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LIFE TABLES

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FOREWORD

In the absence of reliable registration data on births and deaths, it has been the practice in India to examine in detail the single-year age returns of the decennial census and to prepare life tables and vital rates for the decade using the smoothed age distributions of two successive censuses. Provisional life tables, giving estimates at national level based on 1% sample advance tabulation, were released earlier.

This report presents life tables for males and females of India and its five zones. These are based on tabulation of 10% rural and 20% urban samples of individual slips. The report has been prepared by the Demography Division of this office. It is a pleasure to acknowledge the services of Shri K. S. Natarajan who prepared the report and of his team. Special mention should be made of the dedicated work done by Shri A.K. Biswas, at present Assistant director of census operations, Lakshadweep, and Shri S.S. Bawa, Investigator.

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Report on the life tables

This is the ninth of a series of investigations on the mortality of the Indian population based on census data. Registration of births and deaths continues to be unsatisfactory in our country. Therefore, the mortality rate has to be derived by the indirect method of comparing a cohort of one census with its survivors in the next census The method can give only approximate results and should not be construed as a substitute for methods based on registration of births and deaths

The data supplied for the purpose of the present investigation were :

(i) The sex-wise single-year age returns of the 1971 census for each state and union territory based on a 10% rural and a 20% urban sample of individual slips For small states and union territories, these were based on full count

(ii) The number of inter-state migrants by state of last residence, age, sex and duration of residence 0-9 years

(iii) The infant mortality rate for the years 1968, 1969 and 1970 based on the sample registration system

Since 1951, life tables have been presented at the zonal level In the present report, the following zonal composition has been adopted.

1. *Northern zone* : Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan, Delhi and Chandigarh.
2. *Central zone* : Madhya Pradesh and Uttar Pradesh
3. *Eastern zone* : Assam, Bihar, Orissa, Sikkim, West Bengal, Manipur, Meghalaya, Nagaland and Tripura.
4. *Western zone* . Gujarat, Maharashtra, Goa, Daman & Diu and Dadra & Nagar Haveli.
5. *Southern zone*: Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Lakshadweep and Pondicherry.

Arunachal Pradesh and the Andaman & Nicobar Islands have been included in all-India only.

Method adopted for deriving mortality rates

Various methods have been adopted in the past in deriving the mortality rates. The principle adopted here, is one of tracing a cohort of persons living at a point of census to their survivors at another point of time From the estimates of population at each age in the 1961 and 1971 censuses the probabilities of survival for 10 years at each age were obtained by dividing the population aged x+10 in 1971 by the population aged x in 1961. The probability of survival for one year was obtained by the formula explained elsewhere. For older and younger ages special methods have been adopted

Smoothing of age data

The single-year age returns suffer from age distortions These have to be corrected The procedures adopted for smoothing the age data and the rationale behind have been discussed in another publication. In brief, it may suffice to mention that the unadjusted age data were grouped into different quinquennial age groups like 0-4, 1-5, 2-6, 3-7, 4-8. The age ratio score and the deviation of the quinquennial total of Myer's index of digital preference from 50 were then calculated. On the basis of these two tests, the 'best' group was determined The group totals were then distributed into individual ages by using Grabill's co-efficients The group of these values was quite smooth but for a slight depression in the age range 15-30 These were then smoothed out by using 10-year groups instead of 5-year groups Such a procedure was essential as in these age ranges the concentration at ages 25 and 30 were much higher than all other age groups, indicating thereby that age attractions might stretch beyond five years on either side. For younger ages, omission and distortion factors arrived at from the census evaluation study were used. (*See* "Age tables 1971" for details)

Adjustment for migration

The age distribution of the population is to be corrected for the disturbances due to migration. The disturbances due to migration relative to the size of the population are quite unimportant for most of the states. Grouping of the states into zones further reduces the impact of migration.

There appears to be two methods to allow for the impact of migration. The first is to work out the age distribution of the natural population at the two

censuses. This can be done by adding out-migrants and subtracting in-migrants from the enumerated age group population of each census. The second is to estimate the migration during the inter-censal period.

If I_x and O_x are the number of in-and out-migrants respectively at age x during the inter-censal period and if out of the excess of in-migrants over out-migrants D_x deaths have occurred, then we can adjust the population of the later census suitably.

Adjusting for migration has always remained a problem in Indian censuses owing to lack of the age distribution of migrants. One cannot assume the age distribution of the resident population as applicable to migrants also, as the latter are known to comprise a higher proportion of young adults and a lower proportion of very young and old population compared to the resident population. In all the previous actuarial investigations (except in 1961 in which the procedure adopted is not known) the age distribution of migrants has been based on that estimated by Sir George Hardy in 1891. He examined the data on the number of male in-and out-migrants in each state and found that in three provinces, viz., Coorg, lower Burma and Bihar in-migrants formed a large proportion. In view of this, he adopted the age distribution of these states as that of migrants.

A welcome improvement in the 1971 census is the provision for the tabulation of the age distribution of inter-state migrants (by place of last residence), whose duration of residence was 0-9 years. Since the duration of residence at the place of enumeration was less than 10 years, all of them are inter-censal migrants. There could of course be a few migrants who might have made more than one inter-state migration during the decade. It is not unreasonable to assume that they would form a small part of the inter-state migrants and that their number would be negligible compared to the population size when we consider inter-zonal migration. In view of this the age distribution of the migrants (duration of residence 0-9 years) was made use of.

Another practical point arose from the fact that the migration data were available in the age group 0-2, 3-7, 8-12, etc. These when plotted on a graph showed the excess of migrants in age groups containing digit O compared to the adjoining groups, indicating the familiar preference for digits ending O. It was, therefore, assumed that the age distribution of migrants is also subject to the same kind of biases and distortions as those of the general population. Migrants by individual ages were, therefore, estimated by Grabill's co-efficients. These gave migrants by single-year of age from 13 to 62. The adjusted values for the age group 8-12 and 63-67 were obatained after smoothing them by applying the formula $\frac{1}{4}(W_{-1}+2W_0+W_1)$. The groups 3-7 and 68-72 were taken without any change. From these totals individual ages were estimated by applying Sprague's end panel co-efficients. The single-year data so obtained were progressing reasonably well. These were then prorata adjusted so that the total migrants did not change.

Information on international migration is scanty. The immigration statistics of the U.K. and the U.S.A. indicate that during the decade 1961-71 about 3,41,000 emigrated to the U.K. and 27,000 to the U.S.A. Of the former about 2,41,000 were males and the rest females. Emigrants to countries like Canada are not known. Though the above figures are not of much significance at national level, a large chunk of it is from the north zone. In the absence of any other indicator, it was assumed that about four-fifth of the emigrants were from the north zone. Adjustments were made accordingly in north zone age data relating to 1971.

The age distribution of 1961 and 1971 were smoothed by different procedures. When ten-year survival probabilities were calculated for all ages, it was found that in some cases, the ${}_{10}p_{x+\frac{1}{2}}$ were near one, sometimes even more than one. The 1961 unadjusted age data for these zones were, therefore, smoothed afresh using the procedure adopted in the 1971 census. Such fresh smoothings were done in the case of East zone, West zone and North zone (males). However, it was felt that it would not be proper to apply the omission and distortion factors for ages 0 and 1 revealed by the census evaluation study to 1961 data. For example, the depression at age 1 on 1971 is much sharper than in the 1961 census. In fact even the absolute number at age one was less than that of 1961 in which no such depression was observed in the case of age 0. Hence no allowance could be made for under-enumeration at ages 0 and 1 in 1961. For the construction of the life table, the smoothed population aged two and above was made equal to the corresponding unadjusted population, wherever 1961 age data were smoothed afresh.

Calculation of mortality rates for individual ages 13 to 65

From the smoothed populations of the two censuses (1971 age distribution adjusted for Ist March and migration) the ratio of the population $P^{71}{}_{x+10}$ of 1971 to $P^{61}{}_x$ of 1961 was derived for all ages x. These gave the probability, ${}_{10}p_{x+\frac{1}{2}}$, that a person exactly aged

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$x+\frac{1}{2}$ in 1961 would survive for the next 10 years. From these the individual values of P_x were obtained as explained below.

For understanding the procedure adopted, one has to consider the movement of the population over the years of age as well as calendar years.

P^{Z}_{X}, the population aged x in the year z, (reckoned from Ist March to coincide with census), moves to P^{Z+10}_{X+10} in the year $Z+10$ by the operation of mortality rates q^{Z}_{X}, q^{Z+1}_{X+1}, q^{Z+2}_{X+2}, q^{Z+3}_{X+3}, q^{Z+9}_{X+9}. Thus the population aged 20-29 in 1961 moves to population aged 30-39 in 1971 by the operation of mortality pertaining to ages 20 to 38 prevailing in various years of the decade 1961-70. In this movement the actual mortality at age 29 for each of ten years in 1961-70 was effective. This is true for all ages above age 10.

There are a set of 10 ratios, each of which gives information about a particular mortality rate q_x. From these $_{10}p_x$ the probability p_x of surviving a year was obtained using the relation :

$$\frac{[2][10][10]}{200}\left(1-\frac{67}{8}b\right)\log p_x=\log p_x \text{ where}$$

$$b=\Delta^2 E_1 \quad \ldots\ldots\ldots\

These differences narrow down further when we group the data into quinquennial groups. These give an indication of the possible range of error introduced in the rates of mortality derived by the present formula.

The values of q_x so derived when plotted on a graph showed some kinks. Since the purpose for which the life tables are used demand a smooth series, the log p_x values were first grouped into quinquennial group totals. Before obtaining the individual log p_x' the group totals were examined for smooth progression. In some cases, these 5 years group totals were smoothed by weighing the adjacent three groups in the ratio 1:2 1. Whenever any group was changed by such a procedure, the next group above or below as the case may be, was either increased or decreased, so that log $10p_x$ does not change. From the log $5p_x$ so obtained log p_x's were got by using sprague's multipliers.

Extension to ages above 65

To derive the values of p_x for ages beyond 65, the differences of p_x and log p_x were examined and a suitable curve determined. This curve varied from zone to zone and all-India. The curves fitted by least square method, for various zones are as follows :

TABLE 2

Curve fitted to old age

Zone	Males	Females
All-India	$y=a+bx$	$y=a+bx$
South zone	$y=a+bx$	$y=a+bx+cx^2$
Central zone	$y=a+bx$	$y=a+bx$
East zone	$y=a+bx$	$y=a+bx$
West zone	$y=a+bx+cx^2+dx^3$	$y=a+bx+cx^2+dx^3$
North zone	$y=a+bx+cx^2$	$y=a+bx$

y stand for log p_x

To improve smoothness at the junction in a few cases the two series were either extended forward or backward.

Derivation of p_x for younger ages

To determine the log p_x's for ages one above two, the following relations were made use of :

$$\log 10p_2=\log 5p_2+\log 5p_7 \quad (1)$$

$$\log 10p_7=\log 5p+\log 5p_{12} \quad (2)$$

$$\log 10p_{12}=\log 5p_{12}+\log 5p_{17} \quad (3)$$

using the log $5p_{17}$ derived, in (3), log $5p_{12}$ was derived. Using this value of log $5p_{12}$ in (2), log $5p_7$ and then log $5p_2$ were obtained. These gave values of log $5p_x$ for x=2,7 and 12.

From the values of log $5p_x$ so obtained log p_x for individual values were derived. This gave another set of values for 13, 14, 15 and 16. The two set of values were then utilised for smooth joining of the two curves, one for younger ages and other for adult ages. In certain cases one set or the other of the values was used, without modification.

The civil registration being incomplete, we cannot use the sophisticated methods used elsewhere to derive the mortality rate at younger ages. The choice of a suitable infant mortality rate is however crucial for the construction of life table. The sample registration system provides a set of values of IMR for recent years sex-wise. For rural areas the values were available for the years 1968, 1969 and 1970 and for urban areas for the year 1970. The average number of births and infant deaths for the three years were combined with those of the urban and a set of values for the years worked out. Assuming a linear trend in IMR for 1951 onwards a rough estimate of the mortality at age 0 was worked out. These values are presented below :

TABLE 3

Values of q_0 assumed for 1961-70 lifetables

Zone	1961-70		1951-60	
	Males	Females	Males	Females
All-India	.13013	.12837	.15322	.13826
South zone	.11120	.09970	.13843	.12721
West zone	.11458	.11972	.13983	.12896
East zone	.12190	.11590	.13586	.12820
North zone	11112	.11577	.12070	.11516
Central zone	.15861	16410	18407	.17783

Using the above values of q_0, q_1 was obtained from log p_0, log p_2..log p_8 by divided difference formula.

The life table was then constructed for individual ages upto age 84. For younger ages, the L_x values were obtained by using the following relations :

$$L_0=.25\ l_0+.75\ l_1$$

$$L_1=.41\ l_1+.59\ l_2$$

$$L_2=.42\ l_2+.58\ l_3$$

$$L_3=.48\ l_3+.52\ l_4$$

$$L_4=.49\ l_4+.51\ l_5$$

For other ages L_x was obtained by averaging l_x+l_{x+1}. For age 85+, T_{85} was approximated by l_{85x} log l_{85}.

The life tables for various zones are presented in Appendix A together with a graph of e°_x for all-India.

Test of the life table

The life table has been derived by comparing the age distribution at two different points of time. Due to considerations of smoothness and lack of data a few changes had been made. As a check, on the validity of the life table, the 10 year survival ratios derived from the life tables were applied to 1961 population to obtain 1971 population. The tables 1 and 2 in Appendix C present difference between the values so obtained and the smoothed data of 1971 census age-wise. These indicate the closeness of the life tables to the original values without sacrificing smoothness in values. Since the mortality rates for the age groups O and 1 were not based on census data, similar comparisons have not been undertaken for age group 0-4 surviving to 10-14 in 1971.

