# Trends and Prospects of Mortality by Age and Sex in India: 1991-2030

## Introduction

Since independence the public health programme has extensively focused on improvement of infant and child health. This has led to the rapid decline in infant mortality in India. The Infant mortality rate has declined from 129 to 44 per thousand live births during 1971 and 2011. Modernisation, urbanisation, socio-economic advancement, improved medical technology, public health intervention, and changing life style have pushed India to the second stage of epidemiological transition. Disease affecting adult and elderly population becomes common in the second stage of epidemiological transition (Omran, 2005; Ghosh and Kulkarni, 2004).

According to the SRS, the share of adult (15-65 years) deaths among male has increased from 30% to 40% and among female share has increased from 28% to 32% in India. The mortality transition and consequent bulging of adult population has enormous implication on the adult deaths in India. Subramanian et al. (2006) found that increasing income inequality has developed the dual burden of morbidity in India. On one side 54.8% children (age 0-4 years) in EAG states died due to major infectious disease whereas 60% adults age 15-69 years died due to major non-communicable disease (NCD) in 2001-2003 (ORGI, 2009). Distribution of death by age showed that child (age 0-4 year) deaths constitutes 3% of the total deaths in Kerala compared with 25% in Uttar Pradesh, whereas adult deaths constitutes almost 30% to 35% of total in all major states of India (SRS, 2013). Thus, slowing the pace of the decline of infant and child mortality rate calls for the policy shift from the maternal-child health to the life style related NCD among the adults (Claeson et al., 200).

However, there are limited numbers of studies on the trends and future prospects of adult mortality in India, Yadav *et al.* (2012) estimated the age specific death rate (ASDR) from 2011 to 2025 for India. The SRS is the only source that provides the mortality estimates in

India. Hence, there is no comprehensive estimate of adult mortality and its determinants in India and states. Data limitation has also been the cause of slow pace methodological innovation to estimate adult mortality across the groups. However, researchers have discussed several direct and indirect methods to measure adult mortality Owing to its importance (as mentioned in chapter 1), level and trend of adult mortality in India must be revisited.

This chapter examines the level and trend of adult mortality by age and sex in India. The beginning of this chapter discusses the level and trend of mortality with available information on age specific death rate (ASDR) and life expectancy, provided by SRS. The ASDR and life expectancy are two most common mortality indicators. Another model based estimate e.g. probability of dying is calculated for adult age group (15-59) and also for other age groups to overview the state of adult mortality in India and selected states. Future prospects of adult mortality have been shown under two assumptions; constant mortality scenario and varying mortality scenario.

**Data**

To understand the age and sex pattern of mortality, data from two sources; the Census of India and Sample Registration System (SRS) is used.

The Indian Census is the largest single source of a variety of statistical information on different characteristics of the people of India. With a history of more than 130 years, this time tested exercise has been bringing out a wealth of statistics every ten years, beginning from 1872. To the scholars and researchers in demography, economics, statistics, anthropology, sociology and many other disciplines, the Indian Census is the most fascinating source of data. It captures the true diversity of the people of India and hence become one of the powerful tools to understand India. The responsibility of conducting the decennial Census rests with the Office of the Registrar General and Census Commissioner, India under the

Ministry of Home Affairs, Government of India. Census of India provides population composition by age-sex and type of residence up to small geographical location.

This study has used population data by age, sex and residence from Census, for India and selected states to calculate the mortality indicators. Using this data, intercensal growth rate has been calculated using exponential model and then population is interpolated for the year in-between census years. Census population has been adjusted for "age not stated" and then smoothed using "Strong Method".

The SRS is the main source of data for this objective. The SRS system was initiated by the Office of the Registrar General, India. The SRS generates most reliable and continuous data on demographic indicators. It was introduced as a pilot scheme in some selected states in 1964-65 and was converted into a full-scale system in 1969-1970. The SRS is based on dual record system and it involves continuous recording of births and deaths in a sample of villages or urban blocks by a resident (part time) enumerator. In addition, at the end of the six month period, a retrospective survey is conducted by full time supervisor. The data obtained through these two surveys are matched. The unmatched and partially matched events are re-verified in the field. The advantage of this procedure is that in addition to elimination of errors of duplication, it leads to quantitative assessment of the sources of distortion in the two data sets of records. SRS is a self-evaluating technique. The sampling units of SRS are replaced periodically using the results of the latest census report.

There are two types of measures of adult mortality: empirical and model based. Empirical estimates are based on vital registration data, surveys or census. A vital registration system with 100% coverage is the best source for measuring mortality indicators. But unfortunately it is mostly available in developed nations of the world.

**Methodology**

A number of methods/ and measures are used to understand the trends, change and future mortality scenario. These includes computing the probability of death ( ${}_nq_x$ ) using the life table for adults and other age group, projection of population using cohort-component method, projection of age specific death rate using Lee Carter model

We have used the three years moving average of ASDR for analysis, which is calculated as follows: $${}_nm_{x,i} = ({}_nm_{x,i-1} + {}_nm_{x,i} + {}_nm_{x,i+1})/3 \quad ; i = 1991,1996,2001,2006 \text{ and } 2009 \quad (1)$$

**Distribution of deaths by age**

The absolute number of deaths and distribution of deaths by age has been calculated from 1991 to 2009 to examine the levels and trends of adult mortality relative to other age groups. The calculation procedure is slightly different for census years and other years. (Method for census and other SRS based calculation are given below).

*For census years: 1991 and 2001,*

$$ {}_nD_x = ({}_nP_x * {}_nm_x)/1000 \quad (2)$$

where, ${}_nP_x$ is the population in age group x to x+n;

${}_nm_x$ is the death rate of age group x to x+n

${}_nD_x$ is the number of deaths in x to x+n age group

here, population is borrowed from Census of India, it is adjusted for 'Age not stated' and smoothed using **strong method**. Population of 'age not stated' is equally distributed among all the age groups. **Strong Method** for population smoothing is also recommended by technical group (projection report, 2001).

**Strong method for population smoothing**

If $W_1$, $W_2$, $W_3$, ... , are respectively the n quinquennial age groups, 0-4, 5-9, 10-14 and so on, then:

$$S(W_2) = 0.25*O(W_1) + 0.50*O(W_2) + 0.25*O(W_3)$$

where S is the smoothed population and O is the observed population.

In this way, smoothing of the all n-2 (except the first group $W_1$ and last group $W_n$) quinquennial age groups has been carried out. For smoothing, $W_1$ and $W_n$, this formula cannot be applied since there are respectively no preceding and succeeding age groups in these two cases. So, $W_1$ has been smoothed as under:

$$S(W_{0-4}) = O(W_{0-14}) - (S(W_{5-9}) + S(W_{10-14}))$$

Similarly, $S(W_{75+}) = O(W_{15-75+}) - (S(W_{15-19}) + \ldots + S(W_{70-74}))$

ASDR is borrowed from SRS.

*For intercensal years, we have used the age distribution of SRS and the inter-censal population of 1996, 2006 and 2009.*

It is computed as $_nP_x = (_np_x * P)/100$

where, $_np_x$ is the population distribution taken from SRS and, $P$ is the total population obtained from interpolation.

**Probability of death**

One of the model based estimate is also calculated e.g. probability of dying/ risk of mortality $_nq_x$ for each five year age group and also for various other age groups: **5q0, 20q15, 35q15, 45q15, 45q15, 40q30, 20q60, 25q15, 20q40**. This has been done by constructing life tables using Mortpak.

Separate probabilities for males and females were calculated using this formula:

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

All the analysis has been carried out for India and four states of India which are in different phases of demographic transition: Uttar Pradesh, Maharashtra, Kerala and Tamil Nadu.

**Population projection**

Since the mortality projection required the future population by age group, the population projection has been carried out by till 2030. The base year of population projection is 2009

as the SRS age distribution was available for this period. . The assumptions, inputs and procedure of population projection are given below:

***Base level population*:** The intercensal population of 2009 and the age-sex distribution of population of 2009 are used as base year population for projection. The 2009 is used as base year because many of our trend analyses are till 2009.

***Assumptions regarding fertility*:** We have used the time series estimates of TFR for India from 1971-2007 to project the TFR till 2030. The trend analysis of TFR is done using Gompertz model (also used by the Expert Committee on Population Projection Technical Group) for projecting the future levels of TFR for India. The lowest threshold for TFR is assumed to be 1.8. Mathematical form of Gompertz model is:

***Ln (-(Ln(TFR-L) / (U-L))) = Ln(-Ln*a) + t*Ln*b***

Where U and L are the upper and lower limits of TFR respectively and, *a* and *b* are constants. Here, U = 6.5; L = 1.8.

The observed values of TFRs from 1981-2007 were used for projecting the future levels of TFR as the reliable estimates from SRS are available from 1981 onwards. Projected TFR is given in Appendix 2.A.

***Sex ratio at birth (SRB)*:** SRB for India was 110 in 2009 (SRS, 2009). This is used as a base year estimate of SRB and it is assumed to remain constant during future years.

***Assumptions regarding mortality*:** Life expectancy at birth (LEB) for base year (2009) is borrowed from SRS abridged life table. LEB for end year (2030) is estimated by using average annual increase in LEB from 2001-05 to 2021-25, projected by Expert Committee. LEB is interpolated for years in-between 2009 and 2030 in Mortpak (Appendix 2.B). UN South Asia model life table has been selected for projection.

***Assumptions regarding migration*:** International migration has been assumed to be negligible, so it has not been considered for projection exercise.

**Projection of age specific death rate by fitting Lee-Carter's Model**

Lee carter model is the most widely used model for population projection. Assuming forecast of the single parameter can be used to generate forecasts of the level and distribution of mortality in future. The central death rate $m(x,t)$ can be modelled as the function of age specific constants, $a_x$ and $b_x$, and time varying index $k_t$. Model can be defined as:

$$ln(m_{x,t}) = a_x + b_x * k_t + \varepsilon_{x,t}$$

Where $k_t$ is an index of the level of mortality measures the time component using time series model (autoregressive moving average, ARIMA) , $a_x$ gives the general shape of the mortality schedule across age, and $b_x$ measure the rate of decline of mortality, and $\varepsilon_{x,t}$ is random error. The error term $\varepsilon_{x,t}$ with mean 0 and variance $\sigma_\varepsilon^2$ reflects particular age-specific historical influences not captured by the model.

The estimates of $a_x$, $b_x$, and $k_t$ can be obtained by normalizing $b_x$ to sum to unity and the $k_t$ to sum to zero. Average of $ln\{m(x,t)\}$ over time gives the $a_x$ values, and $k_t$ can be estimated by summing of $[ln\{m(x,t)\} - a_x]$ over age. Also, $b_x$ can be estimated by regressing, without a constant term, $[ln\{m(x,t)\} - a_x]$ on $k_t$ separately for each age group $x$.

Using these basic inputs separately for male female for period of 1970 to 2011 in the above given Lee-Carter method, age specific death rate has been projected for the period 2012 to 2030 (Appendix 2.C, 2.D, 2.E, 2.F).

**Mortality projection: 2016, 2021, 2026 and 2030**

To examine the future scenario of adult mortality, number of deaths and its distribution is projected under two possible scenarios from 2011 to 2030.

***Constant mortality scenario:*** It has been done by assuming that ASDR for 2011 will remain constant in future and only age structure (population) will subject to change.

$_nD_{x,i} = (_nP_{x,i} * _nm_{x,2011})$ **; i = 2011, 2016, 2021, 2026 and 2030**

here, $_nP_x$ is the projected population.

***Varying mortality scenario:*** In varying mortality scenario, population structure and age specific mortality rate both are subject to change.

$_nD_{x,i} = (_nP_{x,i} * _nm_{x,i})$ **; i = 2011, 2016, 2021, 2026 and 2030**

here, $_nP_x$ is the projected population and $_nm_x$ is the projected age specific death rate.

