOR 5-YEAR AGE GROUPS, MALE POPULATION, HIGH MORTALITY

Age Group	1955-60	1960-65	1965-70	1970-75	1975-80	1980-85	1985-90	1990-95	1995-2000	2000-2005 and after
Birth to 0- 4	.97082	.97387	.97621	.97791	.97909	.97984	.98025	.98044	.98048	.98048
0- 4 to 5- 9	.99505	.99519	.99532	.99543	.99552	.99559	.99564	.99568	.99570	.99570
5- 9 to 10-14	.99720	.99726	.99732	.99736	.99740	.99743	.99746	.99747	.99748	.99748
10-14 to 15-19	.99517	.99527	.99536	.99543	.99549	.99554	.99558	.99561	.99562	.99562
15-19 to 20-24	.99131	.99129	.99135	.99147	.99163	.99179	.99195	.99208	.99215	.99216
20-24 to 25-29	.99032	.99041	.99051	.99062	.99073	.99083	.99092	.99099	.99103	.99103
25-29 to 30-34	.99046	.99072	.99094	.99112	.99128	.99141	.99150	.99156	.99160	.99160
30-34 to 35-39	.98786	.98834	.98876	.98912	.98941	.98965	.98983	.98995	.99001	.99002
35-39 to 40-44	.98156	.98225	.98282	.98332	.98374	.98408	.98433	.98450	.98458	.98459
40-44 to 45-49	.97032	.97135	.97225	.97302	.97367	.97418	.97457	.97483	.97495	.97497
45-49 to 50-54	.95234	.95382	.95511	.95621	.95713	.95787	.95842	.95879	.95898	.95900
50-54 to 55-59	.92718	.92910	.93078	.93222	.93341	.93437	.93509	.93557	.93581	.93584
55-59 to 60-64	.89201	.89437	.89643	.89819	.89966	.90084	.90172	.90231	.90260	.90264
60-64 to 65-69	.84091	.84255	.84470	.84713	.84966	.85209	.85421	.85582	.85672	.85684
65-69 to 70-74	.78223	.78575	.78928	.79268	.79583	.79860	.80086	.80250	.80337	.80349
70-74 to 75-79	.70181	.70699	.71152	.71541	.71864	.72123	.72318	.72447	.72512	.72520
75-79 to 80-84	.58847	.59509	.60064	.60520	.60882	.61158	.61355	.61479	.61538	.61545
80-84 to 85-89	.45550	.46427	.47195	.47853	.48401	.48840	.49169	.49389	.49498	.49512
85-89 to 90-94	.31931	.32926	.33797	.34544	.35166	.35664	.36037	.36286	.36410	.36426
90+ to 95+	.18100	.18636	.19104	.19506	.19841	.20109	.20310	.20444	.20511	.20519

Table 7-L

PROJECTED SURVIVAL RATIOS FOR 5-YEAR AGE GROUPS, FEMALE POPULATION, LOW MORTALITY

Age Group	1955-60	1960-65	1965-70	1970-75	1975-80	1980-85	1985-90	1990-95	1995-2000	2000-2005 and after
Birth to 0- 4	.97733	.98016	.98263	.98474	.98648	.98787	.98891	.98959	.98994	.98998
0- 4 to 5- 9	.99620	.99655	.99686	.99712	.99734	.99751	.99764	.99773	.99777	.99778
5- 9 to 10-14	.99827	.99842	.99855	.99866	.99876	.99883	.99889	.99893	.99895	.99895
10-14 to 15-19	.99775	.99794	.99810	.99824	.99836	.99845	.99852	.99856	.99859	.99859
15-19 to 20-24	.99671	.99699	.99723	.99744	.99761	.99775	.99785	.99792	.99796	.99796
20-24 to 25-29	.99595	.99631	.99662	.99689	.99712	.99730	.99743	.99752	.99756	.99757
25-29 to 30-34	.99475	.99525	.99569	.99606	.99637	.99662	.99681	.99693	.99699	.99700
30-34 to 35-39	.99247	.99321	.99387	.99443	.99489	.99527	.99555	.99574	.99583	.99584
35-39 to 40-44	.98871	.98981	.99078	.99161	.99230	.99285	.99327	.99354	.99368	.99370
40-44 to 45-49	.98287	.98455	.98601	.98726	.98831	.98914	.98977	.99019	.99039	.99042
45-49 to 50-54	.97470	.97792	.98041	.98228	.98360	.98448	.98500	.98526	.98534	.98535
50-54 to 55-59	.96296	.96761	.97122	.97391	.97583	.97709	.97784	.97820	.97832	.97833
55-59 to 60-64	.94475	.95168	.95707	.96111	.96399	.96591	.96706	.96764	.96783	.96785
60-64 to 65-69	.90878	.91600	.92299	.92955	.93550	.94063	.94477	.94772	.94929	.94949
65-69 to 70-74	.86178	.87303	.88305	.89181	.89924	.90529	.90991	.91304	.91463	.91483
70-74 to 75-79	.78916	.80571	.81854	.82811	.83491	.83940	.84206	.84336	.84379	.84382
75-79 to 80-84	.66269	.67631	.68846	.69906	.70806	.71539	.72099	.72478	.72671	.72695
80-84 to 85-89	.52684	.54297	.55709	.56919	.57927	.58734	.59339	.59742	.59944	.59969
85-89 to 90-94	.37803	.39606	.41183	.42535	.43662	.44564	.45240	.45690	.45916	.45944
90+ to 95+	.20382	.21336	.22171	.22887	.23483	.23960	.24318	.24557	.24676	.24691

Table 7-H

PROJECTED SURVIVAL RATIOS FOR 5-YEAR AGE GROUPS, FEMALE POPULATION, HIGH MORTALITY

Age Group	1955-60	1960-65	1965-70	1970-75	1975-80	1980-85	1985-90	1990-95	1995-2000	2000-2005 and after
Birth to 0- 4	.97716	.97954	.98135	.98268	.98359	.98418	.98450	.98464	.98468	.98468
0- 4 to 5- 9	.99603	.99616	.99628	.99637	.99645	.99652	.99657	.99660	.99662	.99662
5- 9 to 10-14	.99819	.99823	.99827	.99830	.99833	.99836	.99837	.99838	.99839	.99839
10-14 to 15-19	.99765	.99771	.99776	.99780	.99783	.99786	.99788	.99789	.99790	.99790
15-19 to 20-24	.99658	.99668	.99677	.99685	.99691	.99696	.99700	.99703	.99704	.99704
20-24 to 25-29	.99580	.99596	.99611	.99623	.99633	.99641	.99648	.99652	.99654	.99654
25-29 to 30-34	.99456	.99480	.99501	.99519	.99534	.99546	.99556	.99562	.99565	.99565
30-34 to 35-39	.99218	.99255	.99288	.99316	.99340	.99358	.99372	.99382	.99386	.99387
35-39 to 40-44	.98826	.98880	.98926	.98966	.99000	.99026	.99046	.99060	.99066	.99067
40-44 to 45-49	.98221	.98301	.98372	.98432	.98483	.98523	.98553	.98574	.98584	.98585
45-49 to 50-54	.97290	.97411	.97516	.97606	.97682	.97742	.97787	.97817	.97832	.97834
50-54 to 55-59	.96033	.96205	.96356	.96485	.96592	.96678	.96743	.96786	.96807	.96810
55-59 to 60-64	.94093	.94357	.94588	.94786	.94952	.95084	.95183	.95249	.95282	.95286
60-64 to 65-69	.90800	.91310	.91706	.92002	.92214	.92355	.92440	.92482	.92497	.92498
65-69 to 70-74	.85739	.86278	.86750	.87154	.87491	.87761	.87963	.88098	.88166	.88174
70-74 to 75-79	.78043	.78731	.79333	.79849	.80279	.80623	.80881	.81053	.81139	.81150
75-79 to 80-84	.65804	.66545	.67192	.67747	.68210	.68580	.68858	.69043	.69135	.69147
80-84 to 85-89	.51043	.51710	.52294	.52794	.53211	.53544	.53794	.53961	.54045	.54055
85-89 to 90-94	.35857	.36538	.37134	.37645	.38071	.38412	.38667	.38837	.38922	.38933
90+ to 95+	.19616	.20128	.20576	.20960	.21281	.21537	.21729	.21857	.21921	.21929

C. Population Projections

Of the six projections listed in Table 1, the two involving the assumption of "very high fertility"(Projections V and VI) are regarded as mainly of academic interest, in illustrating that continuation of present fertility rates over the next 95 years would lead to a total population in 2050 of more than 1 billion, a condition which seems unlikely to arise. Accordingly, the remaining discussion is mainly devoted to Projections I to IV. Of these four, Projections II and III are the two which offer the widest range in the size of the total population, and serve to illustrate the degree of variation that might reasonably be expected in this regard. On the other hand, Projections I and IV show a wider range in the cost estimates for the Old-Age, Survivors, and Disability Insurance system. For this purpose the most important factor is the relationship between the aged and productive populations.[9] Projection I assumes low fertility and low mortality, which produce a relatively high total cost for the OASDI system. Projection IV, which assumes high fertility and high mortality, has the opposite effect. It should be emphasized, however, that these pairs of projections certainly do not represent the extreme outside limits possible as to size of the population or cost of the OASDI system.

Table 8 summarizes, by four broad age groups, the growth of the population since 1900 and its future progress under the various projections, while Tables 9, 10, and 11, respectively, give the total population, male population, and female population by 5-year age groups in every fifth year from 1955 to 2000 and for 2025 to 2050. The total population is shown for all six projections, the male and female populations for Projections I to IV. The low-fertility projections show an increase in the total population of somewhat more than 50% between 1955 and 2000, with a further increase of about 15% in the following 50 years. Under the high-fertility projections, the total population will slightly less than double between 1955 and 2000, and then increase by somewhat more than 40% from 2000 to 2050. Finally, the very-high fertility projections represent an increase of roughly 120% in the first period and 170% in the second.

9/ The old-age and survivors insurance program includes monthly old-age benefits (including those to aged survivors) and monthly benefits for totally and permanently disabled insured workers aged 50-64 and for surviving orphans and their widowed mothers plus lump-sums for deaths. The cost for the old-age monthly benefits predominates. Thus, other things being equal, estimates based on low-mortality assumptions, which yield relatively more aged persons, will show a higher total cost, since the larger cost for benefits to the aged will far more than offset the lower cost for young survivor benefits.

Table 8

ESTIMATES AND PROJECTIONS OF THE UNITED STATES POPULATION[a]/
BY BROAD AGE GROUPS, 1900-2050

Year	Under 20	Population[b]/ (in thousands)				65 and Over as Percent of Total
		20-44	45-64	65 and Over	Total	
1900	34,281	29,247	10,577	3,124	77,229	4.0
1910	39,394	36,675	13,696	4,016	93,781	4.3
1920	44,730	41,144	17,223	4,973	108,070	4.6
1930	49,383	47,765	21,658	6,691	125,497	5.3
1940	47,365	52,147	26,415	9,047	134,974	6.7
1950	53,439	58,045	31,062	12,308	154,854	7.9
1955	63,104	60,284	34,693	14,552	172,633	8.4
Projection I						
1960	69,214	60,473	37,810	16,413	183,910	8.9
1970	73,438	67,647	43,946	20,604	205,635	10.0
1980	75,965	81,531	45,672	26,386	229,554	11.5
1990	80,805	91,590	47,498	32,468	252,361	12.9
2000	81,694	94,395	60,891	35,198	272,178	12.9
2025	81,354	101,762	72,431	51,366	306,913	16.7
2050	79,945	99,814	75,742	58,993	314,494	18.8
Projection II						
1960	69,201	60,448	37,727	16,319	183,695	8.9
1970	73,329	67,516	43,426	19,881	204,152	9.7
1980	75,651	81,216	44,605	24,306	225,778	10.8
1990	80,197	90,964	46,024	28,451	245,636	11.6
2000	80,768	93,443	58,815	29,490	262,516	11.2
2025	79,696	99,770	69,184	42,095	290,745	14.5
2050	77,593	96,947	71,570	47,536	293,646	16.2
Projection III						
1960	73,191	60,473	37,810	16,413	187,887	8.7
1970	87,077	67,647	43,946	20,604	219,274	9.4
1980	100,137	85,455	45,672	26,386	257,650	10.2
1990	114,919	105,042	47,498	32,468	299,927	10.8
2000	124,512	122,072	60,891	35,198	342,673	10.3
2025	135,964	156,180	94,775	54,561	441,480	12.4
2050	136,363	167,614	118,152	79,696	501,825	15.9

Note: These data relate to the entire United States and not merely to the continental United States (see text).

