MORTALITY OF INDIAN ASSURED LIVES

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THE standard table of mortality of assured lives used in India before the nationalization of life insurance business was the Oriental's (1925–35) table. This was derived from the experience of lives assured with the leading insurance company, 'Oriental', during 1925–35. A paper dealing with this experience was submitted to the Institute by the late L. S. Vaidyanathan (*J.I.A.*, **70**, 15). Substantial changes in mortality rates which had occurred during the decade and a half that had elapsed since the publication of this table led the Indian actuaries to modify the table for the purposes of the last general revision of premium rates which took place in 1954. The modification adopted by the Oriental was to take 70% of its 1925–35 qs up to age 50, gradually increasing the percentage to 100% at 70, and keeping it uniform at that level thereafter. The Indian Life Assurance Offices' Association had by this time already started collecting data for the purposes of a study of the combined mortality experience of life offices in India which could not, however, be completed on account of nationalization. The data submitted to the Association by the Oriental pertaining to the years 1953–54, were subsequently analysed by Life Insurance Corporation in connexion with the framing of a scheme in terms of Sec. 49(2)(k) of the LIC Act, 1956. This investigation is interesting inasmuch as it brought to a focus the changes in mortality which had occurred since the publication of Oriental's (1925–35) table. A paper dealing with the experience during 1961 of nine Integrated Head Office Units of leading Indian Insurers (IHOs) and fifteen Divisional Offices of LIC was submitted jointly by the author and V. H. Vora to the Actuarial Society of India (*T.A.S.* 1963, 1). These studies showed that very substantial reduction in mortality rates had taken place over the last three decades, the greatest proportionate reductions being at ages below 50. A pressing need was therefore felt for a new table to provide an efficient and up-to-date instrument for life assurance calculations.

2. Commencing from the policy anniversary in 1961, all the offices of the Corporation and the above-mentioned nine IHOs have been contributing data for LIC's Continuous Mortality Investigation. After the publication of the experience of lives assured with LIC during 1961, it was decided to make the first mortality investigation of assured lives in India, covering the period 1961–64. This period was considered suitable as some preliminary investigations, referred to earlier, had already been made and also there were no abnormal occurrences during this period.

3. The form in which the data were collected is given in Appendix I of our paper to the Actuarial Society of India (*T.A.S.* 1963, 1). For the purposes of the construction of the standard table, the experience of medically examined male lives accepted at ordinary rates under the

whole life and endowment assurance plans was used. The exposed to risk, deaths and observed rates of mortality for durations 3 and over are given in Table 1, and the comparison of actual deaths for durations 0 to 2 with expected deaths according to the contemporaneous mortality at durations 3 and over is given in Table 3. The aggregate figures for all ages are given in the following table:

	Duration 0	Duration 1	Duration 2	Durations 3 and over
Exposed to risk	1,152,079	1,134,223	1,279,080	9,757,692
Deaths	1,935	2,429	2,693	37,455

The data are voluminous enough to provide a clear picture of the present level of mortality rates of assured lives in India. In the analysis that follows it will be well to bear in mind that whereas at durations 3 and over the bulk of the data at younger ages pertains to policies issued by the Corporation, at ages 50 and above the bulk pertains to policies issued by the nine IHOs whose experience is likely to be more favourable than the combined average experience of the erstwhile insurers. Although this introduces some heterogeneity the practical advantages obtained by combining the data with a view to having adequate exposed-to-risk at all ages are so overwhelming in constructing an efficient and reliable instrument for life assurance calculations, that this course was adopted.

4. Since 1961, the LIC has been issuing increasing numbers of policies on a non-medical basis. As the experience under this class of business needs to be carefully watched during the initial stages, steps were taken early to collect the data in a suitable form so that the mortality experience could be analysed and compared with that of medically examined lives. The mortality experience of this class of business is included in the present investigation.

5. No standard experience of female assured lives in India exists. The data relating to female lives accepted at ordinary rates were compiled in a suitable form for the evaluation of female assured lives' mortality. Though the volume of the available data is rather small and pertains only to female lives considered to be on a par with male lives, yet for the first time we have a definite picture of the relative mortality of male and female lives assured.

6. From the point of view of practical convenience, the census method was used for the evaluation of mortality rates of both non-medical business and female lives assured.

Duration of selection

7. In the construction of assured lives' mortality tables the problem of selection generally gives rise to considerable difficulty. In India the degree

of selection is found to be relatively small. In the Oriental's (1925–35) table the select period was taken to be one year. For the purpose of the present examination the data were collected separately for duration 0, 1, 2, and 3 and over. Before undertaking a detailed examination thereof it appears necessary to refer to certain special peculiarities of the data on which the standard table is based.

8. It may be recalled that in his paper the late L. S. Vaidyanathan (*J.I.A.* **70,** 30) had devoted a special section to errors in age, which are inherent in the data of assured lives in India.

9. Soon after its establishment, the LIC undertook an intensive drive to develop insurance business in the interior rural areas. As a result, nearly 36% of new policies issued at present are from rural areas, considerably adding to the existing difficulties of getting satisfactory proof of age at the time of effecting assurances. On the other hand the introduction of a Salary Savings Scheme by the LIC under which the premiums are deducted from salary by the employer and remitted to the Corporation, and which has proved very popular in urban centres, has had an opposite effect, for under these policies a satisfactory record of age is almost invariably available. The policies issued under this scheme form at present nearly 20% of the new policies issued.

10. Production of satisfactory proof of age at the proposal stage is generally insisted upon by LIC offices, failing which efforts are made to secure it as early as possible, after the issue of the policy. Anyway, in recent years a general awareness is shown by the agency organization to the practical need for getting the age admitted along with the proposal. Accordingly a considerable improvement has now taken place in the admission of age: the percentage of policies issued with age admitted was 46·3 in the financial year 1965–66, 53·9 in the financial year 1966–67, and 57·6 in the financial year 1967–68.