Number of deaths and its distribution is presented in broad age groups: 0-4, 5-14, 15-39. 39-49, 50-59, 60+, 0-14 and 15-59.

## Results

### Probability of dying: 1991, 2001 and 2009

Table 1 presents the estimated probability of death for various age groups; 0-5, 15-34, 15-49, 15-59, 30-69, 60-79, 15-39 and 40-59. In each age group, the probability of death has declined from 1991 to 2009 in India and selected states. In India, the probability of death for adults (45q15) has declined from 27% in 1991 to 23% in 2009 for male whereas 22% in 1991 to 15%for female. This indicates that one male out of every four male and one female out of every five female of fifteen year old die before reaching age sixty in 2009. Probability of dying is consistently higher in the age group 15-59 as compared to other subcategories of children and adults, for both male and female. The risk of dying for adults ($_{45}q_{15}$) is two to four times higher than children ($_5q_0$) for male and is two times higher for female. Figure 5-6 shows the comparative level and trend of probability of dying among adults and children. Among adults, the probability of death is significantly higher for the age group 40-60 as compared to 15 to 39 years. The state differentials in mortality level are stark. The probability of death in Kerala is lower than that of Maharashtra and Uttar Pradesh for both children and adults. During 1991-2009, the probability of death in Kerala has declined from 22% to 18%

for male and from 11% to 1%for female. In case of Uttar Pradesh, it has reduced from 29% to 24%for male and from 25%to 17% for female during the same time period.

**Table 1: Probability of dying, India and selected states**

| Age Group | 1991 | | 2001 | | 2009 | |
|---|---|---|---|---|---|---|
| | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** |
| | | | **India** | | | |
| $_5q_0$ | 0.109 | 0.120 | 0.083 | 0.091 | 0.061 | 0.068 |
| $_{20}q_{15}$ | 0.049 | 0.057 | 0.047 | 0.047 | 0.041 | 0.035 |
| $_{35}q_{15}$ | 0.133 | 0.119 | 0.128 | 0.101 | 0.119 | 0.079 |
| $_{45}q_{15}$ | **0.269** | **0.218** | **0.252** | **0.188** | **0.227** | **0.149** |
| $_{40}q_{30}$ | 0.491 | 0.404 | 0.457 | 0.352 | 0.426 | 0.307 |
| $_{20}q_{60}$ | 0.828 | 0.798 | 0.661 | 0.581 | 0.654 | 0.568 |
| $_{25}q_{15}$ | 0.068 | 0.073 | 0.068 | 0.062 | 0.062 | 0.046 |
| $_{20}q_{40}$ | 0.216 | 0.156 | 0.197 | 0.135 | 0.177 | 0.108 |
| | | | **Kerala** | | | |
| $_5q_0$ | 0.023 | 0.017 | 0.014 | 0.013 | 0.012 | 0.015 |
| $_{20}q_{15}$ | 0.032 | 0.019 | 0.027 | 0.016 | 0.025 | 0.014 |
| $_{35}q_{15}$ | 0.102 | 0.054 | 0.088 | 0.045 | 0.083 | 0.039 |
| $_{45}q_{15}$ | **0.219** | **0.106** | **0.192** | **0.096** | **0.177** | **0.080** |
| $_{40}q_{30}$ | 0.413 | 0.233 | 0.394 | 0.219 | 0.349 | 0.187 |
| $_{20}q_{60}$ | 0.853 | 0.844 | 0.640 | 0.483 | 0.595 | 0.422 |
| $_{25}q_{15}$ | 0.049 | 0.027 | 0.041 | 0.024 | 0.037 | 0.020 |
| $_{20}q_{40}$ | 0.179 | 0.080 | 0.157 | 0.074 | 0.145 | 0.061 |
| | | | **Maharashtra** | | | |
| $_5q_0$ | 0.073 | 0.075 | 0.053 | 0.057 | 0.032 | 0.034 |
| $_{20}q_{15}$ | 0.041 | 0.044 | 0.047 | 0.036 | 0.033 | 0.024 |
| $_{35}q_{15}$ | 0.115 | 0.096 | 0.134 | 0.091 | 0.107 | 0.059 |
| $_{45}q_{15}$ | **0.240** | **0.185** | **0.237** | **0.170** | **0.214** | **0.124** |
| $_{40}q_{30}$ | 0.454 | 0.356 | 0.446 | 0.325 | 0.393 | 0.273 |
| $_{20}q_{60}$ | 0.823 | 0.803 | 0.661 | 0.588 | 0.610 | 0.530 |
| $_{25}q_{15}$ | 0.057 | 0.059 | 0.070 | 0.050 | 0.054 | 0.350 |
| $_{20}q_{40}$ | 0.194 | 0.134 | 0.180 | 0.126 | 0.169 | 0.093 |
| | | | **Uttar Pradesh** | | | |
| $_5q_0$ | 0.139 | 0.170 | 0.108 | 0.126 | 0.084 | 0.099 |
| $_{20}q_{15}$ | 0.054 | 0.072 | 0.053 | 0.072 | 0.045 | 0.046 |
| $_{35}q_{15}$ | 0.147 | 0.142 | 0.139 | 0.139 | 0.130 | 0.098 |
| $_{45}q_{15}$ | **0.287** | **0.248** | **0.260** | **0.231** | **0.243** | **0.174** |
| $_{40}q_{30}$ | 0.503 | 0.437 | 0.460 | 0.389 | 0.466 | 0.339 |
| $_{20}q_{60}$ | 0.801 | 0.786 | 0.663 | 0.588 | 0.703 | 0.616 |
| $_{25}q_{15}$ | 0.074 | 0.092 | 0.076 | 0.094 | 0.068 | 0.061 |
| $_{20}q_{40}$ | 0.23 | 0.172 | 0.199 | 0.151 | 0.188 | 0.12 |

**Figure 1: Probability of death among children, young adult, old adult and adult, Male, India, 1991-2009**

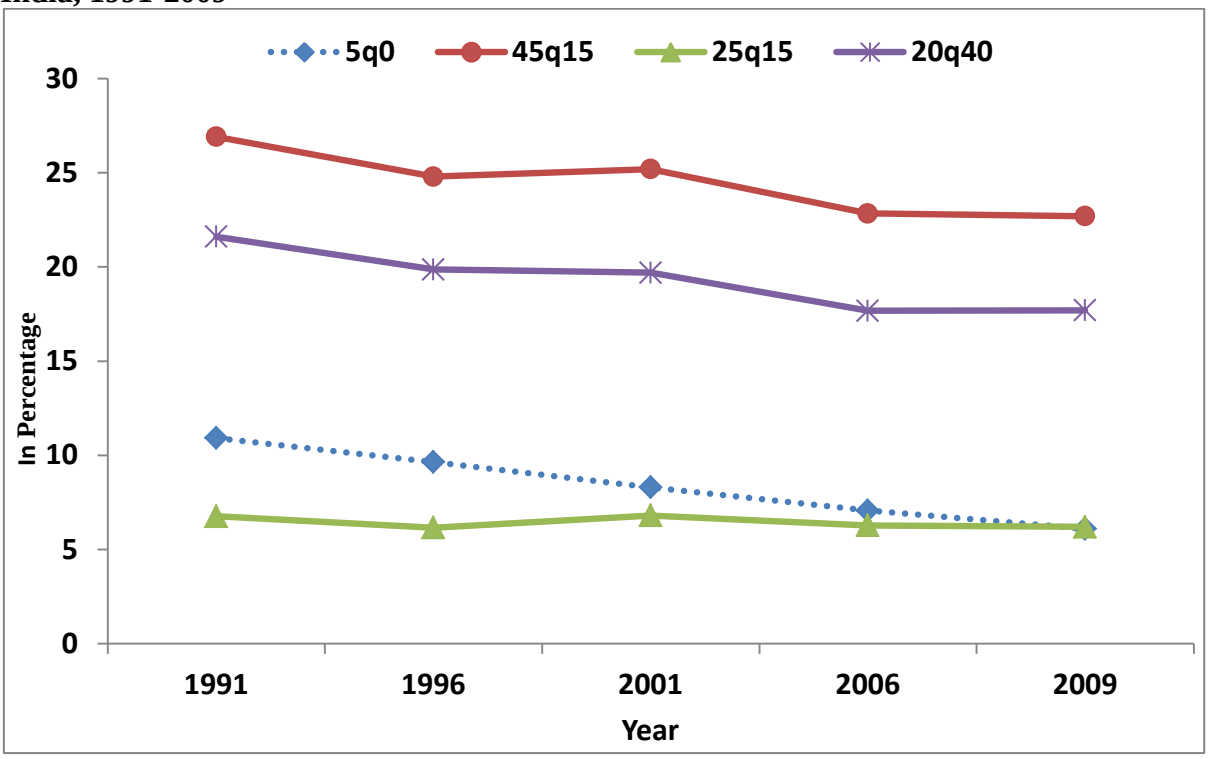
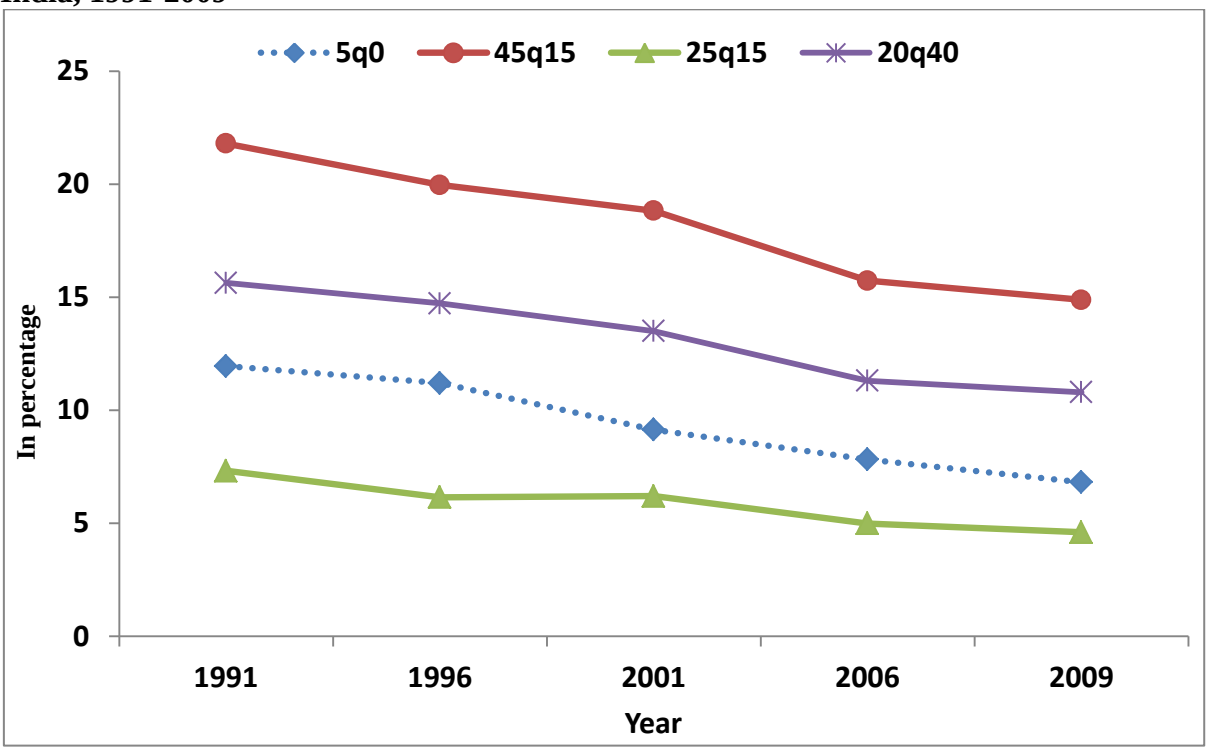



**Figure 2: Probability of death among children, young adult, old adult and adult, Female, India, 1991-2009**



Different types of trend/regression lines were calculated to assess which achieve the best fit to the relation between age and probability of dying. Goodness of fit was determined with the value of coefficient of determination $R^2$. Range of $R^2$ is 0 to 1; value of 1 indicates that the regression line perfectly fits the data points. As the ASDR was available till age 85, we have forecasted till 100 years. We found that the exponential equation best explained the relationship with highest $R^2$ value for India and states. So, the exponential equation is fitted to find out the probability of death at each age starting with 15 years to the point when probability of death reaches to one, for both male and female in 2009. The probability of death for adults and elderly in 2009 is shown graphically, for each five year age groups by sex (Figure 3-6). From these graphs, gender differentials in the probability of death are clearly observed after age 35 years. In 2009, the probability of death reached unity at the age of 90 years for male and 95.5 years for female, in India and states.

