



BENEFIT-COST ANALYSIS

MATERNAL AND CHILD HEALTH

Analysis of maternal and child health interventions in
RAJASTHAN

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Strategic Initiatives to Improve Maternal and Child Health in Rajasthan: A Cost-Benefit Analysis

Rajasthan Priorities An India Consensus Prioritization Project

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Academic Abstract

The objective of this paper is to address the issue of maternal and child health in India – specifically in Rajasthan. Despite a significant decrease in infant and maternal mortality rates in the country, India continues to demonstrate among the highest prevalence of neonatal mortality in the world, with about 0.75 million neonates dying every year.

Rajasthan has improved significantly on its maternal and child survival indicators in the last 10 years. Between 2005-06 and 2015-16, Rajasthan's infant mortality fell from 65 to 41 deaths per 1000 live births (NFHS-3, NFHS-4). Maternal mortality rate fell from 318 per 100,000 live births in 2008, to 244 in 2013 (Ministry of Health and Family Welfare). Nevertheless, there is still room for improvement, particularly on several indicators related to access and use of child and maternal health services. In Rajasthan, 58 percent of women exclusively breastfeed, 39 percent of women had at least 4 antenatal care (ANC) visits during pregnancy, and only 55 percent of children are fully vaccinated (NFHS-4).

A cost-benefit analysis of three policy interventions - breastfeeding promotion, promotion and incentivization of immunizations in lagging districts and conditional cash transfers for accessing ante natal services shows significantly positive benefit-cost ratios (BCRs). The paper argues that the most effective (highest benefits-to-costs) intervention to improve maternal and child health is immunization promotion, while promotion of exclusive breastfeeding to new mothers has the largest net benefits.

Policy Abstract

The Problem

The nomenclature 'Maternal and Child Health' (MCH) itself heralds the interactive nature of human lives and multi-dimensional health care regimes. Since Independence it has been the government's resolve to provide affordable health care access including MCH to the masses. While supply of health care has always been a challenge there are many demand side issues that regulate health seeking behavior, especially in the MCH field. The current survival status of a child is a good indicator of the efficacy of MCH programs. Yet there are many factors relating to mothers such as level of education, frequency of antenatal checkups, place of delivery, length of breast feeding and place of residence which all independently as well as interactively affect the child's survival. Considerable variation in the supply and demand for MCH services is noticed across India and there is stark differential between states.

Like many parts of the developing world, Rajasthan has improved significantly on its maternal and child survival indicators in the last 10 years. Between 2005-06 and 2015-16 survey data indicate that Rajasthan's infant mortality fell from 65 to 41 deaths per 1000 live births (NFHS 3, NFHS4). Maternal mortality rate fell from 318 per 100,000 live births in 2008, to 244 in 2013 (Ministry of Health and Family Welfare).

Nevertheless, there is still room for improvement, particularly on several indicators related to access and use of child and maternal health services. In Rajasthan, 58 percent of women exclusively breastfeed, 39 percent of women had at least 4 antenatal care (ANC) visits during pregnancy, and only 55 percent of children are fully vaccinated (NFHS-4).

Existing Initiatives

At the federal level, several initiatives exist to tackle the issue of poor maternal and child health. *Mission Indradhanush* was launched to reach out to the children where routine vaccination cannot be reached out with the primary objective to increase full immunization coverage in India to at least 90% children by 2020. It was launched on 25 December, 2014 and implementation began on 7 April, 2015. More than 2 crore children and around 56 lakh pregnant women have been immunized under this scheme.

MAA (Mother's Absolute Affection) is a focused programme launched on the 5th August 2016 towards promotion of breastfeeding. The specific goal of the MAA programme is to revive

efforts towards promotion, protection and support of breastfeeding practices through health systems to enhance breastfeeding rates.

Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) was launched to provide fixed-day assured, comprehensive and quality antenatal care universally to all pregnant women on the 9th of every month. While antenatal care is routinely provided to pregnant women, special ANC services are provided by OBGY specialists / radiologists / physicians at government health facilities under PMSMA. An important component of PMSMA has been the identification and follow-up of high risk pregnancies.