Tables 3 and 4 in the Appendix C presents similar deviation based on 1951-60 life tables and the 1951 and 1961 adjusted aged distribution. For deriving the differences, 1951 smoothed age data were adjusted prorata to conform to 1961 territorial jurisdiction. Since the migration adjustments adopted in the construction of the life table are not available, the 1961 adjusted age data presented in the age tables have been made use of. To ensure comparability deviation using similar 1971 age figures, without adjustment for migration have been presented. It is seen that in almost all the cases, the 1961-70 life tables reproduce the 1971 age data closely.

Comparison of the males and females mortality rate indicates that in all the life tables, the female mortality in the age range 27-45, was higher compared to males. Similar trend has been observed in earlier life tables also. However in the 1951-60 life tables the values for q_xs are higher for females than that for males for the entire reproductive age range. This was not observed in the present tables. In fact the male and female mortality curves criss-cross. In this respect the pattern observed in similar to 1941-50 life tables. The female mortality rate is higher than that of males in the age range 30 to 45.

Discussion of the results

One is inclined to compare the results with those of earlier investigations. There are a few limitations which one has to bear in mind before attempting such a comparison. The first one is that the mortality rates derived from two census age distributions are conditioned by the efficiency in enumeration of the total population as well as by ages. The PEC conducted after 1971 census, indicated an over all under count of 1.5% for males and 1.8% for females in 1971. The age wise omission rates in 1971 census show same variations. Similar age-sex wise omission rates are not available for 1961. Further an adjustment for omission, though desirable, introduces another problem of adjusting the all-India figure to the zonal totals. In view of this no adjustment has been done for undercount.

A second point that has to be borne in mind is that the deduced rate of mortality is to a certain extent sensitive to the methods of graduation adopted. Indian age returns are subject to errors of large magnitude. Therefore, smoothing formulae of very great power have to be employed, with the result that the calculated rates of mortality depend on the smoothing formula. Though undesirable, this seems unavoidable as we have no reliable vital statistics to guide.

Comparison based on the life tables

The most common measure for comparing the longevity of different population is the expectation of life at different ages. This is the average number of years lived by persons attaining a particular age, on the assumption that they are subject to the life table rates of mortality. The chief advantage of comparing expectations at different ages is that these give the cumulative effect of mortality over its entire length from any given age and are not affected by minor fluctuations in mortality at particular ages. Table 5 in the Appendix C presents, such a comparison for various decades separately for males and females.

It is seen that the expectation of life has been steadily increasing at all ages. During the decade 1951-60, there was a spurt in expectation of life at ages 0 and 10 compared to the previous decades. The same extent of improvement has not been sustained during the current decade. At ages 20 and above the improvement in e°_x during the two decades 1951-60 and 1961-70 seem more or less of the same magnitude.

A second method of comparing the mortality is to work out percentage of persons surviving to age 20 and the age to which 50% and 25% persons survive. Table 4 gives the above information for the available Indian life tables.

TABLE 4

Survivorship in India

Life tables year	Age to which 50% of the people survive		Age to which 25% of the people survive		Percentage surviving to age 20	
	Males	Females	Males	Females	Males	Females
1881-1890	14-15	17-18	46-47	46-47	46.6	47.7
1891-1900	11-12	13-14	45-46	44-45	45.2	45.2
1901-1910	10-11	12-13	42-43	43-44	43.8	44.8
1921-1930	21-22	22-23	49-50	46-47	51.2	52.8
1941-1950	30-31	30-31	57-58	56-57	57.9	56.8
1951-1960	48-49	44-45	64-65	63-64	72.0	71.2
1961-1970	54-55	54-55	69-70	69-70	74.3	72.9

The above figures indicate the impact of mortality on Indian males and females. The dramatic improvement is seen in the proportion surviving the age 20 in the post independence period. This, however, is still much lower than what has been observed elsewhere. In most of the European countries as well as U.S.A. and Canada about 95% survive to age 20 as against 75% in India. In most of these countries 50% of the people survive to over age 70.

Zonal life tables

The following table shows the expectation of life at birth and at ages 0 and 10 in 1961-70 and 1951-60 in various zones :

TABLE 5

Expectation of life at birth at ages 0 & 10 *during* 1961-70 & 1951-60 *for various zones/all-India*

Zone	e^0				e^{10}			
	Males		Females		Males		Females	
	1971	1961	1971	1961	1971	1961	1971	1961
All-India	46.40	41.89	44.70	40.55	48.80	45.21	47.70	43.78
South zone	47.52	41.09	46.40	39.24	47.85	45.01	47.46	42.87
West zone	48.57	44.19	49.00	42.50	50.94	45.96	52.83	44.68
East zone	45.97	39.78	42.76	40.05	51.39	42.86	48.28	43.06
North zone	50.55	49.62	48.34	44.55	50.64	49.50	49.26	45.01
Central zone	42.20	39.76	40.70	38.80	46.40	44.71	46.60	44.13

Comparison of the expectation of life at birth with that of the previous decade indicates that the gain in expectation during the current decade has been moderate compared with the previous decades in all the zones except the south zone. In the latter the gain during the decade 1961-70 is more than the previous decade. This trend is as anticipated since the decade 1951-60 has already witnessed dramatic improvements in expectation of life at birth compared with earlier decade. While the availability of cheap medicines and extension of public health measures have been instrumental in bringing out a drastic improvement in mortality during 1951-60, further sustained improvement becomes difficult. The country seems to reaching a stage wherein further improvement in expectations will be possible only by measures like expansion of medical facilities to rural areas, making available pure drinking water etc. and not on cheap public health measures.

Added to this, another possible reason for the slow improvement during the decade 1961-70 may be the severe drought which affected a states like Maharashtra, Gujarat, Bihar, Orissa and Uttar Pradesh during the decade. As acknowledged in the fourth plan draft outline (1969-74) severe stresses had been developing in the economy. Among the contributory factors were the hostilities of 1962 and 1965 followed by the

fall in agricultural production over two successive years 1965-66 and 1966-67. In 1965-66 the foodgrain production fell by nearly 20%, compared to the previous year. Though the impact of these on mortality conditions is difficult to quantity, it would not be wrong to state that the decade 1961-70 as a whole was not as propitious for such rapid decline in mortality as the previous decade.

According to the life tables, north zone has the highest expectation of life at birth followed by west, south, east and central zones in that order. The relative position of zones is the same as in 1961.

Comparison of the expectation of life at birth with that of previous decade indicates that substantial gains in expectation have been made in east, south and west zones. The improvement in e^0_0 in west zone which was 12.9 and 11.6 for males and females during the 1951-60 decade was, however, only 4.4 and 6.5 during the current decade. South zone on the other hand has shown greater improvement during the current decade as compared with the previous decade. The gain in e^0_0 was only 4.9 and 2.0 for males and females during 1951-60 as against 4.4 and 6.5 for males and females in 1961—70.

N.S.S. and S.R.S. data show that the death rate in Uttar Pradesh is high compared to other states of India. In addition the state has been subject to severe droughts. These may probably explain the low improvement in central zone.

Though east zone as a whole has shown an improvement of 4.5 year in e^0_0 the gains differ widely for males and females. Males gained 6.2 years during the decade but females gained only 2.7 years. In this zone major states like Bihar and Orissa have been affected by drought. On the other hand states and union territories like Assam, Meghalaya, Manipur, Tripura and Arunachal Pradesh transport and communication improved considerably specially after the Chinese war of 1962. The zone as a whole, therefore, seems to be subject to different pulls with part of zone showing condition propitious for increasing mortality and the other part being affected by drought.

The high male-female differential observed may be partly attributed to the data. Table 6 in Appendix C giving sex ratio of the population in 1961 and that of 1971, 10+ gives an idea of extent of sex distortion in the data supplied. 10+ has been taken in the latter census, as the life table is more influenced by this ratio rather than that of the whole population. The PEC did not, however, show marked male-female differential under enumeration. Neither has there been differential out-migration of females or in-migration of males. The only conclusion that can be drawn from the sex ratios is that the male-female gap in mortality has widened.

The meagre improvement in north zone seem surprising at first sight. The zone has been surplus in foodgrains production. Even the severe drought could not have as much effect on this zone as compared to other zones as areas like Delhi, Himachal Pradesh, Punjab, Haryana and Jammu & Kashmir were hardly affected. An application of the quasi-stable model, using west model life tables gives an estimate of 46.4 and 42.6 for males and females respectively. The expectations differ considerably from the census actuary's estimate of 49.4 for males and 44.6 for females. Since the method of construction of the 1951-60 life tables were not known, fresh life tables were constructed for the decade 1951-60 using the same age data but the different procedure of life table construction adopted in 1971. The resultant expectations of life at birth were 47.0 and 44.3 agreeing closely with that of quasi-stable estimates. The estimate of e^0_0 based on quasi-stable model for the zone was 49.4 for the decade 1961-71 (males 50.7 year and females 47.9 year). Though due to the incipient decline in fertility the estimate may not be exact, it indicates a probable range for the estimates. Barring Punjab and the union territory of Delhi, the other parts of the zone like Jammu & Kashmir, Haryana, Himachal Pradesh, Rajasthan had no significant impact of family planning. The estimates may not, therefore, be far off from these. The estimates by this method for 1951-60 and 1961-70 for the north zone are as follows.

TABLE 6

Estimates for north zone by various methods

Methods	Males		Females	
	1951-60	1961-71	1951-60	1961-70
1. By 1971 method	47.0	50.6	44.3	48.3
2. By quasi-stable method	46.4	50.8	42.6	47.9

These indicate that the increase in north zone is also of the order of 0.4 year per annum.

The male-female differential in expectation of life at birth has, however, narrowed during 1961-70 decade in the north zone. While it was 5.1 in 1951-60, it was only 2.3 in 1961-70.

The zones also reflect similar trends in the age to which 50% survive. Table 7 presents such a comparison for the decade 1951-60 and 1961-70.

TABLE 7

Age to which 50% survive according to 1951-60 and 1961-70 life table

Zone	Sex	Year			
		1951-60		1961-70	
North zone	M	57-58		57-58	
	F		48-49		55-56
Central zone	M	45-46		47-48	
	F		42-43		44-45
East zone	M	45-46		54-55	
	F		42-43		46-47
South zone	M	48-49		55-56	
	F		42-43		52-53
West zone	M	49-50		57-58	
	F		46-47		55-56

West and South zones show substantial improvements. Similar improvement is also shown in case of East zone males and North zone females.

Consistency of zonal and all-India life tables

Zonal and all-India life tables have been constructed separately. A few checks have, therefore, been made to examine their consistency.

1. The births in each zone and all-India were estimated separately using the respective life tables and age distributions. The deviations of the sum of the estimated number of births zonewise from the number of births estimated using all-India life tables for the age groups 0-4, 5-9 and 0-9 were 0.28%, 1.33% and 0.78% respectively.

2. The number of deaths estimated agewise and zonewise by applying the central death rates derived from the life table to the average 1961-70 age distribution were compared with the deaths estimated at national level. The % difference was 0.42%.

3. The zonal expectation of life at birth when weighed with the corresponding number of births gave an expectation of life at birth of 46.2 for males and 44.2 for females against the figure of 46.4 and 44.7 for all-India.

These checks indicate that the Zonal and all-India life tables are reasonably consistent.

Estimate of vital rates

Vital rates like birth and death rates have been estimated by the reverse survival method, central death rate method, census differencing method and quasi-stable population method (Appendix B). The details of the material used and the assumptions made in each method were as follows.

(1) *Quasi-stable model method*

In this method the procedure suggested in U.N. Manual IV [1] has been followed with adjustment for the effect of declining mortality. The growth rate has been adjusted to correspond to the end of the decade in a manner suggested by Coale. [2]. The rate of change in growth rate $\frac{(\Delta r)}{(\Delta t)}$ has been based on exponential growth rates of 1961-71 and 1921-31 assuming them to be centred at 1966 and 1926 respectively. Since in general migration is high in the age group 15-35, a large in-migration would inflate the proportion under ages 20, 25, 30 and 35 resulting in an upward bias in birth and death rate. On the other hand, large scale out-migration reduces the proportion and has the opposite effect. In the absence of the age distribution of migrants it has not been possible to adjust for this. The growth rate however has been adjusted for the effect of migration by working out the natural population $(P_x^t - I^t + O^t)$ as of 1961 and 1971 censuses. In new states like Assam, Meghalaya, Punjab, Haryana and Himachal Pradesh, the 1961 migrant figures corresponding to the present boundaries are not available. For these states no adjustment for growth rate has been attempted.

In case of Kerala the growth rate has increased very little over the last 50 years. No adjustment for declining mortality has, therefore, been made.

It may be pertinent to mention the limitation of the method. Independent evidences like family planning statistics suggest that in some states at least the assumption of constant fertility may not hold good. In these states the estimates are likely to be biased. The estimates may be affected by migration, the model life table used as well deviation from quasi-stability. The expectation of life and other parameters presented may, therefore, reflect the real position only in a broad way and should not be treated as accurate estimates.