11. It will be clear from the above that in considering the results of the present investigation it is to be borne in mind that in the majority of cases exposed-to-risk at durations 0, 1 and 2, age had not been proved at the time of proposal. A certain degree of caution is, therefore, necessary in comparing the rates at duration 0, 1 and 2 with those at durations 3 and over. It is generally found that when proof of age is submitted within a reasonable time after the issue of the policy, say a couple of years, the chances of the original age being understated are practically the same as of its being overstated. Where, however, there has been a deliberate understatement of age with a view to deriving the benefit of lower premiums, there would be an attempt to delay the submission of proof of age as long as possible. In a recent review of pending matured claims, it was found that the non-admission of age was responsible for nearly one-eighth of the cases. Longer delay of submission of proof of age is, therefore, more likely to be associated with understatement of age. It may be taken that with the greater spread of education, the understatement

at younger ages is not likely to be significant but in the middle age-groups it is likely to be substantial. At ages 50 and above, no policy is issued by the Corporation unless age is first proved. At duration 0, therefore, the effect of understatement would be substantial only at ages 40–49. At durations 1 and 2, the exposed to risk at ages 50 and above includes a block of policies issued at ages below 50 with a substantial proportion of cases where age is understated. The exposed to risk at durations 3 and over at middle and higher age-groups includes policies issued at all earlier entry ages, several years ago, and the result of the alterations in age since effected is to reduce the proportion of cases where the age is understated. Under these conditions the mortality rates at durations 3 and over would appear to be relatively low as compared with the rates at durations 1 and 2. In the above argument, it is assumed that the deaths are shown against their correct age because the settlement of claims depends upon the age being first proved to the satisfaction of the insurer. Another relevant factor in this connexion is the fact that the nine IHOs' experience is likely to be more favourable than the average experience of the lives assured with the erstwhile insurers.

12. In this connexion, it is interesting to note that according to a recent sample check of alterations in age during the months of January to March 1968 in a divisional office, it was found that in 115 cases of alterations due to understatement of age the average understatement was by 1·45 years. Further, 23% of these were carried out in the first year; 9% 1–2 years after issue; 44% 3–6 years after issue and 24% 7–10 years after issue.

13. In Table 3 the percentages of actual deaths at durations 0, 1 and 2 to the expected deaths at each age according to the contemporaneous mortality at durations 3 and over are given. The following table summarizes the results thereof:

Age group	Duration 0			Duration 1			Duration 2		
	A	E	100 A/E	A	E	100 A/E	A	E	100 A/E
20–39	935	1056	88·5	1069	1061	100·8	1200	1206	99·5
40–59	957	1118	85·6	1325	1141	116·1	1457	1314	110·9
All ages	1892	2174	87·0	2394	2202	108·7	2657	2520	105·4

Allowing for the effect of understatement of age on the rates at various durations, the table brings out clearly the fact that the effect of medical selection wears out quite early. At ages 20–39 the select rates practically approach the ultimate rates after duration 0. At ages 40–59 the approach is similar but it is somewhat masked by the resulting overstatement of rates at durations 1 and 2. Several other factors appear to have contributed to this apparent anomaly in this section. Reference has already been made to the particular conditions regarding admission of age which are responsible for the mortality rates at durations 3 and over being

relatively low as compared with the rates at durations 1 and 2. Again at durations 1 and 2 the effect is somewhat magnified as a result of the withdrawal of healthy lives resulting from the lapsing of policies by a fairly large proportion of policyholders after the payment of one or more instalments of premiums.

14. It was decided that for practical purposes, it would be sufficient to take the selection to last only one year and to take the ungraduated rates for durations 1 and over as being suitable for constructing the ultimate table.

15. The above decision enabled a direct comparison being made with the Oriental's (1925–35) experience which also has a one-year period of selection. Accordingly expected deaths on the basis of the Oriental's (1925–35) ultimate table were calculated for the period 1961–64. The results of this comparison are summarized in the following table:

Age group	Exposed to risk	A	E	100 A/E
20–49	10,432,046	22,092	76,179	29·0
50–69	1,650,878	18,565	47,529	39·1
70–84	27,624	1,740	2,904	59·9
All ages	12,110,548	42,397	126,612	33·5

It will be seen that over the last three decades the decline of male mortality at all ages has been very substantial, the proportionate reduction being particularly marked at ages below 70.

Graduation: ultimate rates

16. The same considerations weighed in the graduation of ultimate rates of mortality as did in the case of A1949–52 (ultimate) experience of British assured lives. Various experiments were made to find a suitable mathematical formula which would give a satisfactory representation of the assured lives' experience and provide a good working instrument for life assurance work. The quest for a formula did not, however, prove an easy one inasmuch as some of the features of the ungraduated rates, referred to below, had to be incorporated in the formula.

17. The ungraduated rates show a relatively heavy mortality at ages 20–24, followed by a trough at ages 25–29. The former was no doubt primarily due to the incidence of deaths arising from accidents at young ages, and the likely adverse effect on the mortality rates due to the exercise, in the majority of cases, of the option under the children's deferred assurance plans to discontinue the assurance after the vesting age. It was not considered desirable to preserve these features in the standard table, as for all practical purposes it would be sufficient to have a relatively flat curve to represent the rates experienced at ages 20–29.

18. It has already been observed earlier that the decline in male mortality during the last three decades has been very substantial, particularly at ages below 50. Accordingly, between ages 30 and 50, a rapidly increasing progression of rates was required to represent the actual experience.

19. As the data for the standard table comprise whole life and endowment assurances, under both with-profit and non-profit policies, regard must be had to the existence of a differential between the whole life and endowment mortality. This differential ceases to have any relevance at ages above 70 where the data consist of whole life policies only. As a result the transition of rates from 55 to higher ages has to be considerably steeper than that disclosed by the actual experience.

20. Again, at ages 75 and above the proportion of the paid-up policies included in the whole life non-profit data has an increasing influence on the rates particularly as the major portion of the data at advanced ages included in the present investigation pertains to policies issued by erstwhile insurers, whereunder in a sizeable proportion of cases contact with the life assured is believed to have been lost. It is necessary, therefore, to ensure that in the published tables the rates at ages 75 and above, while being in line with the progression of rates at ages below that age, should be progressively higher than the ungraduated rates so as to offset as much as practicable the effect on the rates of mortality at these ages due to the non-exclusion of paid-up policies.

21. Incorporation of the above features of the ungraduated rates in a single mathematical formula presented a considerable difficulty. To resolve the same, various experiments were carried out with the prime consideration of representing the ultimate experience by a smoothly progressing series of rates rather than to achieve the 'best' fit, satisfying the rigorous statistical tests for adherence to data.

22. The final formula evolved is given below:

$$q_x = A f(x) + Bc^x \phi(x)$$

where

$$A = \cdot000812$$
$$B = \cdot0000380658$$
$$c = 1\cdot103164$$
$$f(x) = (1\cdot028)^{(20-x)\ (1-\cdot18\ \overline{20-x})}$$

$$\phi(x) = \cdot3 + \sin\left(\frac{x-7}{50} \cdot \frac{\pi}{2}\right)$$

The resulting rates of mortality are given in the Appendix. In Table 4, a comparison of the actual and expected deaths is given.