Table 8 (Continued)

ESTIMATES AND PROJECTIONS OF THE UNITED STATES POPULATION[a]
BY BROAD AGE GROUPS, 1900-2050

| Year | Under 20 | Population[b] (in thousands) | | | | 65 and Over as Percent of Total |
		20-44	45-64	65 and Over	Total	

Projection IV

Year	Under 20	20-44	45-64	65 and Over	Total	65 and Over as Percent of Total
1960	73,178	60,448	37,727	16,319	187,672	8.7
1970	86,946	67,516	43,426	19,881	217,769	9.1
1980	99,724	85,131	44,605	24,306	253,766	9.6
1990	114,046	104,339	46,024	28,451	292,860	9.7
2000	123,090	120,844	58,815	29,490	332,239	8.9
2025	133,154	153,115	90,592	44,933	421,794	10.7
2050	132,301	162,768	111,678	64,548	471,295	13.7

Projection V

Year	Under 20	20-44	45-64	65 and Over	Total	65 and Over as Percent of Total
1960	74,222	60,473	37,810	16,413	188,918	8.7
1970	88,663	67,647	43,946	20,604	220,860	9.3
1980	106,720	86,471	45,672	26,386	265,249	9.9
1990	134,194	106,601	47,498	32,468	320,761	10.1
2000	162,785	129,570	60,891	35,198	388,444	9.1
2025	269,430	213,962	101,388	55,439	640,219	8.6
2050	443,140	352,033	168,662	89,672	1,053,507	8.5

Projection VI

Year	Under 20	20-44	45-64	65 and Over	Total	65 and Over as Percent of Total
1960	74,208	60,448	37,727	16,319	188,702	8.6
1970	88,528	67,516	43,426	19,881	219,351	9.1
1980	106,275	86,145	44,605	24,306	261,331	9.3
1990	133,171	105,892	46,024	28,451	313,538	9.1
2000	160,909	128,272	58,815	29,490	377,486	7.8
2025	263,952	209,868	97,010	45,713	616,543	7.4
2050	430,158	342,081	159,730	72,733	1,004,702	7.2

a/ Data for 1900-1955 are based on publications of the Bureau of the Census, but include figures for outlying areas estimated in part by the Division of the Actuary. See Table 1 and text for bases of the projections.

b/ Data for 1900-1950 are for census date; those for 1955-2050 are for July 1. Data for 1920 on include an adjustment for underenumeration of young children in the continental United States. Those for 1955 on incorporate an additional correction for underenumeration at other ages. Those for 1940 on are adjusted for age bias in the nonwhite population of the continental United States for ages 55-69.

Note: These data relate to the entire United States and not merely to the continental United States (see text).

Table 9-I

UNITED STATES TOTAL POPULATION BY QUINQUENNIAL AGE GROUPS, PROJECTION I,
LOW FERTILITY AND LOW MORTALITY ASSUMPTIONS, 1955-2050
(In thousands of persons)

Age	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2025	2050
0-4	19,625	17,706	17,553	18,425	19,390	20,426	20,503	20,307	20,270	20,422	20,326	19,951
5-9	17,576	19,645	17,724	17,577	18,451	19,418	20,454	20,533	20,340	20,304	20,357	19,971
10-14	14,214	17,616	19,670	17,755	17,611	18,486	19,453	20,489	20,568	20,377	20,386	20,004
15-19	11,689	14,247	17,629	19,681	17,776	17,635	18,510	19,476	20,511	20,591	20,285	20,019
20-24	11,319	11,754	14,278	17,646	19,693	17,804	17,670	18,547	19,513	20,547	20,458	20,027
25-29	12,292	11,419	11,826	14,339	17,694	19,736	17,863	17,736	18,612	19,577	20,364	20,035
30-34	12,922	12,363	11,476	11,888	14,392	17,735	19,772	17,911	17,787	18,660	20,232	20,029
35-39	12,104	12,915	12,355	11,485	11,901	14,395	17,723	19,752	17,904	17,782	20,285	19,972
40-44	11,647	12,022	12,827	12,289	11,441	11,861	14,340	17,644	19,660	17,829	20,423	19,751
45-49	10,476	11,456	11,839	12,653	12,144	11,325	11,750	14,204	17,470	19,464	20,181	19,735
50-54	9,149	10,157	11,133	11,541	12,363	11,892	11,111	11,540	13,952	17,156	18,865	19,325
55-59	8,129	8,695	9,697	10,677	11,112	11,940	11,514	10,780	11,210	13,553	17,453	18,692
60-64	6,939	7,502	8,082	9,075	10,053	10,515	11,344	10,974	10,297	10,718	15,932	17,990
65-69	5,536	6,091	6,640	7,221	8,187	9,156	9,659	10,496	10,207	9,605	14,978	17,025
70-74	4,204	4,566	5,094	5,630	6,202	7,117	8,044	8,557	9,356	9,126	14,763	15,229
75-79	2,634	3,157	3,499	3,976	4,461	4,973	5,759	6,553	6,999	7,667	10,853	11,890
80-84	1,371	1,658	2,031	2,295	2,656	3,028	3,418	3,999	4,582	4,909	6,190	7,946
85-89	602	686	858	1,080	1,249	1,473	1,705	1,945	2,290	2,633	2,938	4,352
90-94	166	215	258	336	437	519	626	736	848	1,003	1,233	1,915
95+	39	40	52	66	89	120	148	182	218	255	411	636
Total	172,633	183,910	194,521	205,635	217,302	229,554	241,366	252,361	262,594	272,178	306,913	314,494
0-19	63,104	69,214	72,576	73,438	73,228	75,965	78,920	80,805	81,689	81,694	81,354	79,945
20-64	94,977	98,283	103,513	111,593	120,793	127,203	133,087	139,088	146,405	155,286	174,193	175,556
65+	14,552	16,413	18,432	20,604	23,281	26,386	29,359	32,468	34,500	35,198	51,366	58,993

Note: These data relate to the entire United States and not merely to the continental United States.   See Table 1 and text
for bases of the several projections.

Table 9-II

UNITED STATES TOTAL POPULATION BY QUINQUENNIAL AGE GROUPS, PROJECTION II,
LOW FERTILITY AND HIGH MORTALITY ASSUMPTIONS, 1955-2050
(In thousands of persons)

Age	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2025	2050
0-4	19,625	17,700	17,533	18,385	19,319	20,319	20,359	20,124	20,049	20,160	19,885	19,340
5-9	17,576	19,641	17,710	17,546	18,396	19,328	20,325	20,367	20,134	20,059	19,929	19,369
10-14	14,214	17,614	19,662	17,736	17,572	18,422	19,353	20,348	20,390	20,157	19,982	19,426
15-19	11,689	14,246	17,620	19,662	17,745	17,582	18,430	19,358	20,350	20,392	19,900	19,458
20-24	11,319	11,752	14,273	17,627	19,660	17,755	17,595	18,440	19,365	20,352	20,073	19,469
25-29	12,292	11,418	11,820	14,326	17,659	19,681	17,790	17,632	18,473	19,393	19,975	19,471
30-34	12,922	12,358	11,466	11,868	14,359	17,671	19,683	17,806	17,650	18,486	19,847	19,465
35-39	12,104	12,908	12,336	11,456	11,858	14,331	17,618	19,616	17,756	17,602	19,890	19,399
40-44	11,647	12,012	12,797	12,239	11,376	11,778	14,222	17,470	19,446	17,610	19,985	19,143
45-49	10,476	11,442	11,799	12,577	12,039	11,200	11,600	13,998	17,186	19,125	19,653	19,034
50-54	9,149	10,139	11,076	11,434	12,199	11,688	10,883	11,276	13,601	16,692	18,205	18,464
55-59	8,129	8,671	9,621	10,527	10,883	11,623	11,147	10,388	10,766	12,982	16,580	17,580
60-64	6,939	7,475	7,991	8,888	9,747	10,094	10,794	10,362	9,662	10,016	14,746	16,492
65-69	5,536	6,082	6,581	7,062	7,881	8,669	8,998	9,638	9,260	8,638	13,305	14,980
70-74	4,204	4,549	5,031	5,476	5,906	6,619	7,308	7,605	8,161	7,847	12,441	12,716
75-79	2,634	3,128	3,415	3,809	4,176	4,529	5,099	5,650	5,892	6,330	8,667	9,417
80-84	1,371	1,650	1,985	2,189	2,465	2,723	2,971	3,358	3,733	3,898	4,677	5,953
85-89	602	666	816	996	1,112	1,265	1,409	1,546	1,755	1,955	2,036	2,986
90-94	166	205	233	293	363	411	473	532	586	667	748	1,148
95+	39	39	48	56	71	90	105	122	140	155	221	336
Total	172,633	183,695	193,813	204,152	214,786	225,778	236,162	245,636	254,355	262,516	290,745	293,646
0-19	63,104	69,201	72,525	73,329	73,032	75,651	78,467	80,197	80,923	80,768	79,696	77,593
20-64	94,977	98,175	103,179	110,942	119,780	125,821	131,332	136,988	143,905	152,258	168,954	168,517
65+	14,552	16,319	18,109	19,881	21,974	24,306	26,363	28,451	29,527	29,490	42,095	47,536

Note: These data relate to the entire United States and not merely to the continental United States. See Table 1 and text
for bases of the several projections.

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Table 9-III

UNITED STATES TOTAL POPULATION BY QUINQUENNIAL AGE GROUPS, PROJECTION III,
HIGH FERTILITY AND LOW MORTALITY ASSUMPTIONS, 1955-2050
(In thousands of persons)

Age	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2025	2050
0-4	19,625	21,683	21,981	23,698	26,065	28,304	29,784	30,694	31,550	32,424	34,637	33,768
5-9	17,576	19,645	21,685	21,989	23,707	26,072	28,310	29,789	30,700	31,555	34,379	34,062
10-14	14,214	17,616	19,670	21,709	22,016	23,733	26,096	28,333	29,811	30,721	33,916	34,240
15-19	11,689	14,247	17,629	19,681	21,718	22,028	23,744	26,103	28,337	29,812	33,032	34,293
21-24	11,319	11,754	14,278	17,646	19,693	21,728	22,044	23,759	26,113	28,343	32,868	34,262
25-29	12,292	11,419	11,826	14,339	17,694	19,736	21,768	22,089	23,801	26,148	32,193	34,140
30-34	12,922	12,363	11,476	11,888	14,392	17,735	19,772	21,798	22,121	23,826	31,299	33,822
35-39	12,104	12,915	12,355	11,485	11,901	14,395	17,723	19,752	21,770	22,092	30,419	33,228
40-44	11,647	12,022	12,827	12,289	11,441	11,861	14,340	17,644	19,660	21,663	29,401	32,162
45-49	10,476	11,456	11,839	12,653	12,144	11,325	11,750	14,204	17,470	19,464	27,700	31,706
50-54	9,149	10,157	11,133	11,541	12,363	11,892	11,111	11,540	13,952	17,156	25,099	30,551
55-59	8,129	8,695	9,697	10,677	11,112	11,940	11,514	10,780	11,210	13,553	22,224	28,918
60-64	6,939	7,502	8,082	9,075	10,053	10,515	11,344	10,974	10,297	10,718	19,752	26,977
65-69	5,536	6,091	6,640	7,221	8,187	9,156	9,659	10,496	10,207	9,605	18,173	24,506
70-74	4,204	4,566	5,094	5,630	6,202	7,117	8,044	8,557	9,356	9,126	14,763	20,898
75-79	2,634	3,157	3,499	3,976	4,461	4,973	5,759	6,553	6,999	7,667	10,853	15,819
80-84	1,371	1,658	2,031	2,295	2,656	3,028	3,418	3,999	4,582	4,909	6,190	10,118
85-89	602	686	858	1,080	1,249	1,473	1,705	1,945	2,290	2,633	2,938	5,396
90-94	166	215	258	336	437	519	626	736	848	1,003	1,233	2,323
95+	39	40	52	66	89	120	148	182	218	255	411	636
Total	172,633	187,887	202,910	219,274	237,580	257,650	278,659	299,927	321,292	342,673	441,480	501,825
0-19	63,104	73,191	80,965	87,077	93,506	100,137	107,934	114,919	120,398	124,512	135,964	136,363
20-64	94,977	98,283	103,513	111,593	120,793	131,127	141,366	152,540	166,394	182,963	250,955	285,766
65+	14,552	16,413	18,432	20,604	23,281	26,386	29,359	32,468	34,500	35,198	54,561	79,696

Note: These data relate to the entire United States and not merely to the continental United States. See Table 1 and text
for bases of the several projections.

