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Madhya Pradesh
Health and Mortality Transition

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1. Introduction

Madhya Pradesh has the dubious distinction of having the second lowest expectation of life at birth among the major states in India which reflects that health of the people of Madhya Pradesh is amongst the poorest in the country. According to the Sample Registration System, the expectation of life at birth in Madhya Pradesh was around 62 years during the period 2006-10 which was about 4 years less than the expectation of life at birth for India as a whole and almost 12 years less than the expectation of life at birth in Kerala (Government of India, 2012). Thirty five years ago, during the period 1970-75, the expectation of life at birth in Madhya Pradesh was higher than that in Assam, Orissa and Uttar Pradesh (Government of India, 1984) but now Assam is the only state in India which has a lower expectation of life at birth than Madhya Pradesh. During the 35 years between 1970-75 through 2006-10, the annual average improvement in the expectation of life at birth in Madhya Pradesh has been slower than the improvement in Odisha, Uttar Pradesh and even Assam (Government of India, 2012). Obviously, poverty of longevity and health remains a major development challenge in Madhya Pradesh.

The present paper analyses mortality and health transition in Madhya Pradesh during the 35 years between 1970-75 through 2006-10 and explores factors that may be attributed to relatively slow transition in mortality in the state. The analysis is based on the life tables prepared for females and males on the basis of age and sex specific death rates available through the Sample Registration System. The age and sex specific death rates available through the Sample Registration System are known for year to year fluctuations of unknown origin. The standard practice, therefore is to construct life tables on the basis of five-year average age and sex specific death rates instead of annual age and sex specific death rates. It is assumed that the life tables so prepared refer to the mid-year of the time interval used for the construction of the life table. Thus, life table for the period 1970-75 is assumed to refer to the year 1973. Similarly, life table for the period 2006-10 is assumed to refer to the year 2008.

The paper is divided into seven sections including this introduction. The next section of the paper analyses trends in the expectation of life at birth in the state during the period under reference. The expectation of life at birth is the most commonly used indicator for analysing and comparing mortality transition across populations, population groups and over time. The expectation of life at birth, however, is a synthetic measure which gives the number of years, a new born is expected to survive, given the prevailing age schedule of mortality. The relationship between mortality transition and increase in the expectation of life at birth is essentially reciprocal but the exact connection is not straightforward (Vaupel and Canudas Romo, 2003). A deeper understanding of mortality transition requires age specific analysis. Such an attempt is made in the third section of the paper which analyses transition in the probability of survival at different ages and how survival probability in different ages contributes to the probability of survival up to a given age.

The fourth section of the paper analyses the disparity in lifespan – variation among individuals in the age at the time of death. There is generally a negative correlation between the expectation of life at birth and lifespan disparity. Progress in preventing premature deaths reduces lifespan disparity whereas progress in reducing deaths at older ages increases this disparity.

Social class and within state, inter-district, variations in the expectation of life at birth that are so pervasive in Madhya Pradesh are discussed in section five of the paper. Information available through the Sample Registration System, however, does not permit analysis of transition in mortality by social class or across the districts of the state.

The sixth section of the paper discusses current levels and trends in key determinants of health and mortality. This section also discusses the state response to prevailing health and mortality situation and how state response has contributed meeting the health needs of the people. The last, concluding section of the paper summarises the findings of the analysis and discusses possible options for accelerating the pace of health and mortality transition in the state in terms of reinvigorating the health care delivery system.

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2.　Trends in Life Expectancy

　　Estimates available through the Sample Registration System suggest that the female expectation of life at birth in the state increased from around 45.8 years during 1970-75 to 63.9 years during 2006-10. This means an average annual increase of around 0.52 years during the period under reference or an average increase of almost 2.6 years per quinquennials. The gain in the male life expectancy during this period, on the other hand was 12.4 years which implies an average annual increase of 0.35 years or an increase of 1.8 years per quinquennials. Information available through the sample registration system thus suggests that the transition in female mortality in the state has been faster than the transition in male mortality. As a result, a female is expected to live, on average, 2.8 years longer than the male in the state during 2006-10. This is in quite contrast to the period 1970-75 when a male was expected to live, on average, 2.9 years longer than a female. Increase in the female expectation of life at birth has been particularly sharp during 1970 through 80 and again during the period 1991 through 2010. During the 15 years between 1991-95 and 2006-10, the female expectation of life at birth is estimated to have increased by more than 9 years at an average annual rate of increase of more than 0.6 years or more than 3 years per quinquennials. By contrast, this increase was only about 6.4 years in males which implies an average annual increase of less than 0.5 years or less than 2.5 years per quinquennials.

　　Increase in the expectation of life at birth in the state can be compared with global model mortality transition schedules developed on the basis of the empirical evidence about increase in the expectation of life at birth during the period 1950 to 2005 in countries where life expectancy ranged between 50 to 85 years (United Nations, 2004). These schedules represent average transition in mortality grouped according to 90th percentile (very fast increase), 75th percentile (fast increase), average (medium increase), 25th percentile (slow increase), and 10th percentile (very slow increase). They have been further extended to cover life expectancy ranging from 40 years to 92.5 years by fitting the Lee-Carter mortality model (United Nations, 2004a).
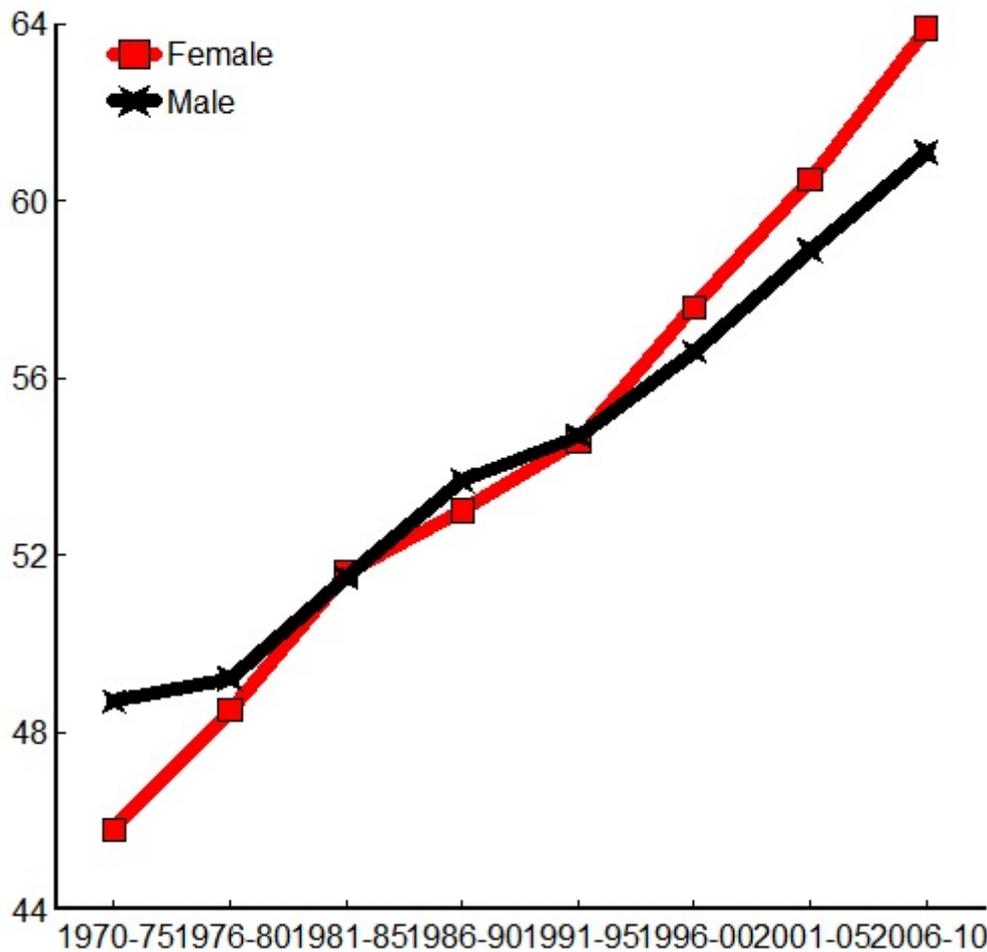
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Figure 1:   Trends in female and male expectation of life at
             birth in Madhya Pradesh, 1970 through 2010.