23. In considering the results of the graduation it will be recalled that it was decided to have a flat curve for the range 20–29. The actual deaths are practically equal to the expected. Incidentally it may be mentioned here that the reasonableness of the level of rates in this section of the curve is borne out by the corresponding experience of non-medical assured lives.

24. The distribution of the function $(A-E)/\sqrt{E}$ given in Table 4 is summarized in the following table, and it will be seen therefrom that the graduation by the mathematical formula chosen has not resulted in any undue sacrifice of the fidelity to the data.

Value of $(A-E)/\sqrt{E}$	Number of ages (26–75)	% of total
0·0–0·9	27	54
1·0–1·9	18	36
2·0–2·9	2	4
3·0 and over	3	6
Total	50	100

Inspection of Table 4 will also show that the deviations in the range 26–75 change sign frequently, there being as many as 19 changes of sign as against 24·5 expected according to the assumption of a binomial distribution. Further, bearing in mind the limitations of heterogeneous experience resulting from the combining of the relatively recent LIC data with that of the IHOs and old units having much longer average durations, the total of the deviations irrespective of sign as compared with the total of $\sqrt{E}$ are within reasonable limits, the few freak values noticed at some ages being very difficult to eliminate by the use of any smooth curve for graduation.

25. Practically throughout the section '75 and above', the expected deaths exceed the actual, the deviations being substantial above age 84. This is in accordance with the desired practical objective of the resulting rates being progressively higher than the ungraduated rates at these ages.

26. Separate inspection of the data of the nine IHO units and of the data pertaining to the other units since decentralized and integrated with the divisional offices of the Corporation revealed that it is the IHO units which are mainly responsible for the ungraduated rates at advanced ages being understated due to unreported deaths. The business of these insurers was spread over the whole country and the uprooting of large sections of population following the partition of the country in 1947 appears to have been considerably responsible for the loss of contact with the assured in the affected areas.

27. The curve used in the formula thus succeeds in achieving the main objectives of the graduation without any undue sacrifice of the fidelity to the data and the resulting rates represent the present experience of assured lives in India. It is proposed to refer to the new table as the LIC (1961–64) table.

Graduation: select rates

28. The select portion of the table, represented by the first policy

year's experience in the present investigation, is generally constructed by reference to the ultimate experience. However, since the degree of the selection, as revealed by comparison with the ultimate experience, varied considerably from age-group to age-group it was evident that no linear fit would provide a suitable basis for the graduation of the ratios of $q_{[x]}/q_x$. Fortunately, the volume of data relating to the first policy year is itself substantial. It was, therefore, decided to graduate the select experience by directly fitting a mathematical curve to represent the rates over the entire range 20–60. After various experiments the following curve, which uses the same value of parameter c as in the ultimate section of the table, was found to be suitable.

$$q_x = A f(x) + Bc^x$$

where

$$c = 1 \cdot 103164$$
$$A = \cdot 72 \times \cdot 000812$$
$$f(x) = (1 \cdot 028)^{(20-x)(1-\cdot 18\ \overline{20-x})}$$
$$B = \cdot 0000402793$$

29. The resulting rates are given in the Appendix. In Table 6 is given a comparison of actual to expected deaths together with the values of the function $(A - E)/\sqrt{E}$ for measuring the deviations age by age. The deviations are reasonable, 26 being less than or equal to σ. Further, throughout the range 20–54 the deviations change sign frequently and the number of changes is 14. Above age 55 the data are scanty and the expected deaths exceed the actual at all the ages up to 60.

30. The resulting ratios of $q_{[x]}/q_x$ are given in Table 5 together with the corresponding ratios of actual deaths to expected deaths according to the graduated rates for durations 1 and over. The ratios gradually increase as the age increases till a maximum of $\cdot 970$ is reached at age 31 and 32, and thereafter they decrease gradually.

Non-medical business

31. The non-medical business transacted by the corporation comprises the business done under its two schemes—non-medical (general) and non-medical (special). The non-medical (general) scheme provides cover up to a maximum sum assured of Rs.2,000 (since raised to Rs.4,000) and the non-medical (special) scheme, which is applicable to persons in the service of Government and quasi-Government institutions and also well-known commercial organizations, provides cover up to a maximum of Rs.5,000 (since raised to Rs.7,500).

32. The exposed-to-risk, actual deaths and the observed central rates of mortality are given in Table 8 and a comparison of the actual deaths with the expected deaths according to the new LIC (1961–64) ultimate table is given in Table 9 together with separate similar comparisons for non-medical (general) and non-medical (special) schemes. It would be

seen from the last three columns of Table 9, that in the combined experience the actual deaths are less than the expected deaths except in the case of age groups 30–34 and 50–54, but the difference is not significant. Whereas on *a priori* considerations one may expect the non-medical experience to be heavier than or on a par with the medical, it is not expected to be significantly lower. The non-medical experience incidentally gives corroborative evidence of the actual level of ultimate rates as shown in the new main table.

33. So far as the separate experiences under the non-medical (general) scheme and the non-medical (special) scheme are concerned, it is observed that except in certain age-groups the special scheme experience is throughout lighter than that of the general scheme. The actual deaths in the combined non-medical experience are 91·4% of those expected by the standard ultimate table. While this is mainly attributable to the greater concentration of the exposed-to-risk at younger ages and the shorter average duration of policies in the non-medical experience, it will probably be correct to infer that the safeguards adopted by LIC under the non-medical scheme have on the whole proved to be satisfactory.

Mortality experience of female assured lives

34. As compared with the data pertaining to the main table, the quantity of the data relating to female assured lives is small. This is to be expected in a developing country like India where until recently only a few families in the higher social strata paid any attention to the education of females, and, barring a few professions, there were very few females who had an earned income of their own to feel the need for insurance. The development of insurance amongst females in India has therefore been rather late and slow. Further, the mortality experience of female lives assured with the Corporation immediately after nationalization, when it was decided to accept assurances on female lives on the same terms as male lives, was found to be adverse as compared with that of male lives assured during the same period, resulting in the placing of certain restrictions for acceptance of female lives for insurance. Broadly speaking, female proposers are now divided into three categories, namely: (a) women with earned income; (b) women with unearned income, who pay income tax and/or have sizable property likely to attract Estate Duty; and (c) others. Only female lives considered to be on a par with the male lives on account of their educational qualifications and socio-economic status and accepted both before and after the adoption of the new scheme of categorization at ordinary rates on the same terms as male lives are included in the present investigation.

