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Securing Child Survival with Specific Reference to Madhya Pradesh

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Abstract

This paper highlights the highly pervasive and persistent inequality in child mortality in Madhya Pradesh and argues that reduction in between districts and within-district inequality in child mortality can contribute significantly towards accelerating the pace of improvement in child survival in the state which contributes to be the poorest in the country. The paper presents a conceptual framework to prevent child deaths in the state and recommends constitution of an Inter-agency Task Force on Child Survival for operationalising the framework.

Key Words

Madhya Pradesh, Child Survival, Small Area Estimation, Inequality

Background

The risk of death during childhood in Madhya Pradesh remains amongst the highest in India. Latest estimates available through India's official Sample Registration System suggest that, out of every 1000 new-born, 48 fail to see their first birthday compared to only 4 in Nagaland, 5 in Mizoram and 7 in Kerala (Government of India, 2020a). Data available from SRS also suggest that 56 out of every 1000 new-borns fail to see their fifth birthday compared to 43 in India while 72 fail to see their fifteenth birthday compared to 49 in India and 15 in Kerala (Government of India, 2020b; 2020c). In the rural areas of the state, 60 out of every 1000 new-born fail to survive up to fifth birthday while this number is only 39 in the urban areas which reflects wide rural-urban gap in child survival in the state which appears to have persisted over time. According to the estimates prepared by the United Nations Inter-Agency Group on Child Mortality Estimation (UN IGME), only 24 out of the 195 countries of the world have under-five mortality rate higher than that prevails in Madhya Pradesh (UNICEF, 2020). Although, child mortality is decreasing in the state, yet the rank of Madhya Pradesh vis-a-vis other states and Union Territories of the country has more less remained unchanged during the last forty years. Madhya Pradesh has always been among the bottom three states of the country in terms of all indicators of child survival – infant mortality rate; under-five mortality rate; and the probability of death in the first 15 years of life. The grossly unacceptable child survival scenario in the state is a matter of urgent concern as during these four decades, many programmes and interventions have been implemented to promote child survival in the state. It appears that these efforts have somewhere fallen short of expectations as far as securing the life of the children of the state is concerned. It is now universally recognised that the risk of death during childhood is a more sensitive indicator of the level of social and economic development and improvement in the quality of life than the conventionally used monetary indicator like per capita income and per capita gross domestic product.

Within Madhya Pradesh, district level estimates of the risk of death during childhood are not available either from the Sample Registration System or from the civil registration system. The National Family Health Survey also does not provide district level estimates of the risk of death during childhood. The Government of India had launched the Annual Health Survey Programme in 2011 to provide district level estimates of key demographic indicators in selected states of India including Madhya Pradesh. This programme was closed in 2013. The Government of Madhya Pradesh carried out first even Madhya Pradesh Family Welfare Programme Evaluation Survey in the rural areas of the state in 2003. This Survey provided estimates of key demographic indicators including estimates of the risk of death in the first five years of life up to development block level. This Survey, however, could not be repeated. The National Health System Resource Centre has prepared estimates of the risk of death in the first five years of life at the district level in India based on the data available from the 2011 population census using indirect technique of child mortality estimation. These estimates, however, refer to the period around 2005 (Ahuja, *no date*).

It is also well known that the population within a district is not homogenous but heterogenous in terms of residence, social class, gender, religious composition, etc. It may be hypothesised that the risk of death during childhood varies widely across different mutually exclusive population sub-groups within a district. However, there is currently no information about within-district inequality in child mortality. It may be conjectured that reducing the within-district inequality in child mortality can contribute significantly towards reducing child mortality at the district level. An understanding of the within-district inequality in child mortality is, therefore, important in the quest for improving child survival in the state.

Recently, Chaurasia (2021) has prepared child mortality estimates for the districts of the state at the most recent date following a hybrid approach. These estimates correspond to the latest child mortality estimates for the state as a whole which are made available by the Registrar General of India based on the official Sample Registration System. Chaurasia (2021) has also prepared child mortality estimates for 12 mutually exclusive population sub-groups in each district of the state which highlight the inequality in child mortality across different population groups within each district. The estimates prepared by Chaurasia (2021) reveal that child mortality not only varies widely across the districts of the state but also across different mutually exclusive population sub-groups in each district. The pervasiveness and the persistence of child mortality inequality in Madhya Pradesh appears to be a major development challenge and an important factor that keeps the risk of death during childhood in the state unacceptably high.

This paper has two objectives. The first objective of the paper is to highlight the highly pervasive and persistent child mortality inequality in Madhya Pradesh. The pervasiveness and persistence of child mortality inequality in the state requires that targeted interventions focussing specific population sub-groups are needed to reduce the child mortality inequality and hence accelerate the progress towards securing the survival of the children of the state. It is well-known that reduction in child mortality inequality across population sub-groups contributes significantly towards increasing the pace of reduction in child mortality.

The second objective of the paper is to outline and discuss a framework for accelerating the progress towards securing survival of children of the state. The prevailing child mortality inequality within the state emphasises that any effort directed towards improving the prospects of the survival of the children of the state must be multi-dimensional in conceptualisation and comprehensive in implementation. The means that any effort to promote child survival must be an inter-sectoral entity with different components of child survival efforts closely inter-linked at the local level – the interface with the community. The highly pervasive child mortality inequality in the state suggests that child survival needs of different population sub-groups may be different so that different approaches may be needed to promote child survival I different population sub-groups. The paper, therefore, argues that the success of any effort to promoting child survival in the state is possible only through adopting decentralised planning and programming approach.