     Figures 2 compares increase in the expectation of life at
birth in Madhya Pradesh with the model mortality transition
schedules separately for females and males. By global standards,
male mortality transition in the state has been somewhere very
slow and slow model mortality transition schedules. By contrast,
female mortality transition has been marginally faster than the
average model mortality transition schedule. Transition in female
mortality was quite fast during the period 1970-85 but slowed
down considerably during 1985-95 and picked up the momentum again
after 1995. On the other hand, male mortality transition was
extremely slow during 1970-1980, although the pace of transition
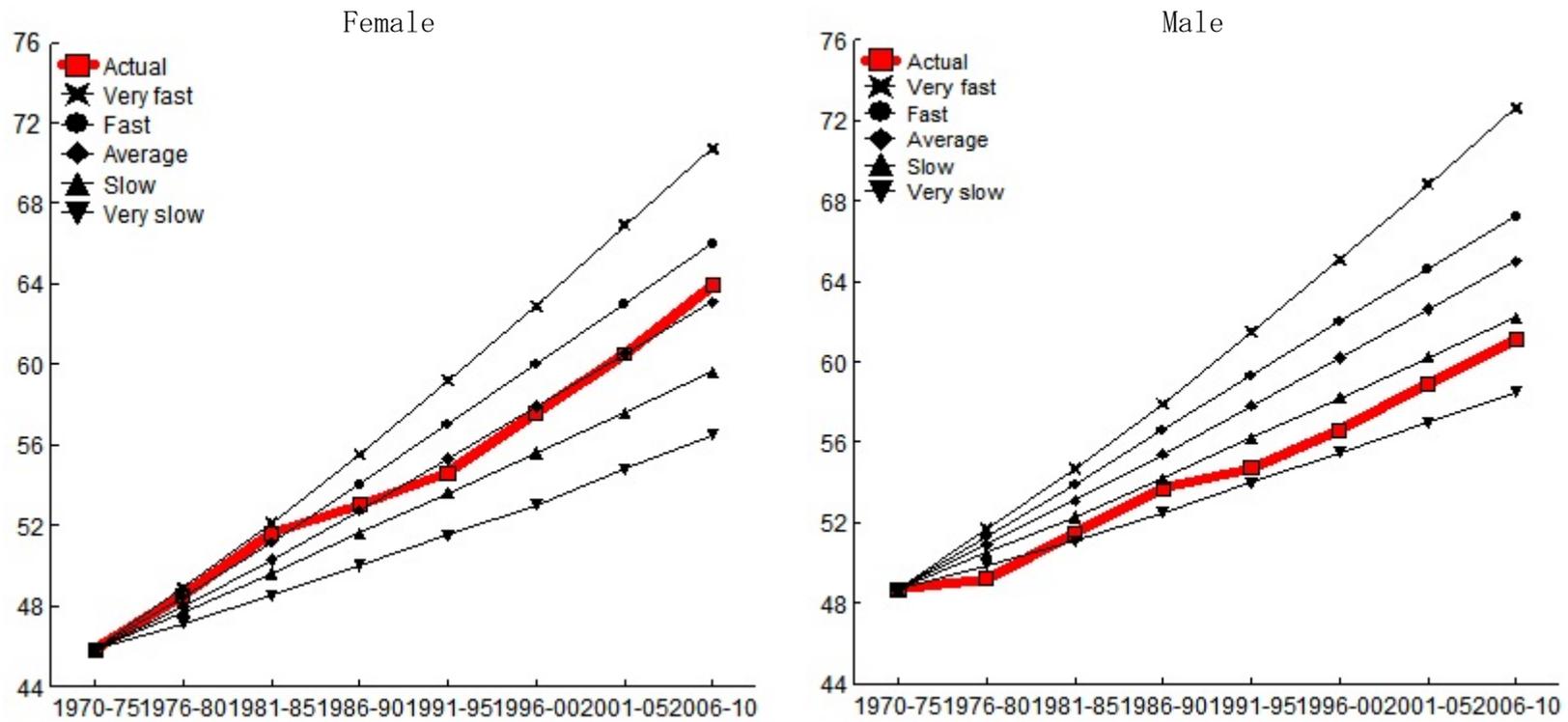increased marginally after 1980.

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Figure 2   Comparison of female and male mortality transition in Madhya Pradesh, 1970-2010 with global model mortality transition schedules

The pace of mortality transition has been different in the rural areas of the state as compared to its urban areas. In rural females, the expectation of life at birth increased by more than 18 years during the period under reference compared to an increase of only around 13 years in the urban areas during the period under reference. Similarly, in rural males, the expectation of life at birth increased by more than 12 years during the period under reference compared to an increase of only 10 years in urban males. As a result, the urban rural gap in the expectation of life at birth in the state has narrowed down substantially over the years. During 1970-75 both urban females, and urban males, on average, lived around 10 years longer than their rural counterparts. This difference in the longevity of urban females and males decreased to around 7 years during the period 2006-10, although, in recent years, the urban-rural gap in male expectation of life at birth has widened again.