(1) Manual IV-Methods of estimating basic demographic measures from incomplete data. ST/SOA/Series A/42

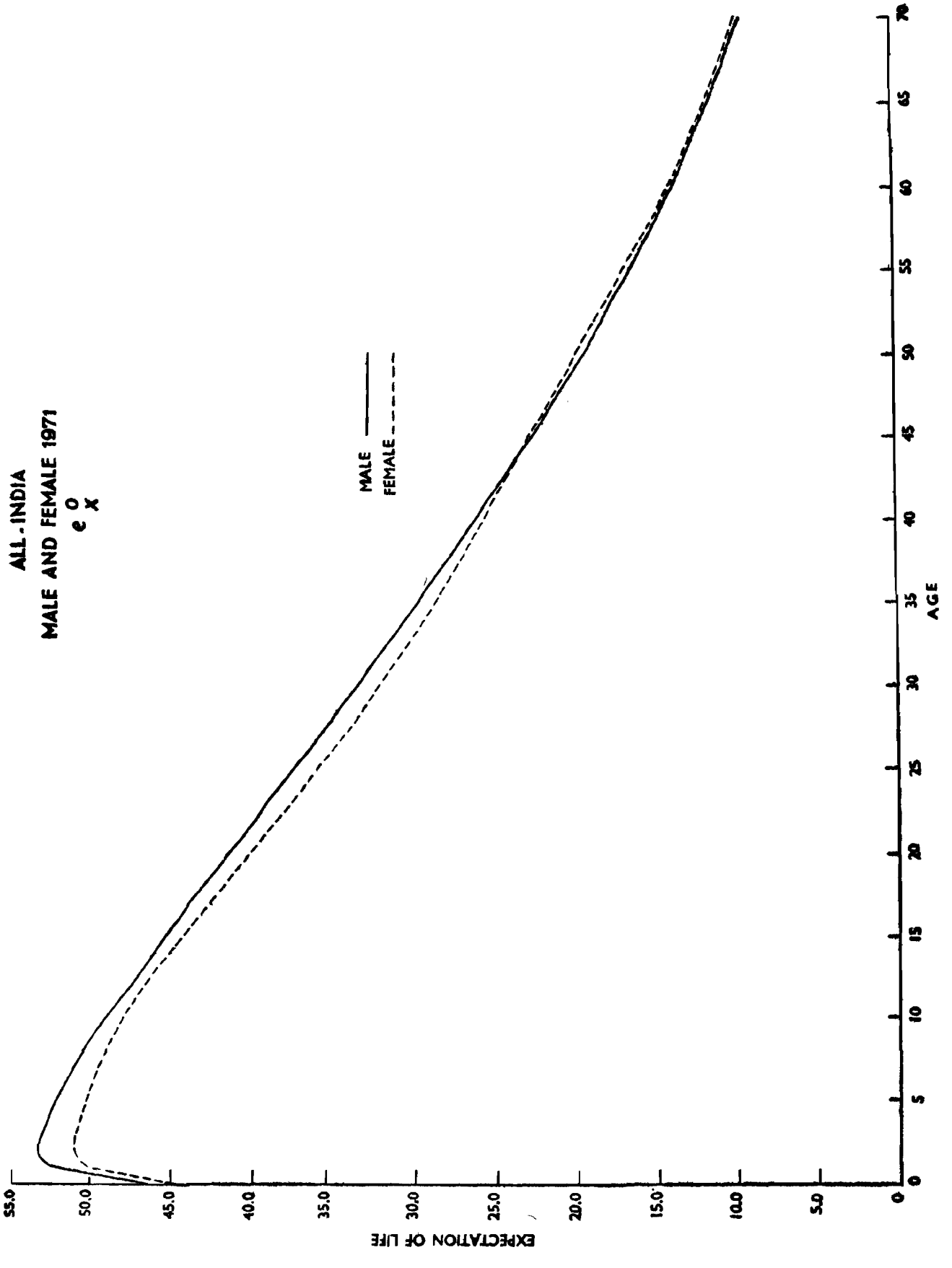
(2) Constructing the age distribution of a population recently subject to declining mortality by Ausily J. Coale-Population index-Vol. 37 No. 2.

(2) *Census differencing method*

As is well known, the method depends mainly on the expectation of counter balancing of two errors which are generally in the opposite direction. For the purposes of this method, the ratio of the total number of deaths aged 5and above was calculated from the civil registration data for the years 1961 to 1970 zonewise. For all the states falling within a zone, the same zonal ratio was applied. Adjustment for migration have been made based on place of birth data. Since civil registration figures are highly unreliable in all the major states in Eastern zone, estimates have been worked out for this zone using all-India ratio.

(3) *Central death rate method and Reverse survival method*

These two methods have some common features, both make use the age distribution and the life table, for the zones. In the first method the central death rates derived from the zonal life table are applied to the mean age distribution of 1961 and 1971 censuses and the number of deaths estimated. Adding the decadal growth rate, birth rate is obtained. In the reverse survival method, the reverse survival factors derived from the zonal life tables are applied to the population aged 0-9 to work out the number of births during the decade. From the births, the birth rates are derived. Since, in general, the inter-state migration may not affect the younger ages very much, birth rate derived is not likely to be affected by migration. As substantial adjustments have been made for under enumeration at younger ages, the estimates based on reverse survival method are recommended for official use. It is, however, essential to bear in mind that the state level estimates are always affected by migration. A more serious error may, however, be caused if the states within the zone differ drastically in mortality conditions.


ALL-INDIA
MALE AND FEMALE 1971
e o x
MALE
FEMALE
EXPECTATION OF LIFE
AGE
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70

TABLES

APPENDIX A

ALL-INDIA—MALES

Life Table (1961-70)

Age	Survivors to exact age x	Deaths between ages x and x+1	Probability of dying between ages x and x+1	Number living between ages x and x+1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e°_x
1	2	3	4	5	6	7
0	100000	13013	.13013	90891	4637190	46.4
1	86987	3282	.03773	85018	4546299	52.3
2	83705	976	.01166	83217	4461281	53.3
3	82729	866	.01047	82383	4378064	52.9
4	81863	771	.00942	81632	4295681	52.5
5	81092	688	.00849	80748	4214049	52.0
6	80404	618	.00769	80095	4133301	51.4
7	79786	559	.00700	79507	4053206	50.8
8	79227	509	.00643	78973	3973699	50.2
9	78718	469	.00596	78484	3894726	49.5
10	78249	437	.00558	78031	3816242	48.8
11	77812	412	.00529	77606	3738211	48.0
12	77400	394	.00509	77203	3660605	47.3
13	77006	381	.00494	76816	3583402	46.5
14	76625	374	.00488	76438	3506586	45.8
15	76251	375	.00492	76064	3430148	45.0
16	75876	380	.00501	75686	3354084	44.2
17	75496	388	.00514	75302	3278398	43.6
18	75108	399	.00531	74909	3203096	42.6
19	74709	408	.00546	74505	3128187	41.9
20	74301	410	.00552	74096	3053682	41.1
21	73891	410	.00555	73686	2979586	40.3
22	73481	413	.00562	73275	2905900	39.5
23	73068	416	.00569	72860	2832625	38.8
24	72652	422	.00581	72441	2759765	38.0
25	72230	430	.00594	72015	2687324	37.2
26	71800	439	.00611	71581	2615309	36.4
27	71361	450	.00630	71136	2543728	35.6
28	70911	462	.00652	70680	2472592	34.9
29	70449	476	.00675	70211	2401912	34.1
30	69973	491	.00701	69728	2331701	33.3
31	69482	508	.00731	69228	2261973	32.6
32	68974	526	.00763	68711	2192745	31.8
33	68448	546	.00797	68175	2124034	31.0
34	67902	568	.00836	67618	2055859	30.3
35	67334	591	.00878	67039	1988241	29.5
36	66743	617	.00924	66435	1921202	28.8
37	66126	635	.00960	65809	1854767	28.0
38	65491	674	.01029	65154	1788953	27.3
39	64817	708	.01093	64463	1723804	26.6

ALL-INDIA—MALES—(*Concld.*)

Age	Survivors to exact age x	Deaths between ages x and x + 1	Probability of dying between ages x and x+1	Number living between ages x and x + 1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	$e_x°$
1	2	3	4	5	6	7
40	64109	734	.01145	63742	1669341	25.9
41	63375	757	.01194	62997	1595599	25.2
42	62618	782	.01249	62227	1532602	24.5
43	61836	808	.01307	61432	1470375	23.8
44	61028	845	.01385	60606	1408943	23.1
45	60183	898	.01492	59734	1348337	22.4
46	59285	960	.01619	58805	1288603	21.7
47	58325	1020	.01749	57815	1229798	21.1
48	57305	1082	.01888	56764	1171983	20.5
49	56223	1132	.02014	55657	1115219	19.8
50	55091	1165	.02114	54509	1059562	19.2
51	53926	1187	.02201	53333	1005053	18.6
52	52739	1214	.02302	52132	951720	18.0
53	51525	1245	.02416	50903	899588	17.5
54	50280	1276	.02538	49642	848685	16.9
55	49004	1308	.02669	48350	799043	16.3
56	47696	1342	.02813	47025	750693	15.7
57	46354	1380	.02977	45664	703668	15.2
58	44974	1422	.03162	44263	658004	14.6
59	43552	1468	.03371	42818	613741	14.1
60	42084	1518	.03608	41325	570923	13.6
61	40566	1572	.03875	39780	529598	13.1
62	38994	1628	.04175	38180	489818	12.6
63	37366	1686	.04512	36523	451638	12.1
64	35680	1764	.04943	34798	415115	11.6
65	33916	1790	.05277	33021	380317	11.2
66	32126	1803	.05611	31225	347296	10.8
67	30323	1802	.05943	29422	316071	10.4
68	28521	1790	.06275	27626	286649	10.1
69	26731	1766	.06605	25848	259023	9.7
70	24965	1731	.06934	24100	233175	9.3
71	23234	1687	.07262	22391	209075	9.0
72	21547	1635	.07589	20730	186684	8.7
73	19912	1576	.07914	19124	165954	8.3
74	18336	1511	.08239	17581	146830	8.0
75	16825	1436	.08532	16107	129249	7.7
76	15389	1367	.08884	14706	113142	7.4
77	14022	1291	.09205	13377	98436	7.0
78	12731	1213	.09525	12125	85059	6.7
79	11518	1134	.09844	10951	72934	6.3
80	10384	1055	.10161	9857	61983	6.0
81	9329	978	.10479	8840	52126	5.6
82	8351	901	.10793	7901	43286	5.2
83	7450	828	.11108	7036	35385	4.7
84	6622	756	.11421	6244	28349	4.3
85+	5866	—	—	22105	22105	3.8

ALL-INDIA—FEMALES

Life Table (1961-70)

Age	Survivors to exact age x	Deaths between ages x and x + 1	Probability of dying between ages x and x+1	Number living between ages x and x + 1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e_x°
1	2	3	4	5	6	7
0	100000	12837	12837	91014	4465447	44.7
1	87163	2969	.03406	85382	4374437	50.2
2	84194	1348	01601	83520	4289051	50.9
3	82846	1198	.01446	82367	4205531	50.8
4	81648	1072	.01313	81326	4123164	50.5
5	80576	971	.01205	80091	4041838	50.2
6	79605	893	.01122	79159	3961747	49.8
7	78712	832	.01057	78296	3882588	49.3
8	77880	728	.00935	77516	3804292	48.8
9	77152	658	.00852	76823	3726776	48.3
10	76494	593	.00775	76198	3649953	47.7
11	75901	518	.00683	75642	3573755	47.1
12	75383	443	.00588	75162	3498113	46.4
13	74940	340	.00454	74770	3422951	45.7
14	74600	273	00366	74464	3348181	44.9
15	74327	260	.00350	74197	3273717	44.0
16	74067	283	.00382	73926	3199520	43.2
17	73784	294	.00398	73637	3125594	42.4
18	73490	304	.00414	73338	3051957	41.5
19	73186	315	.00430	73029	2978619	40.7
20	72871	324	.00445	72709	2905590	39.9
21	72547	334	.00460	72380	2832881	39.0
22	72213	336	.00465	72045	2760501	38 2
23	71877	342	.00476	71706	2688456	37.4
24	71535	345	.00482	71363	2616750	36.6
25	71190	386	.00542	70997	2545387	35.8
26	70804	447	.00631	70581	2474390	34.9
27	70357	507	.00720	70104	2403809	34.2
28	69850	568	.00813	69566	2333705	33.4
29	69282	621	.00896	68972	2264139	32.7
30	68661	656	.00956	68333	2195167	32.0
31	68005	680	.01000	67665	2126834	31.3
32	67325	708	.01051	66971	2059169	30.6
33	66617	735	.01103	66250	1992198	29.9
34	65882	766	.01162	65499	1925948	29.2
35	65116	803	.01233	64715	1860449	28.6
36	64313	843	.01310	63892	1795734	27.9
37	63470	880	.01386	63030	1731842	27.3
38	62590	916	.01463	62132	1668812	26.7
39	61674	947	.01535	61201	1606680	26.1