Further, the **Janani Shishu Suraksha Karyakaram (JSSK)** was launched by Government of India on 1st June, 2011 to eliminate out of pocket expenditure for pregnant women and sick newborns for drugs, diet, diagnostics, user charges, referral transport, etc. The scheme entitles all pregnant women delivering in public health institutions to absolutely free and no expense delivery including caesarean section. This initiative also provides for free transport from home to institution, between facilities in case of a referral and drop back home. Similar entitlements have been put in place for all sick newborns accessing public health institutions for treatment up to one year after birth. This was expanded to cover the complications during ANC, PNC and also sick infants under-1 year coming to public health institutions for treatment.

In Rajasthan, there are 53 Special newborn care units (SNCUs), 304 Newborn Stabilization units (NBSUs) and 2065 Newborn care corners (NBCCs) spread across the state. **ANM Samvad** is a program run by the state government to strengthen the skills and capacities of ANM staff in delivering proper ANC services. The **Rashtriya Kishor Swasthya Karyakram (RKSK)** launched in 2014 focuses on adolescent health and improving their nutritional status through iron and folic acid supplementation among other initiatives. POSHAN - Proactive and Optimum care of children, through Social-Household Approach for Nutrition is a program aimed at community based management of malnourished children under the age of 5 years.

This paper analyses the impact of three interventions - breastfeeding promotion, promotion of immunizations and conditional cash transfers for accessing ante natal services on child survival. The justification for these interventions was based on logit regression¹ estimations

¹ Regression run on last born children of mothers who were interviewed in IHDS-II survey (2014-15). This analysis (in the appendix) finds that the likelihood (odds in favour) of a child being alive increases by almost 9.43 time higher for those who are breast-fed beyond 19 months than the children who were not breast-fed at

on last-born children (both dead and alive at the time of survey). The mandate was to identify key elements, catalytic in nature within the MCH program which augment and sustain child survival in the state of Rajasthan.

The BCR analysis presented below indicates positive BCRs for all three interventions namely breastfeeding promotion, promotion and incentivization of immunizations in lagging districts and conditional cash transfers for accessing ante natal services. These interventions are designed primarily to foster demand for MCH services, though two of the interventions have supply driven elements (extra staff for breast feeding promotion, and establishment of immunization camps for lagging areas).

Intervention 1: Mass media promotion and intensive counselling of breastfeeding

Overview

- TV advertisements to be broadcasted (aired) on different TV channels during prime time shows when highest number of audience watch such ads.
- Counselling of mothers who have just given birth or are about to give birth. Dedicated staff (educated and specifically having knowledge of human psychology) must be hired at hospital / PHC level – one for every 120 visiting mothers – who can teach importance of breastfeeding to mothers who make pre-natal visits or those mothers who delivered a baby and are admitted in the hospital.
- Mothers will also be provided with printed fliers/ pamphlets which contain the communication material which they are given orally at hospitals.

Implementation Considerations

- Clearly researched oral communication protocols / counselling must be developed so that the mothers are educated during the anti-natal and post-natal periods about the extraordinary benefits of breast-feeding. Existing initiatives in the region, such as *Alive and Thrive*, can be leveraged for this purpose. The prevailing protocols and mechanism of engagements appear inadequate and ineffective. After a careful review of a large amount of literature relating to breast-feeding the authors recommend 17-point interactive communication opportunities

all. Impact of prolonged breastfeeding on child mortality is huge; and jointly with early breastfeeding soon after birth, and exclusive breastfeeding for at least 3-4 months yields extraordinary child survival gains in India. Additional independent child survival gains are observed through the frequency of 'antenatal checkups' and 'child immunizations'.

between the mother (and child) and health professionals as follows:

Seventeen Point Interactive Breastfeeding Counselling Protocol			
4 times during ANC checks	4 times in the hours and days after birth ²	6 times Every month for 3 months and 3 more time for 9 more months	3 times After one year of age of the child

Source: Authors adapted from Menon et al. (2016)

Costs and Benefits

The dominant positive impact of breastfeeding a ‘behavioral’ factor cannot be overemphasized. Notwithstanding the behavioral characteristics of breast feeding; information sharing, and promotional campaigns using multi-media such as electronic, audio-visual and print media are essential to ensure extended and exclusive breastfeeding.