Inter-district Variation in Child Survival

District level estimates of the risk of death during the first five years of life for the year 2018 are presented in table 1 and depicted in figure 1. These estimates correspond to an under-five mortality rate (U5MR) of 56 under five deaths for every 1000 live births estimated for Madhya Pradesh for the year 2018 by India's official Sample Registration System (Government of India, 2020b). It may be seen from the table that the risk of death during childhood (U5MR) varies widely across the districts. The U5MR is the highest in district Singrauli (81 under-five deaths per 1000 population) but the lowest in district Indore (38 under-five deaths per 1000 live births). Singrauli is the only district where, out of every 1000 new-born, more than 81 fail to survive to their fifth birthday. Other districts where the U5MR is estimated to be exceptionally high are Katni, Panna, Shahdol, Sheopur, Sidhi and Umaria. In these districts, between 70-80 out of every 1000 new-born fail to survive to their fifth birthday. Five of these six districts, except district Sheopur, constitute the geographical continuity as all these five districts are located in the north-eastern corner of the state.

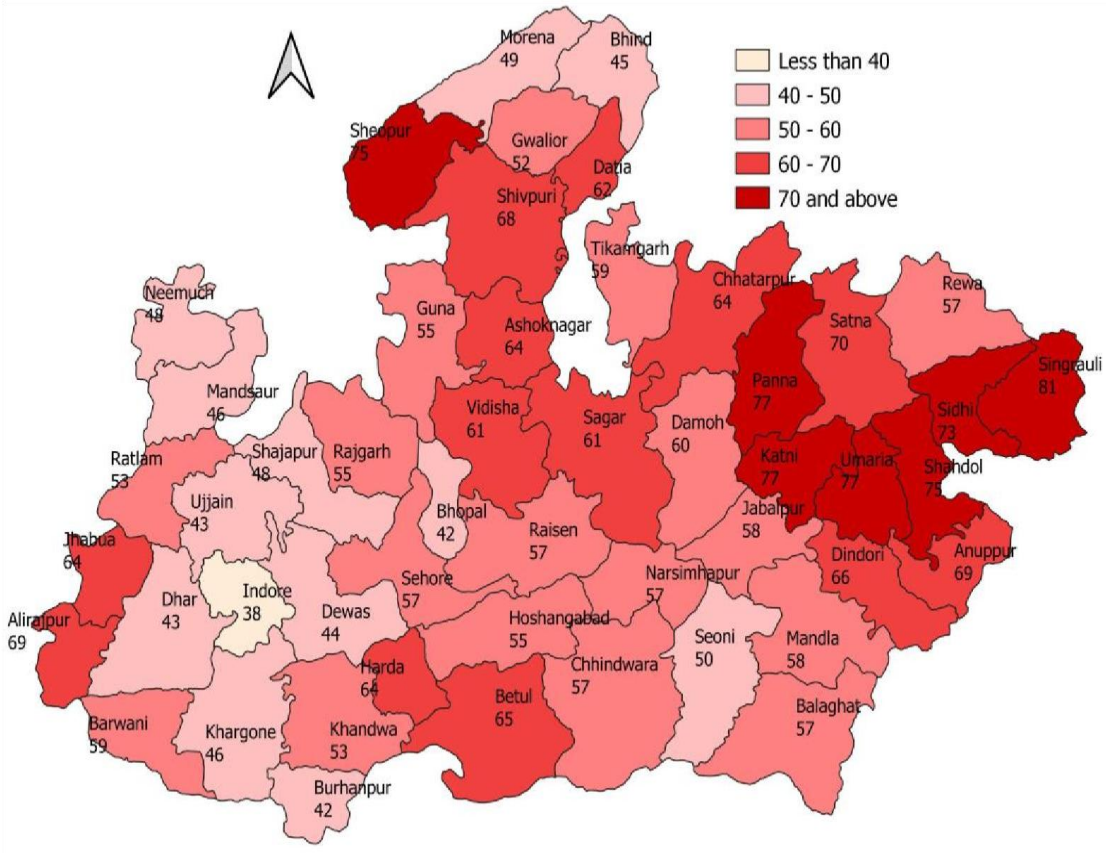


Figure 1: U5MR in districts of Madhya Pradesh, 2018

On the other hand, district Indore is only district where U5MR is estimated to be less than 40 under-five deaths per 1000 live births. In addition, in 12 districts - Bhind, Bhopal, Burhanpur, Dewas, Dhar, Khargone, Mandsaur, Morena, Neemuch, Seoni, Shajapur, and Ujjain – U5MR varies between 40-50 under-five deaths for every 1000 live births circa 2018. Most of these districts are located in the south-western part of the state and constitute another geographical continuity. The north-south divide in the risk of death during childhood in the state is very much apparent from figure 1. In general, U5MR is higher in the northern part of the state compared to its southern part barring a few exceptions.

Child Survival Inequality

The population of each district can be divided into the following 12 mutually exclusive, yet exhaustive population sub-groups:

1. Rural Scheduled Castes male
2. Rural Scheduled Tribes female
3. Rural Scheduled Tribes male
4. Rural Scheduled Tribes female
5. Rural Other Castes male
6. Rural Other Castes female
7. Rural Scheduled Castes male
8. Rural Scheduled Tribes female
9. Rural Scheduled Tribes male
10. Rural Scheduled Tribes female
11. Rural Other Castes male
12. Rural Other Castes female

At the 2011 population census, there were 50 districts in the state so that the population of Madhya Pradesh can be divided into 600 mutually exclusive, yet exhaustive population sub-groups in terms of residence, social class, and gender - 50 districts; 2 residence areas - rural and urban; 3 social classes - Scheduled Castes, Scheduled Tribes and Other Castes; and 2 gender - female and male (50x2x3x2=600). Estimates of U5MR for each of the 600 mutually exclusive and exhaustive population sub-groups of the state, as estimated by Chaurasia (2021), are presented in table 2 and depicted in figure 2 in the form of the heat map. Very wide variation in the under-five mortality rate across the 600 mutually exclusive and exhaustive population sub-groups of the state is very much evident from the figure. The under-five mortality rate in 2018 is estimated to be the highest in Scheduled Tribes female children in the rural areas of district Shivpuri (114 under-five deaths per 1000 live births) but the lowest in Other Castes male children in the urban areas of district Alirajpur (19 under-five deaths per 1000 live births) which reflects the pervasiveness of population sub-group inequality in child mortality in the state. There are 12 population sub-groups in the state where the U5MR is still estimated to be more than 100 under-five deaths for every 1000 live births whereas in 52 population sub-groups, U5MR is estimated to range between 80-100 under-five deaths for every 1000 live births. These population sub-groups are the child mortality hotspots of the state.