Table 9-IV

UNITED STATES TOTAL POPULATION BY QUINQUENNIAL AGE GROUPS, PROJECTION IV,
HIGH FERTILITY AND HIGH MORTALITY ASSUMPTIONS, 1955-2050
(In thousands of persons)

Age	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2025	2050
0-4	19,625	21,677	21,957	23,646	25,972	28,156	29,573	30,418	31,205	32,009	33,885	32,726
5-9	17,576	19,641	21,670	21,951	23,636	25,954	28,131	29,544	30,387	31,171	33,652	33,025
10-14	14,214	17,614	19,662	21,687	21,968	23,651	25,964	28,137	29,548	30,389	33,216	33,234
15-19	11,689	14,246	17,620	19,062	21,682	21,963	23,641	25,947	28,114	29,521	32,401	33,316
20-24	11,319	11,752	14,273	17,627	19,660	21,670	21,951	23,622	25,917	28,073	32,244	33,299
25-29	12,292	11,418	11,820	14,326	17,659	19,681	21,680	21,961	23,623	25,904	31,578	33,181
30-34	12,922	12,358	11,466	11,868	14,359	17,671	19,683	21,670	21,950	23,603	30,699	32,871
35-39	12,104	12,908	12,336	11,456	11,858	14,331	17,618	19,616	21,589	21,867	29,824	32,249
40-44	11,647	12,012	12,797	12,239	11,376	11,778	14,222	17,470	19,446	21,397	28,770	31,168
45-49	10,476	11,442	11,799	12,577	12,039	11,200	11,600	13,998	17,186	19,125	26,976	30,574
50-54	9,149	10,139	11,076	11,434	12,199	11,688	10,883	11,276	13,601	16,692	24,224	29,187
55-59	8,129	8,671	9,621	10,527	10,883	11,623	11,147	10,388	10,766	12,982	21,111	27,191
60-64	6,939	7,475	7,991	8,888	9,747	10,094	10,794	10,362	9,662	10,016	18,281	24,726
65-69	5,536	6,082	6,581	7,062	7,881	8,669	8,998	9,638	9,260	8,638	16,143	21,562
70-74	4,204	4,549	5,031	5,476	5,906	6,619	7,308	7,605	8,161	7,847	12,441	17,452
75-79	2,634	3,128	3,415	3,809	4,176	4,529	5,099	5,650	5,892	6,330	8,667	12,527
80-84	1,371	1,650	1,985	2,189	2,465	2,723	2,971	3,358	3,733	3,898	4,677	7,577
85-89	602	666	816	996	1,112	1,265	1,409	1,546	1,755	1,955	2,036	3,701
90-94	166	205	233	293	363	411	473	532	586	667	748	1,393
95+	39	39	48	56	71	90	105	122	140	155	221	336
Total	172,633	187,672	202,197	217,769	235,012	253,766	273,250	292,860	312,521	332,239	421,794	471,295
0-19	63,104	73,178	80,909	86,946	93,258	99,724	107,309	114,046	119,254	123,090	133,154	132,301
20-64	94,977	98,175	103,179	110,942	119,780	129,736	139,578	150,363	163,740	179,659	243,707	274,446
65+	14,552	16,319	18,109	19,881	21,974	24,306	26,363	28,451	29,527	29,490	44,933	64,548

Note: These data relate to the entire United States and not merely to the continental United States. See Table 1 and text
for bases of the several projections.

Table 9-V

UNITED STATES TOTAL POPULATION BY QUINQUENNIAL AGE GROUPS, PROJECTION V
VERY HIGH FERTILITY AND LOW MORTALITY ASSUMPTIONS, 1955-2050
(in thousands of persons)

Age	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2025	2050
0-4	19,625	22,714	21,779	24,460	28,219	32,182	35,429	38,339	42,103	46,950	77,713	127,919
5-9	17,576	19,645	22,712	21,788	24,467	28,219	32,176	35,418	38,325	42,080	70,154	115,642
10-14	14,214	17,616	19,670	22,734	21,815	24,492	28,240	32,194	35,431	38,335	63,691	104,762
15-19	11,689	14,247	17,629	19,681	22,740	21,827	24,501	28,243	32,189	35,420	57,872	94,817
20-24	11,319	11,754	14,278	17,646	19,693	22,744	21,843	24,512	28,245	32,180	52,217	85,559
25-29	12,292	11,419	11,826	14,339	17,694	19,736	22,779	21,889	24,551	28,270	46,758	77,080
30-34	12,922	12,363	11,476	11,888	14,392	17,735	19,772	22,804	21,921	24,573	41,922	69,542
35-39	12,104	12,915	12,355	11,485	11,901	14,395	17,723	19,752	22,770	21,893	38,110	62,950
40-44	11,647	12,022	12,827	12,289	11,441	11,861	14,340	17,644	19,660	22,654	34,955	56,902
45-49	10,476	11,456	11,839	12,653	12,144	11,325	11,750	14,204	17,470	19,464	31,542	50,868
50-54	9,149	10,157	11,133	11,541	12,363	11,892	11,111	11,540	13,952	17,156	27,222	44,765
55-59	8,129	8,695	9,697	10,677	11,112	11,940	11,514	10,780	11,210	13,553	22,995	39,022
60-64	6,939	7,502	8,082	9,075	10,053	10,515	11,344	10,974	10,297	10,718	19,629	34,007
65-69	5,536	6,091	6,640	7,221	8,187	9,156	9,659	10,496	10,207	9,605	19,027	29,271
70-74	4,204	4,566	5,094	5,630	6,202	7,117	8,044	8,557	9,356	9,126	14,777	23,881
75-79	2,634	3,157	3,499	3,976	4,461	4,973	5,759	6,553	6,999	7,667	10,861	17,199
80-84	1,371	1,658	2,031	2,295	2,656	3,028	3,418	3,999	4,582	4,909	6,192	10,885
85-89	602	686	858	1,080	1,249	1,473	1,705	1,945	2,290	2,633	2,938	5,367
90-94	166	215	258	336	437	519	626	736	848	1,003	1,233	2,433
95+	39	40	52	66	89	120	148	182	218	255	411	636
Total	172,633	188,918	203,735	220,860	241,315	265,249	291,881	320,761	352,624	388,444	640,219	1,053,507
0-19	63,104	74,222	81,790	88,663	97,241	106,720	120,346	134,194	148,048	162,785	269,430	443,140
20-64	94,977	98,283	103,513	111,593	120,793	132,143	142,176	154,099	170,076	190,461	315,350	520,695
65+	14,552	16,413	18,432	20,604	23,281	26,386	29,359	32,468	34,500	35,198	55,439	89,672

Note: These data relate to the entire United States and not merely to the continental United States. See Table 1 and text
for bases of the several projections.

Table 9-VI

UNITED STATES TOTAL POPULATION BY QUINQUENNIAL AGE GROUPS, PROJECTION VI
VERY HIGH FERTILITY AND HIGH MORTALITY ASSUMPTIONS, 1955-2050
(In thousands of persons)

Age	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2025	2050
0-4	19,625	22,707	21,755	24,406	28,117	32,014	35,179	37,996	41,641	46,345	76,037	124,027
5-9	17,576	19,641	22,695	21,750	24,393	28,091	31,975	35,129	37,936	41,567	68,705	112,200
10-14	14,214	17,614	19,662	22,710	21,768	24,406	28,096	31,973	35,121	37,922	62,445	101,765
15-19	11,689	14,246	17,620	19,662	22,702	21,764	24,393	28,073	31,937	35,075	56,765	92,166
20-24	11,319	11,752	14,273	17,627	19,660	22,684	21,754	24,370	28,032	31,876	51,225	83,176
25-29	12,292	11,418	11,820	14,326	17,659	19,681	22,687	21,765	24,365	28,005	45,863	74,938
30-34	12,922	12,358	11,466	11,868	14,359	17,671	19,683	22,671	21,756	24,340	41,121	67,630
35-39	12,104	12,908	12,336	11,456	11,858	14,331	17,618	19,616	22,581	21,675	37,367	61,178
40-44	11,647	12,012	12,797	12,239	11,376	11,778	14,222	17,470	19,446	22,376	34,292	55,159
45-49	10,476	11,442	11,799	12,577	12,039	11,200	11,600	13,998	17,186	19,125	30,723	49,070
50-54	9,149	10,139	11,076	11,434	12,199	11,688	10,883	11,276	13,601	16,692	26,271	42,779
55-59	8,129	8,671	9,621	10,527	10,883	11,623	11,147	10,388	10,766	12,982	21,842	36,703
60-64	6,939	7,475	7,991	8,888	9,747	10,094	10,794	10,362	9,662	10,016	18,174	31,178
65-69	5,536	6,082	6,581	7,062	7,881	8,669	8,998	9,638	9,260	8,638	16,903	25,828
70-74	4,204	4,549	5,031	5,476	5,906	6,619	7,308	7,605	8,161	7,847	12,453	19,949
75-79	2,634	3,128	3,415	3,809	4,176	4,529	5,099	5,650	5,892	6,330	8,674	13,624
80-84	1,371	1,650	1,985	2,189	2,465	2,723	2,971	3,358	3,733	3,898	4,678	7,854
85-89	602	666	816	996	1,112	1,265	1,409	1,546	1,755	1,955	2,036	3,683
90-94	166	205	233	293	363	411	473	532	586	667	748	1,459
95+	39	39	48	56	71	90	105	122	140	155	221	336
Total	172,633	188,702	203,020	219,351	238,734	261,331	286,394	313,528	343,557	377,486	616,543	1,004,702
0-19	63,104	74,208	81,732	88,528	96,980	106,275	119,643	133,171	146,635	160,909	263,952	430,158
20-64	94,977	98,175	103,179	110,942	119,780	130,750	140,388	151,916	167,395	187,087	306,878	501,811
65+	14,552	16,319	18,109	19,881	21,974	24,306	26,363	28,451	29,527	29,490	45,713	72,733

Note: These data relate to the entire United States and not merely to the continental United States. See Table 1 and text for bases of the several projections.