ALL-INDIA—FEMALES—*(concld.)*

Age	Survivors to exact age x	Deaths between ages x and x + 1	Probability of dying between ages x and x+1	Number living between ages x and x + 1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e^o_x
1	2	3	4	5	6	7
40	60727	970	.01597	60242	1545479	25.4
41	59757	989	.01655	59263	1485237	24.9
42	58768	1006	.01712	58265	1425974	24.3
43	57762	1021	.01767	57252	1367709	23.7
44	56741	1038	.01829	56222	1310457	23.1
45	55703	1061	.01904	55173	1254235	22.5
46	54642	1086	.01987	54099	1199062	21.9
47	53556	1079	.02014	53017	1144963	21.4
48	52477	1076	.02050	51939	1091946	20.8
49	51401	1079	.02099	50862	1040007	20.2
50	50322	1077	.02141	49784	989145	19.7
51	49245	1076	.02184	48707	939361	19.1
52	48169	1074	.02229	47632	890654	18.5
53	47095	1073	.02279	46559	843022	17.9
54	46022	1072	.02330	45486	796463	17.3
55	44950	1085	.02414	44408	750977	16.7
56	43865	1111	.02532	43310	706569	16.1
57	42754	1145	.02677	42182	663259	15.5
58	41609	1189	.02857	41015	621077	14.9
59	40420	1244	.03077	39798	580062	14.4
60	39176	1308	.03339	38522	540264	13.8
61	37868	1382	.03650	37177	501742	13.2
62	36486	1464	.04012	35754	464565	12.7
63	35022	1551	.04428	34247	428811	12.2
64	33471	1641	.04902	32651	394564	11.8
65	31830	1661	.05217	31000	361913	11.4
66	30169	1675	.05553	29332	330913	11.0
67	28494	1671	.05865	27659	301581	10.6
68	26823	1654	.06167	25996	273922	10.2
69	25169	1630	.06477	24354	247926	9.9
70	23539	1598	.06787	22740	223572	9.5
71	21941	1557	.07096	21163	200832	9.2
72	20384	1509	.07403	19630	179669	8.8
73	18875	1455	.07710	18148	160039	8.5
74	17420	1396	.08015	16722	141891	8.1
75	16024	1333	.08320	15358	125169	7.8
76	14691	1267	.08623	14058	109811	7.5
77	13424	1198	.08926	12825	95753	7.1
78	12226	1128	.09227	11662	82928	6.8
79	11098	1057	.09528	10570	71266	6.4
80	10041	987	.09827	9548	60696	6.0
81	9054	917	.10126	8596	51148	5.6
82	8137	848	.10423	7713	42552	5.2
83	7289	781	.10720	6899	34839	4.8
84	6508	717	.11015	6150	27940	4.3
85+	5791	–	—	21790	21790	3.8

NORTHERN ZONE—MALES

Life Table (1961-70)

Age	Survivors to exact age x	Deaths between ages x and x+1	Probability of dying between ages x and x + 1	Number living between ages x and x+1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e^o_x
1	2	3	4	5	6	7
0	100000	11112	.11112	91066	5055373	50.6
1	88888	2271	.02555	87548	4963707	55.8
2	86617	611	.00705	86293	4876159	56.3
3	86006	562	.00653	85714	4789866	55.7
4	85444	515	.00603	85181	4704152	55.1
5	84929	471	.00555	84694	4618971	54.4
6	84458	432	.00511	84242	4534277	53.7
7	84026	395	.00470	83829	4450035	53.0
8	83631	363	.00434	83450	4366206	52.2
9	83268	336	.00404	83100	4282756	51.4
10	82932	316	.00381	82774	4199656	50.6
11	82616	302	.00365	82465	4116882	49.8
12	82314	291	.00353	82169	4034417	49.0
13	82023	281	.00343	81883	3952248	48.2
14	81742	289	.00354	81598	3870365	47.3
15	81453	321	.00394	81293	3788767	46.5
16	81132	368	.00454	80948	3707474	45.7
17	80764	415	.00514	80557	3626526	44.9
18	80349	464	.00577	80117	3545969	44.1
19	79885	505	.00634	79633	3465852	43.4
20	79380	530	.00668	79115	3386219	42.7
21	78850	546	.00692	78577	3307104	41.9
32	78304	563	.00719	78023	3228527	41.2
23	77741	581	.00747	77451	3150504	40.5
24	77160	593	.00768	76864	3073053	39.8
25	76567	599	.00782	76268	2996189	39.1
26	75968	599	.00789	75669	2919921	38.4
27	75369	600	.00796	75069	2844252	37.7
28	74769	602	.00805	74468	2769183	37.0
29	74167	600	.00809	73867	2694715	36.3
30	73567	606	.00824	73264	2620848	35.6
31	72961	616	.00844	72653	2547584	34.9
32	72345	624	.00862	72033	2474931	34.2
33	71721	631	.00880	71406	2402898	33.5
34	71090	638	.00898	70771	2331492	32.8
35	70452	647	.00918	70129	2260721	32.1
36	69805	655	.00939	69478	2190592	31.4
37	69150	664	.00960	68818	2121114	30.7
38	68486	674	.00984	68149	2052296	30.0
39	67812	689	.01003	67472	1984147	29.3

NORTHERN ZONE—MALES—(*concld.*)

Age	Survivors to exact age x	Deaths between ages x and x + 1	Probability of dying between ages x and x+1	Number living between ages x and x + 1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e^o_x
1	2	3	4	5	6	7
40	67132	681	.01014	66792	1916675	28.8
41	66451	678	.01021	66112	1849883	27.8
42	65773	679	.01033	65434	1783771	27.1
43	65094	683	.01049	64753	1718337	26.4
44	64411	687	.01066	64068	1653584	25.7
45	63724	690	.01083	63379	1589516	24.9
46	63034	695	.01102	62687	1526137	24.2
47	62339	704	.01129	61987	1463450	23.5
48	61635	717	.01164	61277	1401463	22.7
49	60918	740	.01215	60548	1340186	22.0
50	60178	776	.01289	59790	1279638	21.3
51	59402	820	.01381	59402	1219848	20.5
52	58582	873	.01490	58992	1160446	19.8
53	57709	937	.01624	58146	1101454	19.1
54	56772	996	.01755	57241	1043308	18.4
55	55776	1044	.01872	56274	986067	17.7
56	54732	1090	.01992	55254	929793	17.0
57	53642	1154	.02151	54187	874539	16.3
58	52488	1233	.02349	53065	820352	15.6
59	51255	1325	.02586	51872	767287	15.0
60	49930	1433	.02871	50593	715415	14.3
61	48497	1555	.03206	49214	664822	13.7
62	46942	1685	.03590	47720	615608	13.1
63	45257	1994	.04407	46100	567888	12.5
64	43263	2074	.04795	44260	521788	12.1
65	41189	2134	.05182	42226	477528	11.6
66	39055	2174	.05567	40122	435302	11.1
67	36881	2194	.05950	37968	395180	10.7
68	34687	2196	.06332	35784	357212	10.3
69	32491	2181	.06713	33589	321428	9.9
70	30310	2149	.07091	31401	287839	9.5
71	28161	2103	.07469	29236	256438	9.1
72	26058	2044	.07845	27110	227202	8.7
73	24014	1974	.08219	25036	200092	8.3
74	22040	1894	.08592	23027	175056	7.9
75	20146	1806	.08963	21093	152029	7.5
76	18340	1711	.09332	17485	130936	7.1
77	16629	1613	.09701	15823	113451	6.8
78	15016	1512	.10067	14260	97628	6.5
79	13504	1409	.10433	12800	83368	6.2
80	12095	1306	.10796	11442	70568	5.8
81	10789	1204	.11159	10187	59126	5.5
82	9585	1104	.11519	9033	48939	5.1
83	8481	1007	.11879	7978	39906	4.7
84	7474	941	.12593	7004	31928	4.3
85+	6533	—	—	24924	24924	3.8

NORTHERN ZONE—FEMALES

Life Table (1961-70)

Age	Survivors to exact age x	Deaths between ages x and x+1	Probability of dying between ages x and x+1	Number living between ages x and x+1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e^o_x
1	2	3	4	5	6	7
0	100000	11577	.11577	91317	4833859	48.3
1	88423	2413	.02729	86999	4742542	53.6
2	86010	721	.00839	85628	4655543	43.1
3	85289	697	.00817	84927	4569915	53.6
4	84592	672	.00794	84249	4484988	53.0
5	83920	646	.00770	83597	4400739	52.4
6	83274	619	.00743	82965	4317142	51.8
7	82655	591	.00715	82360	4234177	51.2
8	82064	565	00688	81782	4151817	50.6
9	81499	539	00660	81230	4070035	49.9
10	80960	514	.00635	80703	3988805	49.3
11	80446	490	.00609	80201	3908102	48.6
12	79956	468	00585	79722	3827901	47.9
13	79488	446	.00561	79265	3748179	47.2
14	79042	430	.00544	78827	3668914	46.4
15	78612	421	.00535	78402	3590087	45.7
16	78191	417	.00533	77933	3511685	44.9
17	77774	408	.00524	77570	3433752	44.2
18	77366	412	.00532	77160	3356182	43.4
19	76954	410	.00533	76749	3279022	42.6
20	76544	410	.00535	76339	3202273	41.8
21	76134	408	.00536	75930	3125934	41.1
22	75726	414	.00547	75519	3050004	40.3
23	75312	426	.00565	75099	2974485	39.5
24	74886	424	.00566	74674	2899386	38.7
25	74462	423	.00568	74251	2824712	37.9
26	74039	422	.00570	73828	2750461	37.1
27	73617	419	.00569	73408	2676633	36.4
28	73198	419	.00572	72989	2603225	35.6
29	72779	423	00581	72568	2530236	34 8
30	72356	472	.00652	72120	2457668	34 0
31	71884	530	.00737	71619	2385548	33.2
32	71354	596	.00835	71056	2313929	32.4
33	70758	645	.00911	70436	2242873	31.7
34	70113	690	.00984	69769	2172437	31.0
35	69423	730	.01052	69058	2102666	30.3
36	68693	765	.01115	68310	2033610	29.6
37	67927	809	.01191	67523	1965300	28.9
38	67119	836	.01245	66701	1897777	28.3
39	66283	865	.01305	65851	1831076	27.6

NORTHERN ZONE—FEMALES—(*concld.*)

Age	Survivors to exact age x	Deaths between ages x and x + 1	Probability of dying between ages x and x+1	Number living between ages x and x + 1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e^o_x
1	2	3	4	5	6	7
40	65418	886	.01354	64975	1765225	27.0
41	64532	901	.01396	64082	1700250	26.3
42	63631	915	.01438	63174	1636168	25.7
43	62716	927	.01478	62253	1572994	25.1
44	61789	939	.01520	61320	1510741	24.4
45	60850	955	.01569	60373	1449421	23.8
46	59895	971	.01621	59410	1389048	23.2
47	58924	995	.01688	58427	1329638	22.6
48	57929	1013	.01748	57423	1271211	21.9
49	56916	1003	.01762	56415	1213788	21.3
50	55913	986	.01763	55420	1157373	20.7
51	54927	977	.01779	54439	1101953	20.1
52	53950	964	.01787	53468	1047514	19.4
53	52986	949	.01791	52512	994046	18.8
54	52037	959	.01842	51558	941534	18.1
55	51078	1006	.01969	50575	889976	17.4
56	50072	1078	.02152	49533	839401	16.8
57	48994	1136	.02319	48426	789868	16.1
58	47858	1182	.02468	47267	741442	15.5
59	46676	1250	.02677	46051	694175	14.9
60	45426	1343	.02956	44755	648124	14.3
61	44083	1463	.03318	43352	603369	13.7
62	42620	1609	.03774	41816	560017	13.1
63	41011	1748	.04262	40137	518201	12.6
64	39263	1797	.04577	38365	478064	12.2
65	37466	1833	.04892	36550	439699	11.7
66	35633	1855	.05205	34706	403149	11.3
67	33778	1864	.05517	32846	368443	10.9
68	31914	1860	.05828	30984	335597	10.5
69	30054	1845	.06138	29132	304613	10.1
70	28209	1819	.06447	27300	275481	9.8
71	26390	1783	.06756	25499	248181	9.4
72	24607	1738	.07063	23738	222682	9.1
73	22869	1685	.07369	22027	198944	8.7
74	21184	1626	.07674	20371	176917	8.4
75	19558	1560	.07978	18788	156546	8.0
76	17998	1490	.08281	17253	137758	7.7
77	16508	1419	.08593	15799	120505	7.3
78	15089	1341	.08884	14419	104706	6.9
79	13748	1263	.09184	13117	90287	6.6
80	12485	1184	.09483	11893	77170	6.2
81	11301	1105	.09781	10749	65277	5.8
82	10196	1028	.10079	9682	54528	5.3
83	9168	951	.10375	8693	44846	4.9
84	8217	877	.10670	7779	36153	4.4
85+	7340	—	—	28374	28374	3.9

SOUTHERN ZONE—MALES

Life Table (1961-70)

Age	Survivors to exact age x	Deaths between ages x and x + 1	Probability of dying between ages x and x + 1	Number living between ages x and x + 1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e_x°
1	2	3	4	5	6	7
0	100000	11120	.11120	91660	4751726	47.5
1	88880	3116	.03506	87042	4660066	52.4
2	85764	1092	.01273	85185	4573024	53.3
3	84672	846	.00999	84232	4487839	53.0
4	83826	646	.00770	83497	4403607	52.5
5	83180	486	.00584	82937	4320110	51.9
6	82694	361	.00437	82514	4237173	51.2
7	82333	269	.00326	82199	4154659	50.5
8	82064	205	.00250	81962	4072460	49.6
9	81859	165	.00201	81777	3990498	48.7
10	81694	148	.00181	81620	3908721	47.8
11	81546	150	.00184	81471	3827101	46.9
12	81396	272	.00334	81260	3745630	46.0
13	81124	317	.00391	80966	3664370	45.2
14	80807	350	.00433	80632	3583404	44.3
15	80457	402	.00500	80256	3502772	43.5
16	80055	424	.00529	79843	3422516	42.8
17	79631	447	.00561	79408	3342673	42.0
18	79184	472	.00596	78948	3263265	41.2
19	78712	497	.00631	78464	3184317	40.5
20	78215	522	.00667	77954	3105853	39.7
21	77693	547	.00704	77420	3027899	39.0
22	77146	569	.00738	76862	2950479	38.2
23	76577	591	.00771	76282	2873617	37.5
24	75986	611	.00804	75681	2797335	36.8
25	75375	629	.00834	75061	2721654	36.1
26	74746	647	.00865	74423	2646593	35.4
27	74099	657	.00886	73771	2572170	34.7
28	73442	657	.00894	73114	2498399	34.0
29	72785	650	.00893	72460	2425285	33.3
30	72135	643	.00891	71814	2352825	32.6
31	71492	636	.00889	71174	2281011	31.9
32	70856	631	.00890	70541	2209837	31.2
33	70225	629	.00896	69911	2139296	30.5
34	69596	631	.00906	69281	2069385	29.7
35	68965	634	.00919	68648	2000104	29.0
36	68331	643	.00941	68010	1931456	28.3
37	67688	646	.00955	67365	1863446	27.5
38	67042	640	.00955	66722	1796081	26.8
39	66402	632	.00951	66086	1729359	26.0