State/District	All	Rural						Urban					
		Scheduled Castes		Scheduled Tribes		Other Castes		Scheduled Castes		Scheduled Tribes		Other Castes	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
MP	0.056	0.061	0.065	0.074	0.071	0.050	0.051	0.050	0.049	0.056	0.053	0.043	0.041
Alirajpur	0.069	0.065	0.061	0.076	0.069	0.046	0.049	0.026	0.030	0.043	0.033	0.019	0.031
Anuppur	0.069	0.077	0.075	0.079	0.071	0.072	0.060	0.066	0.062	0.075	0.059	0.053	0.047
Ashoknagar	0.064	0.074	0.075	0.095	0.103	0.054	0.059	0.062	0.055	0.058	0.074	0.045	0.047
Balaghat	0.057	0.067	0.057	0.072	0.064	0.060	0.050	0.049	0.044	0.048	0.034	0.048	0.037
Barwani	0.059	0.056	0.056	0.067	0.059	0.052	0.047	0.040	0.043	0.047	0.041	0.036	0.030
Betul	0.065	0.066	0.059	0.081	0.075	0.057	0.050	0.052	0.044	0.062	0.065	0.049	0.042
Bhind	0.045	0.045	0.055	0.065	0.079	0.038	0.049	0.045	0.057	0.025	0.052	0.039	0.049
Bhopal	0.042	0.062	0.071	0.067	0.066	0.052	0.048	0.042	0.037	0.037	0.039	0.038	0.038
Burhanpur	0.042	0.037	0.031	0.056	0.054	0.034	0.042	0.035	0.031	0.045	0.031	0.030	0.033
Chhatarpur	0.064	0.074	0.079	0.089	0.101	0.059	0.064	0.060	0.061	0.068	0.076	0.051	0.051
Chhindwara	0.057	0.058	0.055	0.075	0.067	0.055	0.048	0.045	0.037	0.048	0.047	0.037	0.035
Damoh	0.060	0.068	0.076	0.073	0.073	0.055	0.061	0.051	0.055	0.052	0.074	0.044	0.041
Datia	0.062	0.069	0.072	0.082	0.097	0.057	0.059	0.069	0.073	0.074	0.050	0.061	0.055
Dewas	0.044	0.052	0.055	0.056	0.062	0.038	0.040	0.038	0.040	0.043	0.045	0.033	0.032
Dhar	0.043	0.044	0.041	0.048	0.049	0.034	0.035	0.036	0.034	0.035	0.038	0.031	0.033
Dindori	0.066	0.089	0.082	0.070	0.064	0.062	0.060	0.097	0.028	0.085	0.058	0.052	0.043
Guna	0.055	0.055	0.067	0.073	0.079	0.048	0.054	0.040	0.053	0.062	0.074	0.042	0.040
Gwalior	0.052	0.058	0.063	0.090	0.095	0.044	0.055	0.056	0.051	0.061	0.083	0.052	0.045
Harda	0.064	0.059	0.069	0.080	0.088	0.054	0.056	0.039	0.040	0.069	0.049	0.045	0.037
Hoshangabad	0.055	0.067	0.072	0.081	0.071	0.049	0.049	0.051	0.064	0.042	0.041	0.042	0.035
Indore	0.038	0.042	0.038	0.045	0.044	0.034	0.033	0.041	0.037	0.044	0.041	0.041	0.036
Jabalpur	0.058	0.073	0.068	0.083	0.075	0.060	0.053	0.062	0.056	0.073	0.074	0.053	0.044
Jhabua	0.064	0.036	0.041	0.069	0.066	0.045	0.043	0.053	0.028	0.040	0.037	0.043	0.031
Katni	0.077	0.080	0.075	0.101	0.096	0.074	0.068	0.066	0.068	0.093	0.073	0.057	0.043
Khandwa	0.053	0.050	0.054	0.066	0.068	0.046	0.046	0.041	0.039	0.047	0.039	0.036	0.030
Khargone	0.046	0.050	0.048	0.053	0.050	0.043	0.041	0.043	0.028	0.043	0.040	0.032	0.029
Mandla	0.058	0.053	0.051	0.064	0.057	0.065	0.054	0.045	0.026	0.057	0.031	0.040	0.032
Mandsaur	0.046	0.060	0.058	0.067	0.058	0.048	0.043	0.039	0.042	0.044	0.026	0.032	0.031
Morena	0.049	0.047	0.067	0.074	0.080	0.041	0.055	0.047	0.057	0.023	0.056	0.038	0.046
Narsimhapur	0.057	0.064	0.062	0.075	0.070	0.060	0.052	0.050	0.048	0.062	0.042	0.043	0.039
Neemuch	0.048	0.060	0.053	0.084	0.073	0.046	0.045	0.045	0.040	0.057	0.063	0.039	0.032
Panna	0.077	0.083	0.092	0.101	0.099	0.068	0.067	0.067	0.074	0.070	0.095	0.043	0.036
Raisen	0.057	0.069	0.067	0.077	0.074	0.051	0.051	0.056	0.053	0.058	0.066	0.044	0.040
Rajgarh	0.055	0.065	0.069	0.067	0.059	0.054	0.055	0.051	0.051	0.048	0.044	0.045	0.044
Ratlam	0.053	0.064	0.062	0.066	0.066	0.050	0.045	0.040	0.047	0.048	0.058	0.038	0.032
Rewa	0.057	0.063	0.070	0.082	0.085	0.047	0.047	0.062	0.057	0.079	0.086	0.041	0.044
Sagar	0.061	0.073	0.078	0.084	0.079	0.054	0.054	0.059	0.060	0.077	0.104	0.052	0.050
Satna	0.070	0.077	0.081	0.101	0.102	0.061	0.065	0.070	0.060	0.095	0.085	0.042	0.043
Sehore	0.057	0.072	0.069	0.074	0.073	0.052	0.048	0.063	0.057	0.053	0.042	0.046	0.046
Seoni	0.050	0.054	0.053	0.054	0.050	0.051	0.048	0.052	0.034	0.055	0.036	0.043	0.034
Shahdol	0.075	0.078	0.076	0.092	0.083	0.073	0.069	0.055	0.043	0.062	0.066	0.039	0.038
Shajapur	0.048	0.056	0.061	0.053	0.056	0.046	0.046	0.053	0.049	0.037	0.032	0.035	0.037
Sheopur	0.075	0.063	0.082	0.109	0.110	0.059	0.061	0.066	0.067	0.074	0.094	0.044	0.055
Shivpuri	0.068	0.068	0.074	0.107	0.114	0.057	0.063	0.050	0.064	0.077	0.094	0.038	0.044
Sidhi	0.073	0.077	0.077	0.095	0.097	0.060	0.061	0.071	0.078	0.079	0.063	0.043	0.043
Singrauli	0.081	0.088	0.080	0.096	0.095	0.074	0.073	0.080	0.074	0.091	0.080	0.056	0.045
Tikamgarh	0.059	0.058	0.069	0.078	0.091	0.055	0.061	0.041	0.058	0.059	0.037	0.049	0.046
Ujjain	0.043	0.054	0.058	0.051	0.049	0.044	0.043	0.041	0.038	0.053	0.028	0.033	0.035
Umaria	0.077	0.072	0.073	0.092	0.087	0.065	0.065	0.069	0.057	0.069	0.080	0.046	0.050
Vidisha	0.061	0.074	0.078	0.103	0.100	0.055	0.059	0.056	0.061	0.067	0.091	0.043	0.042