35. In Table 10 are given the exposed to risk, actual deaths and the observed rates of mortality for durations 1 and over. The following table gives a comparison of the actual and expected deaths on the basis of the LIC (1961–64) table:

Age-group	Duration 0			Duration 1 and over		
	Actual deaths	Expected deaths by LIC (1961–64) males— select	100 A/E	Actual deaths	Expected deaths by LIC (1961–64) males— ultimate	100 A/E
20–24	28	22	127·3	69	41	168·3
25–29	18	26	69·2	181	115	157·4
30–34	15	18	83·3	160	138	115·9
35–39	13	13	100·0	156	162	96·3
40–44	5	9	55·6	188	197	95·4
45–49	3	7	42·9	162	209	77·5
50–54	1	2	50·0	133	174	76·4
55–59	—	—	—	98	100	98·0
60–64	—	—	—	43	66	65·2
65–69	—	—	—	22	56	39·3
70–74	—	—	—	37	58	63·8
All ages	83	97	85·6	1249	1316	94·9

36. It will be observed from the above table that at durations 1 and over the actual deaths at ages 20–34 are substantially higher than the expected deaths thus pointing to the need for caution in accepting this class of business for assurance. There is also a case for charging suitable extra premiums, if the same trend were to persist. As already stated the terms on which female lives are now accepted provide certain safeguards and are so designed as to minimize this tendency. In the higher age-groups the female experience is relatively more favourable than that of male lives which is similar to the experience of western countries.

37. So far as duration 0 is concerned, although the total number of actual deaths was only 83 it is satisfactory to find that the ratio A/E is very similar to that found in the case of the male lives' experience, thus providing a further evidence of the success of the measures already taken by LIC in the acceptance of assurances on female lives.

Comparison with earlier tables

38. In an earlier section mention has been made of the steep decline of mortality rates of assured lives in India during the last three decades. A comparison of q_x at quinquennial ages according to various tables of assured lives is given in Table 7. At ages 25 and 30 the new qs are only 23% of the Oriental's (1925–35) qs; thereafter the ratios rise gradually to 30% at 40, 42% at 60, 54% at 70, 70% at 80 and a little over 75% at ages 85 and above. Confirmation of the substantial improvement in mortality that has taken place since 1925–35 is provided by the comparison of the Oriental's (1953–54) qs with the company's (1925–35) qs. It will be observed therefrom that the level of the proportionate improvement noticed in the comparison of new qs with the Oriental's (1925-35) qs occurs

several ages earlier in the case of the 1953–54 qs indicating that the substantial improvement in mortality which had commenced at younger ages is still to expend itself. The progressive improvement shown by the comparison of these tables is not confined to younger sections only, the proportionate reduction in the new qs at advanced ages is, however, much smaller.

39. The resulting effect on the longevity of the assured lives is reflected in the values of $\mathring{e}_x$ given in the next section of the table. It will be observed therefrom that new $\mathring{e}_{20}$ is 25% higher than that by the earlier table. The proportionate increase continuously rises thereafter until it reaches a maximum value of 41% at age 60; above age 65 the improvement shows a gradual reduction until it reaches the level of 26% at age 85. The values of $\mathring{e}_x$ according to the All India Census 1951–60 as compared with that for the Census 1941–50 also show substantial improvement during the decennium; the proportionate increase being 12% at age 20, which proportionate improvement is again reached at age 55 after falling down to a minimum of $7\frac{1}{2}$% at age 40; thereafter the improvement continues to rise with age and is as much as 29% at age 80. At ages 90 and 95 there is actually a small deterioration instead of an improvement.

40. The following table gives the reduction in the pure annual premium per thousand sum assured produced by the LIC (1961–64) as compared with the Oriental's (1925–35) using 4% interest.

	Reduction in annual premium per thousand sum assured		
Age	Whole life	20-year limited payment life	20-year endowment
20	4·76	6·26	1·94
30	6·44	7·45	2·60
40	9·82	10·00	5·18
50	15·80	15·10	11·46
60	23·52	22·40	20·59

Mortality Functions

41. The Mortality Functions for the LIC (1961–64) table are given in the Appendix. The new table now placed before the profession gives a very serviceable representation of the most modern experience of assured lives in India. The nature of heterogeneity inherent in the data has been dealt with at length in the paper. It is hoped that in the material furnished in the various tables given in the paper the working actuary has sufficient guidance to determine the bases which in his individual judgment would be most appropriate for his calculations in any particular case, with such adjustments, if any, as may be considered necessary.

Table 1. *Assured lives (1961–64) (durations 3 and over). Exposed to risk, deaths and observed rates of mortality*

Age x	Exposed to risk	Deaths	q_x	Age x	Exposed to risk	Deaths	q_x
Up to 19	9,398	15					
20	12,194	30	·00246	55	118,161	1,276	·01080
21	23,298	33	·00142	56	97,316	1,227	·01261
22	40,552	63	·00155	57	82,305	1,161	·01411
23	67,374	81	·00120	58	70,717	1,039	·01469
24	116,006	135	·00116	59	58,006	899	·01550
25	162,987	142	·00087	60	45,491	743	·01633
26	196,776	211	·00107	61	35,806	677	·01891
27	228,638	213	·00093	62	28,742	613	·02133
28	267,880	246	·00092	63	23,626	561	·02375
29	291,048	303	·00104	64	18,365	443	·02412
30	303,172	309	·00102	65	14,196	389	·02740
31	321,855	353	·00110	66	11,131	330	·02965
32	324,501	389	·00120	67	9,008	283	·03142
33	360,020	428	·00119	68	7,549	270	·03577
34	362,254	465	·00128	69	6,141	260	·04234
35	374,607	531	·00142	70	5,025	226	·04498
36	379,588	529	·00139	71	4,170	268	·06427
37	381,511	691	·00181	72	3,554	210	·05909
38	399,520	801	·00200	73	3,005	185	·06156
39	392,235	796	·00203	74	2,493	143	·05736
40	375,402	854	·00227	75	2,079	125	·06013
41	363,415	818	·00225	76	1,726	94	·05446
42	343,175	840	·00245	77	1,474	125	·08480
43	342,542	1,061	·00310	78	1,104	82	·07428
44	322,622	1,070	·00332	79	880	75	·08523
45	310,930	1,178	·00379	80	653	47	·07198
46	297,515	1,244	·00418	81	493	44	·08925
47	281,288	1,351	·00480	82	374	42	·11230
48	272,700	1,436	·00527	83	321	46	·14330
49	249,797	1,399	·00560	84	273	28	·10256
50	225,432	1,507	·00668	85–89	1,114	79	
51	206,412	1,493	·00723	90–94	991	30	
52	186,258	1,445	·00776	95 and over	755	4	
53	166,109	1,544	·00930				
54	141,637	1,427	·01008				