Table 10-I

UNITED STATES MALE POPULATION BY QUINQUENNIAL AGE GROUPS, PROJECTION I
LOW FERTILITY AND LOW MORTALITY ASSUMPTIONS, 1955-2050
(in thousands of persons)

Age	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2025	2050
0-4	10,023	9,049	8,974	9,423	9,919	10,452	10,493	10,395	10,376	10,455	10,406	10,214
5-9	8,981	10,028	9,054	8,982	9,432	9,929	10,462	10,504	10,408	10,389	10,417	10,221
10-14	7,256	8,997	10,036	9,066	8,996	9,446	9,943	10,476	10,518	10,423	10,429	10,234
15-19	5,929	7,258	8,989	10,026	9,063	8,995	9,445	9,941	10,473	10,516	10,368	10,233
20-24	5,695	5,923	7,235	8,955	9,988	9,037	8,974	9,426	9,923	10,454	10,437	10,220
25-29	6,105	5,706	5,923	7,226	8,936	9,965	9,026	8,968	9,420	9,916	10,361	10,205
30-34	6,364	6,123	5,719	5,939	7,236	8,938	9,963	9,031	8,975	9,425	10,263	10,187
35-39	5,969	6,351	6,111	5,717	5,939	7,230	8,922	9,941	9,016	8,961	10,260	10,144
40-44	5,748	5,914	6,295	6,068	5,686	5,910	7,191	8,867	9,877	8,962	10,300	10,011
45-49	5,210	5,624	5,796	6,183	5,973	5,608	5,835	7,099	8,750	9,746	10,138	9,966
50-54	4,542	4,997	5,408	5,594	5,986	5,800	5,461	5,692	6,930	8,542	9,417	9,694
55-59	4,005	4,240	4,688	5,101	5,304	5,701	5,546	5,239	5,473	6,667	8,625	9,274
60-64	3,399	3,594	3,832	4,271	4,684	4,906	5,308	5,193	4,925	5,156	7,754	8,785
65-69	2,688	2,868	3,055	3,293	3,716	4,128	4,378	4,788	4,723	4,500	7,140	8,143
70-74	1,964	2,109	2,277	2,461	2,696	3,093	3,489	3,749	4,141	4,107	6,847	7,089
75-79	1,197	1,387	1,517	1,668	1,835	2,044	2,379	2,715	2,942	3,265	4,853	5,333
80-84	606	706	834	930	1,043	1,169	1,323	1,562	1,800	1,961	2,629	3,394
85-89	258	283	341	413	472	539	613	702	834	965	1,157	1,739
90-94	66	85	98	123	153	180	210	242	280	334	443	703
95+	15	15	19	23	30	39	47	56	66	77	132	214
Total	86,020	91,257	96,201	101,462	107.087	113,109	119,008	124,586	129,850	134,821	152,376	156,003
0-19	32,189	35,332	37,053	37,497	37,410	38,822	40,343	41,316	41,775	41,783	41,620	40,902
20-64	47,037	48,472	51,007	55,054	59,732	63,095	66,266	69,456	73,289	77,829	87,555	88,486
65+	6,794	7,453	8,141	8,911	9,945	11,192	12,439	13,814	14,786	15,209	23,201	26,615

Note: These data relate to the entire United States and not merely to the continental United States. See Table 1 and text
for bases of the several projections.

Table 10-II

UNITED STATES MALE POPULATION BY QUINQUENNIAL AGE GROUPS, PROJECTION II
LOW FERTILITY AND HIGH MORTALITY ASSUMPTIONS, 1955-2050
(in thousands of persons)

Age	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2025	2050
0-4	10,023	9,046	8,963	9,401	9,880	10,393	10,414	10,295	10,257	10,313	10,173	9,894
5-9	8,981	10,026	9,046	8,965	9,402	9,880	10,391	10,413	10,295	10,257	10,190	9,904
10-14	7,256	8,996	10,032	9,055	8,974	9,411	9,888	10,398	10,420	10,302	10,213	9,929
15-19	5,929	7,257	8,983	10,015	9,044	8,964	9,399	9,874	10,382	10,404	10,159	9,934
20-24	5,695	5,922	7,232	8,943	9,968	9,006	8,928	9,361	9,834	10,339	10,222	9,916
25-29	6,105	5,706	5,920	7,218	8,914	9,931	8,978	8,902	9,332	9,801	10,135	9,890
30-34	6,364	6,120	5,713	5,926	7,214	8,896	9,906	8,962	8,887	9,314	10,036	9,866
35-39	5,969	6,346	6,098	5,698	5,911	7,187	8,853	9,854	8,921	8,847	10,022	9,815
40-44	5,748	5,907	6,273	6,033	5,643	5,855	7,113	8,754	9,741	8,823	10,031	9,655
45-49	5,210	5,614	5,769	6,130	5,901	5,525	5,735	6,963	8,565	9,528	9,808	9,547
50-54	4,542	4,989	5,377	5,532	5,884	5,670	5,314	5,519	6,698	6,236	8,993	9,160
55-59	4,005	4,228	4,650	5,020	5,172	5,507	5,313	4,984	5,178	6,283	8,047	8,560
60-64	3,399	3,583	3,789	4,178	4,517	4,661	4,969	4,799	4,505	4,682	6,954	7,794
65-69	2,688	2,862	3,022	3,204	3,541	3,841	3,975	4,248	4,110	3,863	6,018	6,788
70-74	1,964	2,104	2,250	2,386	2,541	2,819	3,068	3,184	3,410	3,303	5,340	5,470
75-79	1,197	1,378	1,488	1,601	1,707	1,826	2,033	2,219	2,307	2,473	3,485	3,793
80-84	606	704	820	894	969	1,039	1,117	1,247	1,364	1,420	1,747	2,232
85-89	258	276	327	387	428	469	507	549	616	675	713	1,058
90-94	66	82	91	111	134	151	167	183	199	224	250	389
95+	15	15	18	21	26	32	37	41	46	50	69	108
Total	86,020	91,161	95,861	100,716	105,770	111,063	116,105	120,749	125,067	129,137	142,605	143,702
0-19	32,189	35,325	37,024	37,436	37,300	38,648	40,092	40,980	41,354	41,276	40,735	39,661
20-64	47,037	48,415	50,821	54,676	59,124	62,238	65,109	68,098	71,661	75,853	84,248	84,203
65+	6,794	7,421	8,016	8,604	9,346	10,177	10,904	11,671	12,052	12,008	17,622	19,838

Note: These data relate to the entire United States and not merely to the continental United States.   See Table 1 and text for bases of the several projections.

Table 10-III

UNITED STATES MALE POPULATION BY QUINQUENNIAL AGE GROUPS, PROJECTION III
HIGH FERTILITY AND LOW MORTALITY ASSUMPTIONS, 1955-2050
(In thousands of persons)

Age	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2025	2050
0-4	10,023	11,081	11,238	12,120	13,334	14,483	15,243	15,711	16,151	16,599	17,732	17,287
5-9	8,981	10,028	11,077	11,237	12,119	13,332	14,480	15,239	15,708	16,147	17,593	17,432
10-14	7,256	8,997	10,036	11,084	11,246	12,127	13,339	14,486	15,245	15,713	17,337	17,516
15-19	5,929	7,258	8,989	10,026	11,073	11,237	12,117	13,326	14,471	15,228	16,884	17,530
20-24	5,695	5,923	7,235	8,955	9,988	11,033	11,202	12,082	13,288	14,430	16,771	17,485
25-29	6,105	5,706	5,923	7,226	8,936	9,965	11,008	11,181	12,059	13,260	16,387	17,390
30-34	6,364	6,123	5,719	5,939	7,236	8,938	9,963	11,001	11,175	12,048	15,892	17,203
35-39	5,969	6,351	6,111	5,717	5,939	7,230	8,922	9,941	10,973	11,146	15,407	16,863
40-44	5,748	5,914	6,295	6,068	5,686	5,910	7,191	8,867	9,877	10,899	14,849	16,302
45-49	5,210	5,624	5,796	6,183	5,973	5,608	5,835	7,099	8,750	9,746	13,934	16,015
50-54	4,542	4,997	5,408	5,594	5,986	5,800	5,461	5,692	6,930	8,542	12,545	15,332
55-59	4,005	4,240	4,688	5,101	5,304	5,701	5,546	5,239	5,473	6,667	10,994	14,361
60-64	3,399	3,594	3,832	4,271	4,684	4,906	5,308	5,193	4,925	5,156	9,623	13,192
65-69	2,688	2,868	3,055	3,293	3,716	4,128	4,378	4,788	4,723	4,500	8,671	11,738
70-74	1,964	2,109	2,277	2,461	2,696	3,093	3,489	3,749	4,141	4,107	6,847	9,743
75-79	1,197	1,387	1,517	1,668	1,835	2,044	2,379	2,715	2,942	3,265	4,853	7,106
80-84	606	706	834	930	1,043	1,169	1,323	1,562	1,800	1,961	2,629	4,326
85-89	258	283	341	413	472	539	613	702	834	965	1,157	2,159
90-94	66	85	98	123	153	180	210	242	280	334	443	854
95+	15	15	19	23	30	39	47	56	66	77	132	214
Total	86,020	93,289	100,488	108,432	117,449	127,462	138,054	148,871	159,811	170,790	220,680	250,048
0-19	32,189	37,364	41,340	44,467	47,772	51,179	55,179	58,762	61,575	63,687	69,546	69,765
20-64	47,037	48,472	51,007	55,054	59,732	65,091	70,436	76,295	83,450	91,894	126,402	144,143
65+	6,794	7,453	8,141	8,911	9,945	11,192	12,439	13,814	14,786	15,209	24,732	36,140

Note: These data relate to the entire United States and not merely to the continental United States. See Table 1 and text for bases of the several projections.

Table 10-IV

UNITED STATES MALE POPULATION BY QUINQUENNIAL AGE GROUPS, PROJECTION IV
HIGH FERTILITY AND HIGH MORTALITY ASSUMPTIONS, 1955-2050
(In thousands of persons)

Age	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2025	2050
0-4	10,023	11,078	11,225	12,091	13,283	14,402	15,128	15,561	15,964	16,375	17,335	16,742
5-9	8,981	10,026	11,069	11,216	12,080	13,267	14,362	15,106	15,538	15,939	17,208	16,887
10-14	7,256	8,996	10,032	11,072	11,219	12,082	13,266	14,378	15,101	15,532	16,977	16,986
15-19	5,929	7,257	8,983	10,015	11,051	11,198	12,058	13,237	14,345	15,065	16,541	17,010
20-24	5,695	5,922	7,232	8,943	9,968	10,997	11,144	11,999	13,170	14,270	16,420	16,961
25-29	6,105	5,706	5,920	7,218	8,914	9,931	10,951	11,098	11,946	13,107	16,029	16,855
30-34	6,364	6,120	5,713	5,926	7,214	8,896	9,906	10,918	11,064	11,906	15,536	16,663
35-39	5,969	6,346	6,098	5,698	5,911	7,187	8,853	9,854	10,857	11,002	15,049	16,316
40-44	5,748	5,907	6,273	6,033	5,643	5,855	7,113	8,754	9,741	10,730	14,463	15,720
45-49	5,210	5,614	5,769	6,130	5,901	5,525	5,735	6,963	8,565	9,528	13,481	15,335
50-54	4,542	4,989	5,377	5,532	5,884	5,670	5,314	5,519	6,698	8,236	11,981	14,486
55-59	4,005	4,228	4,650	5,020	5,172	5,507	5,313	4,984	5,178	6,283	10,258	13,251
60-64	3,399	3,583	3,789	4,176	4,517	4,661	4,969	4,799	4,505	4,682	8,629	11,703
65-69	2,688	2,862	3,022	3,204	3,541	3,841	3,975	4,248	4,110	3,863	7,309	9,788
70-74	1,964	2,104	2,250	2,386	2,541	2,819	3,068	3,184	3,410	3,303	5,340	7,519
75-79	1,197	1,378	1,488	1,601	1,707	1,826	2,033	2,219	2,307	2,473	3,485	5,052
80-84	606	704	820	894	969	1,039	1,117	1,247	1,364	1,420	1,747	2,845
85-89	258	276	327	387	428	469	507	549	616	675	713	1,313
90-94	66	82	91	111	134	151	167	183	199	224	250	473
95+	15	15	18	21	26	32	37	41	46	50	69	108
Total	86,020	93,193	100,146	107,674	116,103	125,355	135,036	144,841	154,724	164,663	208,820	232,013
0-19	32,189	37,357	41,309	44,394	47,633	50,949	54,834	58,282	60,948	62,911	68,061	67,625
20-64	47,037	48,415	50,821	54,676	59,124	64,229	69,298	74,888	81,724	89,744	121,846	137,290
65+	6,794	7,421	8,016	8,604	9,346	10,177	10,904	11,671	12,052	12,008	18,913	27,098

Note: These data relate to the entire United States and not merely to the continental United States. See Table 1 and text for bases of the severl projections.