Figure 2: Variation in the probability of death in the first five years of life across 600 population sub-groups in Madhya Pradesh, 2018

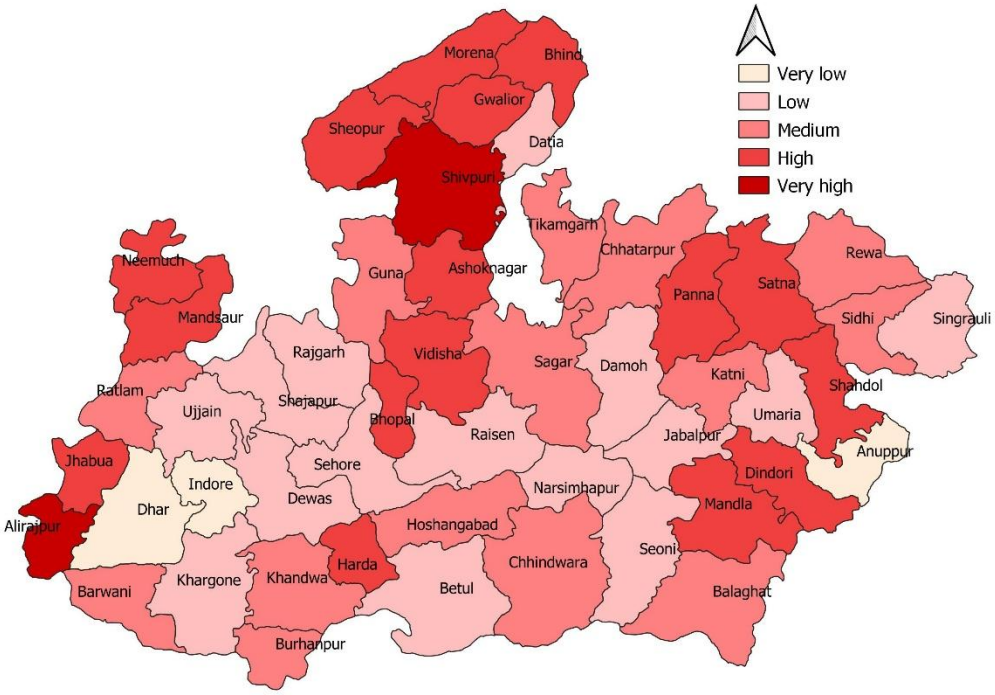


Figure 3: Within-district inequality in the probability of death in the first five years of life in Madhya Pradesh, 2018

Table 2 also highlights within-district inequality in child mortality that has been given the least attention in efforts directed towards promoting child survival. For Madhya Pradesh, the ratio of the highest U5MR to the lowest U5MR across 12 mutually exclusive population sub-groups is more than 1.8 while the coefficient of variation is 0.181 and the ration of arithmetic mean to geometric mean is 1.016. If U5MR would have been the same for all population sub-groups, the ratio of the highest to the lowest U5MR would have been 1; coefficient of variation would have been 0; and the ratio of arithmetic mean to geometric mean would have been 1. This shows that just by reducing the population sub-groups inequality, the U5MR in the state can be brought down from the current 56 to 41 under five deaths per 1000 live births or a reduction of almost 37 per cent even if there is no decrease in U5MR.

The within-district, population sub-group inequality in U5MR is found to be the highest in district Alirajpur but the lowest in district Indore. There are 31 districts where the highest U5MR across the 12 mutually exclusive population sub-groups is at least two times higher than the lowest U5MR. This means that substantial reduction in U5MR in these districts is possible just by reducing within-district, population sub-group inequality in U5MR. In general, the U5MR is high in those districts where the within-district population sub-group inequality in U5MR is high. Obviously, the improvement in the probability of survival of children of the state can be accelerated by reducing population sub-group inequality in the probability of survival during childhood across 600 mutually exclusive population sub-groups in the state.