The expectation of life at birth depicts the combined mortality experience of population of different age groups. It is a synthetic measure which gives the number of years, a new born is expected to survive, given the prevailing age schedule of mortality. The relationship between mortality transition and increase in life expectancy is essentially reciprocal but the exact connection is not straightforward (Vaupel and Canudas Romo, 2003). Since, mortality transition varies by age, any analysis of mortality transition requires analysis of transition in age-specific mortality and how age-specific mortality transition contributes to transition in mortality all ages combined. Such an analysis results in numerous comparative indexes which may be categorised as aggregative indexes and average of relative indexes (Schoen, 1970). Kittagawa (1966) has found that use of different indexes of mortality may provide different picture of mortality transition over time. It therefore seems reasonable to focus attention on differences in the pattern of death rates over the whole age spectrum (Schoen, 1970). A better understanding of mortality transition may therefore be obtained by analysing transition in age specific probability of death or, equivalently, age specific probability of survival and analysing how mortality transition in different ages contributes to mortality transition in all ages combined. Results of such an analysis are presented in the next section.

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3. Survival Probability

The age specific probabilities of death derived from the age-specific death rates available through the Sample Registration System suggest that about 32 per cent of newborn females are expected to reach their 70th birth day given the age schedule of female mortality that prevailed in the state during 1970-75. On the other hand, given the age schedule of female mortality that prevailed in the state during 2006-10, around 55 per cent of newborn females are expected to reach their 70th birth day. Alternatively, given the 1970-75 age schedule of female mortality, about 68 per cent female newborn would fail to see their 70th birthday whereas given the 2006-10 age schedule of female mortality, only 45 per cent of female newborn would not be able to see their 70th birth day. In case of males, 69 per cent of newborn would fail to survive up to their 70th birthday given the 1970-75 age schedule of male mortality whereas this proportion would be 54 per cent given the 2006-10 age schedule of male mortality.

Table 1 decomposes the proportion of newborn dying before their 70th birthday under different age schedule of mortality. Given the 1970-75 age schedule of mortality, around 26 per cent of females newborn would died before reaching their fifth birth day; another about 3 per cent would die during 5-15 years of their life; about 5 per cent would die during 15-30 years of their life; about 9 per cent would die during 30-50 years of their life while about 25 per cent would die during 50-70 years of their life. The corresponding proportions, given the 2006-10 age schedule of mortality are 10 per cent; 1 per cent; 3 per cent; 6 per cent; and 24 per cent respectively.

In case of males, on the other hand, given the 1970-75 age schedule of mortality, about 24 per cent of the new born would be dying before reaching their fifth birthday; 2 per cent would die during 5-15 years of age; 4 per cent would die during 15-30 years of age; 9 per cent would die during 30-35 years of age while 30 per cent would die during 50-70 years of age. The corresponding proportions given the 2006-10 age schedule of mortality are 9 per cent; 2 per cent; 2 per cent; 9 per cent; and 32 per cent respectively.

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Table 1

Proportion of females and males born during 1970-75 and during 2006-10 expected to die in different age groups

Age	Female		Male	
	1970-75	2006-10	1970-75	2006-10
Combined population				
0-5	0.26	0.10	0.24	0.09
5-15	0.03	0.01	0.02	0.02
15-30	0.05	0.03	0.04	0.02
30-50	0.09	0.06	0.09	0.09
50-70	0.25	0.24	0.30	0.32
0-70	0.68	0.44	0.69	0.54
Rural population				
0-5	0.28	0.11	0.25	0.10
5-15	0.03	0.01	0.03	0.01
15-30	0.05	0.03	0.04	0.03
30-50	0.09	0.06	0.09	0.10
50-70	0.25	0.25	0.29	0.32
0-70	0.70	0.46	0.70	0.56
Urban population				
0-5	0.16	0.06	0.14	0.06
5-15	0.02	0.00	0.01	0.01
15-30	0.03	0.03	0.02	0.02
30-50	0.09	0.04	0.09	0.08
50-70	0.27	0.23	0.37	0.28
0-70	0.57	0.36	0.63	0.45

Source: Author's calculations

It is well known that the probability of survival up to age a is the product of the probability of survival up to ages less than or equal to a (Shyrock and Siegel, 1976). In other words,

$$_aP_0 = \prod_{i=1}^{a} {}_1p_{i-1} \qquad (1)$$

where p is the survival probability and I represents age. This implies that the change in the survival probability over time can be written as

$$_a\omega_0 = {}_aP_0^2 / {}_aP_0^1 = \prod_{i=1}^{a} \left({}_1p_{i-1}^2 / {}_1p_{i-1}^1 \right) \qquad (2)$$

where the superscript denotes the time. The ratio ω is a measure of transition in mortality. If $\omega=1$, there is no transition in mortality up to age a. On the other hand, larger is the value of ω, the faster is the transition in mortality up to age a. In this way, ω reflects the pace of mortality transition in a given age interval. Equation (2) suggests that mortality transition up to a given age can be decomposed into mortality transition in ages less than or equal the given age.

The above argument suggests that, for females, the probability of survival up to 70 years of age is 77 per cent higher given 2006-10 age schedule of mortality as compared to 1970-75 age schedule of mortality. The corresponding proportion for males is only 52 per cent which shows that mortality transition in the age interval 0-70 years has been significantly faster in females than males in the state during the 35 years between 1970-75 through 2006-10. In the rural areas also, mortality transition has been significantly faster than males during the period under reference but in the urban areas, mortality transition in females and males has nearly been the same. In rural females, the probability of surviving up to 70 years of age given 2006-10 age schedule of mortality is more than 79 per cent higher than the corresponding probability given 1970-75 age schedule of mortality whereas this increase was only about 49 per cent in rural males. However, in the urban areas, the corresponding proportions are 47 per cent in case of females and around 48 per cent in case of males. In other words, the pace of transition in male mortality has been more or less the same in rural and urban areas but female mortality transition has been faster in rural than in urban areas of the state.