Costs

The cost of the intervention is the sum of three categories of costs. The first is the cost of running 30 advertisements per day on 10 local and national news channels for two days a week which yields a total cost of Rs 468 crores. The second is the extra staff cost for intensive counselling, including communications materials, on breastfeeding (to pregnant and new mothers across the health system) by professional counsellors which adds up to Rs. 323 crores. The final set of costs are private costs such as transport, food and time when availing the 17 counselling services. This is Rs. 390 crore. The total annual requirement to promote various components of breastfeeding practices in Rajasthan is therefore Rs. 1,181 crores per year.

Benefits

Following similar experiences in Bangladesh, Vietnam, Madagascar, Bolivia and Ghana we estimate that this will increase exclusive breastfeeding from 58 percent to 90 percent, and extended breastfeeding from 75 percent to 94 percent. This will lead to 12,628 fewer child deaths (0-23 month old) per year, reduce U5 mortality rate from 51 to 43 per 1000 live births and avoid almost 81,000 years lost to disability (YLDs). The benefits at 5 percent discount rate is estimated to be Rs. 9,277 crores.

² Counseling is provided to the mother and relatives during intra-partum and post-partum periods.

Intervention 2: Promotion, Incentivization and Supply of Immunization in Lagging Districts

Overview

- Promotion and provision of immunization camps for remote areas, that incentivizes mothers to bring children for immunization.

It is focused on districts where full immunization rates are below the state average (Jalore, Barmer, Jaisalmer, Jodhpur, Chittorgarh, Udaipur, Nagaur, Banswara, Sawai Modhopur, Sirohi and Alwar). The population weighted average coverage rate in these districts is 43 percent, compared to the state average of 55 percent.

Implementation Considerations

- The intervention will be implemented with in-kind transfers (lentils and meals) worth Rs 685 based on a randomized controlled study from rural Rajasthan (Banerjee et al. 2010).

Costs and Benefits

Costs

The augmented total cost per annum for the immunization camps plus incentives in Rajasthan is Rs. 24 crores, 16 crore of which are the incentives. This includes an assumed 70 percent substitution away from the existing system, for those who would have been vaccinated anyway.

Benefits

This intervention is assumed to raise the level of fully immunized children in the districts to the state average 55 percent, saving 827 children per year and avoiding 8,675 YLDs. At 5 percent discounting rate the Benefit-Cost ratio is 30.

Intervention 3: Conditional Cash Transfer for ANC Visits

Overview

- Provision of Rs 2000 for accessing 4 ANC visits during pregnancy.

Implementation Considerations

We assume this large incentive will boost uptake of 4 ANC services from 39 percent to 61 percent of women during pregnancy. This is based on similar success of Janani Suraksha Yojana (JSY) program in significantly boosting demand for maternity services (institutional births) in the state.

Costs and Benefits

Costs

The total cost of this intervention is 241 crore, 186 crore for the cash incentives, and 55 crore for health system and private costs of mothers making new ANC visits.

Benefits

We expect this to lead to a reduction in neonatal mortality of 8 per 1000 live births, following similar experiences in India and developing countries. This will save 2,764 infant lives per year and avert 13,558 YLDs. Benefits are estimated at 2097 crore per year (5 percent discount), including 186 crore cash incentive (both a benefit and a cost).

Conclusion

Maternal and Child Health (MCH) outcomes are dependent upon a complicated set of health and wellbeing interventions directed towards two 'primary and biologically' bounded individuals – the mother and the child. Further there are three distinct but inter-related temporal phases that are closely linked – namely 'ante-natal', 'intra-natal' and 'post-natal' periods. However, a multitude of dimensions, such as behavioural, economic, medical, technical, and administrative factors impact the performance of policy interventions.