**Figure 3: Probability of dying by age and sex, India, 2009**

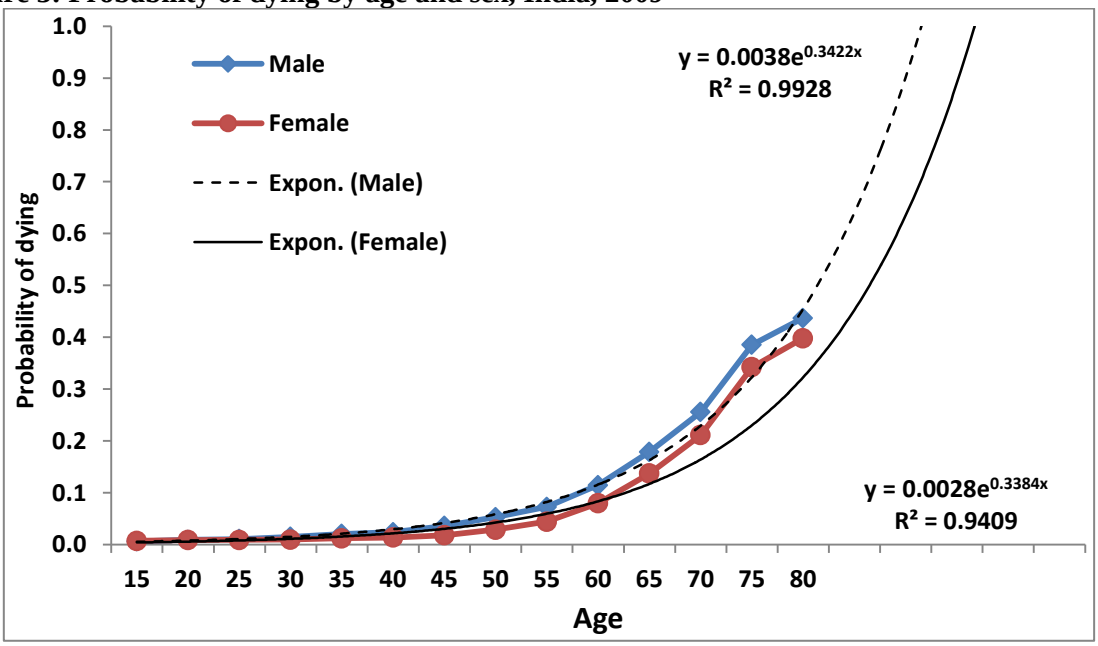


**Figure 4: Probability of dying by age and sex, Kerala, 2009**

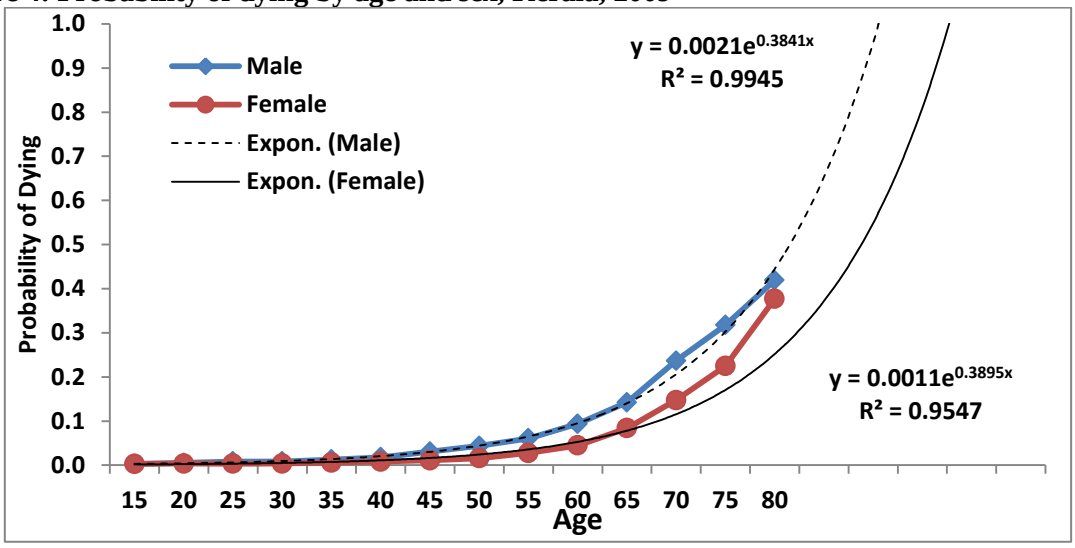



**Figure 5: Probability of dying by age and sex, Maharashtra, 2009**

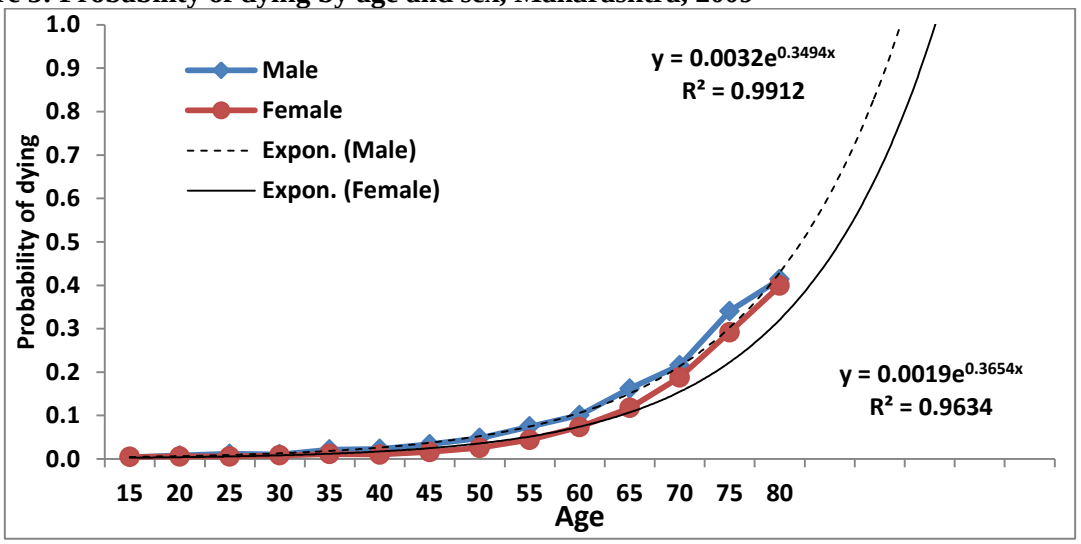
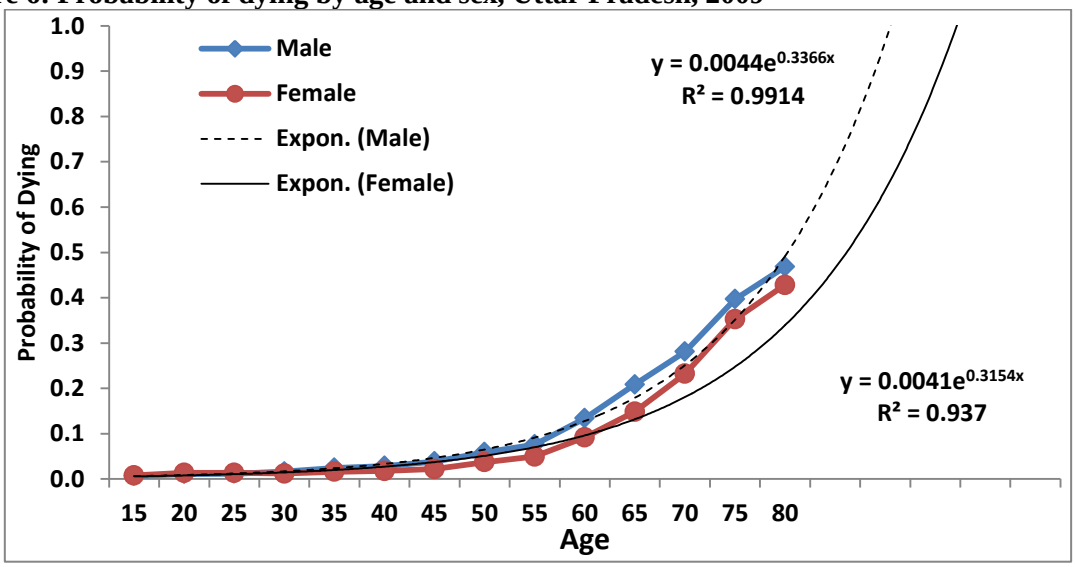



**Figure 6: Probability of dying by age and sex, Uttar Pradesh, 2009**



**Distribution of deaths by age and sex: 1991-2030**

Table 2-5 and figure 7 shows the actual number of deaths and projected deaths under fixed and varying mortality scenario in India and selected states. In 1991, the observed number of deaths was 8.2 million of which 2.2 million (accounting 27%) were among adults. By 2011, we noticed both increase in absolute and adults deaths. The absolute number of total deaths had increased to 7.5 million by 2001 and 8.6 million by 2011. The number of adults deaths had increased to 2.5 million (33 % of total deaths) in 2001 and 2.6 million (30% of total deaths) in 2011. The distribution deaths suggest that the share of adult deaths has increased from 27% in 1991 to 33 % by 2001 and reduced by 30% by 2011. On the other hand, under-five mortality had declined from 2.9 million (35%) in 1991 to 1.5 million (17%) in 2011. The projected deaths for India under constant and varying mortality scenario are also shown in table 2.2. Results indicate that deaths in constant mortality scenario are higher than in varying mortality scenario. By 2030, the absolute number of deaths will be 13.2 million under constant scenario and 9.3 million under varying scenario. The absolute number of adult deaths is likely to increase under both the scenario. Under the varying scenario, the absolute number of adult deaths will be 2.9 million by 2016, 3.2 million by 2021 and 3.8 million by 2030 whereas, under varying scenario, it will be 2.6 million by 2016 and remains almost/ approximately similar by 2030.

The gender differential in mortality is significant. The absolute number of male deaths is higher than that of female in all adult age group. Future projection also indicates the similar pattern of mortality differentials under both scenarios.

The age distribution of deaths is gradually changing. During 1991 to 2011, the deaths at base level have reduced significantly while that of adults remained similar. By 2030, the child deaths (0-4) will be 1.3 million under constant scenario and 0.6 million under varying scenario.

There are considerable interstate differentials in the distribution of death by age. Kerala has lowest level of mortality at all ages followed by Maharashtra and Uttar Pradesh, though the pattern is similar. In Kerala, number of deaths among adults had increased from 0.05 million in 1991 to 0.055 million in 2011 and it is projected to become 0.064 million under constant mortality scenario and 0.046 million under varying scenario. In Maharashtra, there were 0.18 million deaths in 1991, 0.22 million in 2011 and would be 0.3 million under constant scenario and 0.18 million under varying scenario in the adult age group, by 2030. In Uttar Pradesh, number of deaths among adults has remained approximately constant at a level of 0.4 million from 1991 to 2011 and also by 2030, under varying scenario.