Mortality transition in the age group 0-70 years is the combined result of mortality transition in different ages less than and equal to 70 years. Table 2 presents the increase in the probability of survival during 2006-10 over the probability of survival during 1970-75 in different age intervals less than 70 years of age while the ratio of the probability of survival during 2006-10 to the probability of survival during 1970-75 is presented in figure 3 for different age intervals less than 70 years. It is apparent from the table as well as from the figure that nearly all the mortality transition in the age interval 0-70 years has been confined to age intervals 0-5 years and 50-70 years in both females and males as well as in the combined, rural and urban populations. By comparison, mortality transition in the age interval 5-50 years has been slow to very slow, although mortality transition in this age interval has been marginally faster in females as compared to males during the 35 years under reference. In fact, the probability of survival in urban males decreased instead increased in the age interval 15-25 years during the period under reference. Among different age intervals, mortality transition has been the most rapid in the age interval 1-5 years followed by the age interval 0-1 years. In the age interval 50-70 years, the speed of transition in mortality increased in both females and males with a very rapid increase in the speed of transition in urban males in the age interval 55-60 years. At the same time, there has been little transition in male mortality in combined and rural populations whereas in the urban population, the speed of mortality transition in the age interval 65-70 years has been substantially slower than the speed of transition in the age interval 60-65 years or in the age interval 55-60 years.

It may also be seen from the figure and the table that, in general, transition in female mortality has been more rapid than the transition in male mortality in the state. The only exceptions are the age interval 55-60 years in the combined and rural populations and the age interval 55-70 years in the urban population. Relatively slower female than male mortality transition in the age interval 55-70 years appears to be the reason behind relatively slow female mortality transition in the urban areas of the state in the age interval 0-70 years as compared to the rural areas.

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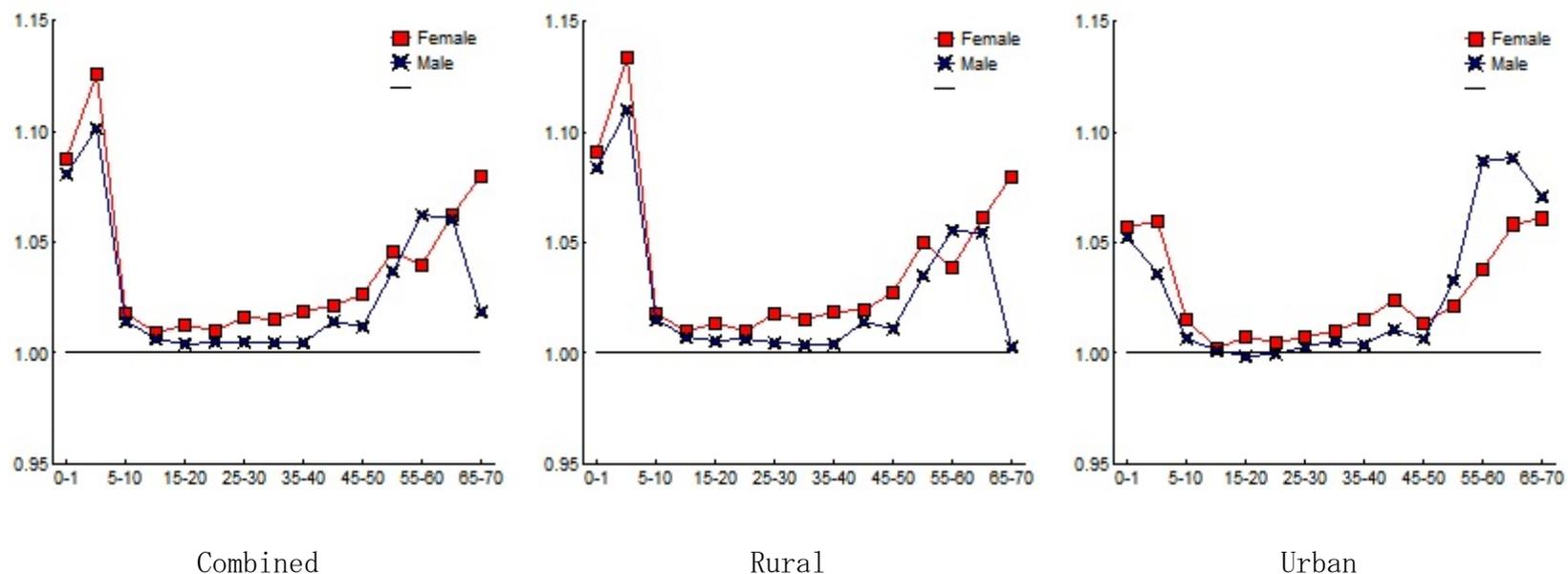|	Combined	Rural	Urban

Figure 3   Ratio of the probability of survival during 2006-10 and during 1970-75 in different age
            intervals in Madhya Pradesh

Table 2
Increase (per cent) in survival probability in different age
groups between 1970-75 and 2006-10

Age	Combined		Rural		Urban	
	Female	Male	Female	Male	Female	Male
0-1	8.7	8.1	9.1	8.4	5.7	5.3
1-5	12.6	10.1	13.4	11.0	6.0	3.6
5-10	1.8	1.4	1.8	1.5	1.5	0.7
10-15	0.9	0.6	1.0	0.7	0.2	0.1
15-20	1.2	0.4	1.3	0.5	0.8	-0.2
20-25	1.0	0.5	1.0	0.6	0.5	-0.0
25-30	1.6	0.5	1.8	0.5	0.7	0.3
30-35	1.5	0.5	1.5	0.4	1.0	0.5
35-40	1.9	0.5	1.9	0.4	1.5	0.4
40-45	2.1	1.4	1.9	1.4	2.4	1.0
45-50	2.7	1.2	2.8	1.1	1.4	0.7
50-55	4.6	3.7	5.0	3.5	2.1	3.3
55-60	4.0	6.2	3.8	5.6	3.8	8.7
60-65	6.2	6.0	6.1	5.5	5.8	8.8
65-70	8.0	1.8	8.0	0.3	6.1	7.1
0-70	76.6	51.7	79.3	49.4	47.3	47.6

It is now possible to summarise the basic features of
mortality transition in Madhya Pradesh during the period under
reference. First, except for urban males in the age interval 50-
70 years, mortality transition in all age intervals has been
faster in females than in males in the combined as well as rural
and urban populations. Second, there has been virtually little
transition in male mortality in the age interval 5-50 years.
Third, there has been virtually no transition in rural male
mortality in the age group 65-70 years. Fourth mortality
transition in rural females has been substantially faster than
mortality transition in urban females.