The very fact that the risk or the probability of death in children varies widely across the 600 mutually exclusive population sub-groups of the state implies that the health and nutritional status, and the living conditions of children varies widely across different mutually exclusive population sub-groups within the state. At the same time, it also appears that programmes and interventions directed towards preventing premature deaths among children are having differential impact on different population sub-groups as far as prevention of the premature deaths during childhood is concerned. This means that task of reducing the diversity or the inequality in the risk or the probability of death during childhood, essentially, translates into reducing disparities in the health and nutritional status, and living conditions of children of different mutually exclusive population sub-groups within the state as well as improving the realised efficiency of programmes and interventions directed towards the reduction in child mortality.

Unfortunately, information about the health and nutritional status and living conditions of children of 600 mutually exclusive population sub-groups of the state is not available from any data source. This lack of information is probably and so obviously the most important impediment by way of an accelerated improvement in child survival probability in the state. However, the limited evidence available through the National Family Health Survey 2015-16 clearly indicates that the diversity in the health and nutritional status and living conditions of children as well as the realised efficiency of child survival interventions is quite pervasive in the state. For example:

- The registration of births varies from 95 per cent in district Shajapur to 53 per cent in district Barwani.
- Women receiving full ANC during their pregnancy varies from more than 30 per cent in district Jabalpur to less than 2 per cent in district Sidhi.
- Children 12-23 months of age who are fully immunized (received all basic vaccinations - BCG, 3 doses of DPT and OPV and Measles) varies from more than 78 per cent in district Raisen to less than 23 per cent in district Alirajpur.
- Children below five years of age who are under-weight varies from 30 per cent in district Sagar to 55 per cent in district Barwani.

The Challenge

The diverse and very complex health and nutritional status and living conditions of children of Madhya Pradesh as well as the poor organisational efficiency of child survival interventions in the state suggests that the challenge of accelerated reduction in child mortality in the state is essentially two-dimensional – the demand side challenge and the supply side challenge. It appears that the demand for critical child health and nutrition interventions in the state is low and varies across different population sub-groups (*600*). It also appears that the realised efficiency of current child health and nutrition interventions is poor in meeting whatever demand is there.

Increasing the demand for critical child health and nutrition interventions requires community mobilisation. Different population sub-groups (*600*) may require different approaches of community mobilisation. Similarly, increasing the realised efficiency of child health and nutrition services requires improving the needs effectiveness and capacity efficiency of these services in the context of specific population sub-groups (*600*). A decentralised approach is, therefore, required for both increasing the demand for critical child health and nutrition interventions and for improving the efficiency and efficacy of child health and nutrition interventions to meet the increased demand.

Meeting the Challenge

It is obvious that a multi-dimensional approach is required to meeting the challenge of securing the survival of children in the state. This approach may include:

- Formulating a child survival policy of Madhya Pradesh as a reflection of the political commitment towards preventing premature deaths in children of the state.
- Articulating a Child Survival Action Plan for Madhya Pradesh that is directed towards an accelerated improvement in the child probability of survival probability in the state.
- Generating the evidence necessary to create a constituency for the health nutrition and survival of children below 15 years of age - the future citizens of the state.
- Mobilising the community to universalize the demand for critical child health and nutrition interventions necessary for preventing premature child deaths.
- Motivating the government and the private sector for increased investment in child health and nutrition.
- Building the technical capacity of the state in all dimensions of child survival including health and nutrition.

Child Survival Policy

- Madhya Pradesh does not have state-specific child survival policy. A state-specific child survival policy may address the state-specific concerns.
- Children of Madhya Pradesh had faced the highest risk or probability of death among all states and Union Territories of the country for more than four decades.
- There is the need of the state policy on child survival that addresses the specific child survival challenges being faced by the state.
- Lack of an explicit child survival policy reflects lack of political will and bureaucratic commitment towards saving the lives of children - the future citizens of the state.

- Formulation and adoption of an explicit child survival policy should therefore be the first and, perhaps, the foremost step towards accelerated reduction in child mortality in the state.
- The proposed Madhya Pradesh Child Survival Policy must elaborate a decentralised approach towards preventing premature child deaths in the state.
- The implementation of the Madhya Pradesh Child Survival Policy should be entrusted to Madhya Pradesh Child Survival Commission that may be constituted through an Act passed in the state legislature.

Child Survival Action Plan

- The Madhya Pradesh Child Survival Policy should be accompanied by Madhya Pradesh Child Survival Action Plan that should be directed towards building the capacity of the state to prevent child deaths. The Action Plan should focus on four key components of securing child survival in the state: 1) enhancing household capacity; 2) building community capacity; 3) improving organisational effectiveness of child health and nutrition services; and 4) generating evidence for evidence-based policy, planning and programming for child survival.
- The Action Plan should work towards enhancing household capacity in terms of

  Monitoring child health and nutrition at household level.
  Developing household level skills to prevent child deaths.
  Mobilising household level resources to meet health and nutrition needs of children.
  Building household capacity to manage risk, especially in the context of risks associated with child health and nutrition.

- The Action Plan should also be directed towards building community capacity in terms of

  Ensuring universal availability of safe drinking water.
  Providing universal access to improved sanitation facilities.
  Local vector control.
  Providing health and nutrition services at the local level.

- Finally, the Action Plan should also work for improving the organisational effectiveness of child health and nutrition services through

  Improving the administrative capacity.
  Increasing the operational efficiency.
  Developing the community interface.

Generating Evidence

- The lack of the empirical evidence necessary for reducing child mortality and creating a constituency for preventing child deaths is perhaps the greatest challenge towards an accelerated improvement in child survival in the state.