It is important to note while all interventions do generate great benefits, they may produce many types of externalities not accounted for in this analysis and estimation of benefit-cost ratios. For example, enhanced investments in MCH may also improve health and survival of pregnant and lactating mothers thus reducing maternal mortality. Further, there are many synergies and mutually beneficial effects of all these three inventions can generate. Such synergistic benefits can be very high and developmental in nature.

BCR Summary Table: Rajasthan

Intervention	Benefits per year (crore)	Costs per year (crore)	BCR	Quality of Evidence
Mass media promotion and intensive counselling of breastfeeding	9,277	1,181	8	Strong
Promotion, incentivization and supply of immunization in lagging districts	720	24	30	Strong
Conditional cash transfer for ANC visits	2,097	241	9	Strong

Note: All figures assume a 5 percent discount rate, costs and benefits are in annual Crore INR

Introduction

The healthcare system in India is at a crucial juncture today. Significant progress has been made since Independence through improvement in life expectancy, reduction in infant mortality and crude death rates, effective eradication of diseases such as small-pox and polio and so on (Patel *et al.* 2015). Life expectancy has increased by almost four years over the last ten, from 64.4 years in 2005 to 68.3 years in 2015. The rate of infant mortality has declined from 57 deaths per 1,000 live births in 2005 to 37 deaths per 1,000 live births currently. India's human development index has improved from 0.494 in 2000 to 0.624 in 2015, with the country ranking at 131 out of a total of 188 countries in 2015 - an improvement of 4 ranks from the corresponding 2010 figure (UNDP, 2016).

However, in spite of these achievements, challenges due to outbreaks of communicable diseases and a rise in incidence of chronic diseases such as cardio vascular disease, cancers and diabetes remain. Further, concerns on maternal mortality and infant mortality remain constant with undue focus on the period of childbirth and not on the pre and postnatal stages. More than 659,000 newborn babies die every year in India – amongst the highest number of newborn deaths in the world. India also accounts for twenty percent of all maternal deaths worldwide, with more than 150 women dying in India each day due to preventable causes related to pregnancy and childbirth.

The 2030 Agenda for Sustainable Development goal number 3 seeks to ensure healthy lives and promote well-being for all at all ages. An important aspect of this goal is the focus on reproductive, maternal, newborn and child health with the aim of reducing maternal and child mortality. Maternal and Child Health (MCH) outcomes are dependent upon a complicated set of health and wellbeing interventions directed towards two 'primary and biologically' bounded individuals – the mother and the child. Further there are three distinct but inter-related temporal phases that are identified and linkages established.

Phase 1: Maternal health, Ante-natal Health and Nutrition:

The health of a newly born child and the future labour force is dominantly dependent upon the health and nutrition of the mother for an extended duration of time which goes beyond the gestation period. Maternal health and nutrition, ante-natal checks and consumption of prophylaxis such as iron and folic acid supplementation are essential to ensure health child growth within the womb. A recent study of survey data across 69 low income countries

indicates that ANC visits can significantly reduce child mortality (Kunht and Vollmer, 2017). Efforts, often behavioural by the pregnant woman and her household, and primary health care providers must be in tandem for them to succeed.

Phase 2: Intra-natal Period

The second segment of the MCH puzzle occurs during the time of birth when the child loses the protective cover of the mother's womb and is exposed to multitude of environmental, social and traditional issues. It is but natural that the child faces many health-related situations such as sickness, affliction of disease, trauma, disability etc., which determines the child survival and life expectancy.

Given the complex physical transition that a child must go through during birth, it is important the birth occurs within the environs of a health institution and under the presence and care of trained medical assistance. India faces high incidence of low birth weights (Fadel, Shaza A. et al., 2017) and there must be special care and arrangements, including the availability of incubators, oxygen and other essential health inputs. It is also important that the child is put on exclusive breast feeding almost immediately after birth – without any delay so that the natural immunological advantages of mother's milk is received by the child.

It is useful to review the analysis and recommendations of 'The Million Death Study (MDS)' which extracts data from the Sample Registration System (SRS). Estimates suggest that 14.3 per cent of all infant deaths and 55 per cent of all neonatal deaths are caused by low birth weight (2015). Three causes — prematurity or low birthweight, neonatal infections, and birth asphyxia or trauma — accounted for more than three-quarters of neonatal deaths in India.