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4.　Disparity in Lifespan

Another important aspect of mortality transition is the reduction in the variation among individuals in the age at death (Edwards and Tuljapurkar, 2005; Shkolnikov, Andreev and Begun, 2003; Smits and Monden, 2009; Wilmoth and Horiuchi, 1999). In general, there is a negative correlation between the expectation of life at birth and the variation among individuals in the age at death, although there may be discrepancies (Vaupel, Zhang and Raalte, 2011). Progress in reducing premature deaths reduces variation among individuals in the age at death, whereas progress in reducing deaths at older ages increases variation among individuals in the age at death.

The variation in the age at death among individuals can be measured by the life disparity measure, $e^{\dagger}$ (Vaupel and Romo, 2003). It is defined as the average remaining life expectancy at the age when death occurs. In other words, it is a measure of life years lost due to death. With the transition in mortality deaths get increasingly concentrated at older ages resulting in the reduction in the variation in the age at which individuals die and the remaining lifespan of individuals who survive beyond this age.

The Lifespan disparity does not decrease with the increase in the number of deaths prevented at any age as is the case with expectation of life at birth. Rather, it decreases or increases depending upon the balance between preventing deaths at early ages and saving lives at late ages. Generally, a fixed age, for example 65 years, is used to separate early deaths from late deaths. This approach is independent of the prevailing level of mortality. A more pragmatic approach is to define the age at death used for categorising deaths as early or premature and late relative to the level of mortality. Separating the two is a unique threshold age, $a^{\dagger}$ which is generally just below life expectancy. A recently developed demographic formula permits estimation of $a^{\dagger}$ (Zhang and Vaupel, 2009) so that deaths occurring before the threshold age $a^{\dagger}$ may be categorised as early or premature deaths while deaths occurring after this age are categorised as late deaths. In this approach premature deaths definition are defined relative to the level of mortality.

Table 3
Reduction in premature deaths in Madhya Pradesh

Population		Average years of life lost due to death $(e^\dagger)$		Threshold age for premature deaths $(a^\dagger)$		Proportion of premature deaths (%)	
		1970-75	2006-10	1970-75	2006-10	1970-75	2006-10
Total	Female	25.9	18.1	56.5	63.0	48.8	30.1
	Male	26.0	18.0	50.7	57.6	40.0	29.3
Rural	Female	26.4	18.7	56.4	62.6	50.7	31.7
	Male	25.1	18.3	53.3	57.0	42.0	29.8
Urban	Female	21.8	14.3	57.8	65.4	36.3	25.9
	Male	21.5	16.9	55.4	59.5	31.0	25.2

Source: Author's calculations

Results of the analysis are presented in table 3. The average years of life lost due to death during 1970-75 was about 26 years in the state which reduced to around 18 years during 2006-10 which indicates that mortality transition in the state has been a result of reduction in the proportion of premature deaths. In fact, as may be seen from the table, the proportion of premature deaths in females decreased from around 49 per cent during 1970-75 to around 30 per cent during 2006-10 whereas in males, the proportion of premature deaths decreased from 40 per cent to around 29 per cent. Relatively slow reduction in the proportion of premature deaths indicates that mortality transition has been slower in males than in females during the period under reference. Reduction in the proportion of premature deaths has been the fastest in rural females but the slowest in urban males.

It may also be observed from the table that the age that separates early or premature deaths from late deaths has also increased over time. During 1970-75, a female death at age 56 and a male death at age 50 or below was an early or a premature death whereas during 2006-10, a female death at age less than 63 years and a male death at 57 years was a premature death according to out criteria.

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5. Social Class and Regional Differentials

Estimates of expectation of life at birth by social class are not available from the sample registration system. However, estimates derived on the basis of 2001 population census suggest that the expectation of life at birth in the Scheduled Tribes of the state was very low, around 50 years only as compared to around 53 years in Scheduled Castes and more than 58 years in non Scheduled Tribes/Castes (Chaurasia, 2011). There is however no evidence whether these differentials have narrowed or widened over time. The importance of social class differentials in mortality in the state lies in the fact that, according to the 2001 population census, around one fifth of the state population was classified as Scheduled Tribes while another around 15 per cent was classified as Scheduled Castes.
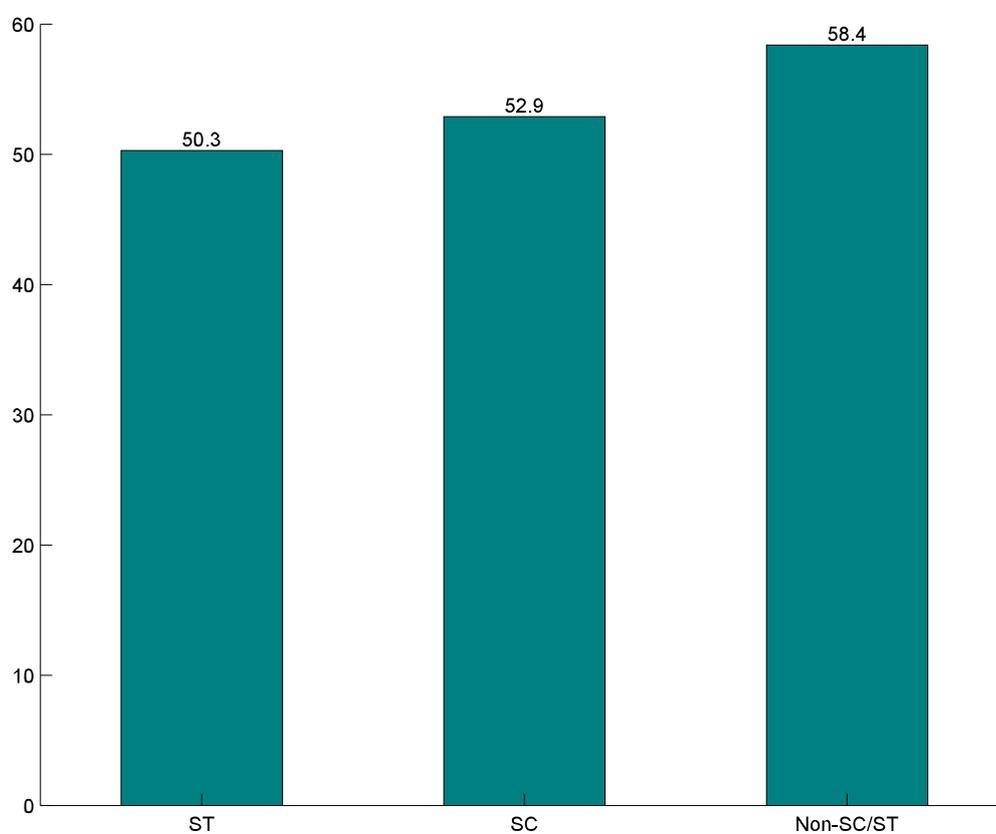
Figure 6   Social class differentials in expectation of life at birth in Madhya Pradesh, 2001
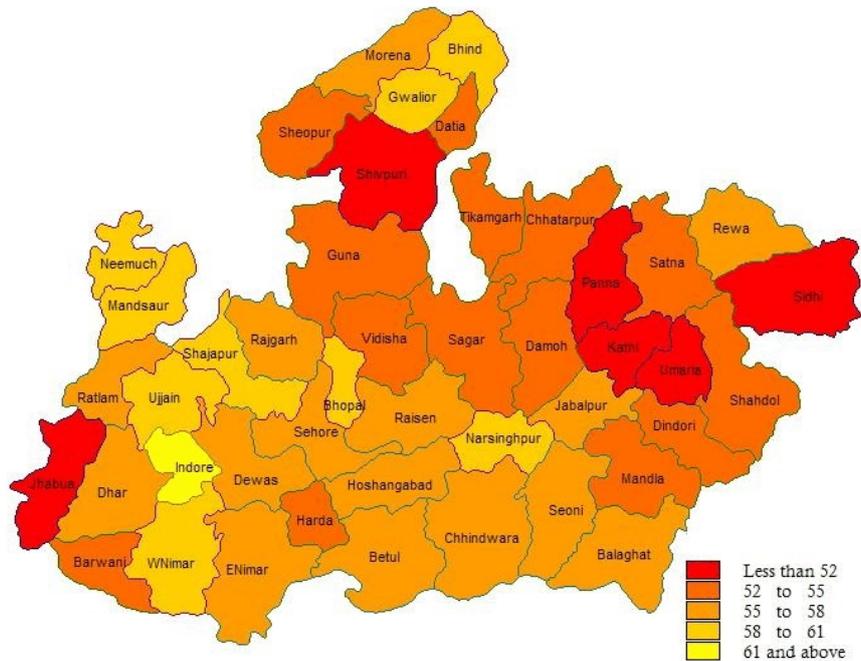
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Figure 7:   Expectation of life at birth (years) in districts of
             Madhya Pradesh, 2001.