State wise analysis also shows remarkable gender differences in the level and prospects of adult mortality. Male mortality in adult ages is higher than that of female which is consistent with the result shown in table 1 e.g. probability of death 45q15 is more for male than female.

We have presented the distribution of deaths by using the pyramid for the year 1991, 2011 and 2030 under varying mortality scenario (Figure 8; Appendix G, H, and I). It depicts that there is an upward shift in the mortality. Concentration of deaths has gradually declined in childhood ages and gets accumulated in adult and old ages, which results into the short base and large top pyramid by 2030. Kerala, Maharashtra and Uttar Pradesh follow the same pattern though the magnitude is different.

**Table 2: Trend and prospects in deaths (in 000's) by age and sex, India**

| Age group | Actual Deaths | | | | | Projected Deaths | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Constant mortality scenario | | | | Varying mortality scenario | | | |
| | **1991** | **1996** | **2001** | **2006** | **2011** | **2016** | **2021** | **2026** | **2030** | **2016** | **2021** | **2026** | **2030** |
| **Person** | | | | | | | | | | | | | |
| 0-4 | 2913 | 2525 | 2292 | 1909 | 1466 | 1537 | 1475 | 1391 | 1321 | 1252 | 977 | 747 | 598 |
| 5-14 | 428 | 425 | 352 | 315 | 210 | 212 | 213 | 211 | 203 | 184 | 154 | 127 | 105 |
| 15-39 | 956 | 968 | 1093 | 1045 | 1027 | 1102 | 1175 | 1220 | 1235 | 985 | 959 | 911 | 858 |
| 40-49 | 496 | 515 | 563 | 565 | 637 | 706 | 778 | 882 | 975 | 620 | 628 | 654 | 674 |
| 50-59 | 773 | 771 | 837 | 858 | 941 | 1072 | 1291 | 1453 | 1572 | 956 | 1052 | 1080 | 1084 |
| 60+ | 2691 | 3174 | 2408 | 3622 | 4293 | 4919 | 5838 | 6943 | 7906 | 4489 | 5009 | 5592 | 6034 |
| 0-14 | 3341 | 2950 | 2644 | 2224 | 1676 | 1749 | 1688 | 1602 | 1525 | 1436 | 1131 | 873 | 703 |
| **15-59** | **2225** | **2254** | **2492** | **2468** | **2605** | **2880** | **3243** | **3555** | **3783** | **2561** | **2639** | **2645** | **2616** |
| All ages | 8258 | 8378 | 7545 | 8313 | 8575 | 9549 | 10770 | 12099 | 13213 | 8487 | 8780 | 9110 | 9353 |
| **Male** | | | | | | | | | | | | | |
| 0-4 | 1416 | 1241 | 1125 | 945 | 746 | 776 | 745 | 703 | 669 | 653 | 498 | 370 | 289 |
| 5-14 | 204 | 198 | 175 | 160 | 113 | 113 | 114 | 113 | 109 | 97 | 80 | 65 | 53 |
| 15-39 | 466 | 481 | 579 | 590 | 601 | 653 | 703 | 739 | 753 | 595 | 596 | 582 | 559 |
| 40-49 | 305 | 322 | 361 | 378 | 426 | 465 | 512 | 581 | 643 | 419 | 428 | 450 | 467 |
| 50-59 | 476 | 455 | 514 | 522 | 586 | 711 | 823 | 915 | 989 | 647 | 689 | 702 | 706 |
| 60+ | 1519 | 1688 | 1783 | 2031 | 2375 | 2671 | 3155 | 3766 | 4367 | 2467 | 2736 | 3058 | 3361 |
| 0-14 | 1620 | 1439 | 1299 | 1105 | 858 | 889 | 859 | 816 | 777 | 750 | 579 | 435 | 341 |
| **15-59** | **1248** | **1258** | **1455** | **1489** | **1612** | **1829** | **2038** | **2235** | **2384** | **1661** | **1713** | **1735** | **1732** |
| All ages | 4388 | 4385 | 4538 | 4626 | 4846 | 5389 | 6052 | 6817 | 7528 | 4878 | 5028 | 5228 | 5434 |
| **Female** | | | | | | | | | | | | | |
| 0-4 | 1497 | 1270 | 1169 | 910 | 721 | 761 | 730 | 687 | 653 | 599 | 479 | 376 | 309 |
| 5-14 | 225 | 221 | 179 | 155 | 97 | 98 | 99 | 98 | 95 | 87 | 74 | 62 | 52 |
| 15-39 | 492 | 474 | 516 | 459 | 426 | 449 | 472 | 481 | 483 | 391 | 364 | 329 | 299 |
| 40-49 | 188 | 192 | 202 | 184 | 212 | 240 | 266 | 301 | 332 | 202 | 200 | 204 | 206 |
| 50-59 | 299 | 313 | 323 | 335 | 355 | 362 | 468 | 538 | 583 | 308 | 362 | 378 | 378 |
| 60+ | 1186 | 1439 | 1098 | 1737 | 1918 | 2248 | 2683 | 3177 | 3539 | 2023 | 2273 | 2534 | 2674 |
| 0-14 | 1722 | 1491 | 1348 | 1065 | 818 | 860 | 829 | 786 | 747 | 686 | 553 | 438 | 361 |
| **15-59** | **979** | **979** | **1041** | **978** | **993** | **1051** | **1205** | **1320** | **1398** | **901** | **926** | **910** | **884** |
| All ages | 3887 | 3909 | 3487 | 3780 | 3729 | 4159 | 4717 | 5283 | 5685 | 3609 | 3752 | 3883 | 3919 |

**Table 3: Trend and prospects in distribution of deaths (in 000's) by age and sex, Kerala**

| Age group | Actual Deaths | | | | | Projected death | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Constant mortality scenario | | | | Varying mortality scenario | | | |
| | 1991 | 1996 | 2001 | 2006 | 2011 | 2016 | 2021 | 2026 | 2030 | 2016 | 2021 | 2026 | 2030 |
| **Person** | | | | | | | | | | | | | |
| 0-4 | 12 | 10 | 7 | 8 | 6 | 6 | 5 | 5 | 5 | 3 | 2 | 2 | 1 |
| 5-14 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 15-39 | 18 | 15 | 17 | 15 | 13 | 14 | 14 | 14 | 14 | 11 | 11 | 10 | 9 |
| 40-49 | 12 | 13 | 14 | 12 | 14 | 15 | 15 | 15 | 15 | 12 | 11 | 11 | 10 |
| 50-59 | 20 | 20 | 23 | 25 | 28 | 30 | 33 | 34 | 34 | 27 | 28 | 28 | 26 |
| 60+ | 125 | 125 | 156 | 153 | 163 | 194 | 232 | 276 | 311 | 180 | 205 | 233 | 252 |
| 0-14 | 15 | 13 | 10 | 10 | 7 | 7 | 6 | 6 | 6 | 4 | 3 | 2 | 2 |
| **15-59** | **50** | **48** | **54** | **52** | **55** | **58** | **62** | **63** | **64** | **51** | **50** | **48** | **46** |
| All ages | 190 | 186 | 219 | 215 | 225 | 259 | 300 | 346 | 381 | 234 | 258 | 283 | 300 |
| **Male** | | | | | | | | | | | | | |
| 0-4 | 7 | 12 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 |
| 5-14 | 2 | 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 15-39 | 12 | 20 | 10 | 9 | 9 | 9 | 10 | 10 | 10 | 8 | 8 | 8 | 8 |
| 40-49 | 8 | 19 | 10 | 9 | 10 | 10 | 10 | 10 | 11 | 9 | 9 | 9 | 8 |
| 50-59 | 14 | 31 | 15 | 19 | 19 | 21 | 23 | 23 | 23 | 21 | 21 | 21 | 21 |
| 60+ | 65 | 150 | 41 | 80 | 88 | 107 | 129 | 153 | 172 | 106 | 124 | 143 | 158 |
| 0-14 | 9 | 16 | 5 | 5 | 4 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 |
| **15-59** | **34** | **71** | **35** | **37** | **38** | **40** | **42** | **43** | **44** | **38** | **38** | **37** | **37** |
| All ages | 107 | 237 | 81 | 121 | 130 | 150 | 175 | 200 | 219 | 146 | 164 | 182 | 195 |
| **Female** | | | | | | | | | | | | | |
| 0-4 | 5 | 5 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 0 |
| 5-14 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15-39 | 7 | 6 | 7 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 2 | 2 |
| 40-49 | 4 | 4 | 4 | 3 | 4 | 5 | 5 | 5 | 5 | 3 | 2 | 2 | 2 |
| 50-59 | 6 | 6 | 7 | 6 | 8 | 9 | 11 | 11 | 11 | 7 | 7 | 6 | 6 |
| 60+ | 60 | 55 | 36 | 75 | 75 | 87 | 103 | 123 | 139 | 74 | 81 | 90 | 94 |
| 0-14 | 6 | 6 | 4 | 5 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 |
| **15-59** | **17** | **16** | **18** | **15** | **17** | **18** | **20** | **20** | **20** | **13** | **12** | **11** | **9** |
| All ages | 83 | 78 | 59 | 95 | 95 | 108 | 126 | 146 | 162 | 88 | 94 | 101 | 104 |