Table 11-I

UNITED STATES FEMALE POPULATION BY QUINQUENNIAL AGE GROUPS, PROJECTION I
LOW FERTILITY AND LOW MORTALITY ASSUMPTIONS, 1955-2050
(in thousands of persons)

Age	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2025	2050
0-4	9,602	8,657	8,579	9,002	9,471	9,974	10,010	9,912	9,894	9,967	9,920	9,737
5-9	8,595	9,617	8,670	8,595	9,019	9,489	9,992	10,029	9,932	9,915	9,940	9,750
10-14	6,958	8,619	9,634	8,689	8,615	9,040	9,510	10,013	10,050	9,954	9,957	9,770
15-19	5,760	6,989	8,640	9,655	8,713	8,640	9,065	9,535	10,038	10,075	9,917	9,786
20-24	5,624	5,831	7,043	8,691	9,705	8,767	8,696	9,121	9,590	10,093	10,021	9,807
25-29	6,187	5,713	5,903	7,113	8,758	9,771	8,837	8,768	9,192	9,661	10,003	9,830
30-34	6,558	6,240	5,757	5,949	7,156	8,797	9,809	8,880	8,812	9,235	9,969	9,842
35-39	6,135	6,564	6,244	5,768	5,962	7,165	8,801	9,811	8,888	8,821	10,025	9,828
40-44	5,899	6,108	6,532	6,221	5,755	5,951	7,149	8,777	9,783	8,867	10,123	9,740
45-49	5,266	5,832	6,043	6,470	6,171	5,717	5,915	7,105	8,720	9,718	10,043	9,769
50-54	4,607	5,160	5,725	5,947	6,377	6,092	5,650	5,848	7,022	8,614	9,448	9,631
55-59	4,124	4,455	5,009	5,576	5,808	6,239	5,968	5,541	5,737	6,886	8,828	9,418
60-64	3,540	3,908	4,250	4,804	5,369	5,609	6,036	5,781	5,372	5,562	8,178	9,205
65-69	2,848	3,223	3,585	3,928	4,471	5,028	5,281	5,708	5,484	5,105	7,838	8,882
70-74	2,240	2,457	2,817	3,169	3,506	4,024	4,555	4,808	5,215	5,019	7,916	8,140
75-79	1,437	1,770	1,982	2,308	2,626	2,929	3,380	3,838	4,057	4,402	6,000	6,557
80-84	765	952	1,197	1,365	1,613	1,859	2,095	2,437	2,782	2,948	3,561	4,552
85-89	344	403	517	667	777	934	1,092	1,243	1,456	1,668	1,781	2,613
90-94	100	130	160	213	284	339	416	494	568	669	790	1,212
95+	24	25	33	43	59	81	101	126	152	178	279	422
Total	86,613	92,653	98,320	104,173	110,215	116,445	122,358	127,775	132,744	137,357	154,537	158,491
0-19	30,915	33,882	35,523	35,941	35,818	37,143	38,577	39,489	39,914	39,911	39,734	39,043
20-64	47,940	49,811	52,506	56,539	61,061	64,108	66,861	69,632	73,116	77,457	86,638	87,070
65+	7,758	8,960	10,291	11,693	13,336	15,194	16,920	18,654	19,714	19,989	28,165	32,378

Note: These data relate to the entire United States and not merely to the continental United States. See Table 1 and text for bases of the several projections.

Table 11-II

UNITED STATES FEMALE POPULATION BY QUINQUENNIAL AGE GROUPS, PROJECTION II
LOW FERTILITY AND HIGH MORTALITY ASSUMPTIONS, 1955-2050
(In thousands of persons)

Age	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2025	2050
0-4	9,602	8,654	8,570	8,984	9,439	9,926	9,945	9,829	9,792	9,847	9,712	9,446
5-9	8,595	9,615	8,664	8,581	8,994	9,448	9,934	9,954	9,839	9,802	9,739	9,465
10-14	6,958	8,618	9,630	8,681	8,598	9,011	9,465	9,950	9,970	9,855	9,769	9,497
15-19	5,760	6,989	8,637	9,647	8,701	8,618	9,031	9,484	9,968	9,988	9,741	9,524
20-24	5,624	5,830	7,041	8,684	9,692	8,749	8,667	9,079	9,531	10,013	9,851	9,553
25-29	6,187	5,712	5,900	7,108	8,745	9,750	8,812	8,730	9,141	9,592	9,840	9,581
30-34	6,558	6,238	5,753	5,942	7,145	8,775	9,777	8,844	8,763	9,172	9,811	9,599
35-39	6,135	6,562	6,238	5,758	5,947	7,144	8,765	9,762	8,835	8,755	9,868	9,584
40-44	5,899	6,105	6,524	6,206	5,733	5,923	7,109	8,716	9,705	8,787	9,954	9,488
45-49	5,266	5,828	6,030	6,447	6,138	5,675	5,865	7,035	8,621	9,597	9,845	9,487
50-54	4,607	5,150	5,699	5,902	6,315	6,018	5,569	5,757	6,903	8,456	9,212	9,304
55-59	4,124	4,443	4,971	5,507	5,711	6,116	5,834	5,404	5,588	6,699	8,533	9,020
60-64	3,540	3,892	4,202	4,712	5,230	5,433	5,825	5,563	5,157	5,334	7,792	8,698
65-69	2,848	3,220	3,559	3,858	4,340	4,828	5,023	5,390	5,150	4,775	7,287	8,192
70-74	2,240	2,445	2,781	3,090	3,365	3,800	4,240	4,421	4,751	4,544	7,101	7,246
75-79	1,437	1,750	1,927	2,208	2,469	2,703	3,066	3,431	3,585	3,857	5,182	5,624
80-84	765	946	1,165	1,295	1,496	1,684	1,854	2,111	2,369	2,478	2,930	3,721
85-89	344	390	489	609	684	796	902	997	1,139	1,280	1,323	1,928
90-94	100	123	142	182	229	260	306	349	387	443	498	759
95+	24	24	30	35	45	58	68	81	94	105	152	228
Total	86,613	92,534	97,952	103,436	109,016	114,715	120,057	124,887	129,288	133,379	148,140	149,944
0-19	30,915	33,876	35,501	35,893	35,732	37,003	38,375	39,217	39,569	39,492	38,961	37,932
20-64	47,940	49,760	52,358	56,266	60,656	63,583	66,223	68,890	72,244	76,405	84,706	84,314
65+	7,758	8,898	10,093	11,277	12,628	14,129	15,459	16,780	17,475	17,482	24,473	27,698

Note: These data relate to the entire United States and not merely to the continental United States. See Table 1 and text
for bases of the several projections.

Table 11-III

UNITED STATES FEMALE POPULATION BY QUINQUENNIAL AGE GROUPS, PROJECTION III
HIGH FERTILITY AND LOW MORTALITY ASSUMPTIONS, 1955-2050
(In thousands of persons)

Age	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2025	2050
0-4	9,602	10,602	10,743	11,578	12,731	13,821	14,541	14,983	15,399	15,825	16,905	16,481
5-9	8,595	9,617	10,608	10,752	11,588	12,740	13,830	14,550	14,992	15,408	16,786	16,630
10-14	6,958	8,619	9,634	10,625	10,770	11,606	12,757	13,847	14,566	15,008	16,579	16,724
15-19	5,760	6,989	8,640	9,655	10,645	10,791	11,627	12,777	13,866	14,584	16,148	16,763
20-24	5,624	5,831	7,043	8,691	9,705	10,695	10,842	11,677	12,825	13,913	16,097	16,777
25-29	6,187	5,713	5,903	7,113	8,758	9,771	10,760	10,908	11,742	12,888	15,806	16,750
30-34	6,558	6,240	5,757	5,949	7,156	8,797	9,809	10,797	10,946	11,778	15,407	16,619
35-39	6,135	6,564	6,244	5,768	5,962	7,165	8,801	9,811	10,797	10,946	15,012	16,365
40-44	5,899	6,108	6,532	6,221	5,755	5,951	7,149	8,777	9,783	10,764	14,552	15,860
45-49	5,266	5,832	6,043	6,470	6,171	5,717	5,915	7,105	8,720	9,718	13,766	15,691
50-54	4,607	5,160	5,725	5,947	6,377	6,092	5,650	5,848	7,022	8,614	12,554	15,219
55-59	4,124	4,455	5,009	5,576	5,808	6,239	5,968	5,541	5,737	6,886	11,230	14,557
60-64	3,540	3,908	4,250	4,804	5,369	5,609	6,036	5,781	5,372	5,562	10,129	13,785
65-69	2,848	3,223	3,585	3,928	4,471	5,028	5,281	5,708	5,484	5,105	9,502	12,768
70-74	2,240	2,457	2,817	3,169	3,506	4,024	4,555	4,808	5,215	5,019	7,916	11,155
75-79	1,437	1,770	1,982	2,308	2,626	2,929	3,380	3,838	4,057	4,402	6,000	8,713
80-84	765	952	1,197	1,365	1,613	1,859	2,095	2,437	2,782	2,948	3,561	5,792
85-89	344	403	517	667	777	934	1,092	1,243	1,456	1,668	1,781	3,237
90-94	100	130	160	213	284	339	416	494	568	669	790	1,469
95+	24	25	33	43	59	81	101	126	152	178	279	422
Total	86,613	94,598	102,422	110,842	120,131	130,188	140,605	151,056	161,481	171,883	220,800	251,777
0-19	30,915	35,827	39,625	42,610	45,734	48,958	52,755	56,157	58,823	60,825	66,418	66,598
20-64	47,940	49,811	52,506	56,539	61,061	66,036	70,930	76,245	82,944	91,069	124,553	141,623
65+	7,758	8,960	10,291	11,693	13,336	15,194	16,920	18,654	19,714	19,989	29,829	43,556

Note: These data relate to the entire United States and not merely to the continental United States. See Table 1 and text
for bases of the several projections.