        District level estimates of the expectation of life at
birth are also not available from the Sample Registration System.
However, estimates based on 2001 population census suggest that
mortality levels vary widely across the districts of the state.
The expectation of life at birth is estimated to be the highest
in Indore district (64 years) which was the only district in the
state having an expectation of life at birth of more than 60
years around the year 2001. On the other hand the expectation of
life at birth was estimated to be the lowest in district Katni of
the state where an average individual was expected to live only
49 years around the year 2001 (Chaurasia, 2011). The wide inter-
district variation in the expectation of life at births suggests
that mortality transition varies widely across the districts of
the state. Moreover, in 21 districts of the state, the
expectation of life at birth was less than 55 years. It has been
argued that a reduction in the inter-district disparity in
mortality may contribute significantly in accelerating mortality
transition in the state.

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6. The State of Health

The foregoing analysis reflects very slow to slow mortality transition in Madhya Pradesh during the 35 years between 1970-75 and 2006-10 by global standards. It also reflects poor transition in the health status of the people of the state. It appears that efforts to meeting the health needs of the people of the state have somewhere fallen short of the requirements and needs of the people. It also appears that a large proportion of the population of the state is still devoid of the basic minimum facilities that influence the key determinants of health and mortality - living conditions, nutritional status, especially of children, and an efficient and effective health care delivery system which are necessary for social, mental and physical well-being of the people of the state.

The straightforward ramification of the poor health status of the people is the high prevalence of morbidity - acute as well as chronic. Although, estimates of disease-specific prevalence rates are not available in the state and in its different population groups, yet information available through the annual health survey 2010-11 conducted by the Registrar General of India indicates that the prevalence of both acute and chronic mortality in the state is quite high as close to 15 per cent of the state population is estimated to have been suffering from either acute or chronic morbidity at the time of the survey (Government of India, 2012). Moreover, it there appears little difference in morbidity in rural and urban areas, although acute morbidity is higher in rural areas but chronic morbidity is higher in the urban areas of the state (Table 4). Moreover, both acute as well as chronic morbidity is estimated to be higher in females than in males in the combined as well as in rural and urban populations separately. It is worth pointing out here that the morbidity prevalence presented in table 4 is based on the reported morbidity and therefore may be biased by the knowledge and perception of the respondent about different disease conditions. In any case, it is very much clear from table 4 that social, economic and environmental conditions in the state are not conducive to low levels of both acute as well as chronic morbidity in the state.

Table 4
Acute and chronic morbidity in Madhya Pradesh

Population		Acute morbidity	Chronic morbidity
Person	Combined	93.04	44.46
	Rural	100.87	39.97
	Urban	76.97	53.68
Male	Combined	88.41	40.77
	Rural	96.42	37.74
	Urban	72.10	46.94
Female	Combined	98.12	48.51
	Rural	105.73	42.40
	Urban	82.36	61.16

Source: Annual Health Survey 2010-11

Information related to some of the predisposing factors that contribute to acute and chronic morbidity and influence the health of individuals is presented in table 5. It is very much evident from the table that the living environment of the people of the state needs to be improved substantially in order to have a telling impact on the health of the individuals. For example, almost one third households in the state had none of the six assets – radio/transistor, television, phone (mobile or landline), computer (with or without internet), bicycle, two wheeler, and four wheeler – at the 2011 population census and this proportion was more than 40 per cent in the urban areas. A very high proportion of asset less households suggests that poverty is still rampant especially in the rural areas of the state. Similarly, almost 48 per cent of the households did not have an improved drinking water source and this proportion was almost 55 per cent in the rural areas whereas only one fourth households had access to improved sanitation facilities – only around 10 per cent in the rural areas. It is obvious that the prevailing living conditions of the majority of the population of the state is not conducive to an amenable health status of the people.