SOUTHERN ZONE— MALES—*(concld.)*

Age	Survivors to exact age x	Deaths between ages x and x + 1	Probability of dying between ages x and x+1	Numder living between ages x and x + 1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e^o_x
1	2	3	4	5	6	7
40	65770	630	.00958	65455	1663273	25.3
41	65140	632	.00970	64824	1597818	24.5
42	64508	656	.01017	64180	1532994	23.8
43	63852	714	.01118	63495	1468814	23.0
44	63138	793	.01256	62742	1405319	22.3
45	62345	872	.01398	61909	1342577	21.5
46	61473	953	.01551	60997	1280668	20.8
47	60520	1033	.01707	60004	1219671	20.2
48	59487	1107	.01861	58934	1159667	19.5
49	58380	1176	.02015	57792	1100733	18.9
50	57204	1249	.02183	56580	1042941	18.2
51	55955	1324	.02366	55293	986361	18.1
52	54631	1388	.02541	53937	931068	17.0
53	53243	1437	.02698	52525	877131	16.5
54	51806	1476	.02850	51068	824606	15.9
55	50330	1517	.03014	49572	773538	15.4
56	48813	1555	.03185	48036	723966	14.8
57	47258	1603	.03392	46457	675930	14.3
58	45655	1667	.03650	44882	629473	13.8
59	43988	1735	.03944	43121	584591	13.3
60	42253	1793	.04243	41357	541470	12.8
61	40460	1840	.04547	39540	500113	12.4
62	38620	1878	.04862	37681	460573	11.9
63	36742	1905	.05185	35790	422892	11.5
64	34837	1921	.05513	33877	387102	11.1
65	32916	1924	.05844	31954	353225	10.7
66	30992	1914	.06176	30035	321271	10.4
67	29078	1892	.06505	28132	291236	10.0
68	27186	1857	.06830	26258	263104	9.7
69	25329	1811	.07148	24424	236846	9.4
70	23518	1759	.07479	22639	212422	9.0
71	21759	1694	.07787	20912	189783	8.7
72	20065	1624	.08094	19253	168871	8.4
73	18441	1549	.08399	17667	149618	8.1
74	16892	1470	.08704	16157	131951	7.8
75	15422	1389	.09007	14728	115794	7.5
76	14033	1306	.09310	13380	101066	7.2
77	12727	1198	.09411	12128	87686	6.9
78	11529	1143	.09912	10958	75558	6.6
79	10386	1061	.10211	9856	64600	6.2
80	9325	980	.10510	8835	54744	5.9
81	8345	902	.10807	7894	45909	5.5
82	7443	827	.11105	7030	38015	5.1
83	6616	754	.11399	6239	30985	4.7
84	5862	686	.11694	5519	24746	4.2
85+	5176	—	—	19227	19227	3.7

SOUTHERN ZONE—FEMALES

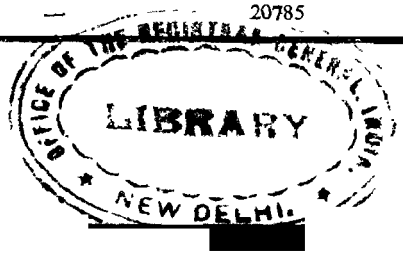
Life Table (1961-70)

Age	Survivors to exact age x	Deaths between ages x and x+1	Probability of dying between ages x and x+1	Number living between ages x and x+1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e^o_x
1	2	3	4	5	6	7
0	100000	9970	.09970	92523	4639514	46.4
1	90030	3498	.03885	87966	4546991	50.5
2	86532	1707	.01972	85627	4459025	51.5
3	84825	1338	.01577	84129	4373398	51.6
4	83487	1033	·01237	82960	4289269	51.4
5	82454	785	·00952	82062	4206309	51.0
6	81669	594	.00727	81372	4124247	50.5
7	81075	432	.00533	80859	4042875	49.9
8	80643	316	.00392	80485	3962016	49.1
9	80327	233	.00290	80211	3881531	48.3
10	80094	179	.00223	80005	3801320	47.5
11	79915	152	.00190	79839	3721315	46.6
12	79763	277	.00347	79625	3641476	45.7
13	79486	316	.00397	79328	3561851	44.8
14	79170	334	.00422	79003	3482523	44.0
15	78836	374	.00474	78649	3403520	43.2
16	78462	403	·00513	78261	3324871	42.4
17	78059	423	·00542	77848	3246610	41.6
18	77636	437	·00563	77418	3168762	40.8
19	77199	446	.00577	76976	3091344	40.0
20	76753	452	.00589	76527	3014368	39.3
21	76301	457	.00599	76073	2937841	38.5
22	75844	462	.00609	75613	2861768	37.7
23	75382	470	.00624	75147	2786155	37.0
24	74912	478	.00638	74673	2711008	36.2
25	74434	482	.00647	74193	2636335	35.4
26	73952	500	.00676	73702	2562142	34.7
27	73452	563	.00766	73171	2488440	33.9
28	72889	638	.00875	72570	2415269	33.1
29	72251	708	.00980	71897	2342699	32.4
30	71543	777	.01086	71155	2270802	31.7
31	70766	835	.01180	70349	2199647	31.1
32	69931	874	.01249	69494	2129298	30.5
33	69057	899	.01302	68608	2059804	29.8
34	68158	925	.01357	67696	1991196	29.2
35	67233	951	.01414	66758	1923500	28.6
36	66282	965	.01456	65800	1856742	28.0
37	65317	963	.01475	64836	1790942	27.4
38	64354	953	.01481	63878	1726106	26.8
39	63401	943	.01487	62930	1662228	26.2

SOUTHERN ZONE—FEMALES—(*concld.*)

Age	Survivors to exact age x	Deaths between ages x and x + 1	Probability of dying between ages x and x+1	Number living between ages x and x + 1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e^o_x
1	2	3	4	5	6	7
40	62458	933	.01494	61992	1599298	25.6
41	61525	928	.01508	61061	1537306	25.0
42	60597	932	.01538	60131	1476245	24.4
43	59665	943	.01580	59194	1416114	23.7
44	58722	952	.01621	58246	1356920	23.1
45	57770	960	.01662	57290	1298674	22.5
46	56810	978	.01721	56321	1241384	21.9
47	55832	1009	.01807	55328	1185063	21.2
48	54823	1046	.01908	54300	1129735	20.6
49	53777	1084	.02015	53235	1075435	20.0
50	52693	1128	.02141	52129	1022200	19.4
51	51565	1153	.02236	50989	970071	18.8
52	50412	1151	.02283	49837	919082	18.2
53	49261	1135	.02303	48694	869245	17.6
54	48126	1131	.02350	47561	820551	17.1
55	46995	1136	.02417	46427	772990	16.5
56	45859	1155	.02518	45282	726563	15.8
57	44704	1191	.02664	44109	681281	15.2
58	43513	1242	.02854	42892	637172	14.6
59	42271	1300	.03075	41621	594280	14·1
60	40971	1366	.03334	40288	552659	13.5
61	39605	1441	.03639	38885	512371	12.9
62	38164	1524	.03992	37402	473486	12.4
63	36640	1611	.04397	35835	436084	11.7
64	35029	1701	.04856	34179	400249	11.2
65	33328	1791	.05373	32433	366070	10.7
66	31537	1881	.05965	30597	333637	10.6
67	29656	1869	.06302	28722	303040	10.2
68	27787	1837	.06610	26869	274318	9.9
69	25950	1795	.06917	25053	247449	9.5
70	24155	1745	.07223	23283	222396	9.2
71	22410	1687	.07528	21567	199113	8.9
72	20723	1623	.07833	19912	177546	8.6
73	19100	1554	.08136	18323	157634	8.3
74	17546	1481	.08438	16806	139311	7.9
75	16065	1404	.08739	15363	122505	7.6
76	14661	1325	.09040	13999	107142	7.3
77	13336	1245	.09339	12714	93143	7.0
78	12091	1165	.09637	11509	80429	6.7
79	10926	1085	.09934	10384	68920	6.3
80	9841	1007	.10231	9338	58536	6.0
81	8834	930	·10526	8369	49198	5.6
82	7904	855	.10820	7477	40829	5.2
83	7049	783	.11114	6658	33352	4.7
84	6266	715	.11406	5909	26694	4.3
85+	5551	—	—	20785	20785	3.7

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EASTERN ZONE– MALES

Life Table (1961-70)

Age	*Survivors to* exact age x	*Deaths between* ages x and x+1	*Probability of* dying between ages x and x+1	*Number living* between ages x and x+1	*Number living* above age x	*Expectation of* life at age x
x	l_x	d_x	q_x	L_x	T_x	e^o_x
1	2	3	4	5	6	7
0	100000	12190	.12190	91467	4597150	46.0
1	87810	2718	.03095	86179	4505683	51.3
2	85092	2297	.02700	83944	4419505	51.9
3	82795	2077	.02519	81757	4335560	52.4
4	80718	1802	.02232	79817	4253803	52.7
5	78916	1571	.01991	78131	4173983	52.9
6	77345	1234	.01596	76728	4095855	53.0
7	76111	961	.01263	75631	4019127	52.8
8	75150	742	.00987	74779	3943496	52.5
9	74408	568	.00763	74124	3868717	52.0
10	73840	454	.00615	73613	3794593	51.4
11	73386	363	.00495	73205	3720980	50.7
12	*73023*	*292*	*.00400*	*72877*	*3647775*	*50.0*
13	72731	237	.00326	72613	3574898	49.2
14	72494	197	.00272	72396	3502285	48.3
15	72297	170	.00235	72212	3429889	47.4
16	72127	154	.00213	72050	3357677	46.6
17	71973	147	.00204	71899	3285627	45.7
18	71826	147	.00205	71753	3213728	44.7
19	71679	153	.00213	71603	3141975	43.8
20	71526	166	.00232	71443	3070372	42.9
21	71360	186	.00261	71267	2998929	42.0
22	71174	196	.00275	71076	2927662	41.1
23	70978	198	.00279	70879	2856586	40.3
24	70780	200	.00283	70680	2785707	39.4
25	70580	200	.00283	70480	2715027	38.5
26	70380	200	.00284	70280	2644547	37.6
27	70180	200	.00285	70080	2574267	36.7
28	69980	200	.00286	69880	2504187	35.8
29	69780	216	.00309	69672	2434307	34.9
30	*69564*	*239*	*.00344*	*69445*	*2364635*	*34.0*
31	69325	264	.00381	69693	2295190	33.2
32	69061	300	.00434	68911	2225497	32.3
33	68761	349	.00507	68587	2156586	31.4
34	68412	407	.00595	68209	2087999	30.5
35	68005	467	.00686	67772	2019790	29.7
36	67538	529	.00784	67274	1952018	28.9
37	67009	586	.00874	66716	1884744	28.1
38	66423	630	.00949	66108	1818028	27.4
39	65793	668	.01016	65459	1751920	26.6

EASTERN ZONE—MALES—(*concld.*)

Age	Survivors to exact age x	Deaths between ages x and x + 1	Probability of dying between ages x and x+1	Number living between ages x and x + 1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e^o_x
1	2	3	4	5	6	7
40	65125	709	.01088	64771	1686461	25.9
41	64416	751	.01166	64041	1621690	25.2
42	63665	794	.01247	63268	1557649	24.5
43	62871	839	.01334	62452	1494381	23.8
44	62032	885	.01427	61590	1431929	23.1
45	61147	931	.01522	60582	1370339	22.4
46	60216	974	.60118	59729	1309657	21.8
47	59242	1020	.01722	58732	1249928	21.1
48	58222	1071	.01839	57687	1191196	20.5
49	57151	1123	.01965	56590	1133509	19.8
50	56028	1177	.02100	55440	1076919	19.2
51	54851	1238	.02257	54232	1021479	18.6
52	53613	1277	.02382	52975	967247	18.0
53	52336	1283	.02452	51695	914272	17.5
54	51053	1276	.02500	50415	862577	16.9
55	49777	1288	.02587	49133	812162	16.3
56	48489	1315	.02711	47832	763029	15.7
57	47174	1355	.02872	46497	715197	15.2
58	45819	1411	.03079	45114	668700	14.6
59	44408	1484	.03341	43666	623586	14.0
60	42924	1574	.03666	42137	579920	13.5
61	41350	1680	.04063	40510	537783	13.0
62	39670	1874	.04498	38778	497273	12.5
63	37886	1843	.04865	36955	458495	12.1
64	36043	1855	.05146	35116	421540	11.7
65	34188	1859	.05437	33259	386424	11.3
66	32329	1851	.05727	31404	353165	10.9
67	30478	1834	.06016	29551	321761	10.6
68	28644	1805	.06304	27741	292210	10.2
69	26838	1769	.06592	25954	264469	9.9
70	25069	1724	.06878	24207	238515	9.5
71	23345	1672	.07164	22509	214308	9.2
72	21673	1614	.07449	20866	191799	8.9
73	20059	1551	.07733	19284	170933	8.5
74	18508	1484	.08016	17766	151649	8.2
75	17024	1413	.08298	16318	133883	7.9
76	15611	1339	.08579	14942	117565	7.5
77	14272	1264	.08859	13640	102523	7.2
78	13008	1189	.09139	12414	88983	6.8
79	11819	1113	.09418	11263	76569	6.5
80	10706	1038	.09695	10187	65306	6.1
81	9668	964	.09973	9186	55119	5.7
82	8704	892	.10249	8258	45933	5.3
83	7812	822	.10524	7401	37675	4.8
84	6990	755	.10799	6613	30274	4.3
85+	6235	—	—	23661	23661	3.8