**Table 4: Trend and prospects in distribution of deaths (in 000's) by age and sex, Maharashtra**

| Age group | Actual Deaths | | | | | Projected Deaths | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Constant mortality scenario | | | | Varying mortality scenario | | | |
| | 1991 | 1996 | 2001 | 2006 | 2011 | 2016 | 2021 | 2026 | 2030 | 2016 | 2021 | 2026 | 2030 |
| **Person** | | | | | | | | | | | | | |
| 0-4 | 162 | 134 | 107 | 84 | 58 | 48 | 47 | 46 | 46 | 35 | 24 | 16 | 12 |
| 5-14 | 23 | 20 | 21 | 16 | 9 | 8 | 8 | 7 | 7 | 6 | 4 | 3 | 2 |
| 15-39 | 74 | 75 | 98 | 91 | 84 | 88 | 92 | 92 | 89 | 75 | 71 | 65 | 60 |
| 40-49 | 41 | 47 | 58 | 51 | 56 | 63 | 69 | 77 | 84 | 52 | 51 | 50 | 50 |
| 50-59 | 67 | 67 | 68 | 78 | 77 | 88 | 104 | 117 | 125 | 78 | 79 | 77 | 74 |
| 60+ | 247 | 305 | 368 | 382 | 430 | 509 | 589 | 684 | 772 | 449 | 468 | 489 | 503 |
| 0-14 | 185 | 154 | 128 | 100 | 67 | 56 | 54 | 53 | 53 | 41 | 28 | 19 | 14 |
| **15-59** | **182** | **189** | **223** | **221** | **217** | **239** | **264** | **285** | **298** | **204** | **201** | **193** | **183** |
| All ages | 614 | 648 | 720 | 702 | 713 | 804 | 907 | 1023 | 1123 | 695 | 698 | 701 | 700 |
| **Male** | | | | | | | | | | | | | |
| 0-4 | 81 | 70 | 53 | 45 | 31 | 25 | 24 | 24 | 24 | 19 | 13 | 9 | 7 |
| 5-14 | 10 | 10 | 12 | 9 | 5 | 4 | 4 | 4 | 4 | 4 | 3 | 2 | 1 |
| 15-39 | 37 | 41 | 58 | 59 | 54 | 58 | 61 | 61 | 60 | 52 | 52 | 50 | 48 |
| 40-49 | 26 | 33 | 38 | 37 | 38 | 42 | 46 | 52 | 56 | 38 | 38 | 39 | 40 |
| 50-59 | 41 | 43 | 41 | 50 | 49 | 59 | 68 | 76 | 82 | 53 | 53 | 53 | 51 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60+ | 137 | 162 | 191 | 192 | 235 | 271 | 312 | 362 | 413 | 244 | 257 | 271 | 285 |
| 0-14 | 91 | 80 | 65 | 53 | 36 | 29 | 28 | 28 | 27 | 23 | 16 | 11 | 8 |
| **15-59** | **105** | **116** | **137** | **146** | **141** | **159** | **175** | **189** | **198** | **142** | **144** | **142** | **139** |
| All ages | 332 | 359 | 393 | 391 | 412 | 459 | 515 | 579 | 639 | 409 | 416 | 424 | 431 |
| **Female** | | | | | | | | | | | | | |
| 0-4 | 82 | 64 | 55 | 39 | 28 | 23 | 23 | 22 | 22 | 16 | 11 | 7 | 5 |
| 5-14 | 13 | 10 | 9 | 7 | 4 | 4 | 4 | 3 | 3 | 3 | 2 | 1 | 1 |
| 15-39 | 37 | 34 | 39 | 32 | 30 | 30 | 31 | 31 | 29 | 23 | 19 | 15 | 12 |
| 40-49 | 15 | 15 | 20 | 15 | 18 | 21 | 23 | 25 | 28 | 14 | 12 | 11 | 10 |
| 50-59 | 26 | 25 | 28 | 29 | 28 | 29 | 36 | 41 | 43 | 25 | 26 | 25 | 22 |
| 60+ | 112 | 146 | 169 | 179 | 194 | 238 | 276 | 322 | 359 | 205 | 212 | 218 | 218 |
| 0-14 | 94 | 74 | 64 | 46 | 32 | 27 | 26 | 25 | 25 | 19 | 12 | 8 | 6 |
| **15-59** | **78** | **73** | **87** | **76** | **75** | **80** | **89** | **97** | **100** | **62** | **57** | **51** | **44** |
| All ages | 284 | 293 | 320 | 301 | 301 | 345 | 392 | 444 | 484 | 286 | 281 | 277 | 268 |

**Table 5: Trend and prospects in distribution of deaths (in 000's) by age and sex, Uttar Pradesh**

| **Age group** | **Actual Deaths** | | | | | **Projected deaths** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Constant mortality scenario** | | | | **Varying mortality** | | | |
| | **1991** | **1996** | **2001** | **2006** | **2011** | **2016** | **2021** | **2026** | **2030** | **2016** | **2021** | **2026** | **2030** |
| **Person** | | | | | | | | | | | | | |
| 0-4 | 750 | 605 | 610 | 508 | 393 | 462 | 491 | 485 | 454 | 332 | 255 | 179 | 125 |
| 5-14 | 101 | 89 | 82 | 72 | 52 | 52 | 56 | 61 | 62 | 39 | 32 | 26 | 20 |
| 15-39 | 173 | 170 | 212 | 188 | 195 | 219 | 246 | 267 | 278 | 207 | 211 | 209 | 202 |
| 40-49 | 88 | 78 | 89 | 85 | 101 | 116 | 130 | 155 | 185 | 95 | 95 | 100 | 107 |
| 50-59 | 135 | 122 | 128 | 123 | 147 | 166 | 206 | 237 | 261 | 128 | 139 | 137 | 133 |
| 60+ | 439 | 504 | 443 | 594 | 659 | 723 | 840 | 987 | 1118 | 639 | 691 | 748 | 786 |
| 0-14 | 850 | 694 | 692 | 580 | 444 | 513 | 547 | 546 | 516 | 371 | 287 | 204 | 145 |
| **15-59** | **396** | **370** | **428** | **397** | **443** | **501** | **582** | **659** | **723** | **430** | **444** | **446** | **443** |
| All ages | 1685 | 1567 | 1564 | 1571 | 1546 | 1738 | 1969 | 2192 | 2358 | 1440 | 1422 | 1398 | 1373 |
| **Male** | | | | | | | | | | | | | |
| 0-4 | 346 | 287 | 294 | 250 | 203 | 237 | 252 | 249 | 233 | 197 | 160 | 118 | 86 |
| 5-14 | 76 | 40 | 36 | 36 | 27 | 27 | 29 | 32 | 32 | 22 | 19 | 16 | 13 |
| 15-39 | 80 | 79 | 97 | 100 | 108 | 123 | 140 | 154 | 161 | 127 | 139 | 149 | 151 |
| 40-49 | 56 | 47 | 55 | 53 | **68** | 77 | 87 | 104 | 126 | 63 | 64 | 71 | 78 |
| 50-59 | 84 | 68 | 76 | 74 | 92 | 109 | 131 | 149 | 163 | 87 | 93 | 93 | 92 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60+ | 264 | 284 | 266 | 326 | 385 | 419 | 481 | 561 | 645 | 374 | 406 | 446 | 485 |
| 0-14 | 422 | 327 | 330 | 286 | 230 | 264 | 281 | 281 | 265 | 220 | 179 | 134 | 99 |
| **15-59** | **220** | **193** | **228** | **227** | **268** | **310** | **357** | **407** | **450** | **276** | **296** | **312** | **321** |
| All ages | 906 | 805 | 824 | 839 | 883 | 993 | 1119 | 1249 | 1360 | 870 | 881 | 892 | 906 |
| **Female** | | | | | | | | | | | | | |
| 0-4 | 405 | 318 | 318 | 259 | 189 | 224 | 239 | 236 | 221 | 134 | 95 | 61 | 39 |
| 5-14 | 55 | 48 | 46 | 37 | 25 | 25 | 27 | 29 | 30 | 17 | 13 | 9 | 7 |
| 15-39 | 94 | 91 | 116 | 89 | 87 | 96 | 106 | 113 | 117 | 80 | 71 | 60 | 51 |
| 40-49 | 33 | 31 | 34 | 32 | 33 | 39 | 43 | 50 | 59 | 32 | 30 | 29 | 29 |
| 50-59 | 52 | 53 | 52 | 49 | 55 | 57 | 75 | 88 | 98 | 42 | 46 | 45 | 42 |
| 60+ | 177 | 215 | 182 | 259 | 274 | 304 | 360 | 425 | 473 | 265 | 285 | 302 | 300 |
| 0-14 | 460 | 365 | 364 | 295 | 214 | 249 | 266 | 266 | 251 | 151 | 108 | 70 | 46 |
| **15-59** | **179** | **175** | **202** | **170** | **175** | **191** | **225** | **252** | **274** | **154** | **148** | **134** | **121** |
| All ages | 816 | 756 | 748 | 724 | 663 | 744 | 850 | 943 | 997 | 570 | 541 | 506 | 467 |

**Figure 7: Estimated and projected number of deaths (in 000's), India and selected states, 1991-2030**

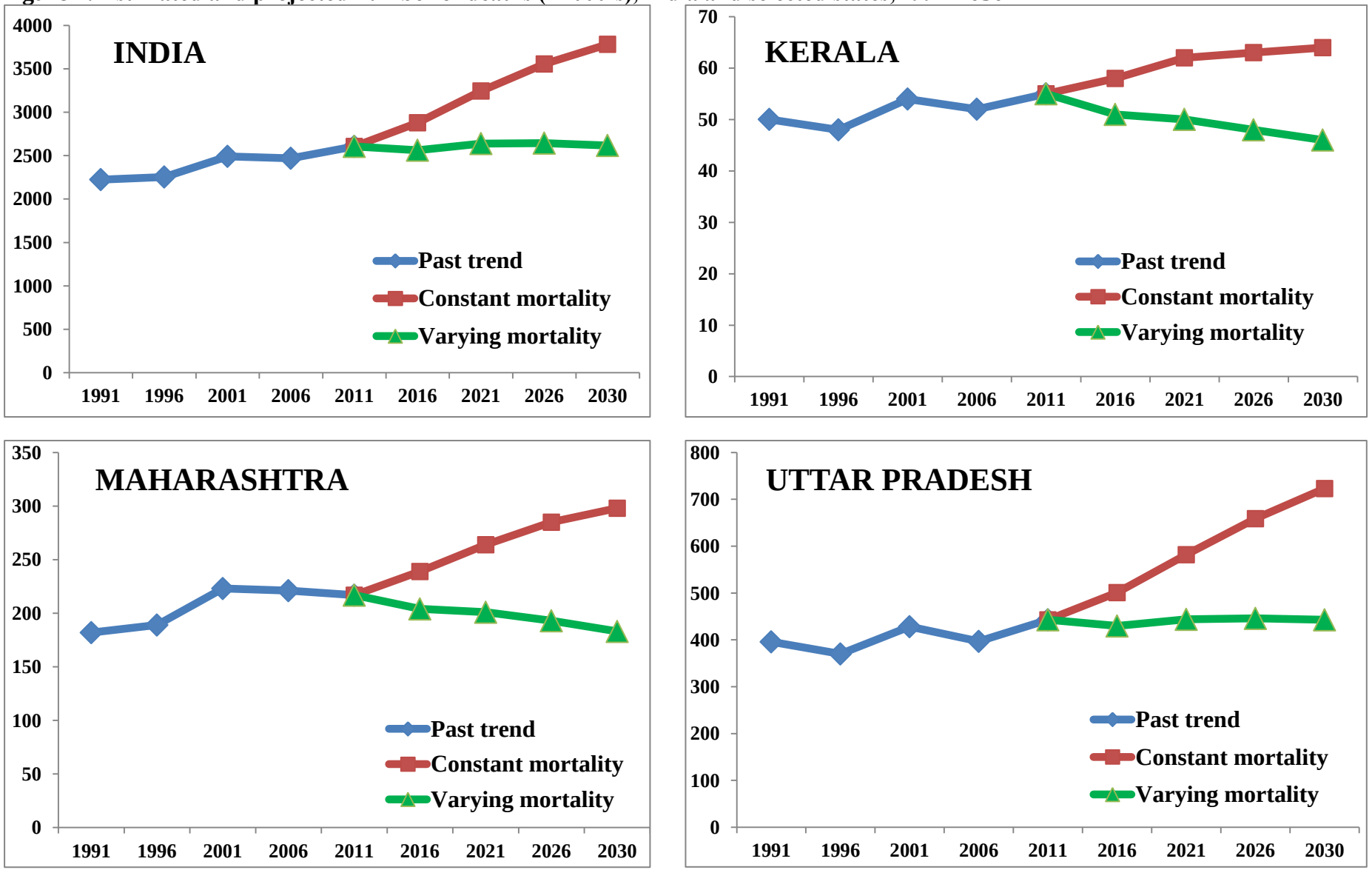
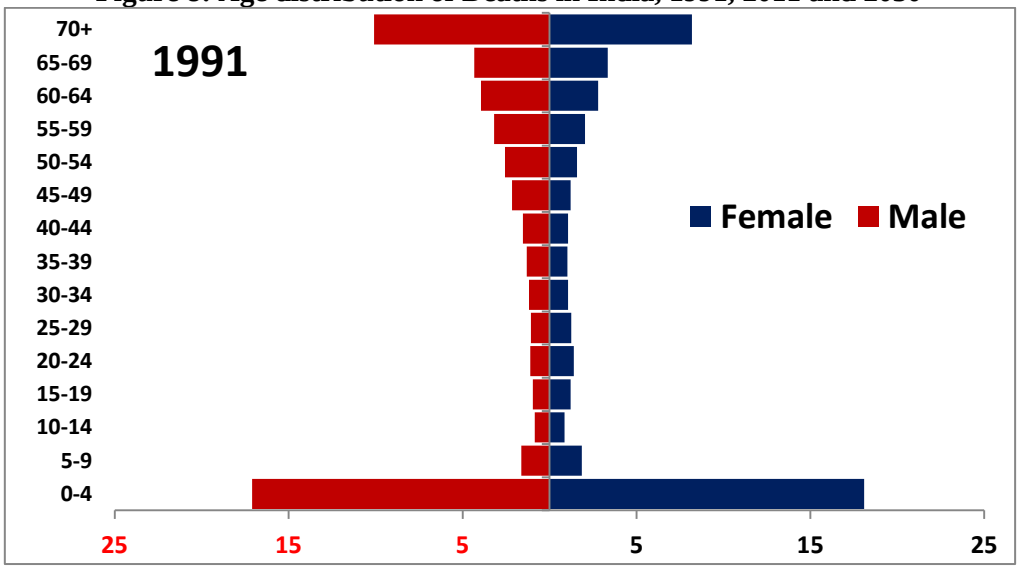
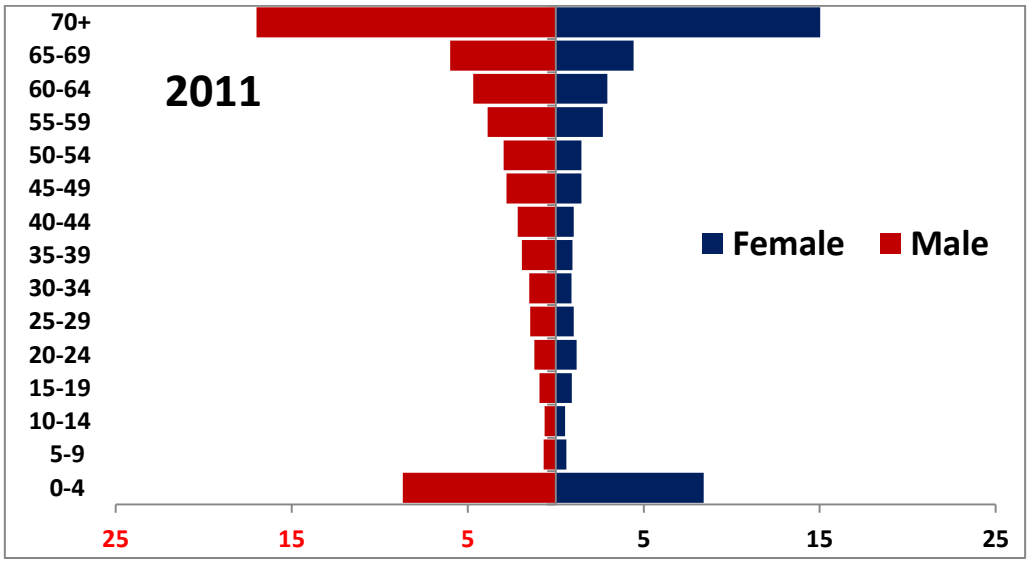