Most of the evidence currently available is either anecdotal or analogical or outdated. There has been little initiative in this direction.

- Filling the data gaps is necessary to effectively operationalise the decentralized approach of accelerated reduction in child mortality in the state.
- The evidence generated must aid planning and programming for preventing premature child deaths.
- The evidence must be SMART.

Community Mobilisation

- Community mobilisation is critical to significantly enhancing the demand for interventions directed towards preventing premature child deaths.
- Community mobilisation is also critical to initiate and sustain local level action that crucial for preventing premature child deaths.
- Community mobilisation activities must be directed towards building household and community capacity to prevent premature child deaths.
- Community mobilisation should not be limited to increasing community awareness. They must be directed towards initiating and sustaining local level action to prevent premature child deaths.

Increasing Investment in Children

- Investing in children is essentially the investment in the future. The state commitment towards child survival is reflected through increased investment in children.
- Private investment through CSR route may be garnered to secure increased private sector investment directed towards preventing premature child deaths.

Building Technical Capacity

- Building the technical capacity of the state to support local level action to prevent child deaths is important to sustain local level action that appears to be critical for an accelerated reduction in the risk of death during childhood in the state.
- The technical support may focus on the following areas which are critical to child survival:

  Good nutrition to women, especially, during pregnancy.
  Balanced diet.
  Breastfeeding.
  Home-based monitoring of child health and nutrition.
  Generating local level evidence that may serve as impetus to promote and sustain local action.
  Local action to address child health and nutrition issues.

Conceptual Framework

The conceptual framework for securing the survival of the children of the state must be directed towards building and sustaining state capacity to prevent deaths of children. The state capacity to prevent child deaths, essentially, has the following three components:

- Building household capacity to monitor health and nutritional status of children and take appropriate action to avoid premature child deaths.
- Building community capacity to initiate and sustain appropriate action at the community level that may help households in avoiding premature child deaths.
- Enhancing the capacity of the system that has been created specifically to safeguarding the life of children through appropriate programme interventions and actions.

The three components of the state capacity to prevent child deaths are mutually reinforcing. They are the most effective in preventing child deaths only when they are operationalised and implemented in tandem. Although, each of the three components contributes to preventing child deaths in its own context, yet they are the most effective when they are planned, implemented, monitored, and evaluated in an integrated manner. This is important as the challenge of preventing child deaths is multi-dimensional.

Building the household capacity, community capacity and system capacity to prevent child deaths in the state requires identification of specific interventions that may constitute the basis for the Child Survival Action Plan. These interventions may be different for different population sub-groups of the state simply because the risk of death during childhood varies widely across different population sub-groups. However, it is possible to identify at least 11 focus areas that tentatively may constitute the business model of the proposed Child Survival Action Plan to prevent premature child deaths. The focus areas are described below:

I Strengthen household capacity

1. Household level monitoring
2. Skills development
3. Resources mobilisation
4. Risk management

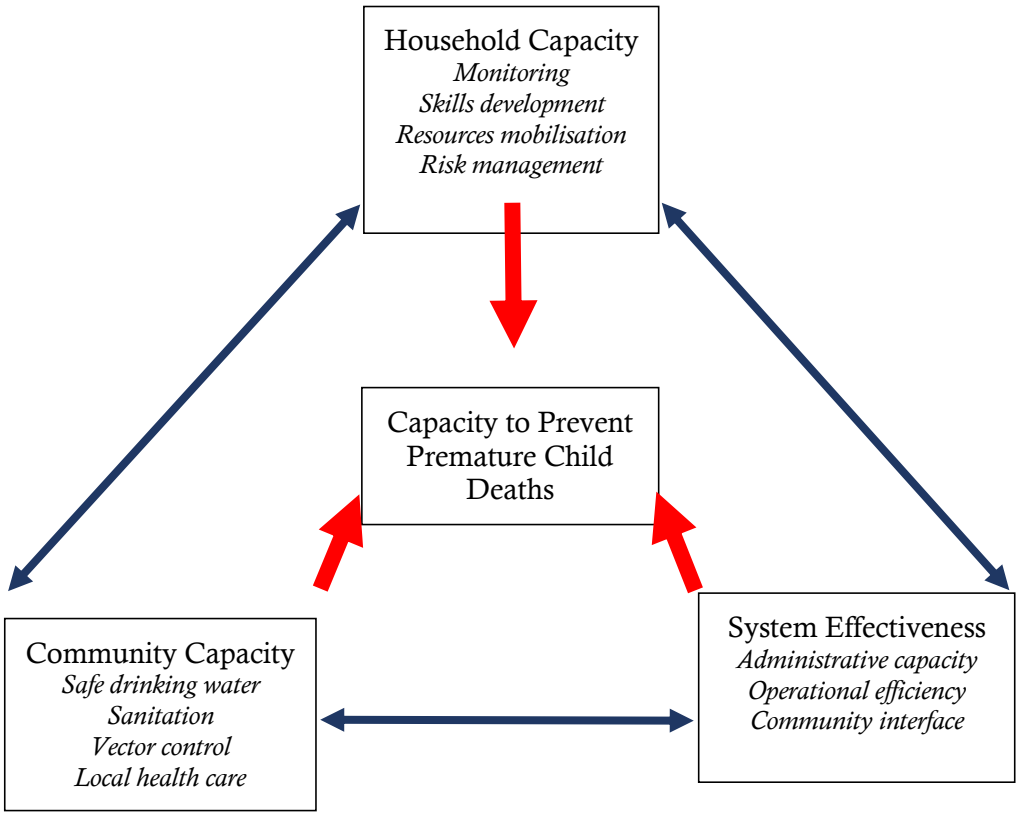
II Build community capacity

5. Safe drinking water
6. Sanitation
7. Vector control
8. Local health action

III Improve system effectiveness

9. Administrative capacity
10. Organisational efficiency
11. Community interface

Conceptual framework for preventing child deaths



The conceptual framework described above identifies 11 focus areas to address the challenge of preventing child deaths in Madhya Pradesh. These focus areas must be capped with an intelligent information system to generate the evidence to support child survival policy, planning and programming right up to the local level. Such an intelligent evidence generation system is crucial for harnessing community support to child survival activities which is lacking miserably at present. Community mobilisation is a must for sustaining child survival efforts, and it is possible to create a constituency for child survival by creating an intelligent evidence generation system.