Table 2. *Assured lives* (1961–64) (*durations 1 and over*). *Percentage of actual to expected deaths on the basis of Oriental's* (1925–35) *ultimate table*

Age	Actual deaths	Expected deaths	Percentage of actual to expected deaths	Age	Actual deaths	Expected deaths	Percentage of actual to expected deaths
20	58	182	31·9	55	1,361	3,619	37·6
21	96	284	33·8	56	1,273	3,240	39·3
22	154	489	31·5	57	1,201	2,941	40·8
23	185	734	25·2	58	1,068	2,688	39·7
24	237	962	24·6	59	928	2,368	39·2
25	233	1,181	19·7	60	753	1,991	37·8
26	333	1,410	23·6	61	683	1,682	40·6
27	340	1,579	21·5	62	616	1,427	43·2
28	361	1,701	21·2	63	561	1,247	45·0
29	399	1,828	21·8	64	443	1,037	42·7
30	426	1,880	22·7	65	389	857	45·4
31	471	2,042	23·1	66	330	718	46·0
32	516	2,105	24·5	67	283	619	45·7
33	552	2,266	24·4	68	270	553	48·8
34	588	2,357	24·9	69	260	479	54·3
35	634	2,462	25·8	70	226	416	54·3
36	691	2,689	25·7	71	268	367	73·0
37	877	2,881	30·4	72	210	332	63·3
38	929	3,059	30·4	73	185	298	62·1
39	938	3,219	29·1	74	143	262	54·6
40	1,001	3,307	30·3	75	125	231	54·1
41	972	3,538	27·5	76	94	203	46·3
42	1,032	3,665	28·2	77	125	184	67·9
43	1,215	3,837	31·7	78	82	146	56·2
44	1,243	3,933	31·6	79	75	123	61·0
45	1,329	4,093	32·5	80	47	96	49·0
46	1,464	4,429	33·1	81	44	77	57·1
47	1,580	4,599	34·4	82	42	62	67·7
48	1,636	4,692	34·9	83	46	56	82·1
49	1,602	4,776	33·5	84	28	51	54·9
50	1,738	4,723	36·8				
51	1,691	4,607	36·7	All ages	42,397	126,612	33·5
52	1,549	4,437	34·9				
53	1,652	4,297	38·4				
54	1,516	3,999	37·9				

Table 3. *Assured lives (1961–64) (durations 0 to 2). Comparison of actual deaths with expected deaths according to corresponding mortality at durations 3 and over (graduated graphically)*

	Duration 0			Duration 1			Duration 2		
Age	A	E	100 A/E	A	E	100 A/E	A	E	100 A/E
20	20	46	43·5	15	32	46·9	13	24	54·2
21	49	78	62·8	38	40	95·0	25	31	80·6
22	56	72	77·8	50	65	76·9	41	41	100·0
23	51	63	81·0	55	67	82·1	49	72	68·1
24	43	61	70·5	48	59	81·4	54	74	73·0
25	45	68	66·2	51	59	86·4	40	66	60·6
26	50	53	94·3	69	68	101·5	53	67	79·1
27	39	45	86·7	50	53	94·3	77	77	100·0
28	42	50	84·0	47	48	97·9	68	65	104·6
29	33	37	89·2	50	53	94·3	46	58	79·3
30	64	58	110·3	42	38	110·5	75	63	119·0
31	37	36	102·8	70	63	111·1	48	49	98·0
32	52	48	108·3	48	39	123·1	79	77	102·6
33	36	40	90·0	59	54	109·3	65	50	130·0
34	44	42	104·8	45	44	102·3	78	66	118·2
35	63	63	100·0	57	45	126·7	46	55	83·6
36	57	47	121·3	88	69	127·5	74	54	137·0
37	53	45	117·8	69	53	130·2	117	88	133·0
38	52	57	91·2	54	50	108·0	74	68	108·8
39	49	47	104·3	64	62	103·2	78	61	127·9
40	94	82	114·6	68	49	138·8	79	73	108·2
41	61	63	96·8	89	90	98·9	65	60	108·3
42	69	78	88·5	67	61	109·8	125	107	116·8
43	45	61	73·8	81	76	106·6	73	66	110·6
44	54	65	83·1	86	64	134·4	87	86	101·2
45	120	122	98·4	73	67	109·0	78	74	105·4
46	65	79	82·3	143	121	118·2	77	75	102·7
47	73	78	93·6	92	77	119·5	137	131	104·6
48	94	105	89·5	102	75	136·0	98	83	118·1
49	81	78	103·8	122	101	120·8	81	80	101·3
50	48	57	84·2	95	76	125·0	136	106	128·3
51	28	44	63·6	80	55	145·5	118	84	140·5
52	33	45	73·3	40	42	95·2	64	59	108·5
53	18	38	47·4	54	44	122·7	54	44	122·7
54	25	34	73·5	43	37	116·2	46	47	97·9
55	24	32	75·0	36	33	109·1	49	40	122·5
56	11	19	57·9	21	32	65·6	25	35	71·4
57	9	15	60·0	10	17	58·8	30	34	88·2
58	3	12	25·0	12	13	92·3	17	17	100·0
59	2	11	18·2	11	11	100·0	18	13	138·5

Table 4. *Assured lives (1961–64) (durations 1 and over). Exposed to risk and comparison of actual deaths with expected deaths according to the ultimate rates of mortality in LIC (1961–64) table*