**Figure 8: Age distribution of Deaths in India, 1991, 2011 and 2030**



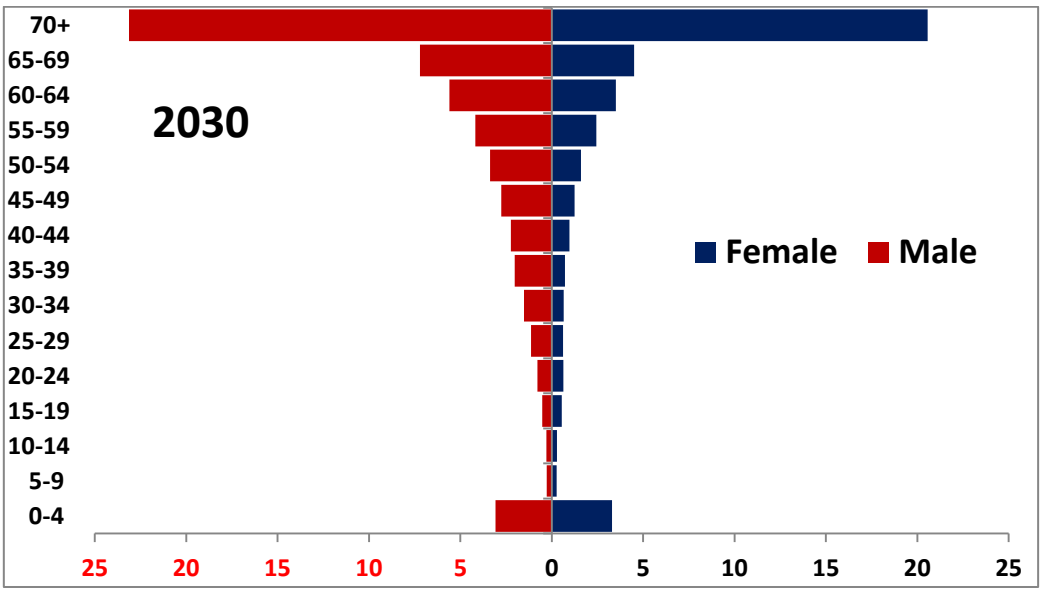



**Table 6: Decomposition analysis of the change in number of deaths from 1991 to 2011 into total population growth, population ageing and changes in age specific death rates, India**

| | All Causes | | | |
|---|---|---|---|---|
| | **Total** | **15-59** | **0-4** | **0-14** |
| **1991 deaths** | 8258 | 2225 | 2913 | 3341 |
| **Expected deaths with 2011 pop, 1991 pop age structure, 1991 death rates** | 11917 | 3212 | 4204 | 4821 |
| **Expected deaths with 2011 pop, 2011 pop age structure, 1991 death rates** | 12713 | 3683 | 3105 | 3588 |
| **2011 deaths** | 8575 | 2605 | 1466 | 1676 |
| **Percentage change from 1991 due to population growth** | 44.3 | 44.4 | 44.3 | 44.3 |
| **Percentage change from 1991 due to population ageing** | 9.6 | 21.2 | -37.7 | -36.9 |
| **Percentage change from 1991 due to change in death rates** | -50.1 | -48.4 | -56.3 | -57.2 |
| **Percentage change from 1991 to 2011** | 3.8 | 17.1 | -49.7 | -49.8 |

Table 6 decomposes the trends into the contribution of total increase in population size, ageing of the population, and changes in age specific death rates. Population growth in India alone would have been expected to increase total deaths and adult deaths by 44.3 % from 1990 to 2011. Ageing of the Indian population contributed to 9.4 % increase in the total number of deaths from 1991 to 2011 and 21.2 % in the adult age group. Decline in age specific death rates accounts for 48.4 % decrease in adult deaths during the same period.

**Conclusions:**

Some important conclusions that could be drawn from this chapter are:

1. During 1991-2009, probability of dying has declined across the age group for both male and female. But it remains high in adult age group (15-59).
2. Probability of dying is relatively higher for male than their counterparts. Among the study states, regional variations had been observed with highest probability of dying in Uttar Pradesh and lowest in Kerala.
3. In India, number of deaths in adult ages had increased from 2.2 million in 1991 to 2.6 million in 2011 and remained similar by 2030 under varying mortality scenario. But it is expected to increase by 3.8 million under the constant mortality scenario. Similar

pattern is observed in Kerala, Maharashtra and Uttar Pradesh, though the level is different.

4. The gender differential in mortality is significant. The absolute number of male deaths is higher than that of female in all adult age group. Future projection also indicates the similar pattern of mortality differentials under both scenarios.
5. The age distribution of deaths is gradually changing from the large base and the short top to the small base and the large top.

**Appendix**

**Table B: Interpolated LEB using Mortpak, India, 2009-2030**

| Year | Male | Female | Year | Male | Female |
|---|---|---|---|---|---|
| 2009 | 64.6 | 67.7 | 2019 | 68.1 | 70.9 |
| 2010 | 64.9 | 68.0 | 2020 | 68.4 | 71.3 |
| 2011 | 65.3 | 68.3 | 2021 | 68.8 | 71.6 |
| 2012 | 65.6 | 68.7 | 2022 | 69.1 | 71.9 |
| 2013 | 66.0 | 69.0 | 2023 | 69.5 | 72.2 |
| 2014 | 66.3 | 69.3 | 2024 | 69.8 | 72.6 |
| 2015 | 66.7 | 69.6 | 2025 | 70.2 | 72.9 |
| 2016 | 67.0 | 70.0 | 2026 | 70.5 | 73.2 |
| 2017 | 67.4 | 70.3 | 2027 | 70.9 | 73.5 |
| 2018 | 67.7 | 70.6 | 2028 | 71.2 | 73.9 |
| 2019 | 68.1 | 70.9 | 2029 | 71.6 | 74.2 |
| 2020 | 68.4 | 71.3 | 2030 | 71.9 | 74.5 |

**Table C: Projected ASDR, India, 2016-2030**

| Age Group | 2016 | | 2021 | | 2026 | | 2030 | |
|---|---|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female | Male | Female |
| **0-4** | 10.13 | 10.17 | 8.05 | 8.49 | 6.34 | 7.08 | 5.20 | 6.12 |
| **5-9** | 0.85 | 0.83 | 0.67 | 0.68 | 0.53 | 0.55 | 0.43 | 0.47 |
| **10-14** | 0.70 | 0.69 | 0.60 | 0.60 | 0.51 | 0.53 | 0.45 | 0.48 |
| **15-19** | 1.07 | 1.20 | 0.96 | 1.08 | 0.85 | 0.97 | 0.77 | 0.88 |
| **20-24** | 1.56 | 1.50 | 1.42 | 1.33 | 1.28 | 1.18 | 1.18 | 1.08 |
| **25-29** | 2.04 | 1.44 | 1.91 | 1.28 | 1.79 | 1.13 | 1.69 | 1.02 |
| **30-34** | 2.59 | 1.46 | 2.43 | 1.28 | 2.27 | 1.13 | 2.15 | 1.02 |
| **35-39** | 3.45 | 1.71 | 3.26 | 1.51 | 3.08 | 1.34 | 2.93 | 1.21 |
| **40-44** | 4.48 | 2.22 | 4.17 | 1.98 | 3.87 | 1.77 | 3.64 | 1.62 |
| **45-49** | 6.45 | 3.22 | 5.99 | 2.90 | 5.54 | 2.62 | 5.19 | 2.41 |
| **50-54** | 9.43 | 4.86 | 8.67 | 4.35 | 7.94 | 3.90 | 7.39 | 3.57 |
| **55-59** | 14.02 | 8.26 | 12.90 | 7.53 | 11.82 | 6.87 | 11.00 | 6.38 |
| **60-64** | 21.90 | 13.81 | 20.09 | 12.56 | 18.37 | 11.42 | 17.05 | 10.59 |
| **65-69** | 35.60 | 23.24 | 33.41 | 21.51 | 31.28 | 19.90 | 29.62 | 18.71 |
| **70+** | 74.81 | 61.05 | 70.68 | 57.83 | 66.63 | 54.79 | 63.44 | 52.47 |