Table 11-IV

UNITED STATES FEMALE POPULATION BY QUINQUENNIAL AGE GROUPS, PROJECTION IV
HIGH FERTILITY AND HIGH MORTALITY ASSUMPTIONS, 1955-2050
(In thousands of persons)

Age	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2025	2050
0-4	9,602	10,599	10,732	11,555	12,689	13,754	14,445	14,857	15,241	15,634	16,550	15,984
5-9	8,595	9,615	10,601	10,735	11,556	12,687	13,749	14,438	14,849	15,232	16,444	16,138
10-14	6,958	8,618	9,630	10,615	10,749	11,569	12,698	13,759	14,447	14,857	16,239	16,248
15-19	5,760	6,989	8,637	9,647	10,631	10,765	11,583	12,710	13,769	14,456	15,860	16,306
20-24	5,624	5,830	7,041	8,684	9,692	10,673	10,807	11,623	12,747	13,803	15,824	16,338
25-29	6,187	5,712	5,900	7,108	8,745	9,750	10,729	10,863	11,677	12,797	15,549	16,326
30-34	6,558	6,238	5,753	5,942	7,145	8,775	9,777	10,752	10,886	11,697	15,163	16,208
35-39	6,135	6,562	6,238	5,758	5,947	7,144	8,765	9,762	10,732	10,865	14,775	15,933
40-44	5,899	6,105	6,524	6,206	5,733	5,923	7,109	8,716	9,705	10,667	14,307	15,448
45-49	5,266	5,828	6,030	6,447	6,138	5,675	5,865	7,035	8,621	9,597	13,495	15,239
50-54	4,607	5,150	5,699	5,902	6,315	6,018	5,569	5,757	6,903	8,456	12,243	14,701
55-59	4,124	4,443	4,971	5,507	5,711	6,116	5,834	5,404	5,588	6,699	10,853	13,940
60-64	3,540	3,892	4,202	4,712	5,230	5,433	5,825	5,563	5,157	5,334	9,652	13,023
65-69	2,848	3,220	3,559	3,858	4,340	4,828	5,023	5,390	5,150	4,775	8,834	11,774
70-74	2,240	2,445	2,781	3,090	3,365	3,800	4,240	4,421	4,751	4,544	7,101	9,933
75-79	1,437	1,750	1,927	2,208	2,469	2,703	3,066	3,431	3,585	3,857	5,182	7,475
80-84	765	946	1,165	1,295	1,496	1,684	1,854	2,111	2,369	2,478	2,930	4,732
85-89	344	390	489	609	684	796	902	997	1,139	1,280	1,323	2,388
90-94	100	123	142	182	229	260	306	349	387	443	498	920
95+	24	24	30	35	45	58	68	81	94	105	152	228
Total	86,613	94,479	102,051	110,095	118,909	128,411	138,214	148,019	157,797	167,576	212,974	239,282
0-19	30,915	35,821	39,600	42,552	45,625	48,775	52,475	55,764	58,306	60,179	65,093	64,676
20-64	47,940	49,760	52,358	56,266	60,656	65,507	70,280	75,475	82,016	89,915	121,861	137,156
65+	7,758	8,898	10,093	11,277	12,628	14,129	15,459	16,780	17,475	17,482	26,020	37,450

Note: These data relate to the entire United States and not merely to the continental United States. See Table 1 and text for bases of the several projections.

In comparing the results of the various projections, it is noteworthy that the fertility assumptions made have considerably more influence than the mortality assumptions. This is because the fertility assumptions provide for a much wider range of variation than the mortality assumptions. In fact, mortality rates at the younger ages are already so low that there is not much room for further improvement.

The population under age 20 is, of course, materially affected by the fertility assumptions made. However, even under the low-fertility assumptions, the population under age 20 increases steadily to about the year 2000, mainly because of the increasing number of mothers, due to the continuing increase in the annual number of births during recent decades. Under the high-fertility assumptions, this population more than doubles by 2050, while under the very-high fertility assumptions it increases approximately sevenfold.

The productive age groups 20-44 and 45-64 show the same general trends, except that they are deferred for a number of years. For example, the age group 20-44 under the low-fertility assumptions continues to increase up to 2025; while the age group 45-64 shows little difference in the various projections up to 2000, since all persons in that group at that time are already born.

The age group 65 and over will be considered in more detail, since it is the most important with regard to old-age benefit costs. Projections I, III, and V produce identical figures for the next 65 years since they involve the same (low) mortality assumptions and since all those who will be in this age group during this period are already born. Likewise, Projections II, IV, and VI (assuming high mortality) are the same for this age group for the next 65 years, until 2020. In all the projections, this group shows a leveling off during the 10 years starting about 1995, followed by a subsequent rise. This reflects the low birth rates of the 1930's, since the increment during the period 1995-2005 to the group aged 65 and over consists of the survivors of those born in 1930-40. As would be expected, the projected number in this age group is more influenced by the mortality assumptions made than in the case of the other age groups. The six projections show a range of 2 to $2\frac{1}{2}$ times the present population by 2000, and $3\frac{1}{2}$ to 6 times the present figure in 2050.

Percentagewise, the age group 65 and over will increase over the next 45 years from the current 8.4% to a proportion in 2000 varying from 8.9% for Projection IV to 12.9% for Projection I. (The more extreme Projection V shows a percentage of 9.1%, slightly above Projection IV, while Projection VI actually indicates a decrease to 7.8%.) The four main projections show an increase (to $13\frac{1}{2}$% to 19%) by 2050; on the other hand, Projections V and VI indicate a nearly constant or even declining proportion.

Perhaps more important measures for social-insurance purposes are the ratios of the dependent groups, "children" and "aged", to the

"productive" group. The numerical boundaries chosen for these groups are necessarily arbitrary and undoubtedly change over the years. Thus, a century ago the group, "children," might have been defined as those under age 12. Today, age 18 would probably be chosen, and in the future this age might be moved higher as the period of education is extended. For the general statistical analysis here, uniform age groupings of under age 20, ages 20-64, and ages 65 and over are used. These groupings do not, of course, exactly coincide with the boundaries established under the OASDI system, since 18 is the maximum age for benefits to dependent children (except for a small number of totally and permanently disabled children), and since the 1956 Amendments to the Social Security Act have made benefits available at age 62 to eligible widows, and optionally in actuarially reduced amounts to eligible wives and female insured workers. The statutory age boundaries are further modified by the "work clause," which withholds benefits from many persons otherwise qualified whose earnings exceed prescribed levels.

Table 12 shows the age groups, "under 20" and "65 and over," as percentages of the "productive" group aged 20-64 over the period 1900-2050, on the basis of the past and projected data given in Table 8 (excluding the more extreme Projections V and VI). Children (under 20) as a percentage of the productive group were well over 100% a century ago, but had declined to 86% by 1900 and to 66% by 1955. Under the low-fertility assumptions, this proportion will rise during the next decade to a peak slightly above 70% as the larger number of births in the 1940's and 1950's makes itself felt as against the smaller number in the 1930's, which still accounts for an appreciable part of the population under age 20. Under the high-fertility assumptions, the rise will be more rapid and will continue longer, reaching a level of almost 78% in 1975. Later on, some decrease is indicated in the ratio of children to the productive group, with Projections I and II leveling off after 2000 at about 46%, and Projections III and IV gradually declining to reach about the same level by 2050.

The ratio of the aged to the productive population has increased steadily from $5\frac{1}{2}$% a century ago and less than 8% in 1900 to more than 15% in 1955. Under the various projections it will continue to increase in the future, but at a slower rate. The increase is particularly slow during the next few decades because of the high postwar birth rates. There is a temporary decline at about the year 2000, which results, as previously noted, from the low birth rates of the 1930's. This is followed by a rapid increase occurring when the members of the postwar baby boom reach old age. By 2050, this ratio reaches about 30% under the low-fertility assumptions and about 25% under the high-fertility assumptions.

The combined dependent groups (under age 20 and aged 65 and over) as related to the productive group showed a steadily decreasing trend through 1940. Since then, a slight rise has occurred, as the birth rate rose and the aged population continued its growth. In the next decade there will be a further rise, but thereafter according to

Table 12

RELATIVE COMPARISON[a] OF "DEPENDENT" AND "PRODUCTIVE" AGE GROUPS
IN THE UNITED STATES, 1900-2050

	As percent of Population Aged 20-64		
Year	Under 20[a]	65 and Over	Under 20 Plus 65 and Over
1900	86.1	7.8	93.9
1910	78.2	8.0	86.2
1920	76.6	8.5	85.1
1930	71.1	9.6	80.7
1940	60.3	11.5	71.8
1950	60.0	13.8	73.8
1955	66.4	15.3	81.7
	Projection I		
1960	70.4	16.7	87.1
1975	60.6	19.3	79.9
2000	52.6	22.7	75.3
2025	46.7	29.5	76.2
2050	45.5	33.6	79.1
	Projection II		
1960	70.5	16.6	87.1
1975	61.0	18.4	79.4
2000	53.0	19.4	72.4
2025	47.2	24.9	72.1
2050	46.0	28.2	74.2
	Projection III		
1960	74.5	16.7	91.2
1975	77.4	19.3	96.7
2000	68.0	19.2	87.2
2025	54.2	21.7	75.9
2050	47.7	27.9	75.6
	Projection IV		
1960	74.5	16.6	91.1
1975	77.9	18.4	96.3
2000	68.5	16.4	84.9
2025	54.6	18.4	73.0
2050	48.2	23.5	71.7

a/ See footnotes to Table 8.

these projections there will be a decrease to a somewhat lower level for a number of years., followed by an eventual slight rise under the low-fertility assumptions and by an eventual leveling off or slight decline under the high-fertility assumptions. In all four projections, the ultimate level is below the 1955 level.

Table 13 shows the sex ratios (i.e., the number of males per 1000 females) for the total population and for the aged population for all six projections as well as for the past censuses. Both for the total population and the aged population, the sex ratio has declined substantially since the 1920's and 1930's. This is due in large part to the decline in the number of immigrants (among whom there was a substantial excess of males during the period of heavy immigration). For the total population, the sex ratio is currently slightly below 1000. All the projections show a slight decrease over the next 20 years, followed by a slight rise. All four main projections show slightly more women than men in the population throughout. (Projection V eventually shows slightly more men, while Projection VI gives practically equal numbers in 2050.) This is due to the particular assumptions made as to mortality, fertility, and sex ratio at birth. With higher fertility there will be relatively more younger people (among whom an excess of males would be found), and with lower mortality there will be a greater probability of survival from birth, so that the higher proportion of male babies will have more effect.

In the population aged 65 and over, there are now slightly less than 900 males per 1000 females. Under all projections, this ratio decreases during the next few decades (because of the increasing mortality differential between males and females during a period when mortality is assumed to be still relatively high) and then rises slightly (for the reason stated in the preceding paragraph) as the full effect of the lower "ultimate" levels of mortality is felt. The especially low sex ratios in the year 2000 are due in part to the very low birth rates of the 1930's, resulting in smaller increments to the aged group (and, consequently, higher average age of the group) in the neighborhood of the year 2000.

Table 13

SEX RATIOS[a]/ OF UNITED STATES TOTAL POPULATION AND AGED POPULATION, 1900-2050

Year	Actual	Projection					
		I	II	III	IV	V	VI

Total Population

Year	Actual	I	II	III	IV	V	VI
1900	1,045	-	-	-	-	-	-
1910	1,061	-	-	-	-	-	-
1920	1,043	-	-	-	-	-	-
1930	1,027	-	-	-	-	-	-
1940	1,012	-	-	-	-	-	-
1950	994	-	-	-	-	-	-
1955	993	-	-	-	-	-	-
1960	-	985	985	986	986	986	987
1975	-	972	970	978	976	979	977
2000	-	982	968	994	983	1,000	990
2025	-	986	963	999	980	1,012	998
2050	-	984	958	993	970	1,015	1,000

Population Aged 65 and Over

Year	Actual	I	II	III	IV	V	VI
1900	1,022	-	-	-	-	-	-
1910	1,012	-	-	-	-	-	-
1920	1,013	-	-	-	-	-	-
1930	1,005	-	-	-	-	-	-
1940	955	-	-	-	-	-	-
1950	899	-	-	-	-	-	-
1955	886	-	-	-	-	-	-
1960	-	832	834	832	834	832	834
1975	-	746	740	746	740	746	740
2000	-	761	687	761	687	761	687
2025	-	824	720	829	727	830	728
2050	-	822	716	830	724	845	730

a/ Males per 1,000 females.

Note: These data relate to the entire United States and not merely to the continental United States. See Table 1 and text for bases of the various projections.