EASTERN ZONE—FEMALES

Life Table (1961-70)

Age	Survivors to exact age x	Deaths between ages x and x+1	Probability of dying between ages x and x+1	Number living between ages x and x+1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e_x^o
1	2	3	4	5	6	7
0	100000	11590	.11590	91308	427o320	42.8
1	88410	3955	.04473	86077	4185012	47.3
2	84455	3162	.03744	82779	4098935	48.5
3	81293	2653	.03264	79913	4016156	49.4
4	78640	1985	.02524	77628	3936243	50.0
5	76655	1471	.01919	75920	3858615	50.3
6	75184	1083	.01440	74643	3782695	50.3
7	74101	795	.01073	73704	3708052	50.0
8	73306	591	.00806	73011	3634348	49.6
9	72715	455	.00626	72488	3561337	49.0
10	72260	442	.00612	72039	3488849	48.3
11	71818	418	.00582	71609	3416810	47.6
12	71400	393	.00550	71204	3345201	46.8
13	71007	369	.00520	70823	3273997	46.1
14	70638	345	.00488	70466	3203174	45.3
15	70293	334	.00475	70126	3132708	44.6
16	69959	364	.00520	69777	3062582	43.8
17	69595	369	.00530	69411	2992805	43.0
18	6922o	372	.00538	69040	2923394	42.2
19	68854	372	.00540	68668	2854354	41.4
20	68482	371	.00542	68297	2785686	40.7
21	68111	371	.00544	67926	2717389	39.9
22	67740	371	.00548	67555	2o49463	39.1
23	67369	372	.00552	67183	2581908	38.3
24	66997	377	00563	66809	2514725	37.5
25	66620	380	.00570	66430	2447916	36.7
26	66240	384	.00579	66048	2381486	35.9
27	65856	392	.00595	65660	2315438	35.2
28	65464	400	.00611	65264	2249778	34.4
29	65064	427	.00656	64851	2184514	33.6
30	64637	478	.00740	64398	2119663	32.8
31	64159	549	.00855	63885	2055265	32.0
32	63610	624	.00981	63298	1991380	31.3
33	62986	683	.01085	62645	1928082	30.6
34	62303	736	.01181	61935	1865437	29.9
35	61567	789	.01281	61173	1803502	29.3
36	60778	840	.01382	60358	1742329	28.7
37	59938	883	.01473	59497	1681971	28.1
38	59055	916	.01551	58597	1622474	27.5
39	58139	940	.01617	57669	1563877	26.9

EASTERN ZONE—FEMALES—*(concld.)*

Age	Survivors to exact age x	Deaths between ages x and x + 1	Probability of dying between ages x and x+1	Number living between ages x and x + 1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e^o_x
1	2	3	4	5	6	7
40	57199	962	.01681	56718	1506208	26.3
41	56237	979	.01741	55748	1449490	25.8
42	55258	992	.01795	54762	1393742	25.2
43	54266	1000	.01842	53766	1338980	24.7
44	53266	1004	.01884	52764	1285214	24.1
45	52262	1005	.01923	51760	1232450	23.6
46	51257	1006	.01962	50754	1180690	23.0
47	50251	1001	.01991	49751	1129936	22.5
48	49250	987	.02004	48757	1080185	21.9
49	48263	970	.02010	47778	1031428	21.4
50	47293	959	.02027	46814	983650	20.8
51	46334	946	.02042	45861	936836	20.2
52	45388	933	.02056	44922	890975	19.6
53	44455	922	.02074	43994	846053	19.0
54	43533	905	.02079	43081	802059	18.4
55	42628	901	.02113	42178	758978	17.8
56	41727	913	.02187	41271	716800	17.2
57	40814	940	.02303	40344	675529	16.6
58	39874	984	.02468	39382	635185	15.9
59	38890	1047	.02692	38367	595803	15.3
60	37843	1128	.02982	37279	557436	14.7
61	36715	1228	.03346	36101	520157	14.2
62	35487	1345	.03791	34815	484056	13.6
63	34142	1390	.04070	33447	449241	13.2
64	32752	1428	.04360	32038	415794	12.7
65	31324	1461	.04665	30594	383756	12.2
66	29863	1474	.04936	29126	353162	11.8
67	28389	1477	.05204	27651	324036	11.4
68	26912	1473	.05472	26176	296385	11.0
69	25439	1460	.05739	24709	270209	10.6
70	23979	1440	.06005	23259	245500	10.2
71	22539	1413	.06271	21833	222241	9.9
72	21126	1381	.06535	20436	200408	9.5
73	19745	1342	.06799	19074	179972	9.1
74	18403	1300	.07062	17753	160898	8.7
75	17103	1253	.07325	16477	143145	8.4
76	15850	1203	.07587	15249	126668	8.0
77	14647	1149	.07848	14073	111419	7.6
78	13498	1094	.08108	12951	97346	7.2
79	12404	1038	.08368	11885	84395	6.8
80	11366	981	.08627	10876	72510	6.4
81	10385	923	.08885	9924	61634	5.9
82	9462	865	.09142	9030	51710	5.5
83	8597	808	.09399	8193	42680	5.0
84	7789	752	.09655	7413	34487	4.4
85+	7037	—	—	27074	27074	3.8

WESTERN ZONE—MALES

Life Table (1961-70)

Age	Survivors to exact age x	Deaths between ages x and x+1	Probability of dying between ages x and x+1	Number living between ages x and x+1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e_x°
1	2	3	4	5	6	7
0	100000	11458	.11458	91407	4857207	48 6
1	88542	3252	.03673	86623	4765800	53.8
2	85290	1295	.01518	84604	4679177	54.9
3	83995	1063	.01271	83440	4594573	54.7
4	82927	891	01074	82473	4511133	54.4
5	82036	751	.00915	81661	4428660	54.0
6	81285	644	.00792	80963	4346999	53.5
7	80641	560	.00694	80361	4266036	52.9
8	80081	525	.00655	79819	4185675	52.3
9	79556	504	.00633	79304	4105856	51 6
10	79052	487	.00616	78809	4026552	50.9
11	78565	475	.00605	78328	3947743	50.3
12	78090	467	.00598	77857	3869415	49.6
13	77623	464	.00598	77391	3791558	48.9
14	77159	460	.00596	76929	3714167	48.1
15	76699	456	.00594	76471	3637238	47.4
16	76243	452	.00593	76017	3560767	46.7
17	75791	449	·00593	75567	3484750	46 0
18	75342	449	.00596	75118	3409183	45.3
19	74893	451	.00602	74668	3334065	44.5
20	74442	456	.00612	74214	3259397	43.8
21	73986	464	.00627	73754	3185183	43.1
22	73522	472	.00642	73286	3111429	42.3
23	73050	481	.00658	72810	3038143	41.6
24	72569	488	.00672	72325	2965333	40.9
25	72081	492	.00682	71835	2893008	40.1
26	71589	494	.00690	71342	2821173	39.4
27	71095	497	.00699	70847	2749831	38.7
28	70598	500	.00708	70348	2678984	38.0
29	70098	501	.00715	69848	2608636	37.2
30	69597	499	.00717	69348	2538788	36.5
31	69098	495	.00716	68851	2469440	35.7
32	68603	492	.00717	68357	2400589	35.0
33	68111	491	.00721	67866	2332232	34.2
34	67620	492	.00727	67374	2264366	33.5
35	67128	496	.00739	66880	2196992	32.8
36	66632	503	.00755	66381	2130112	32.0
37	66129	514	.00777	65872	2063731	31.2
38	65615	528	.00804	65351	1997859	30.5
39	65087	542	.00832	64816	1932508	29.7

WESTERN ZONE—MALES—(*concld.*)

Age	Survivors to exact age x	Deaths between ages x and x + 1	Probability of dying between ages x and x+1	Number living between ages x and x + 1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e^o_x
1	2	3	4	5	6	7
40	64545	554	.00858	64263	1867692	28.9
41	63991	567	.00886	63708	1803424	28.2
42	63424	583	.00919	63133	1739716	27.4
43	62841	598	.00951	62442	1676583	26.7
44	62243	633	.01017	61927	1614141	25.9
45	61610	696	.01130	61262	1552214	25.2
46	60914	776	.01274	60526	1490952	24.5
47	60138	852	.01417	59712	1430426	23.8
48	59286	931	.01570	58821	1370714	23.1
49	58355	988	.01693	57861	1311893	22.5
50	57367	1013	.01765	56861	1254032	21.9
51	56354	1017	.01805	55846	1197171	21.2
52	55337	1028	.01857	54823	1141325	20.6
53	54309	1038	.01912	53790	1086502	20.0
54	53271	1054	.01979	52744	1032712	19.4
55	52217	1079	.02066	51678	979968	18.8
56	51138	1109	.02168	50584	928290	18.2
57	50029	1138	.02274	49460	877706	17.5
58	48891	1168	.02389	48307	828246	16.9
59	47723	1199	.02512	47124	779939	16.3
60	46524	1232	.02648	45908	732815	15.8
61	45292	1266	.02796	44659	686907	15.2
62	44026	1302	.02957	43375	642248	14.6
63	42724	1338	.03131	42055	598873	14.0
64	41386	1375	.03322	40699	556818	13.5
65	40011	1411	.03526	39306	516119	12.9
66	38600	1446	.03746	37877	476813	12.4
67	37154	1480	.03984	36414	438936	11.8
68	35674	1513	.04240	34918	402522	11.3
69	34161	1542	.04513	33390	367604	10.8
70	32619	1568	.04806	31835	334214	10.3
71	31051	1589	.05118	30257	302379	9.7
72	29462	1606	.05450	28659	272122	9.2
73	27856	1617	.05805	27048	243463	8.7
74	26239	1622	.06180	25428	216415	8.3
75	24617	1705	.06926	23765	190987	7.8
76	22912	1762	.07690	22031	167222	7.3
77	21150	1792	.08473	20254	145191	6.9
78	19358	1796	.09276	18460	124937	6.5
79	17562	1773	.10096	16676	106477	6.1
80	15789	1727	.10936	14926	89901	5.7
81	14062	1659	.11795	13233	74875	5.3
82	12403	1572	.12673	11617	61642	5.0
83	10831	1470	.13571	10096	50025	4.6
84	9361	1356	.14488	8683	39929	4.3
85+	8005	—	—	31246	31246	3.9

WESTERN ZONE—FEMALES

Life Table (1961-70)

Age	Survivors to exact age x	Deaths between ages x and x+1	Probability of dying between ages x and x+1	Number living between ages x and x+1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e_x°
1	2	3	4	5	6	7
0	100000	11972	11972	91021	4899905	49.0
1	88028	3408	.03871	86017	4808884	54.6
2	84620	1356	.01603	83901	4722867	55.8
3	83264	1204	.01446	82638	4638966	55.7
4	82060	1068	.01301	81515	4556328	55.5
5	80992	946	.01168	80519	4474813	55.3
6	80046	837	.01046	79628	4394294	54 9
7	79209	741	.00935	78839	4314666	54.5
8	78468	654	.00834	78141	4235827	54.0
9	77814	577	.00741	77526	4157686	53.4
10	77237	512	.00663	76981	4080160	52.8
11	76725	453	.00591	76409	4003179	52.2
12	76272	403	.00528	76036	3926680	51.5
13	75869	360	.00474	75689	3850644	50.8
14	75509	322	.00427	75348	3774955	50.0
15	75187	289	00385	75043	3699607	49.2
16	74898	261	.00349	74768	3624564	48.4
17	74637	205	00275	74535	3549796	47.6
18	74432	217	.00291	74324	3475261	46.7
19	74215	226	.00304	74102	3400937	45.8
20	73989	226	00305	73876	3326835	45.0
21	73763	226	00306	73365	3252959	44.1
22	73537	226	00308	73424	3179594	43.2
23	73311	244	.00333	73189	3106170	42 4
24	73067	259	.00355	72938	3032981	41 6
25	72808	264	00363	72676	2960043	40.7
26	72544	267	.00368	72411	2887367	39 8
27	72277	276	00382	72139	2814956	38.9
28	72001	281	00390	71861	2742817	38.1
29	71720	319	00445	71561	2670956	37.2
30	71401	408	.00571	71197	2599395	36 4
31	70993	525	.00740	70731	2528198	35 6
32	70468	636	.00903	70150	2457467	34.9
33	69832	749	.01073	69458	2387317	34.2
34	69083	815	.01180	68676	2317859	33.6
35	68268	847	.01241	67845	2249183	33 0
36	67421	864	.01281	66989	2181338	32.4
37	66557	869	.01305	66123	2114349	31.8
38	65688	872	.01327	65252	2048226	31.2
39	64816	874	.01349	64379	1982974	30.6