**Table D: Projected ASDR, Kerala, 2016-2030**

| Age Group | 2016 | | 2021 | | 2026 | | 2030 | |
|---|---|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female | Male | Female |
| **0-4** | 1.61 | 1.02 | 1.26 | 0.72 | 1.00 | 0.51 | 0.83 | 0.39 |
| **5-9** | 0.16 | 0.07 | 0.12 | 0.05 | 0.09 | 0.03 | 0.07 | 0.02 |
| **10-14** | 0.21 | 0.13 | 0.18 | 0.10 | 0.15 | 0.08 | 0.13 | 0.07 |
| **15-19** | 0.48 | 0.28 | 0.44 | 0.23 | 0.40 | 0.20 | 0.38 | 0.17 |
| **20-24** | 0.91 | 0.42 | 0.85 | 0.35 | 0.80 | 0.30 | 0.77 | 0.26 |
| **25-29** | 1.35 | 0.39 | 1.28 | 0.32 | 1.23 | 0.27 | 1.18 | 0.23 |
| **30-34** | 1.51 | 0.51 | 1.41 | 0.43 | 1.31 | 0.36 | 1.24 | 0.31 |
| **35-39** | 2.42 | 0.71 | 2.32 | 0.61 | 2.23 | 0.52 | 2.16 | 0.46 |
| **40-44** | 3.02 | 0.80 | 2.82 | 0.67 | 2.64 | 0.56 | 2.51 | 0.49 |
| **45-49** | 5.12 | 1.23 | 4.85 | 1.03 | 4.60 | 0.87 | 4.41 | 0.75 |
| **50-54** | 8.60 | 2.22 | 8.28 | 1.93 | 7.99 | 1.67 | 7.77 | 1.49 |
| **55-59** | 12.42 | 4.14 | 11.89 | 3.68 | 11.39 | 3.27 | 11.03 | 2.98 |
| **60-64** | 21.25 | 6.93 | 20.69 | 6.08 | 20.16 | 5.33 | 19.76 | 4.80 |
| **65-69** | 29.98 | 12.31 | 28.81 | 10.88 | 27.72 | 9.62 | 26.90 | 8.72 |
| **70+** | 80.86 | 50.47 | 78.93 | 46.85 | 77.10 | 43.50 | 75.71 | 40.99 |

**Table E: Projected ASDR, Maharashtra, 2016-2030**

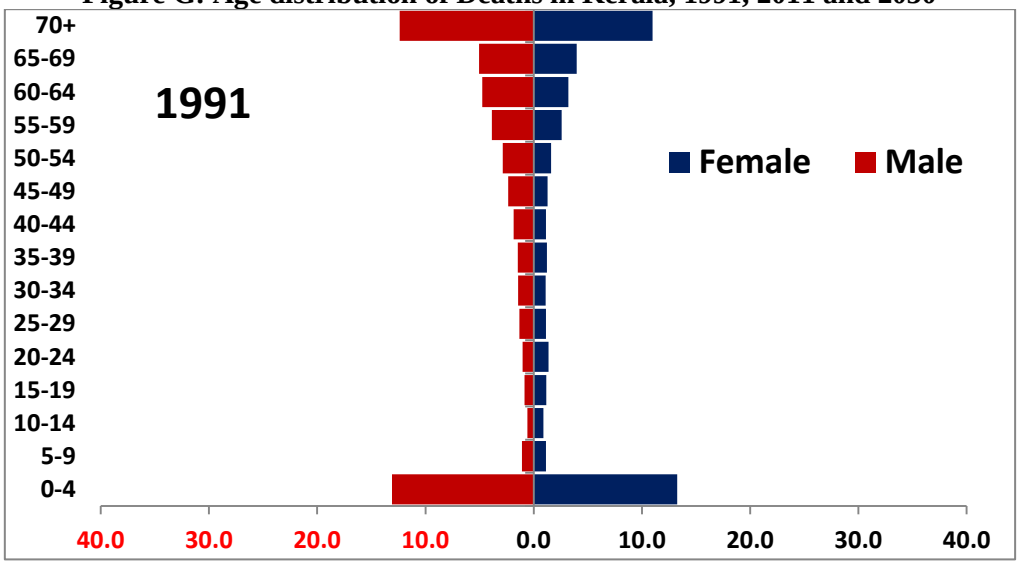
| Age Group | 2016 | | 2021 | | 2026 | | 2030 | |
|---|---|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female | Male | Female |
| **0-4** | 4.26 | 4.04 | 3.05 | 2.73 | 2.14 | 1.80 | 1.59 | 1.26 |
| **5-9** | 0.31 | 0.26 | 0.21 | 0.16 | 0.14 | 0.10 | 0.10 | 0.06 |
| **10-14** | 0.40 | 0.34 | 0.32 | 0.25 | 0.26 | 0.19 | 0.21 | 0.15 |
| **15-19** | 0.66 | 0.84 | 0.56 | 0.69 | 0.46 | 0.56 | 0.40 | 0.47 |
| **20-24** | 1.21 | 0.93 | 1.09 | 0.75 | 0.98 | 0.59 | 0.90 | 0.49 |
| **25-29** | 2.27 | 0.87 | 2.27 | 0.69 | 2.26 | 0.53 | 2.26 | 0.42 |
| **30-34** | 2.22 | 1.00 | 2.05 | 0.81 | 1.89 | 0.65 | 1.76 | 0.54 |
| **35-39** | 3.83 | 1.25 | 3.76 | 1.02 | 3.68 | 0.82 | 3.62 | 0.68 |
| **40-44** | 4.22 | 1.47 | 3.90 | 1.17 | 3.58 | 0.92 | 3.34 | 0.75 |
| **45-49** | 5.74 | 2.40 | 5.26 | 1.97 | 4.79 | 1.60 | 4.43 | 1.33 |
| **50-54** | 7.25 | 3.62 | 6.41 | 3.01 | 5.62 | 2.48 | 5.03 | 2.10 |
| **55-59** | 11.71 | 6.44 | 10.44 | 5.46 | 9.24 | 4.58 | 8.35 | 3.94 |
| **60-64** | 18.76 | 11.75 | 16.75 | 10.09 | 14.86 | 8.57 | 13.44 | 7.47 |
| **65-69** | 29.39 | 18.86 | 26.39 | 16.22 | 23.56 | 13.79 | 21.42 | 12.02 |
| **70+** | 68.05 | 55.54 | 62.68 | 50.02 | 57.46 | 44.70 | 53.43 | 40.64 |

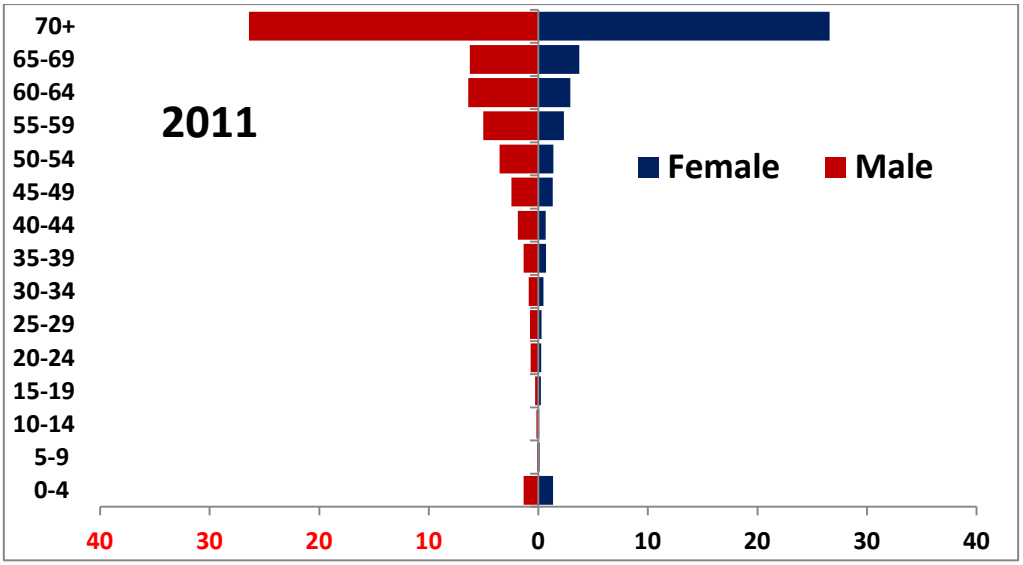
**Table F: Projected ASDR, Uttar Pradesh, 2016-2030**

| Age Group | 2016 | | 2021 | | 2026 | | 2030 | |
|---|---|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female | Male | Female |
| **0-4** | 14.39 | 11.18 | 10.99 | 7.46 | 8.19 | 4.80 | 6.37 | 3.29 |
| **5-9** | 1.03 | 0.98 | 0.77 | 0.66 | 0.56 | 0.42 | 0.43 | 0.29 |
| **10-14** | 0.85 | 0.63 | 0.72 | 0.48 | 0.59 | 0.35 | 0.50 | 0.27 |
| **15-19** | 1.36 | 1.17 | 1.25 | 0.91 | 1.14 | 0.70 | 1.06 | 0.55 |
| **20-24** | 2.17 | 1.72 | 2.10 | 1.34 | 2.03 | 1.03 | 1.97 | 0.82 |
| **25-29** | 2.27 | 2.03 | 2.17 | 1.67 | 2.06 | 1.34 | 1.98 | 1.12 |
| **30-34** | 3.24 | 1.87 | 3.19 | 1.50 | 3.15 | 1.17 | 3.11 | 0.95 |
| **35-39** | 4.32 | 2.20 | 4.27 | 1.83 | 4.21 | 1.50 | 4.16 | 1.26 |
| **40-44** | 4.87 | 2.47 | 4.49 | 2.03 | 4.12 | 1.63 | 3.82 | 1.35 |
| **45-49** | 6.76 | 3.75 | 6.15 | 3.20 | 5.55 | 2.70 | 5.08 | 2.33 |
| **50-54** | 9.66 | 5.37 | 8.65 | 4.45 | 7.66 | 3.63 | 6.91 | 3.05 |
| **55-59** | 14.06 | 8.05 | 12.52 | 6.68 | 11.04 | 5.46 | 9.91 | 4.58 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **60-64** | 24.36 | 13.06 | 22.45 | 10.68 | 20.55 | 8.57 | 19.05 | 7.10 |
| **65-69** | 38.33 | 22.40 | 35.84 | 19.08 | 33.32 | 16.02 | 31.31 | 13.79 |
| **70+** | 79.89 | 63.12 | 76.28 | 58.26 | 72.55 | 53.41 | 69.50 | 49.56 |