The focus areas identified in the conceptual framework are tentative, at best. More focus areas may be added to the list after due discussion and deliberation with different stakeholders. For each focus area, specific interventions may be identified to develop a time bound action plan for preventing premature child deaths thereby improving the child survival probability in the state to achieve the goals laid down in the National Health Policy 2017 and the targets set under the Sustainable Development Goals.

Conclusions

We have argued in this paper that significant improvement in child survival in Madhya Pradesh can be achieved by reducing the child survival inequality across 600 mutually exclusive, yet exhaustive population sub-groups based on residence, social class, and gender. We have used a hybrid approach to estimate the risk of death during childhood in the 600 mutually exclusive and exhaustive population sub-groups to reflect the highly pervasive and persistent inequality in under-five mortality rate in the state. Given the highly pervasive and persistent inequality in child mortality we argue that a decentralised district-based approach is necessary to prevent child deaths in the state and to improve the survival chances of children during childhood. We have also proposed a conceptual framework that may constitute the basis for operationalising the decentralised approach of preventing child deaths. We realise that the approach proposed by us require high level of political will and bureaucratic commitment to make the approach effective. In this context, we recommend that Madhya Pradesh should constitute an Inter-agency Task Force on Child Survival in Madhya Pradesh to provide the necessary leadership and commitment to reinvigorate child survival efforts in the state.

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Table 1: Probability of death in the first five years of life (U5Mr/1000) in 600 population sub-groups of Madhya Pradesh, 2018.

State/District	All	Rural						Urban						Within-district inequality		
		SC		ST		OT		SC		ST		OT		Ratio of highest to lowest	Coefficient of variation	Ratio of arithmetic mean to geometric mean
		M	F	M	F	M	F	M	F	M	F	M	F			
Madhya Pradesh	0.056	0.061	0.065	0.074	0.071	0.050	0.051	0.050	0.049	0.056	0.053	0.043	0.041	1.805	0.181	1.016
Alirajpur	0.069	0.065	0.061	0.076	0.069	0.046	0.049	0.026	0.030	0.043	0.033	0.019	0.031	4.000	0.390	1.086
Anuppur	0.069	0.077	0.075	0.079	0.071	0.072	0.060	0.066	0.062	0.075	0.059	0.053	0.047	1.681	0.147	1.012
Ashoknagar	0.064	0.074	0.075	0.095	0.103	0.054	0.059	0.062	0.055	0.058	0.074	0.045	0.047	2.289	0.260	1.032
Balaghat	0.057	0.067	0.057	0.072	0.064	0.060	0.050	0.049	0.044	0.048	0.034	0.048	0.037	2.118	0.214	1.024
Barwani	0.059	0.056	0.056	0.067	0.059	0.052	0.047	0.040	0.043	0.047	0.041	0.036	0.030	2.233	0.212	1.024
Betul	0.065	0.066	0.059	0.081	0.075	0.057	0.050	0.052	0.044	0.062	0.065	0.049	0.042	1.929	0.196	1.019
Bhind	0.045	0.045	0.055	0.065	0.079	0.038	0.049	0.045	0.057	0.025	0.052	0.039	0.049	3.160	0.265	1.037
Bhopal	0.042	0.062	0.071	0.067	0.066	0.052	0.048	0.042	0.037	0.037	0.039	0.038	0.038	1.919	0.256	1.032
Burhanpur	0.042	0.037	0.031	0.056	0.054	0.034	0.042	0.035	0.031	0.045	0.031	0.030	0.033	1.867	0.227	1.024
Chhatarpur	0.064	0.074	0.079	0.089	0.101	0.059	0.064	0.060	0.061	0.068	0.076	0.051	0.051	1.980	0.209	1.021
Chhindwara	0.057	0.058	0.055	0.075	0.067	0.055	0.048	0.045	0.037	0.048	0.047	0.037	0.035	2.143	0.230	1.026
Damoh	0.060	0.068	0.076	0.073	0.073	0.055	0.061	0.051	0.055	0.052	0.074	0.044	0.041	1.854	0.196	1.020
Datia	0.062	0.069	0.072	0.082	0.097	0.057	0.059	0.069	0.073	0.074	0.050	0.061	0.055	1.940	0.183	1.016
Dewas	0.044	0.052	0.055	0.056	0.062	0.038	0.040	0.038	0.040	0.043	0.045	0.033	0.032	1.938	0.207	1.021
Dhar	0.043	0.044	0.041	0.048	0.049	0.034	0.035	0.036	0.034	0.035	0.038	0.031	0.033	1.581	0.150	1.011
Dindori	0.066	0.089	0.082	0.070	0.064	0.062	0.060	0.097	0.028	0.085	0.058	0.052	0.043	3.464	0.291	1.051
Guna	0.055	0.055	0.067	0.073	0.079	0.048	0.054	0.040	0.053	0.062	0.074	0.042	0.040	1.975	0.229	1.027
Gwalior	0.052	0.058	0.063	0.090	0.095	0.044	0.055	0.056	0.051	0.061	0.083	0.052	0.045	2.159	0.262	1.032
Harda	0.064	0.059	0.069	0.080	0.088	0.054	0.056	0.039	0.040	0.069	0.049	0.045	0.037	2.378	0.278	1.038
Hoshangabad	0.055	0.067	0.072	0.081	0.071	0.049	0.049	0.051	0.064	0.042	0.041	0.042	0.035	2.314	0.259	1.034