Age	Exposed to risk	Actual deaths	Expected deaths	A—E +	A—E −	√E	$\frac{|A-E|}{\sqrt{E}}$
20	43,279	58	43	15		6·6	2·29
21	67,523	96	68	28		8·2	3·40
22	116,377	154	116	38		10·8	3·53
23	174,400	185	174	11		13·2	0·83
24	226,769	237	227	10		15·1	0·66
25	275,820	233	276		43	16·6	2·59
26	325,579	333	326	7		18·1	0·39
27	358,921	340	359		19	19·0	1·00
28	380,522	361	388		27	19·7	1·37
29	401,820	399	418		19	20·5	0·93
30	404,213	426	433		7	20·8	0·34
31	428,024	471	475		4	21·8	0·18
32	429,509	516	503	13		22·4	0·58
33	447,032	552	559		7	23·6	0·30
34	446,407	588	594		6	24·4	0·25
35	445,959	634	642		8	25·3	0·32
36	461,999	691	725		34	26·9	1·26
37	464,641	877	799	78		28·3	2·76
38	461,331	929	872	57		29·5	1·93
39	452,106	938	945		7	30·7	0·23
40	430,646	1001	995	6		31·5	0·19
41	425,755	972	1090		118	33·0	3·57
42	405,445	1032	1151		119	33·9	3·51
43	389,908	1215	1232		17	35·1	0·48
44	366,550	1243	1287		44	35·9	1·23
45	348,007	1329	1357		28	36·8	0·76
46	344,171	1464	1494		30	38·7	0·78
47	325,493	1580	1569	11		39·6	0·28
48	302,878	1636	1620	16		40·3	0·40
49	280,962	1602	1669		67	40·9	1·64
50	253,379	1738	1670	68		40·9	1·66
51	225,623	1691	1647	44		40·6	1·08
52	198,590	1549	1607		58	40·1	1·45
53	175,806	1652	1573	79		39·7	1·99
54	149,953	1516	1485	31		38·5	0·80
55	124,656	1361	1364		3	36·9	0·08
56	102,730	1273	1241	32		35·2	0·91
57	85,999	1201	1146	55		33·9	1·62
58	72,700	1068	1069		1	32·7	0·03
59	59,433	928	963		35	31·0	1·13
60	46,468	753	829		76	28·8	2·64
61	36,575	683	718		35	26·8	1·31
62	28,950	616	625		9	25·0	0·36
63	23,626	561	560	1		23·7	0·04
64	18,365	443	478		35	21·9	1·60
65	14,196	389	405		16	20·1	0·80
66	11,131	330	348		18	18·7	0·97
67	9,008	283	309		26	17·6	1·48
68	7,549	270	283		13	16·8	0·77
69	6,141	260	252	8		15·9	0·50
70	5,025	226	225	1		15·0	0·07
71	4,170	268	204	64		14·3	4·48
72	3,554	210	189	21		13·8	1·53
73	3,005	185	174	11		13·2	0·83
74	2,493	143	158		15	12·6	1·19
75	2,079	125	143		18	12·0	1·51
76	1,726	94	129		35	11·4	3·08
77	1,474	125	119	6		10·9	0·55
78	1,104	82	97		15	9·8	1·52
79	880	75	84		9	9·2	0·98
80	653	47	67		20	8·2	2·44
81	493	44	55		11	7·4	1·48
82	374	42	45		3	6·7	0·45
83	321	46	42	4		6·5	0·62
84	273	28	38		10	6·2	1·62
85–89	1,114	79	194		115		
90–94	991	30	237		207		
95 and over	755	4	239		235		
All ages	12,113,408	42,510	43,417				

Table 5. *Comparison of ratios of select to ultimate rates of mortality in LIC (1961–64) table with the ratios of actual deaths in the 1961–64 experience of assured lives at duration 0 to the expected deaths according to the ultimate rates of mortality*

Age x	$\dfrac{q_{[x]}}{q_x}$	Ratio of actual deaths to expected deaths by ultimate q_x	Age x	$\dfrac{q_{[x]}}{q_x}$	Ratio of actual deaths to expected deaths by ultimate q_x
20	·871	·769	40	·906	1·093
21	·880	1·021	41	·896	·910
22	·889	1·098	42	·886	·841
23	·900	1·063	43	·876	·703
24	·912	·843	44	·868	·794
25	·924	·726	45	·860	·960
26	·935	·980	46	·852	·802
27	·945	·867	47	·846	·913
28	·955	·824	48	·839	·879
29	·962	·846	49	·834	1·013
30	·967	1·032	50	·829	·828
31	·970	·949	51	·825	·636
32	·970	1·020	52	·822	·750
33	·967	·857	53	·819	·486
34	·963	1·023	54	·817	·758
35	·956	·969	55	·815	·774
36	·947	1·163	56	·814	·611
37	·938	1·178	57	·814	·600
38	·927	·929	58	·814	·250
39	·917	1·043	59	·815	·200
			60	·817	

Table 6. *Assured lives (1961–64) (duration 0). Exposed to risk and comparison of actual deaths with expected deaths according to the select rates of mortality*

Age	Exposed to risk	Actual deaths A	Expected deaths E	A—E +	A—E −	√E	|A—E| / √E
20	25,550	20	22		2	4·7	0·43
21	48,462	49	43	6		6·6	0·92
22	51,366	56	46	10		6·8	1·47
23	48,221	51	43	8		6·6	1·22
24	51,198	43	46		3	6·8	0·44
25	62,036	45	57		12	7·6	1·59
26	50,533	50	47	3		6·9	0·44
27	45,331	39	43		4	6·6	0·61
28	50,204	42	49		7	7·0	1·00
29	37,177	33	37		4	6·1	0·66
30	57,591	64	60	4		7·7	0·52
31	34,699	37	38		1	6·2	0·16
32	43,936	52	50	2		7·1	0·28
33	33,286	36	40		4	6·3	0·63
34	32,553	44	42	2		6·5	0·31
35	45,342	63	62	1		7·9	0·13
36	31,054	57	46	11		6·8	1·62
37	26,390	53	42	11		6·5	1·70
38	29,869	52	52			7·2	—
39	22,690	49	43	6		6·6	0·92
40	37,299	94	78	16		8·8	1·81
41	26,365	61	60	1		7·7	0·13
42	29,014	69	73		4	8·5	0·47
43	20,328	45	56		11	7·5	1·47
44	19,240	54	59		5	7·7	0·65
45	32,002	120	107	13		10·3	1·26
46	18,709	65	69		4	8·3	0·48
47	16,647	73	68	5		8·2	0·61
48	19,908	94	89	5		9·4	0·53
49	13,438	81	67	14		8·2	1·71
50	8,742	48	48			6·9	—
51	6,070	28	37		9	6·1	1·48
52	5,472	33	36		3	6·0	0·50
53	4,145	18	30		12	5·5	2·19
54	3,380	25	27		2	5·2	0·38
55	2,870	24	26		2	5·1	0·39
56	1,499	11	15		4	3·9	1·03
57	1,123	9	12		3	3·5	0·87
58	825	3	10		7	3·2	2·21
59	643	2	8		6	2·8	2·12
60	255	—	4		4	2·0	2·00
All ages	1,095,462	1,892	1,887				

Mortality of Indian Assured Lives

Table 7. *Values of q_x and $\overset{\circ}{e}_x$ according to various mortality tables*