WESTERN ZONE—FEMALES—*(concld.)*

Age	Survivors to exact age x	Deaths between ages x and x + 2	Probability of dying between ages x and x+1	Number living between ages x and x + 1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e_x°
1	2	3	4	5	6	7
40	63942	880	.01377	63502	1918495	30.0
41	63062	889	.01409	62618	1855093	29.4
42	62173	892	.01434	61727	1792475	28.8
43	61281	890	.01453	60836	1730748	28.2
44	60391	894	.01480	59944	1669912	27.7
45	59497	906	.01522	59044	1609968	27.1
46	58591	920	.01571	58131	1550924	26.5
47	57671	934	.01620	57204	1492793	25.9
48	56737	949	.01672	56263	1435589	25.3
49	55788	955	.01711	55311	1379326	24.7
50	54833	942	.01718	54362	1324015	24.2
51	53891	933	.01732	53425	1269653	23.6
52	52958	924	.01745	52496	1216228	23.0
53	52034	918	.01765	51575	1163732	22.4
54	51116	915	.01790	50659	1112157	21.8
55	50201	915	.01823	49744	1061498	21.2
56	49286	920	.01866	48826	1011754	20.5
57	48366	932	.01926	47900	962928	19.9
58	47434	945	.01992	46962	915028	19.3
59	46489	967	.02080	46006	868066	18.7
60	45522	996	.02187	45024	822060	18.1
61	44526	1030	.02314	44011	777036	17.5
62	43496	1039	.02388	42977	733025	16.9
63	42457	1069	.02519	41923	690048	16.3
64	41388	1102	.02662	40837	648125	15.7
65	40286	1135	.02818	39719	607288	15.1
66	39151	1165	.02976	38569	567569	14.5
67	37986	1215	.03201	37379	529000	13.9
68	36771	1235	.03358	36154	491621	13.4
69	35536	1266	.03562	34903	455467	12.8
70	34270	1295	.03778	33623	420564	12.3
71	32975	1321	.04006	32315	386941	11.7
72	31654	1344	.04246	30982	354626	11.2
73	30310	1363	.04497	29629	323644	10.7
74	28947	1378	.04760	28258	294015	10.2
75	27569	1388	.05035	26875	265757	9.6
76	26181	1393	.05321	25485	238882	9.1
77	24788	1393	.05619	24092	213397	8.6
78	23395	1387	.05927	22702	189305	8.1
79	22008	1375	.06247	21321	166603	7.6
80	20633	1357	.06578	19955	145282	7.0
81	19276	1334	.06919	18609	125327	6.5
82	17942	1305	.07271	17290	106718	6.0
83	16637	1270	.07634	16002	89428	5.4
84	15367	1230	.08007	14752	73426	4.8
85+	14137	—	—	58674	58674	4.2

CENTRAL ZONE—MALES

Life Table (1961-70)

Age	*Survivors* to exact age x	*Deaths between* ages x and x+1	*Probability* of dying between ages x and x+1	*Number living* between ages x and x+1	*Number living* above age x	*Expectation* of life at age x
x	l_x	d_x	q_x	L_x	T_x	e_x°
1	2	3	4	5	6	7
0	100000	15861	.15861	88104	4218141	42.2
1	84139	3848	.04573	81869	4130017	49.1
2	80291	1112	.01385	79702	4048168	50.4
3	79179	968	.01222	78676	3968466	50.1
4	78211	851	.01088	77777	3889790	49.7
5	77360	759	.00981	76981	3812013	49.3
6	76601	688	.00898	76257	3735032	48.8
7	75913	635	.00836	75596	3658775	48.2
8	75278	597	.00793	74980	3583179	47.6
9	74681	575	.00770	74394	3508199	47.0
10	74106	562	.00759	73825	3433805	46.4
11	73544	559	.00760	73265	3359980	45.7
12	72985	565	.00774	72703	3286715	45.1
13	72420	577	.00797	72132	3214012	44.4
14	71843	589	.00820	71549	3141880	43.7
15	71254	596	.00836	70956	3070331	43.1
16	70658	601	.00850	70358	2999375	42.4
17	70057	608	.00868	69753	2929017	41.8
18	69449	618	.00890	69140	2859264	41.1
19	68831	625	.00908	68519	2790124	40.5
20	68206	627	.00919	67893	2721605	39.9
21	67579	625	.00925	67267	2653712	39.3
22	66954	625	.00933	66642	2586445	38.6
23	66329	625	.00942	66083	2519803	38.0
24	65704	623	.00948	65393	2453720	37.3
25	65081	619	.00951	64772	2388327	36.7
26	64462	614	.00952	64155	2323555	36.0
27	63848	610	.00955	63543	2259400	35.4
28	63238	606	.00958	62935	2195857	34.7
29	62632	605	.00966	62330	2132922	34.0
30	62027	611	.00985	61722	2070592	33.4
31	61416	621	.01011	61106	2008870	32.7
32	60795	630	.01036	60480	1947764	32.0
33	60165	641	.01065	59845	1887284	31.3
34	59524	652	.01095	59198	1827439	30.7
35	58872	664	.01128	58540	1768241	30.0
36	58208	675	.01159	57871	1709701	29.4
37	57533	689	.01197	57189	1651830	28.7
38	56844	705	.01240	56492	1594641	28.0
39	56139	718	.01279	55780	1538149	27.4

CENTRAL ZONE—MALES—(*Concld.*)

Age	Survivors to exact age x	Deaths between ages x and x + 1	Probability of dying between ages x and x+1	Number living between ages x and x + 1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e_x°
1	2	3	4	5	6	7
40	55421	727	.01311	55058	1482369	26.7
41	54694	734	.01342	54327	1427311	26.1
42	53960	743	.01377	53589	1372984	25.4
43	53217	749	.01408	52843	1319395	24.8
44	52468	769	.01466	52084	1266552	24.1
45	51699	808	.01563	51295	1214468	23.5
46	50891	852	.01674	50465	1163173	22.9
47	50039	902	.01802	49588	1112708	22.2
48	49137	946	.01925	48664	1063120	21.6
49	48191	977	.02027	47703	1014456	21.0
50	47214	989	.02095	46720	966753	20.5
51	46225	990	.02141	45730	920033	19.9
52	45235	996	.02201	44737	874303	19.3
53	44239	1009	.02280	43735	829566	18.8
54	43230	1009	.02333	42726	785831	18.2
55	42221	991	.02347	41726	743105	17.6
56	41230	968	.02347	40746	701379	17.0
57	40262	960	.02384	39782	660633	16.4
58	39302	966	.02458	38819	620851	15.8
59	38336	986	.02572	37843	582032	15.2
60	37350	1052	.02816	36824	544189	14.6
61	36298	1149	.03165	35724	507365	14.0
62	35149	1234	.03511	34532	471641	13.4
63	33915	1308	.03857	33261	437109	12.9
64	32607	1370	.04203	31922	403848	12.4
65	31237	1420	.04545	30527	371926	11.9
66	29817	1457	.04887	29089	341399	11.4
67	28360	1500	.05288	27610	312310	11.0
68	26860	1496	.05567	26112	284700	10.6
69	25364	1498	.05906	24615	258588	10.2
70	23866	1490	.06243	23121	233973	9.8
71	22376	1472	.06579	21640	210852	9.4
72	20904	1445	.06914	20182	189212	9.1
73	19459	1410	.07248	18754	169030	8.7
74	18049	1368	.07580	17365	150276	8.3
75	16681	1320	.07911	16021	132911	8.0
76	15361	1266	.08241	14728	116890	7.6
77	14095	1208	.08570	13491	102162	7.2
78	12887	1147	.08898	12314	88671	6.9
79	11740	1083	.09224	11199	76357	6.5
80	10657	1018	.09550	10148	65158	6.1
81	9639	952	.09874	9163	55010	5.7
82	8687	886	.10197	8244	45847	5.3
83	7801	821	.10519	7391	37603	4.8
84	6980	757	.10840	6602	30212	4.3
85+	6223	—	—	23610	23610	3.8

CENTRAL ZONE—FEMALES

Life Table (1961-70)

Age	Survivors to exact age x	Deaths between ages x and x+1	Probability of dying between ages x and x+1	Number living between ages x and x+1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e_x°
1	2	3	4	5	6	7
0	100000	16410	.16410	87693	4070642	40.7
1	83590	2948	.03527	81851	3982949	47.6
2	80642	1566	.01942	79812	3901098	48.4
3	79076	1501	.01898	78295	3821286	48.3
4	77575	1415	.01824	76853	3742991	48.2
5	76160	1313	.01724	75504	3666138	48.1
6	74847	1198	.01601	74248	3590634	48.0
7	73649	1077	.01462	73111	3516386	47.7
8	72572	952	.01312	72096	3443275	47.4
9	71620	828	.1156	71206	3371179	47.1
10	70792	706	.00997	70439	3299973	46.6
11	70086	591	.00843	69791	3229534	46.1
12	69495	479	.00689	69256	3159743	45.5
13	69016	367	.00532	68833	3090487	44.8
14	68649	288	.00419	68505	3021654	44.0
15	68361	258	.00377	68232	2953149	43.2
16	68103	261	.00383	67973	2884917	42.4
17	67842	267	.00393	67709	2816944	41.5
18	67575	282	.00417	67434	2749235	40.7
19	67293	283	.00420	67152	2681801	39.9
20	67010	284	.00424	66868	2614649	39.0
21	66726	288	.00432	66582	2547781	38.2
22	66438	289	.00435	66294	2481199	37.3
23	66149	290	.00437	66004	2414905	36.5
24	65859	309	.00469	65705	2348901	35.7
25	65550	345	.00526	65378	2283196	34.8
26	65205	393	.00602	65009	2217818	34.0
27	64812	430	.00663	64597	2152809	33.3
28	64382	496	.00770	64134	2088212	32.4
29	63886	551	.00862	63611	2024078	31.7
30	63335	604	.00953	63033	1960467	31.0
31	62731	657	.01047	62403	1897434	30.2
32	62074	710	.01144	61919	1835031	29.6
33	61364	762	.01241	60983	1773312	28.9
34	60602	818	.01350	60193	1712329	28.3
35	559784	882	.01475	59343	1652136	27.6
36	58902	947	.01608	58429	1592793	27.0
37	57955	1007	.01737	57452	1534364	26.5
38	56948	1064	.01868	56416	1476912	25.9
39	55884	1104	.01976	55332	1420496	25.4

CENTRAL ZONE—FEMALES *(concld.)*

Age	Survivors to exact age x	Deaths between ages x and x + 1	Probability of dying between ages x and x+1	Number living between ages x and x + 1	Number living above age x	Expectation of life at age x
x	l_x	d_x	q_x	L_x	T_x	e_x°
1	2	3	4	5	6	7
40	54780	1122	.02048	54219	1365164	24.9
41	53o58	1126	.02098	53095	1310945	24.4
42	52532	1128	.02147	51968	1257850	23.9
43	51404	1126	.02190	50841	1205882	23.5
44	50278	1123	.02234	49717	1155041	23.0
45	49155	1121	.02281	48595	1105324	22.5
46	48034	1119	.02329	47475	1056729	22.0
47	46915	1113	.02372	46359	1009254	21.5
48	45802	1106	.02415	45249	962895	21.0
49	44696	1081	.02418	44156	917646	20.5
50	43615	1068	.02449	43081	873490	20.0
51	42547	1069	.02512	42013	830409	19.5
52	41478	1056	.02545	40950	788396	19.0
53	40422	1058	.02618	39893	747446	18.5
54	39364	1032	.02622	38848	707553	18.0
55	38332	1015	.02648	37825	668705	17.5
56	37317	991	.02656	36822	630880	16.9
57	36326	967	.02661	35843	594058	16.4
58	35359	968	.02738	34875	558215	15.8
59	34391	976	.02837	33903	523340	15.2
60	33415	1027	.03074	32902	489437	14.6
61	32388	1079	.03332	31849	456535	14.1
62	31309	1157	.03696	30731	424686	13.6
63	30152	1205	.03996	29550	393955	13.1
64	28947	1243	.04295	28326	364405	12.6
65	27704	1273	.04594	27068	336079	12.1
66	26431	1293	.04891	25785	309011	11.7
67	25138	1304	.05186	24486	283226	11.3
68	23834	1307	.05482	23181	258740	10.9
69	22527	1301	.05776	21877	235559	10.5
70	21226	1288	.06069	20582	213682	10.1
71	19938	1268	.06362	19304	193100	9.7
72	18670	1242	.06653	18049	173796	9.3
73	17428	1210	.06944	16823	155747	8.9
74	16218	1173	.07234	15632	138924	8.6
75	15045	1132	.07523	14479	123292	8.2
76	13913	1087	.07811	13370	108813	7.8
77	12826	1049	.08179	12302	95443	7.4
78	11777	997	.08465	11279	83141	7.1
79	10780	935	.08669	10313	71862	6.7
80	9845	882	.08954	9404	61549	6.3
81	8963	828	.09237	8549	52145	5.8
82	8135	774	.09520	7748	43596	5.4
83	7361	722	.09802	7000	35848	4.9
84	6639	669	.10073	6305	28848	4.4
85+	5970	—	—	22543	22543	3.8

APPENDIX B

TABLE 1 : *Crude Birth and Death Rates for All-India, Zones and Various States* (1961-70)

Zones/States	By reverse survival method		Central death rate		By census difference		Growth rate (a)
	Birth rate	Death rate	Birth rate	Death rate	Birth rate	Death rate	
1	2	3	4	5	6	7	8
All-India	**41.2**	**19.2**	**41.0**	**18.8**	**40.0**	**17.8**	**22.2**
South zone	**38.3**	**17.8**	**37.8**	**17.3**	**36.8**	**16.3**	**20.5**
Andhra Pradesh	39.2	20.4	36.2	17.4	38.6	19.8	18.8
Karnataka	39.9	17.6	40.1	17.8	38.6	16.3	22.3
Kerala	37.5	13.7	41.0	17.2	35.1	11.3	23.8
Tamil Nadu	36.8	16.8	36.9	16.9	34.5	15.4	20.0
West zone	**41.1**	**16.9**	**40.3**	**16.1**	**40.5**	**16.3**	**24.2**
Maharashtra	41.0	16.9	40.3	16.2	42.7	18.6	24.1
Gujarat	41.6	16.8	40.8	16.0	40.2	15.4	24.8
Central zone	**43.6**	**23.2**	**42.3**	**21.9**	**40.6**	**20.2**	**20.4**
Uttar Pradesh	42.5	24.2	40.1	21.8	39.5	21.2	18.3
Madhya Pradesh	46.6	21.5	47.4	22.3	43.4	18.3	25.1
East zone	**43.4**	**21.0**	**42.2**	**19.8**	**40.1**	**17.7**	**22.4**
Assam (excluding Meghalaya) ..	48.4	19.0	49.0	19.6	44.1	14.7*	29.4
Bihar	41.9	23.3	38.6	20.0	40.0	21.4	18.6
Orissa	41.3	20.5	40.1	19.3	38.9	18.1	20.8
West Bengal	44.3	18.5	45.4	19.6	44.7	18.9	25.8
North zone	**41.0**	**16.1**	**41.4**	**16.5**	**42.4**	**17.5**	**24.9**
Haryana	44.5	16.8	44.5	16.8	—	—	27.7(b)
Punjab	36.9	17.4	36.4	16.9	39.7	18.6£	19.5(b)
Himachal Pradesh	37.6	17.1	37.9	17.4	—	—	20.5
Jammu & Kashmir	41.5	17.0	40.8	16.3	41.6	17.1	24.5
Rajasthan	42.7	18.7	40.1	16.1	42.5	18.5	24.0

(a) Exponential growth rate adjusted for migration.