D. Comparison with Previous Projections

Tables 14, 15, and 16 respectively, summarize various projections that have been made in the past for the total population, the population aged 65 and over, and the percentage of the population at ages 65 and over. In comparison with current estimates for 1955, all the earlier projections were extremely low, because of their failure to predict the postwar upsurge in births, which has continued to the present time. The projections in this Study show a somewhat wider spread than those of Actuarial Study No. 33. Typical of the history of population projections for the United States is the further observation that for each future year shown the smallest figure for the total population obtained in this Study is above the largest shown in the previous Study. Even for the population aged 65 and over, where only mortality projections are involved, earlier projections for 1955 fall below the current estimate. This appears to be partly because improvements in mortality have been somewhat greater than anticipated and partly because of changes in reporting of age by the individuals concerned. It is difficult to say whether this is primarily because people actually under age 65 are overstating their age in order to qualify for old-age benefits which have become available mainly in the last two decades or because persons who formerly understated their age (presumably to secure or retain jobs) are now willing to give their correct age. It could well be that the true population in this age group lies somewhere between the figure currently estimated and the earlier projections. The percentage of the population at ages 65 and over in 1955 appears to have been forecast with remarkable accuracy by past projections. This may be partly fortuitous, reflecting compensating underestimation of both numerator and denominator.

Table 14

SUMMARY OF VARIOUS POPULATION PROJECTIONS, [a] TOTAL POPULATION
(In millions of persons)

Projection	1955	1960	1975	2000
This Study[b]	173[c]	184-188	215-238	263-343
Actuarial Study No. 33, 1952[b]	166	173-174	189-201	210-254
Actuarial Study No. 24, 1946	147-157	148-164	147-191	124-241
Bureau of the Census, 1955	165[c]	176-179	207-228	[d]
Bureau of the Census, 1953	164-165	174-177	199-221	[d]
Bureau of the Census, 1950	158-167	162-181	[d]	[d]
Bureau of the Census, 1947	149-156	150-163	152-186	164
Hagood and Siegel, 1952[e]	162-167	167-181	[d]	[d]
National Resources Planning Board, 1943	146-151	148-157	148-174	129-199
National Resources Committee, 1937	138-154	138-160	132-180	[d]
Committee on Economic Security, 1934	144	146	150	151

[a] Where several projections were made, the figures shown are those resulting in the widest range. For sources of data, when not indicated here, see text, pp. 1, 2, and 5.

[b] Based on the entire United States, rather than the continental United States as for other projections shown. Data in this Study (No. 46) also corrected for underenumeration at all ages. Projections V and VI of this Study are not considered.

[c] Current estimate of the population.

[d] Not available.

[e] Margaret Jarman Hagood and Jacob S. Siegel, "Population Projections for Sales Forecasting," Journal of the American Statistical Association, September 1952. Not available by age groups.

Table 15

SUMMARY OF VARIOUS POPULATION PROJECTIONS,[a] POPULATION AGED 65 AND OVER
(In millions of persons)

Projection	1955	1960	1975	2000
This Study[b]	14.6[c]	16.3-16.4	22.0-23.3	29.5-35.2
Actuarial Study No. 33, 1952[b]	13.9	15.4-15.5	20.1-20.6	25.8-28.0
Actuarial Study No. 24, 1946	12.6-13.1	14.0-14.9	16.9-20.5	19.0-29.3
Bureau of the Census, 1955	14.1[c]	15.8	20.7	[d]
Bureau of the Census, 1953	14.0	15.7	20.7	[d]
Bureau of the Census, 1950	13.3-13.7	15.1-16.1	[d]	[d]
Bureau of the Census, 1947	12.5-12.9	13.9-14.7	17.1-19.9	21.5
National Resources Planning Board, 1943	12.2-12.7	13.5-14.4	16.5-19.4	19.6-25.4
National Resources Committee, 1937	12.4-13.3	14.0-15.7	17.6-22.8	[d]
Committee on Economic Security, 1934	12.1	13.6	16.0	19.3

a/ Where several projections were made, the figures shown are those resulting in
   the widest range. For sources of data, when not indicated here, see text, pp.
   1, 2, and 5.
b/ Based on the entire United States, rather than the continental United States
   as for other projections shown. Data in this Study (No. 46) also corrected
   for underenumeration at all ages. Projections V and VI of this Study are not
   considered.
c/ Current estimate of the population.
d/ Not available.

Table 16

SUMMARY OF VARIOUS POPULATION PROJECTIONS, PERCENTAGE AT AGES 65 AND OVER[a]

Projection	1955	1960	1975	2000	2050
This Study[b]	8.4	8.7- 8.9	9.4-10.7	8.9-12.9	13.7-18.8
Actuarial Study No. 33, 1952	8.4	8.8- 8.9	10.1-10.8	10.4-13.0	11.4-16.1
Actuarial Study No. 24, 1946	8.2-8.4	8.8- 9.6	9.7-11.0	9.5-16.5	9.8-19.5
Bureau of the Census, 1955	8.6	8.8- 9.0	9.0-10.0	c/	c/
Bureau of the Census, 1953	8.5	8.9- 9.0	9.4-10.4	c/	c/
Bureau of the Census, 1950	8.2-8.4	8.9- 9.3	c/	c/	c/
Bureau of the Census, 1947	8.3-8.4	9.0- 9.2	10.6-11.2	13.1	c/
National Resources Planning Board, 1943	8.1-8.6	8.7- 9.6	9.9-12.6	10.6-18.1	c/
National Resources Committee, 1937	8.7-9.2	9.8-10.6	12.7-14.6	c/	c/
Committee on Economic Security, 1934	8.4	9.3	10.7	12.8	c/

a/ See footnotes to Tables 14 and 15.
b/ Projections V and VI of this Study are not considered.
c/ Not available.

Appendix. Computation of Survival Ratios for the Year 2000

This Appendix provides mathematical details concerning the computation of postulated survival ratios $_5L_{x+5}/_5L_x$ in the year 2000 from assumed values of the central death rate $_nm_x$.

As previously stated, a modification of the Reed-Merrell formula[10] for construction of an abbreviated life table was used in this computation. This formula assumes that

$$_nq_x = 1 - e^{-n \, _nm_x - an^3(_nm_x)^2} \, ,$$

where e is the natural logarithmic base and a is a constant (taken as .008 in the tables published by Reed and Merrell[10] and in this Study). Beginning with an arbitrary radix l_α at some starting age α, it should be possible to compute the value of $_nL_x$ for each age group by the formulas:

$$l_{x+n} = l_x(1 - _nq_x) \, ,$$

$$_nL_x = \frac{_nd_x}{_nm_x} = \frac{l_x - l_{x+n}}{_nm_x} \, .$$

Since $n = 5$ in most instances for the central death rates obtained in this Study, most of the 5-year survival ratios required could be computed in this way.

Somewhat unexpectedly, survival ratios obtained by this method did not appear reasonable, and it was necessary to make a second computation. The unreasonable character of the values first obtained was apparent mainly through examination of ratios of survival ratios for males to the corresponding ones for females. This difficulty arises because the values of the survival ratios at the younger ages are

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10/ Lowell J. Reed and Margaret Merrell, "A Short Method for Construct-
ing an Abridged Life Table," American Journal of Hygiene, Vol. 30,
p. 33; also H. H. Wolfenden, Population Statistics and their
Compilation (Revised Edition), Chicago, 1954, p. 178.

extremely sensitive to small rounding errors in the various steps of the computation.

In order to see how this comes about, it is convenient to introduce an auxiliary function $_n r_x$ defined by

$$_n r_x = \frac{_n q_x}{n \; _n m_x} = \frac{_n L_x}{n l_x} \; .$$

It follows that

(1)
$$\frac{_n L_{x+n}}{_n L_x} = \; _n p_x \; \frac{_n r_{x+n}}{_n r_x} \; .$$

On the other hand, expansion in series of the exponential term in the Reed-Merrell formula gives, on simplification,

$$_n r_x = 1 - (\tfrac{1}{2} n - a n^2) \; _n m_x + \ldots \; ,$$

where the terms not shown contain the second and higher powers of $_n m_x$. If $n = 5$ and $a = .008$ (as in this Study), this becomes

$$_5 r_x = 1 - 2.3 \; _5 m_x + \ldots \; .$$

With assumed values of $_5 m_x$ at the younger ages given to two significant figures and having the first significant figure in the fourth decimal place, the values of $_5 r_x$ and $_5 p_x$, and therefore the survival ratios, could be computed accurately to about 4 significant figures. Moreover, it would be necessary to carry one or two more figures in the intermediate steps in order to avoid accumulation of rounding error. Conversely, this means that $_5 r_x$ (and therefore the survival ratio) is changed only in the fourth digit by a small change in $_5 m_x$, and thus it is necessary to carry 5 or 6 figures in the intermediate steps in order to avoid anomalous results such as were obtained in the first computation.

The final computation of the survival ratios was made by formula (1) above. In this connection it was noted that more accurate results are obtained at younger ages by interpolating in a table of $_5 r_x$ (and then calculating $_5 q_x$ as $5 \; _5 r_x \; _5 m_x$) than by interpolating in the table of $_5 q_x$ given by

Reed and Merrell[11] and a special table of values of $_5r_x$ was prepared for this purpose.

Special problems arise at age 0 and for the age groups 1-4 and 85 and over. The assumption was made that $q_0 = m_0/(1 + .8m_0)$ (which implies $L_0 = 1_0 - .8d_0$, and further that $_4q_1 = 4 \; _4m_1/(1 + 2 \; _4m_1)$, which assumes uniform distribution of deaths over the age interval.[12]

11/ For convenience, we drop the subscripts of $_nm_x$ and consider straight-line interpolation in a table of some function $f(m)$, which, for the moment, we leave unspecified. It is assumed that we are interpolating between the arguments m_0 and $m_0 + h$ to obtain an approximate value of $f(m_0 + x)$. Then, the error of the interpolation is given by $-\frac{1}{2}x(h - x) \; f''(m_0 + z)$, where z is some (unknown) value between 0 and h (see Harry Freeman, Mathematics for Actuarial Students, Part II, p. 57). Thus, the relative error is proportional to $f''(m_0 + z)/f(m_0 + x)$.

If h is a small interval, the error in stright-line interpolation is therefore roughly proportional to the ratio $f''(m)/f(m)$. Again utilizing the series expansion of the Reed-Merrell formula (and dropping the subscripts of $_nq_x$ and $_nr_x$) we obtain

$$q'' = - (n^2 - 2an^3) + \ldots$$

$$r'' = (2n^2 + 8an^3) + \ldots ,$$

where the omitted terms involve powers of m. Since r is approximately 1, and q is approximately nm, we have, very roughly, $q''/q = - (n - 2m^2)/m$, and $r''/r = 2n^2 + 8 \; an^3$; or, for $n = 5$, $q''/q = 4.6/m$ and $r''/r = 58$. Thus, there is less error in interpolating for r than in interpolating for q if m is less than about .08.

12/ T. N. E. Greville, "Short Methods of Constructing Abridged Life Tables," The Record, American Institute of Actuaries, Vol. XXXII, p. 34. The tables given by Reed and Merrell for obtaining q_0 and $_4q_1$ from m_0 and $_4m_1$ are not suitable for use here, as they involve a correction for under-enumeration.

At the other end of the life table, it was arbitrarily assumed that $_5m_{85} = .9 \, _\infty m_{85}$. Values of $_5q_{100}$ and $_5q_{105}$ were based on the experience of Union veterans of the Civil War,[13] and, by divided-difference interpolation between these and the previously computed values of $_5q_{80}$ and $_5q_{85}$, values of $_5q_{90}$ and $_5q_{95}$ were obtained. Values of $_5m_{90}$ and $_5m_{95}$ were then obtained by entering the Reed-Merrell tables backwards, and those of $_5m_{100}$ and $_5m_{105}$ (which fall outside the limits of the tables) were computed by solving the Reed-Merrell formula for $_5m_x$ and substituting the assumed values of $_5q_x$.

The values of $_5L_x$ for all ages, and the resulting 5-year survival ratios, could then be computed. Values of the ratio T_{95}/T_{90}, needed to project the population in the final age group, 95 and over, were computed on the assumption that $T_{110} = 0$.