Age x	q_x Assured lives Oriental's (1925–35)	Assured lives Oriental's (1953–54)	LIC (1961–64)	$\overset{\circ}{e}_x$ Assured lives Oriental's (1925–35)	LIC (1961–64)	All India Census (males) 1941–50	1951–60
20	·00420	·00106	·00100	42·10	52·57	33·03	36·99
25	·00428	·00131	·00100	37·94	47·82	29·78	32·98
30	·00465	·00154	·00107	33·73	43·05	26·58	29·03
35	·00552	·00187	·00144	29·52	38·29	23·50	25·33
40	·00768	·00283	·00231	25·37	33·61	20·53	22·07
45	·01176	·00493	·00390	21·44	29·05	17·63	19·15
50	·01864	·00872	·00659	17·84	24·70	14·89	16·45
55	·02903	·01483	·01094	14·67	20·63	12·39	13·98
60	·04285	·02351	·01784	11·97	16·88	10·13	11·77
65	·06039	·03558	·02854	9·70	13·54	8·18	9·81
70	·08288	·05328	·04476	7·79	10·64	6·51	8·07
75	·11123	·07892	·06872	6·20	8·20	5·13	6·54
80	·14776	·11648	·10303	4·86	6·22	3·99	5·13
85	·19765	·17344	·15027	3·72	4·67	3·06	3·68
90	·26899	·26172	·21188	2·75	3·50	2·30	2·27
95	·36939	·39339	·28588	1·97	2·67	1·52	1·18

Table 8. *Assured lives (1961–64) (non-medical). Central exposed to risk, deaths and observed central rates of mortality*

Age x	Central exposed to risk	Deaths	m_x	Age x	Central exposed to risk	Deaths	m_x
Up to 19	31,850	19					
20	44,800	27	·00060	50	7,083	54	·00762
21	99,186	69	·00070	51	5,285	26	·00492
22	136,313	99	·00073	52	3,642	37	·01016
23	162,042	140	·00086	53	2,931	26	·00887
24	186,971	167	·00089	54	2,197	25	·01138
25	221,548	157	·00071	55	1,407	19	·01350
26	220,840	173	·00078	56	1,077	13	·01207
27	220,747	212	·00096	57	901	7	·00777
28	223,896	171	·00076	58	774	6	·00775
29	208,094	199	·00096	59	563	7	·01243
30	220,548	230	·00104	60	382	4	·01047
31	192,128	209	·00109	61	481	5	·01040
32	185,788	221	·00119	62	315	2	·00635
33	165,787	223	·00135	63	153	1	·00654
34	154,563	202	·00131	64	114	3	·02632
35	152,843	201	·00132	65	82	3	·03659
36	128,935	182	·00141	66	71	—	
37	115,839	206	·00178	67	64	4	·06250
38	106,938	183	·00171	68	56	4	·07143
39	94,964	174	·00183	69	50	—	—
40	82,809	173	·00209	70	39	1	·02564
41	66,120	165	·00250	71	36	3	·08333
42	55,059	152	·00276	72	30	2	·06667
43	46,201	142	·00307	73	29	1	·03448
44	39,080	133	·00340	74	27	1	·03704
45	32,302	151	·00467	75	23	1	·04348
46	24,838	98	·00395				
47	18,918	71	·00375				
48	13,632	69	·00506	All ages	3,691,180	4,926	
49	9,789	53	·00541				

Table 9. *Assured lives (1961–64) (non-medical). Comparison of actual deaths with expected deaths according to LIC (1961–64) ultimate table*

Age-group	Non-medical—General				Non-medical—Special				Combined			
	Exposed to risk	Actual deaths	Expected deaths	100 A/E	Exposed to risk	Actual deaths	Expected deaths	100 A/E	Exposed to risk	Actual deaths	Expected deaths	100 A/E
20–24	262,669	231	263	87·8	366,643	271	367	73·8	629,312	502	630	79·7
25–29	346,765	302	350	86·3	748,360	610	758	80·5	1,095,125	912	1,108	82·3
30–34	286,888	362	336	107·7	631,926	723	743	97·3	918,814	1,085	1,079	100·6
35–39	179,402	290	304	95·4	420,117	656	718	91·4	599,519	946	1,022	92·6
40–44	53,654	151	142	106·3	235,615	614	659	93·2	289,269	765	801	95·5
45–49	10,706	59	49	120·4	88,773	383	408	93·9	99,479	442	457	96·7
50–54	3,147	23	24	95·8	17,991	145	137	105·8	21,138	168	161	104·3
55–59	799	12	10	120·0	3,923	40	51	78·4	4,722	52	61	85·2
60–64	211	4	4	100·0	1,234	11	26	42·3	1,445	15	30	50·0
65–69	47	3	2	150·0	276	8	9	88·9	323	11	11	100·0
70–74	29	—	2	—	132	8	7	114·3	161	8	9	88·9
All ages	1,144,317	1,437	1,486	96·7	2,514,990	3,469	3,883	89·3	3,659,307	4,906	5,369	91·4

Table 10. *Female assured lives (1961–64) (durations 1 and over). Centra
exposed to risk, deaths and observed central rates of mortality*

Age x	Central exposed to risk	Deaths	m_x	Age x	Central exposed to risk	Deaths	m_x
Up to 19	731	2					
20	1,831	5	·00273	50	6,086	19	·00312
21	4,045	11	·00272	51	5,098	28	·00549
22	7,668	13	·00170	52	4,381	26	·00593
23	11,528	12	·00104	53	3,638	33	·00907
24	15,645	28	·00179	54	2,828	27	·00955
25	18,996	25	·00132	55	2,186	29	·01327
26	21,382	38	·00178	56	1,780	30	·01685
27	23,500	30	·00128	57	1,454	13	·00894
28	24,931	49	·00197	58	1,235	13	·01053
29	24,820	39	·00157	59	1,003	13	·01296
30	24,827	45	·00181	60	746	5	·00670
31	24,253	26	·00107	61	649	7	·01079
32	23,938	15	·00063	62	635	13	·02047
33	22,611	40	·00177	63	612	15	·02451
34	20,972	34	·00162	64	438	3	·00685
35	20,424	33	·00162	65	486	7	·01440
36	19,611	39	·00199	66	325	1	·00308
37	18,941	20	·00106	67	328	5	·01524
38	17,663	42	·00238	68	295	3	·01017
39	16,960	22	·00130	69	215	6	·02791
40	15,319	43	·00281	70	264	14	·05303
41	15,179	29	·00191	71	212	2	·00943
42	13,692	40	·00292	72	231	9	·03896
43	12,987	43	·00331	73	196	9	·04592
44	12,163	33	·00271	74	164	3	·01829
45	10,423	30	·00288	75	181	7	·03867
46	9,460	37	·00391				
47	8,660	31	·00358				
48	8,076	26	·00322	All			
49	7,005	38	·00542	ages	513,907	1,258	