State/District	All	Rural						Urban						Within-district inequality		
		SC		ST		OT		SC		ST		OT		Ratio of highest to lowest	Coefficient of variation	Ratio of arithmetic mean to geometric mean
		M	F	M	F	M	F	M	F	M	F	M	F			
Indore	0.038	0.042	0.038	0.045	0.044	0.034	0.033	0.041	0.037	0.044	0.041	0.041	0.036	1.364	0.097	1.005
Jabalpur	0.058	0.073	0.068	0.083	0.075	0.060	0.053	0.062	0.056	0.073	0.074	0.053	0.044	1.886	0.172	1.016
Jhabua	0.064	0.036	0.041	0.069	0.066	0.045	0.043	0.053	0.028	0.040	0.037	0.043	0.031	2.464	0.273	1.035
Katni	0.077	0.080	0.075	0.101	0.096	0.074	0.068	0.066	0.068	0.093	0.073	0.057	0.043	2.349	0.212	1.025
Khandwa	0.053	0.050	0.054	0.066	0.068	0.046	0.046	0.041	0.039	0.047	0.039	0.036	0.030	2.267	0.234	1.027
Khargone	0.046	0.050	0.048	0.053	0.050	0.043	0.041	0.043	0.028	0.043	0.040	0.032	0.029	1.893	0.191	1.020
Mandla	0.058	0.053	0.051	0.064	0.057	0.065	0.054	0.045	0.026	0.057	0.031	0.040	0.032	2.500	0.261	1.040
Mandsaur	0.046	0.060	0.058	0.067	0.058	0.048	0.043	0.039	0.042	0.044	0.026	0.032	0.031	2.577	0.270	1.039
Morena	0.049	0.047	0.067	0.074	0.080	0.041	0.055	0.047	0.057	0.023	0.056	0.038	0.046	3.478	0.290	1.048
Narsimhapur	0.057	0.064	0.062	0.075	0.070	0.060	0.052	0.050	0.048	0.062	0.042	0.043	0.039	1.923	0.200	1.021
Neemuch	0.048	0.060	0.053	0.084	0.073	0.046	0.045	0.045	0.040	0.057	0.063	0.039	0.032	2.625	0.272	1.036
Panna	0.077	0.083	0.092	0.101	0.099	0.068	0.067	0.067	0.074	0.070	0.095	0.043	0.036	2.806	0.267	1.044
Raisen	0.057	0.069	0.067	0.077	0.074	0.051	0.051	0.056	0.053	0.058	0.066	0.044	0.040	1.925	0.191	1.019
Rajgarh	0.055	0.065	0.069	0.067	0.059	0.054	0.055	0.051	0.051	0.048	0.044	0.045	0.044	1.568	0.157	1.012
Ratlam	0.053	0.064	0.062	0.066	0.066	0.050	0.045	0.040	0.047	0.048	0.058	0.038	0.032	2.063	0.218	1.025
Rewa	0.057	0.063	0.070	0.082	0.085	0.047	0.047	0.062	0.057	0.079	0.086	0.041	0.044	2.098	0.252	1.033
Sagar	0.061	0.073	0.078	0.084	0.079	0.054	0.054	0.059	0.060	0.077	0.104	0.052	0.050	2.080	0.230	1.026
Satna	0.070	0.077	0.081	0.101	0.102	0.061	0.065	0.070	0.060	0.095	0.085	0.042	0.043	2.429	0.266	1.040
Sehore	0.057	0.072	0.069	0.074	0.073	0.052	0.048	0.063	0.057	0.053	0.042	0.046	0.046	1.762	0.195	1.019
Seoni	0.050	0.054	0.053	0.054	0.050	0.051	0.048	0.052	0.034	0.055	0.036	0.043	0.034	1.618	0.165	1.015
Shahdol	0.075	0.078	0.076	0.092	0.083	0.073	0.069	0.055	0.043	0.062	0.066	0.039	0.038	2.421	0.262	1.039
Shajapur	0.048	0.056	0.061	0.053	0.056	0.046	0.046	0.053	0.049	0.037	0.032	0.035	0.037	1.906	0.196	1.021

State/District	All	Rural						Urban						Within-district inequality		
		SC		ST		OT		SC		ST		OT		Ratio of highest to lowest	Coefficient of variation	Ratio of arithmetic mean to geometric mean
		M	F	M	F	M	F	M	F	M	F	M	F			
Sheopur	0.075	0.063	0.082	0.109	0.110	0.059	0.061	0.066	0.067	0.074	0.094	0.044	0.055	2.500	0.274	1.037
Shivpuri	0.068	0.068	0.074	0.107	0.114	0.057	0.063	0.050	0.064	0.077	0.094	0.038	0.044	3.000	0.323	1.053
Sidhi	0.073	0.077	0.077	0.095	0.097	0.060	0.061	0.071	0.078	0.079	0.063	0.043	0.043	2.256	0.235	1.031
Singrauli	0.081	0.088	0.080	0.096	0.095	0.074	0.073	0.080	0.074	0.091	0.080	0.056	0.045	2.133	0.187	1.021
Tikamgarh	0.059	0.058	0.069	0.078	0.091	0.055	0.061	0.041	0.058	0.059	0.037	0.049	0.046	2.459	0.251	1.031
Ujjain	0.043	0.054	0.058	0.051	0.049	0.044	0.043	0.041	0.038	0.053	0.028	0.033	0.035	2.071	0.203	1.022
Umaria	0.077	0.072	0.073	0.092	0.087	0.065	0.065	0.069	0.057	0.069	0.080	0.046	0.050	2.000	0.191	1.019
Vidisha	0.061	0.074	0.078	0.103	0.100	0.055	0.059	0.056	0.061	0.067	0.091	0.043	0.042	2.452	0.285	1.041