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[13] Robert J. Myers and Louis O. Shudde, "Mortality Experience of Union Civil War Veterans," Transactions of the Society of Actuaries, Vol. VII, p. 63. Mortality rates based on this experience were also used at ages 100 and over in the United States Life Tables for 1949-51.

Actuarial Studies Available from the Division of the Actuary*

10. Various Methods of Financing Old-Age Pension Plans·-- September 1938.

14. An Analysis of the Benefits and Costs Under Title II of the Social Security Act Amendments of 1939 -- December 1941.

15. Comparison of Cost Estimates of the Committee on Economic Security With Actual Experience Data -- July 1940.

16. Estimated Amount of Life Insurance Value in Force Under Survivors Benefits of the Old-Age and Survivors Insurance System -- January 1941.

17. New Cost Estimates for the OASI System, With the Assumption of a Static Future Wage Level -- December 1942.

19. OASI 1943-44 Cost Studies -- May 1944.

21. Analysis of Long-Range Cost Factors -- September 1946.

22. Cost Study for Complete Coverage Program of Old-Age, Survivors, and Disability Insurance -- August 1945.

23. Long-Range Cost Estimates for OASI, 1946 -- April 1947.

24. Illustrative U. S. Population Projections, 1946 -- January 1948.

26. Present Values of OASI Benefits Awarded and in Current Payment Status, 1940-46 -- May 1948.

28. Long-Range Cost Estimates for Expanded Coverage and Liberalized Benefits Proposed to the OASI System by H.R. 2893 -- February 1949.

29. Estimated Amount of Life Insurance in Force as Survivor Benefits Under OASI System -- April 1949.

30. Analysis of the Benefits Under Title II of the Social Security Act Amendments of 1950 -- February 1951.

31. Estimated Amount of Life Insurance in Force as Survivor Benefits Under Social Security Act Amendments of 1950 -- September 1951.

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* Numbers not listed are out of print.

32. Analysis of 346 Group Annuities Underwritten in 1946-50 --
    October 1952.

33. Illustrative U. S. Population Projections, 1952 -- November 1952.

34. Analysis of the Benefits Under the OASI Program as Amended in
    1952 -- December 1952.

35. Present Values of OASI Benefits in Current Payment Status
    1940-52 -- May 1953.

36. Long-Range Cost Estimates for OASI 1953 -- June 1953.

37. Estimated Amount of Life Insurance in Force as Survivor Benefits
    Under Social Security Act Amendments of 1952 -- August 1953.

38. Long-Range Cost Estimates for Changes Proposed in the OASI
    System by H.R. 7199, With Supplementary Estimates for Universal
    Coverage -- March 1954.

39. Long-Range Cost Estimates for OASI 1954 -- December 1954.

40. The Financial Principle of Self-Support in the OASI System --
    April 1955.

41. Analysis of Benefits, OASI Program, 1954 Amendments -- May 1955.

42. Present Values of OASI Benefits in Current Payment Status
    1940-54 -- July 1955.

43. Estimated Amount of Life Insurance in Force as Survivor Benefits
    Under OASI-1955 -- September 1955.

44. Analysis of 157 Group Annuity Plans Amended in 1950-54 -- July 1956.

45. Present Values of OASI Benefits in Current Payment Status
    1940-56 -- May 1957.

46. Illustrative United States Population Projections -- May 1957.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
WASHINGTON 25, D.C.

September 3, 1957

MEMORANDUM

From: Division of the Actuary
          Social Security Administration

Subject: Births, Deaths, and Birth and Death Rates in the United
          States, 1915-2050

As a byproduct of the population projections recently prepared[1]
by the Division of the Actuary, crude birth and death rates, averaged
over 5-year periods, have been computed for each of the four principal
illustrative projections. It is hardly necessary to emphasize that
these crude rates are subject to many limitations, but they do
possess considerable interest as a measure of short-term population
change under the assumptions stated.

Table 1 gives a series of estimated annual births and deaths
since 1915, after adjustment for incompleteness of the registration
areas prior to 1933 and for underregistration. The annual number of
births was relatively constant in 1915-27 at about 2.8-3.0 million;
this, coupled with an increasing total population base, resulted in
a decreasing birth rate. After 1927 the annual births decreased
steadily to a minimum of 2.3 million in 1933 and then increased
slowly to 2.6 million in 1940 and more sharply to 3.1 million in
1943. It then declined slightly in 1944-45, and then increased
very sharply in 1946 to 3.4 million and again in 1947 to over 3.8
million. In 1948-50 there was a decrease to 3.6 million annual
births, but in 1951 the 1947 peak was slightly exceeded, and the
number has continued to increase in subsequent years.

The crude birth rate decreased steadily from almost 30 per
1000 in 1915, to about 18 per 1000 in 1933. In the next 6 or 7
years there was little change, but following 1940 there was some
increase until a peak of $26\frac{1}{2}$ per 1000 was reached in 1947. In the
following years the rate has been fairly level at around 25 per
1000.

The annual number of deaths has been remarkably constant over
the period since 1915 with the exception of the influenza year of
1918 when there were about 400,000 to 500,000 excess deaths. Ex-
cluding this abnormal year, the annual number of deaths (excluding
deaths among the armed forces overseas) ranged from a minimum of
1.29 million in 1921 to a maximum of 1.58 million in 1956. Prior
to 1953, the largest number recorded since 1918 was 1.52 million in
1936. In the 42-year period, 1915-56, there were 32 years when the
number of deaths was between 1.39 and 1.50 million (both inclusive).

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1/ "Illustrative United States Population Projections,"
Actuarial Study No. 46, May 1957.

With the relatively constant annual number of deaths and with an increasing total population base, the crude death rate has declined since 1915 from nearly 14 per 1000 to about $9\frac{1}{2}$ per 1000.

Under all the four main projections in <u>Actuarial Study No. 46</u>, the crude birth rate for 1955-60 is above 20 per 1000 (see Table 2), but shows a significant decline in later periods, but with a spread between the low-fertility and high-fertility projections of about 4-5 per 1000 from 1960 until after 2000.

The average annual births will probably be above 4 million for 1955-60. After 1960, all four projections show an increase, which continues to about 1980 under the low-fertility projections and well after 2000 under the high-fertility projections, the ultimate level being about 4 million and more than $6\frac{1}{2}$ million in the respective cases.

The crude death rates shown by the population projections indicate that there may be a small decrease from the present level over the next few decades. In Projections I and II, there is eventually an increase to an ultimate level of perhaps 13 or 14 per 1000. On the other hand, under Projections III and IV the crude death rate changes little from the present level over the course of the next 80 years.

The average annual deaths are about 1.6 million for 1955-60, but thereafter gradually and steadily increase. It appears that the level trend in the annual number of deaths over the past 40 years ended about 1951, and was replaced by an upward trend which may be expected to continue in the future.

Attachments

Table 2

BIRTHS AND DEATHS IN THE UNITED STATES, 1955-2050

Period	Average Annual Births (in thousands)	Average Annual Deaths (in thousands)	Rate per 1000 Mean Population Birth	Death
Projection I				
1955-60	3,623	1,608	20.3	9.0
1960-65	3,582	1,660	18.9	8.8
1970-75	3,937	1,803	18.6	8.5
1980-85	4,148	1,986	17.6	8.4
1990-95	4,093	2,246	15.9	8.7
2000-05	4,140	2,571	15.0	9.3
2025-30	4,093	3,424	13.3	11.1
2045-50	4,037	3,975	12.8	12.6
Projection II				
1955-60	3,623	1,650	20.3	9.3
1960-65	3,581	1,757	19.0	9.3
1970-75	3,932	2,005	18.8	9.6
1980-85	4,137	2,260	17.9	9.8
1990-95	4,071	2,527	16.3	10.1
2000-05	4,105	2,791	15.4	10.5
2025-30	4,021	3,598	13.8	12.3
2045-50	3,937	4,027	13.4	13.7
Projection III				
1955-60	4,440	1,628	24.6	9.0
1960-65	4,488	1,683	23.0	8.6
1970-75	5,295	1,834	23.2	8.0
1980-85	6,030	2,029	22.5	7.6
1990-95	6,376	2,303	20.5	7.4
2000-05	6,676	2,658	18.9	7.5
2025-30	7,002	3,792	15.6	8.4
2045-50	6,832	5,193	13.7	10.4
Projection IV				
1955-60	4,439	1,671	24.6	9.3
1960-65	4,486	1,781	23.0	9.1
1970-75	5,289	2,040	23.4	9.0
1980-85	6,013	2,317	22.8	8.8
1990-95	6,342	2,610	21.0	8.6
2000-05	6,619	2,918	19.4	8.5
2025-30	6,878	4,125	16.0	9.6
2045-50	6,662	5,429	14.2	11.6

Note: These data relate to the entire United States and not merely to the continental United States. See Table 1 and text for bases of the various projections.

Table 1

ACTUAL BIRTHS AND DEATHS IN THE UNITED STATES, 1915-56

Year	Births[a] (in thousands)	Deaths[b] (in thousands)	Rate per 1000 Population[c] Birth	Rate per 1000 Population[c] Death
1915	2965	1389	29.5	13.8
1916	2964	1459	29.1	14.3
1917	2944	1501	28.5	14.5
1918	2948	1934	28.2	18.7
1919	2740	1394	26.1	13.3
1920	2950	1433	27.7	13.5
1921	3055	1294	28.1	11.9
1922	2882	1331	26.2	12.1
1923	2910	1403	26.0	12.5
1924	2979	1367	26.1	12.0
1925	2909	1406	25.1	12.1
1926	2839	1476	24.2	12.6
1927	2802	1397	23.5	11.7
1928	2674	1490	22.2	12.4
1929	2582	1494	21.2	12.3
1930	2618	1439	21.3	11.7
1931	2506	1416	20.2	11.4
1932	2440	1401	19.5	11.2
1933	2307	1384	18.4	11.0
1934	2396	1440	19.0	11.4
1935	2377	1436	18.7	11.3
1936	2355	1525	18.4	11.9
1937	2413	1495	18.7	11.6
1938	2496	1424	19.2	11.0
1939	2466	1431	18.8	10.9
1940	2559	1461	19.4	11.1
1941	2703	1438	20.3	10.8
1942	2989	1422	22.2	10.6
1943	3104	1495	22.7	11.2
1944	2939	1443	21.2	10.8
1945	2858	1430	20.4	10.8
1946	3411	1421	24.1	10.2
1947	3817	1469	26.5	10.3
1948	3637	1465	24.8	10.0
1949	3649	1461	24.5	9.8
1950	3632	1467	24.0	9.7
1951	3823	1497	24.8	9.8
1952	3913	1512	24.9	9.7
1953	3965	1533	24.8	9.7
1954	4078	1496	25.1	9.3
1955[d]	4104	1544	24.8	9.4
1956[d]	4220	1581	25.1	9.5

a/ Corrected for underregistration and for incompleteness of registration area before 1933. Source: Department of Health, Education, and Welfare, Public Health Service, National Office of Vital Statistics, Vital Statistics of the United States, 1950, Vol. I, and 1955, Vol. I, and Monthly Vital Statistics Report, Annual Summary for 1956-Part 1.

b/ Corrected for underregistration and for incompleteness of registration area before 1933. Excludes deaths among armed forces overseas. Based on estimates of Thompson and Whelpton (in Population Trends in the United States) for 1920-30, extension of their method for 1931-39, and data of National Office of Vital Statistics (same sources as in a/) for 1940 and later years (with adjustment for underregistration of 3% of adjusted number in 1940 graded linearly down to 1% in 1950 and subsequent years).

c/ Birth rates based on estimated midyear population including armed forces overseas. Death rates based on estimated midyear population excluding armed forces overseas.

d/ Provisional data.

Note: Data relate to continental United States only.