APPENDIX

LIC (1961–64): Mortality Functions
Select and ultimate

Age [x]	$l_{[x]}$	$d_{[x]}$	$q_{[x]}$	l_{x+1}	d_{x+1}	q_{x+1}	$\overset{\circ}{e}_{x+1}$	Age $x+1$
				999,999	1,000	·00100	57·30	15
15	999,869	870	·00087	998,999	999	·00100	56·35	16
16	998,869	869	·00087	998,000	998	·00100	55·41	17
17	997,870	868	·00087	997,002	997	·00100	54·46	18
18	996,872	867	·00087	996,005	996	·00100	53·52	19
19	995,875	866	·00087	995,009	995	·00100	52·57	20
20	994,880	866	·00087	994,014	994	·00100	51·62	21
21	993,895	875	·00088	993,020	993	·00100	50·67	22
22	992,911	884	·00089	992,027	992	·00100	49·72	23
23	991,928	893	·00090	991,035	991	·00100	48·77	24
24	990,946	902	·00091	990,044	990	·00100	47·82	25
25	989,965	911	·00092	989,054	989	·00100	46·87	26
26	988,985	920	·00093	988,065	988	·00100	45·92	27
27	988,016	939	·00095	987,077	1,007	·00102	44·96	28
28	987,027	957	·00097	986,070	1,026	·00104	44·01	29
29	986,030	986	·00100	985,044	1,054	·00107	43·05	30
30	985,014	1,024	·00104	983,990	1,092	·00111	42·10	31
31	983,961	1,063	·00108	982,898	1,150	·00117	41·14	32
32	982,868	1,120	·00114	981,748	1,227	·00125	40·19	33
33	981,699	1,178	·00120	980,521	1,304	·00133	39·24	34
34	980,482	1,265	·00129	979,217	1,410	·00144	38·29	35
35	979,158	1,351	·00138	977,807	1,535	·00157	37·35	36
36	977,729	1,457	·00149	976,272	1,679	·00172	36·41	37
37	976,165	1,572	·00161	974,593	1,842	·00189	35·47	38
38	974,456	1,705	·00175	972,751	2,033	·00209	34·53	39
39	972,576	1,858	·00191	970,718	2,242	·00231	33·61	40
40	970,504	2,028	·00209	968,476	2,479	·00256	32·68	41
41	968,214	2,217	·00229	965,997	2,743	·00284	31·76	42
42	965,688	2,434	·00252	963,254	3,044	·00316	30·85	43
43	962,877	2,667	·00277	960,210	3,370	·00351	29·95	44
44	959,767	2,927	·00305	956,840	3,732	·00390	29·05	45
45	956,312	3,204	·00335	953,108	4,136	·00434	28·17	46
46	952,496	3,524	·00370	948,972	4,574	·00482	27·29	47
47	948,267	3,869	·00408	944,398	5,053	·00535	26·42	48
48	943,582	4,237	·00449	939,345	5,580	·00594	25·55	49
49	938,410	4,645	·00495	933,765	6,154	·00659	24·70	50
50	932,704	5,093	·00546	927,611	6,772	·00730	23·87	51
51	926,416	5,577	·00602	920,839	7,450	·00809	23·04	52
52	919,494	6,105	·00664	913,389	8,175	·00895	22·22	53
53	911,898	6,684	·00733	905,214	8,962	·00990	21·42	54
54	903,562	7,310	·00809	896,252	9,805	·01094	20·63	55
55	894,425	7,978	·00892	886,447	10,708	·01208	19·85	56
56	884,442	8,703	·00984	875,739	11,674	·01333	19·09	57
57	873,543	9,478	·01085	864,065	12,702	·01470	18·34	58
58	861,677	10,314	·01197	851,363	13,792	·01620	17·60	59
59	848,783	11,212	·01321	837,571	14,942	·01784	16·88	60
60	834,792	12,163	·01457	822,629	16,148	·01963	16·18	61

LIC (1961–64) Mortality Functions
Ultimate

Age x	l_x	d_x	q_x	$\overset{\circ}{e}_x$	Age x
60	837,571	14,942	·01784	16·88	60
61	822,629	16,148	·01963	16·18	61
62	806,481	17,404	·02158	15·50	62
63	789,077	18,709	·02371	14·83	63
64	770,368	20,045	·02602	14·17	64
65	750,323	21,414	·02854	13·54	65
66	728,909	22,800	·03128	12·92	66
67	706,109	24,184	·03425	12·32	67
68	681,925	25,559	·03748	11·74	68
69	656,366	26,898	·04098	11·18	69
70	629,468	28,175	·04476	10·64	70
71	601,293	29,373	·04885	10·11	71
72	571,920	30,472	·05328	9·61	72
73	541,448	31,431	·05805	9·12	73
74	510,017	32,228	·06319	8·65	74
75	477,789	32,834	·06872	8·20	75
76	444,955	33,225	·07467	7·77	76
77	411,730	33,371	·08105	7·35	77
78	378,359	33,258	·08790	6·96	78
79	345,101	32,857	·09521	6·58	79
80	312,244	32,170	·10303	6·22	80
81	280,074	31,195	·11138	5·88	81
82	248,879	29,928	·12025	5·55	82
83	218,951	28,394	·12968	5·24	83
84	190,557	26,619	·13969	4·95	84
85	163,938	24,635	·15027	4·67	85
86	139,303	22,489	·16144	4·41	86
87	116,814	20,232	·17320	4·16	87
88	96,581·8	17,919	·18553	3·93	88
89	78,663·0	15,609	·19843	3·71	89
90	63,053·9	13,360	·21188	3·50	90
91	49,694·0	11,222	·22582	3·31	91
92	38,472·1	9,246	·24032	3·13	92
93	29,226·5	7,459	·25520	2·97	93
94	21,767·9	5,886	·27039	2·81	94
95	15,882·1	4,540	·28588	2·67	95
96	11,341·7	3,419	·30149	2·53	96
97	7,922·29	2,512	·31713	2·41	97
98	5,409·89	1,799	·33261	2·30	98
99	3,610·51	1,255	·34772	2·19	99
100	2,355·06	853	·36221	2·10	100