Table 5
Living conditions in Madhya Pradesh

Indicator	Combined population	Rural population
Asset less households	32.61	40.24
Households without access to improved drinking water facility	47.63	54.24
Households without access to improved sanitation	73.52	89.09

Source:　　Census 2011

One of the implications of poor living conditions in the state is the poor nutritional status of children. Information available through the National Family Health Survey 2005-06 suggests that more than 31 per cent children below three years of age in the state were stunted as well as wasted and this proportion was highest in the country (Chaurasia, 2012). At the same time, about 27 per cent children were stunted but not wasted while around 14 per cent children were wasted but not stunted. This two-dimensional classification of the nutritional status of children suggests that more than 71 per cent children below three years of age in the state were under nourished either in one or both the dimensions of under nutrition.

Table 6
Nutritional status of children 0-3 years of age

Indicator	Combined population	Rural population
Stunted as well as wasted	31.25	NA
Stunted but not wasted	26.63	NA
Wasted but not stunted	13.60	NA
Under nourished	71.47	NA
Stunted	57.87	NA
Wasted	44.85	NA

Source:　　Chaurasia (2012)

Table 7

Coverage index and performance index of health care delivery system in Madhya Pradesh

Population	Dimension of health care	Coverage index	Performance index
Combined	All dimensions	46.35	33.52
	Maternal health	40.51	29.24
	Child Immunisation	57.09	53.14
	Child health	34.60	-3.45
Rural	All dimensions	42.37	32.08
	Maternal health	34.96	31.59
	Child Immunisation	53.51	46.02
	Child health	33.31	-0.80

Source: Chaurasia (2012)

Another reason that may be attributed to the unacceptably slow mortality and health transition in the state is the far from satisfactory performance of the health care delivery system – public as well as private – in terms of meeting the health care needs of the people. Although, it may be argued that the delivery of health care services is one of the many determinants of health and mortality, yet it is well known that health care in the form of life-saving and life-enhancing interventions plays a key role in health and mortality transition in terms of preventing majority of the premature deaths, especially deaths among young children and women who constitute the most vulnerable group of population and in terms of meeting the health care needs of the people. It is also well known that the medical technology that is currently available has the potential of preventing 90-95 per cent of the premature deaths but the challenge remains to reach those who are in need of health care. It is in this context that the performance of the health care delivery system in terms of meeting the health care needs of the people and in terms of preventing premature deaths matters in accelerating the pace of transition in both health status of the people and the mortality transition.

Using the information available through the district level household and facility survey, an attempt has been made to measure the performance of the health system in India at state and district levels (Chaurasia, 2013). The performance of the health system has been measured in two contexts - the coverage and the performance. The coverage index of the health system is based on coverage rate of 14 variables related to maternal health, child immunisation and child health. On the other hand, the performance index is the coverage index adjusted for the prevailing levels of female literacy rate and the level of living index. Both the coverage index and the performance index varies from a maximum of 100 to a minimum of 0 - 100 reflecting the best performance while 0 reflecting the poorest performance.

Results of the analysis, presented in table 7 reflect the poor performance of the health care delivery system in the state in meeting the health care needs of the people. For the combined population, the performance index is estimated to be just around 33 per cent on the basis of the information available through the district level household and facility survey. In the rural areas, the performance index is only 32 per cent. Obviously, poor performance of the health system in the state has also been a dominating factor behind slow to very slow health and mortality transition in the state.

The coverage index and the performance index presented in table 7 comprises of three dimensions of health care - maternal health, child immunisation and child health. The dimension of maternal health care reflects the performance of clinic based services, the dimension of child immunisation reflects the performance of extension services while the dimension of child health reflects the performance of behaviour change communication services. Table 7 suggests that the coverage index of the health care delivery system in the state is relatively the poorest in terms of behaviour change communication services but relatively the best in case of extension or child immunisation services. However, when the coverage index is adjusted for the prevailing level of female literacy and the standard of living index, the performance index turns negative in both combined and rural population which essentially implies that the performance of behaviour change communication services is even poorer than that determined by the prevailing levels of female literacy rate and

the standard of living index. On the other hand, performance of the health system in the dimension of clinic-based services is around 30 per cent in both combined and rural population. Obviously, there is a very substantial scope of improving the performance of health care delivery system in the state to achieve the long cherished dream of universal health care and to accelerate the pace of health and mortality transition.

The State response to addressing the issues of health and longevity of its people is articulated in the state health policy 2000 which still remains a draft. This policy envisions that all people living in the state will have the knowledge and skills required to keep themselves healthy and will have equity in access to effective and affordable health care, as close to the family as possible, that enhances their quality of life, and enables them to lead a healthy productive life (Government of Madhya Pradesh, 2007). In order to realise the aforesaid vision, the draft state health policy has aimed at:

1. Ensuring universal geographic and economic access to quality primary and secondary health care and family welfare services to all people of Madhya Pradesh within a span of five to seven years.

2. Prevention of disaster, to the extent possible, and preparedness for disaster management as and when necessary.

3. Reducing the risk of death due to complications of pregnancy and delivery – measured in terms of maternal mortality ratio – to 220 maternal deaths for every 100 thousand live births by 2011 from the level of 498 (1997 level).

4. Reducing the risk of death during infancy – measured in terms of infant mortality rate – to 62 infant deaths for every 1000 live births by 2011 from the level of 97 (1997 level).

5. Reduction of the total fertility rate in a manner so as to reach the replacement level fertility (i.e. a TFR of 2.1) by the year 2011.

6. Stabilize the prevalence of HIV/AIDS at low level (present level) and further decrease it.

7. Address problems related to mental health care and initiate action to create information base and introduce preventive interventions for improved mental health situation.

The state has also adopted the goals and objectives set under the National Rural Health Mission which was launched by the Government of India in 2005 and was directed towards architectural corrections in the public health care delivery system and a concomitant reduction in infant mortality rate, maternal mortality ratio and total fertility rate; prevention and control of communicable and non-communicable diseases; and revitalization of local health traditions. Madhya Pradesh was among the 18 priority states of the country under the Mission.

It is interesting to observe here that neither the draft state health policy nor the National Rural Health Mission focusses on health and mortality transition in the entire age spectrum as well as in males and female. The analysis presented here indicates that mortality transition in males in the state has been substantially slower than the mortality transition in females. The analysis has also revealed that mortality transition has been very slow in the age group 15-50 years and in males, there has been virtually little mortality transition in this age groups over the last 35 years. However, these issues have not been addressed in the draft state health policy. Similarly, female mortality transition in the age group 50-70 years in the urban areas of the state appears to have been slower than that in males and there are significant social class and regional differentials in mortality levels. However, the draft state health policy has paid little attention to these issues.