**Figure G: Age distribution of Deaths in Kerala, 1991, 2011 and 2030**



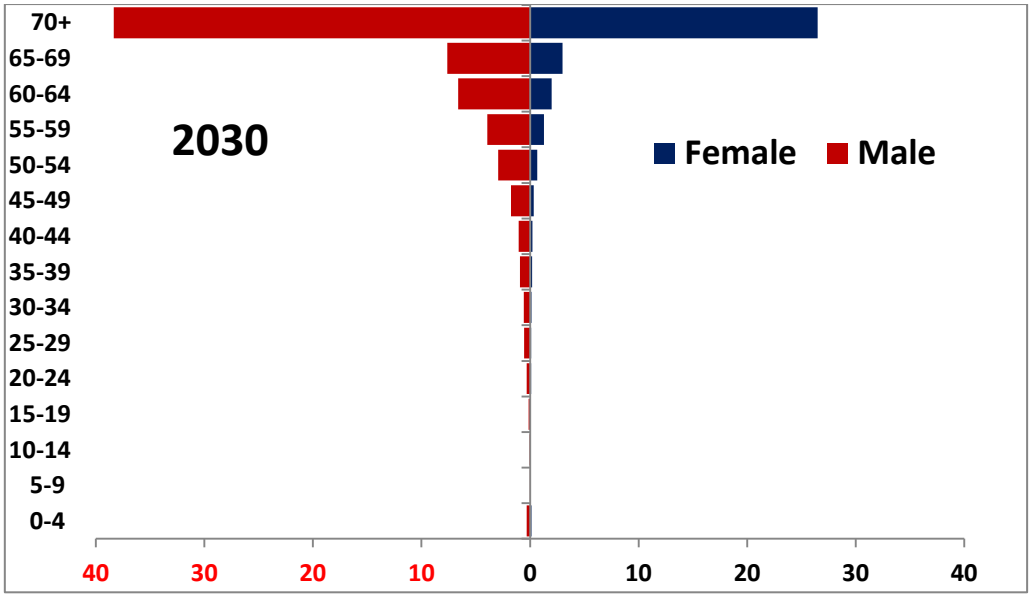
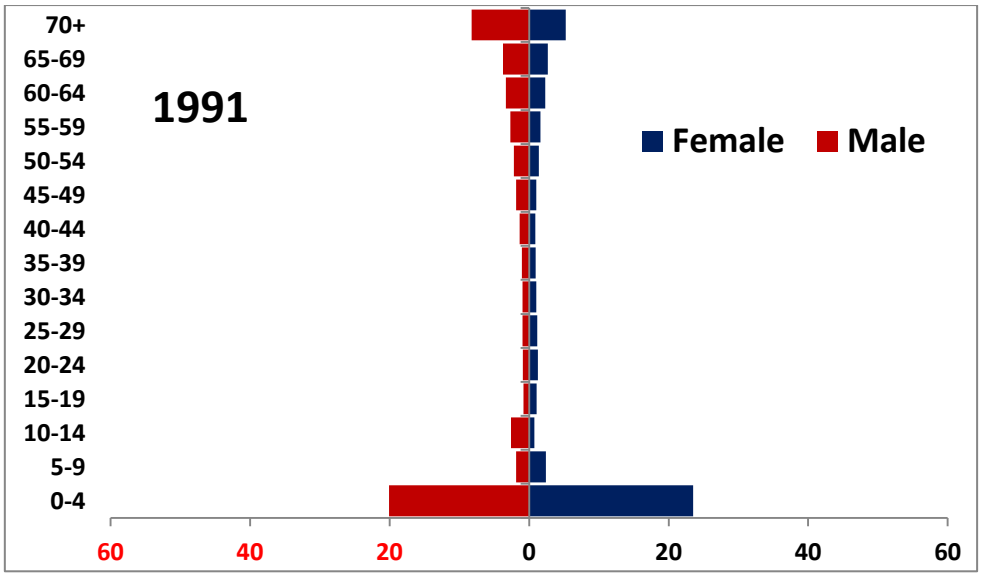
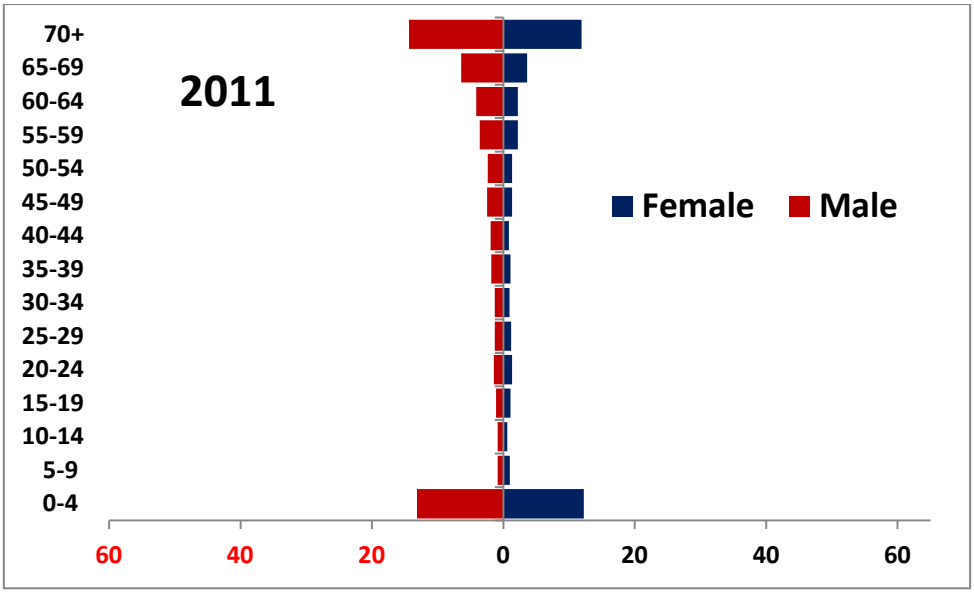



**Figure H: Age distribution of Deaths in UP, 1991, 2011 and 2030**





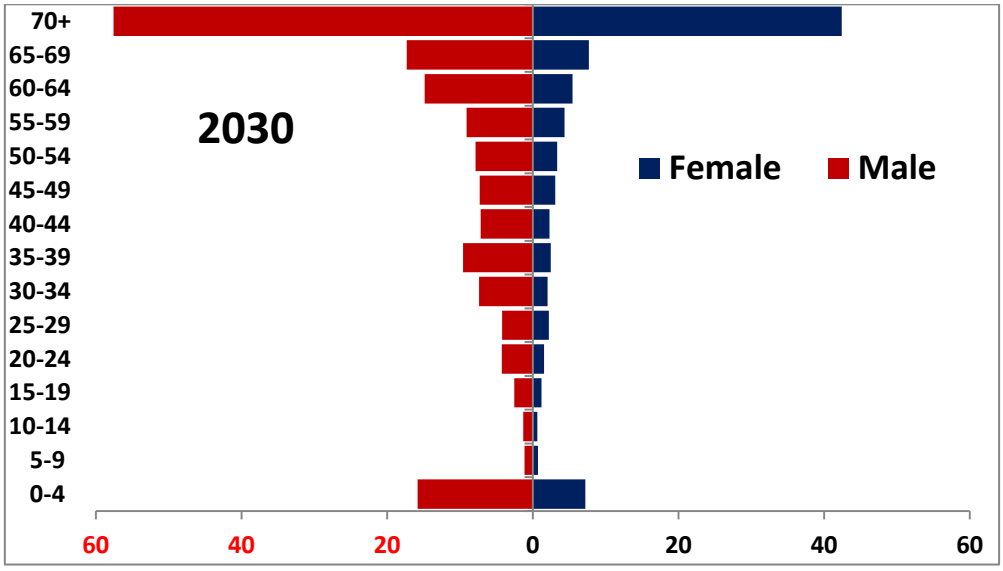
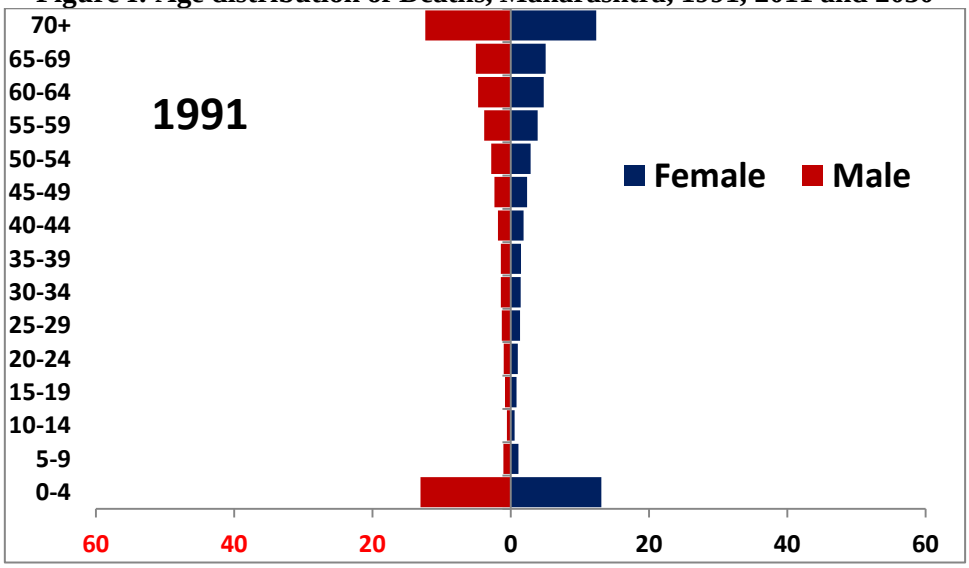
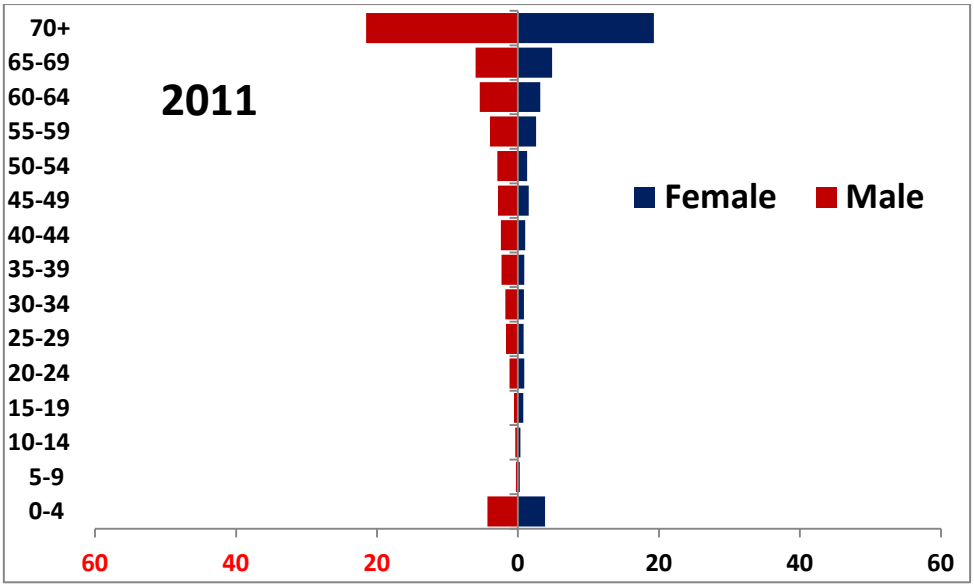
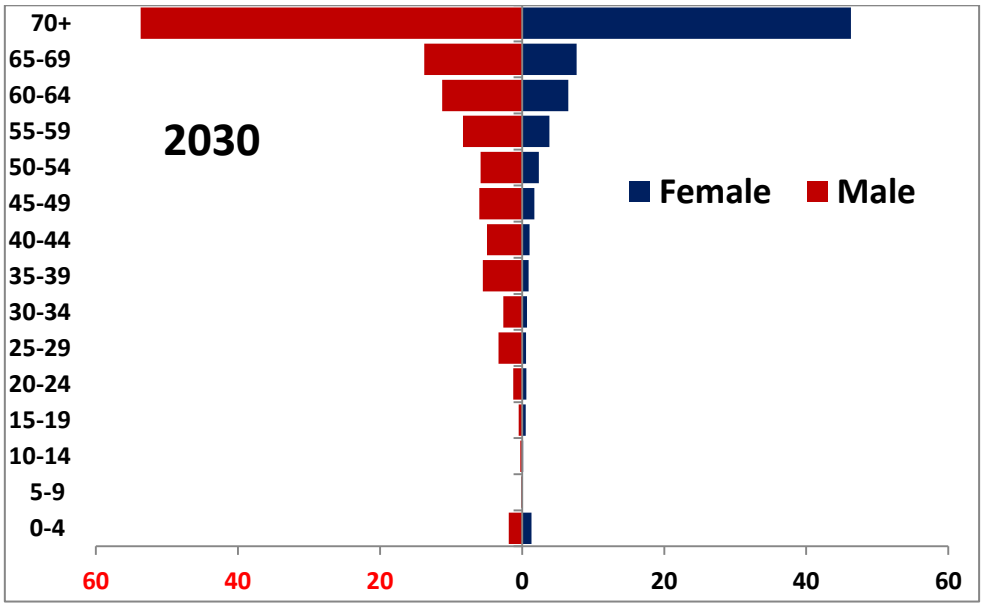




**Figure I: Age distribution of Deaths, Maharashtra, 1991, 2011 and 2030**




2011
70+
65-69
60-64
55-59
50-54
45-49
40-44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0-4
Female
Male
60
40
20
0
20
40
60


2030
70+
65-69
60-64
55-59
50-54
45-49
40-44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0-4
Female
Male
60
40
20
0
20
40
60