(b) Exponential growth rate of enumerated population.

* Including Meghalaya.

£ Including Haryana, Himachal Pradesh and Chandigarh and the corresponding natural growth rate worked for combined Punjab is 21.1.

APPENDIX B

TABLE 2 : *Birth rate, Death rate and Expectation of Life at Birth (Persons) for All-India, Zones and Various States by Quasi-stable Method*

Zones/States	BR	DR	e^o_o
1	2	3	4
All-India	40.59	17.02	47.72
South zone	39.35	17.72	46.65
Andhra Pradesh ..	39.35	19.10	44.37
Karnataka	42.49	19.43	44.59
Kerala* .. .	40.32	16.60	48.80
Tamil Nadu .. .	37.54	16.08	49.57
West zone	40.45	14.57	51.79
Maharashtra	38.39	13.01	54.38
Gujarat	41.11	13.84	53.68
Central zone	39.99	18.29	46.29
Uttar Pradesh	41.17	21.05	42.97
Madhya Pradesh ..	39.66	12.84	54.38
East zone	43.75	20.38	43.10
Assam	49.27	18.42	45.96
Bihar	42.59	22.38	41.04
Orissa	42.70	19.39	44.70
West Bengal	44.81	19.19	44.93
North zone	40.94	14.26	51.72
Haryana	44.03	14.66	50.60
Punjab	39.74	19.75	43.80
Jammu & Kashmir ..	42.82	15.09	50.69
Rajasthan	43.96	16.73	49.40

* Above figures are calculated without adjustment due to decline in mortality.

APPENDIX C

TABLE 1 : *Deviation of the Projected Value from the 'True' Value*

(Males)

1961—70

Ages in 1971	South Zone		North Zone		East Zone		West Zone		Cental Zone	
	%Deviation@	%Cumulative deviation	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation
1	2	3	4	5	6	7	8	9	10	11
15—19	+0.21	+0.21	+0.49	+1.32	—2.65	—2.65	+0.73	+0.73	—0.87	—0.87
20—24	—0.65	—0.19	—1.65	+0.51	—7.15	—4.69	—1.59	—0.33	—1.76	—1.28
25—29	—0.50	—0.28	—2.31	—0.02	—0.54	—3.49	+1.72	—0.26	—2.22	—1.55
30—34	—0.64	—0.35	—0.97	—0.15	+3.39	—2.06	+5.02	+1.23	—1.72	—1.58
35—39	—0.48	—0.37	—0.71	—0.21	+2.12	—1.41	+3.57	+1.59	—0.64	—1.44
40—44	+0.08	—0.32	—1.62	—0.33	—0.86	—1.35	+1.20	+1.54	—1.18	—1.40
45—49	—0.12	—0.30	—0.24	—0.32	—2.37	—1.44	+2.55	+1.64	—0.01	—1.28
50—54	—0.38	—0.31	—2.95	—0.46	—3.18	—1.55	+0.81	+1.58	—0.50	—1.22
55—59	+0.03	—0.29	—5.73	—0.67	—4.50	—1.69	+1.03	+1.55	—1.74	—1.25
60—64	+0.55	—0.26	—4.90	—0.80	—3.56	—1.76	+0.89	+1.53	—2.89	—1.31
65—69	—0.43	—0.26	—7.43	—0.93	—1.79	—1.76	—1.48	+1.45	—3.92	—1.38

@ $\frac{\text{True—Projected}}{\text{True}} \times 100$

APPENDIX 'C'

TABLE 2 : *Deviation of the Projected Value from the 'True' Value*

(Females)

1961—70

Ages in 1971	South Zone		North Zone		East Zone		West Zone		Central Zone	
	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation
1	2	3	4	5	6	7	8	9	10	11
15—19	+2.16	+2.16	—1.49	—1.07	—7.96	—4.20	—4.52	—4.52	—3.86	—3.86
20—24	—0.40	+0.96	—2.58	—1.49	—3.54	—4.02	—0.13	—2.46	—3.91	—3.88
25—29	—2.94	—0.17	+0.51	—1.10	+3.40	—2.54	+5.88	+0.04	—0.75	—2.97
30—34	—1.68	—0.48	+2.10	—0.65	+4.53	—1.49	+3.56	+0.77	+0.16	—2.34
35—39	—0.46	—0.48	+0.07	—0.57	+0.67	—1.24	—0.50	+0.58	—1.40	—2.20
40—44	—0.84	—0.52	—1.69	—0.66	—2.35	—1.34	—0.88	+0.42	—2.60	—2.24
45—49	+0.32	—0.45	+0.87	—0.57	—1.74	—1.36	+0.58	+0.44	+0.05	—2.05
50—54	—0.94	—0.48	+0.20	—0.53	—2.90	—1.44	—0.53	+0.38	—1.05	—1.98
55—59	—1.97	—0.55	—0.58	—0.53	—2.96	—1.50	—0.19	+0.35	—1.43	—1.96
60—64	—2.98	—0.64	+0.65	—0.50	—1.62	—2.50	—0.51	+0.32	—0.84	—1.91
65—69	—3.74	—0.71	—4.75	—0.57	—4.19	—1.55	—10.54	+0.07	—2.94	—1.94

@ $\frac{\text{True—Projected}}{\text{True}} \times 100$

APPENDIX C

TABLE 3 : *Deviation of the Projected Value from the 'True' Value*
(Males)
1951—60

Ages in 1961	South Zone		North Zone		East Zone		West Zone		Central Zone	
	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation
1	2	3	4	5	6	7	8	9	10	11
15—19	—1.72	—1.72	+0.62	+0.62	+2.18	+2.18	—1.38	—1.38	—5.67	—5.67
20—24	—4.12	—2.85	—2.97	—1.05	+0.52	+0.93	—5.73	—3.40	—4.06	—4.91
25—29	—5.40	—3.60	—1.74	—1.24	+6.38	+2.57	—3.56	—3.45	—1.08	—3.11
30—34	—2.69	—3.41	+0.89	—0.82	+10.85	+4.36	—1.77	—3.10	+3.03	—1.82
35—39	—0.39	—2.94	—1.37	—0.90	+6.71	+4.73	—3.92	—3.22	—0.34	—1.59
40—44	—1.08	—2.72	—3.37	—1.17	+2.39	+4.46	—2.22	—3.11	—2.88	—1.74
45—49	+1.98	—2.66	—2.46	—1.28	+2.85	+4.30	—0.88	—2.92	—2.22	—1.78
50—54	—0.19	—2.61	—2.76	—1.38	+2.36	+4.19	+1.43	—2.64	—1.60	—1.77
55—59	—0.22	—2.59	—3.77	—1.49	+1.79	+4.08	+1.07	—2.47	—1.82	—1.77
60—64	—1.92	—2.57	—3.33	—1.56	+2.34	+4.02	+0.05	—2.39	—2.47	—1.80
65—69	—3.28	—2.59	—4.54	—1.63	—0.03	+3.94	—1.59	—2.58	—0.40	—1.77

@ $\frac{\text{True—Projected}}{\text{True}} \times 100$

APPENDIX C

TABLE 4 : *Deviation of the Projected Value from the 'True' Value*
(Females)
1951—60

Ages in 1961	South Zone		North Zone		East Zone		West Zone		Central Zone	
	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation	%Deviation@	Cumulative deviation
1	2	3	4	5	6	7	8	9	10	11
15—19	+0.82	+0.82	—0.50	—0.50	—1.14	—1.14	—6.74	—6.74	—9.93	—9.93
20—24	+0.06	+0.46	—2.50	—1.41	+0.14	—0.54	—3.28	—5.10	—4.42	—7.34
25—29	—3.75	—0.77	—0.26	—1.08	+5.35	+1.22	—0.17	—3.61	+1.65	—4.60
30—34	—6.21	—1.87	+0.07	—0.85	+5.76	+2.18	—1.31	—3.13	+2.59	—3.07
35—39	—4.11	—2.19	—3.31	—1.20	+1.77	+2.11	—3.06	—3.12	—1.44	—2.82
40—44	—1.55	—2.12	—3.83	—1.47	+1.09	+2.00	—2.80	—3.09	—2.83	—2.82
45—49	—1.08	—2.04	—2.97	—1.59	—0.05	+1.83	—0.31	—2.86	—1.14	—2.68
50—54	—1.20	—1.98	—3.41	—1.69	+1.97	+1.84	+0.95	—2.64	—0.91	—2.56
55—59	—1.72	—1.97	—3.93	—1.79	+4.29	+1.96	—0.72	—2.55	—1.16	—2.49
60—64	—1.16	—1.94	—2.96	—1.84	+2.80	+1.99	—0.59	—2.49	—0.50	—2.42
65—69	—2.72	—1.96	—8.72	—1.97	—3.63	+1.86	—3.31	—2.50	—3.28	—2.44

@ $\frac{\text{True—Projected}}{\text{True}} \times 100$

APPENDIX C

TABLE 5 : *Expectation of life at birth and at selected ages from 1901 to 1971—INDIA*

Ages Years	Sex	1901	1911	1921	1931	1941	1951	1961	1971
1	2	3	4	5	6	7	8	9	10
0	M	23.6	22.6	19.4	26.9	32.1	32.5	41.9	46.4
	F	24.0	23.3	20 9	26.6	31.4	31.7	40.6	44.7
10	M	34 7	33.4	29 6	36.4	41.2	39.0	45.2	48.8
	F	33.9	33.7	29.2	33.6	38.6	39.5	43.8	47.7
20	M	28.6	27.5	25.5	29.6	35.0	33.0	37.0	41.1
	F	28.6	28.0	25.4	27.1	33.1	32.9	35.6	39.9
30	M	22.9	22.5	21.6	23.6	29.0	26.6	29.0	33.3
	F	23.8	23.0	21.8	22.3	27.9	26.2	27.9	32.0
40	M	17.9	18.0	17.9	18.6	23.3	20.5	22.1	25.9
	F	19.1	18.5	18.3	18.2	22.9	21.1	22.4	25.4
50	M	13 6	14.0	14.3	14.3	17 8	14.9	16.5	19.2
	F	14.5	14.3	15.0	14.7	18 2	16 2	17.5	19.7

Sources 1. 1921 and 1941 based on Kingsley-Devis.
2. Others : Actuarial Reports.

APPENDIX C

TABLE 6 : *Sex-ratio by Zones/States*

Zones/States	Sex Ratio $\frac{M}{F}\times 1000$		Sex Ratio of 10+	
	1961	1971	Unadjusted	Adjusted
1	2	3	4	5
ALL—INDIA	1063	1075	1111	1090
South Zone	1014	1022	1021	1025
Andhra Pradesh	1019	1024	1027	1032
Karnataka	1043	1045	1055	1059
Kerala	979	984	968	970
Tamil Nadu	1008	1022	1020	1024
Pondicherry	987	1011	1003	1008
Lakshadweep	980	1022	998	1001
West Zone	1065	1073	1090	1087
Maharashtra	1068	1075	1098	1097
Gujarat	1063	1070	1079	1073
Dadra & Nagar Haveli	1038	993	990	998
Goa, Daman & Diu	933	1011	1000	1002
East Zone	1059	1073	1095	1100
Assam	1147	1115	1173	1180
Bihar	1006	1049	1048	1049
Orissa	999	1013	1009	1029
West Bengal	1139	1123	1180	1183
Sikkim	1106	1159	1223	1258
Nagaland	1072	1049	1197	1199
Meghalaya	1068	1062	1101	1087
Manipur	985	1020	1016	1015
Tripura	1073	1061	1078	1084
Central Zone	1085	1113	1114	1127
Madhya Pradesh	1050	1062	1062	1079
Uttar Pradesh	1100	1138	1138	1150
North Zone	1136	1130	1144	1146
Haryana	1152	1154	1166	1167
Punjab	1172	1156	1168	1168
Rajasthan	1101	1098	1103	1105
Himachal Pradesh	1066	1043	1049	1053
Jammu & Kashmir	1140	1139	1177	1183
Delhi	1274	1248	1304	1305
Chandigarh		1335	1410	1414

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