It would be interesting to analyse the progress of Madhya Pradesh against the stated goals and objectives of the draft state health policy 2000 and the National Rural Health Mission. This progress has been charted in Figure 8 for the period 1997 through 2011. It is very much evident from the figure that the state lags behind in terms of the progress towards the goals and objectives of the National Rural Mission as well as in terms of universalising health care. It is only in case of infant mortality rate that the progress in the state conforms to what was visualised in the draft state health policy 2000, although this progress is significantly short of what has been envisaged in the National Rural Health Mission. It is also clear that the reach of the health care delivery system in meeting the health care needs of the people of the state has at best been limited and there is definitely scope for improvement.
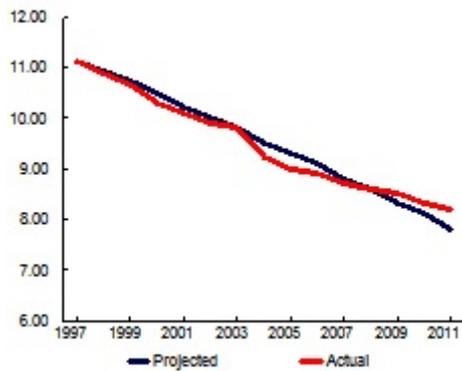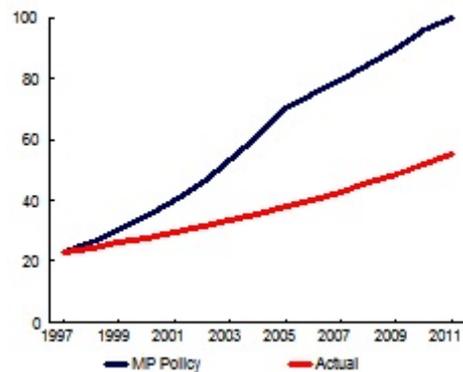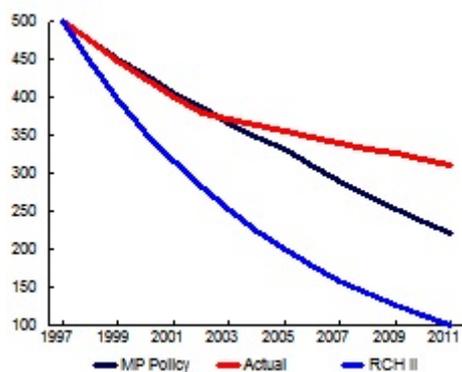
Crude death rate
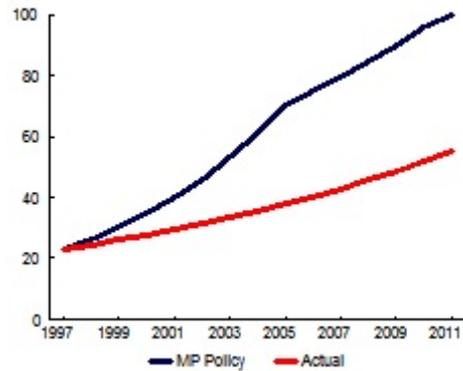
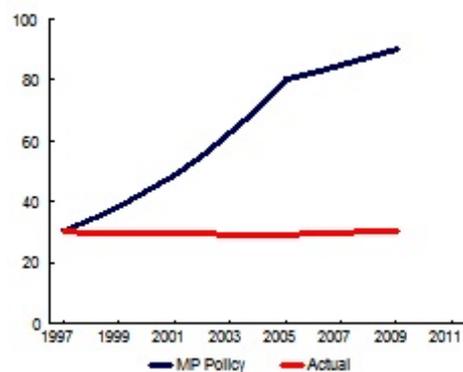Proportion of safe deliveries
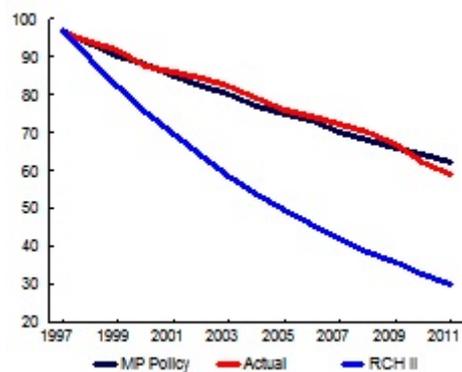
Infant mortality rate

Children fully immunised

Maternal mortality ratio

Use of ORS during diarrhoea

Figure 8   Progress in selected indicators of mortality and
health in Madhya Pradesh, 1997-2011.

7.   Conclusions

It is obvious from the analysis presented here that Madhya Pradesh has somehow not been able to meet the health needs of the people of the state - medical as well as non-medical - so that the transition in health and mortality has remained slow to very slow during the last 35-40 years. The analysis also suggests that substantial demographic, social class and regional differentials in mortality and health situation continue to persist in the state. Persistence of poor health and mortality situation, incidentally, has implications for the social and economic development of the state and improvements in the quality of life of the people.

What are then options for Madhya Pradesh? There is a need to reinvigorate the health care delivery system through user - people - perspective and not through the provider perspective as has largely been the case so far. Key initiatives that may be taken in this direction may include

·   Evolve and institutionalise an information system that facilitates understanding the health needs of the people. This understanding should incorporate both medical and non-medical determinants of health and mortality.

·   Promote local level collective health action by building the capacity of the people and their organizations to identify their health needs and initiate and sustain action to address these needs in an effective yet efficient manner.

·   Support local level collective health action by creating and sustaining community partnerships for health care delivery especially by reaching out to non-traditional partners.

·   Provide health system support to local collective health action by improving the availability, affordability and quality of specialised health care services either through the public or through the private health care delivery system.

·   Develop policies and institutional capacity for regulating health care service delivery either through public or through private health care delivery system.

- Promote determinants of health research by establishing partnerships with research centres and academic institutions from within and outside the health sector to directed towards increasing knowledge to support informed decision-making, especially at the local level.
- Create health disaster management network by involving the entire health care delivery system and the broadest possible inter-sectoral and inter-institutional collaboration and coordination to reduce the impact of emergencies and disasters on the health of the people.
- Revamp and expand the human resources development (education and training) network to develop a health workforce profile that is adequate in terms of knowledge and skills for the delivery of health care services necessary to meet the health needs of the people.
- Strengthen monitoring, evaluation and analysis of health status at the level of the individual and at the level of the community with especial emphasis on identifying inequalities or disparities in risks and threats to healthy life style.

The key to accelerating health and mortality transition in Madhya Pradesh is an astute mix of substantive and formal health care. A focus on the formal, institution-based, health care alone has only limited potential in Madhya Pradesh.

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