To meet the 2030 Sustainable Development Goals for child mortality, India will need to maintain the current trajectory of 1–59-month mortality and accelerate declines in neonatal mortality (to >5 percent annually) from 2015 onwards. Continued progress in reduction of child mortality due to pneumonia, diarrhea, malaria, and measles at 1–59 months is feasible. Additional attention to low birthweight is required which would occur in fact during the time the mother is growing up (pre-marital phase), married at an age where she is biologically robust and that she is nutritionally and emetically balanced so that the child gets the optimal biological environment for nourishment and growth before birth.

Phase 3: Neonatal and Infancy period

An empirical analysis of the latest unit level (household) data suggests that breast feeding for a considerably long period of time such as 12-18 months has shown high benefits in the form of child survival (see appendix). The medical literature further emphasizes that the exclusive breast feeding is essential to ensure safe health of the child during the process of growth (Sankar et al, 2015).

The State of India and Rajasthan

As per NFHS-4, percentage of mothers who had antenatal check-up in first trimester increased in India from 43.9% in 2005-06 (NFHS-3) to 58.6% in 2015-16. Percentage of mothers who had antenatal check-up in first trimester in rural areas was 54.2% in 2015-16 and in urban areas, percentage of mothers who had antenatal check-up in first trimester was 69.1% in 2015-16. In comparison, Rajasthan has improved significantly on its maternal and child survival indicators in the last 10 years. Between 2005-06 and 2015-16 survey data indicate that Rajasthan's infant mortality fell from 65 to 41 deaths per 1000 live births (NFHS 3, NFHS4). Maternal mortality rate fell from 318 per 100,000 live births in 2008, to 244 in 2013 (Ministry of Health and Family Welfare, NFHS-4).

Nevertheless, there is still room for improvement, particularly on several indicators related to access and use of child and maternal health services. In Rajasthan, only 58 percent of women exclusively breastfeed, 39 percent of women had at least 4 antenatal care (ANC) visits during pregnancy, and only 55 percent of children are fully vaccinated (NFHS-4).

At the federal level, several initiatives exist to tackle the issue of poor maternal and child health. ***Mission Indradhanush*** was launched to reach out to the children where routine vaccination cannot be reached out with the primary objective to increase full immunization coverage in India to at least 90% children by 2020. It was launched on 25 December, 2014 and implementation began on 7 April, 2015. More than 2 crore children and around 56 lakh pregnant women have been immunized under this scheme.

MAA (Mother's Absolute Affection) is a focused programme launched on the 5th August 2016 towards promotion of breastfeeding. The specific goal of the MAA programme is to revive efforts towards promotion, protection and support of breastfeeding practices through health systems to enhance breastfeeding rates.

Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) was launched to provide fixed-day assured, comprehensive and quality antenatal care universally to all pregnant women on the 9th of every month. While antenatal care is routinely provided to pregnant women, special ANC services are provided by OBGY specialists / radiologists / physicians at government health facilities under PMSMA. An important component of PMSMA has been the identification and follow-up of high risk pregnancies.

Further, the *Janani Shishu Suraksha Karyakaram (JSSK)* was launched by Government of India on 1st June, 2011 to eliminate out of pocket expenditure for pregnant women and sick newborns for drugs, diet, diagnostics, user charges, referral transport, etc. The scheme entitles all pregnant women delivering in public health institutions to absolutely free and no expense delivery including caesarean section. This initiative also provides for free transport from home to institution, between facilities in case of a referral and drop back home. Similar entitlements have been put in place for all sick newborns accessing public health institutions for treatment up to one year after birth. This was expanded to cover the complications during ANC, PNC and also sick infants under-1 year coming to public health institutions for treatment.

In Rajasthan, there are 36 Special newborn care units (SNCUs) and 162 Newborn Stabilization units (NBSUs) spread across the state. **ANM Samvad** is a program run by the state government to strengthen the skills and capacities of ANM staff in delivering proper ANC services. The **Rashtriya Kishor Swasthya Karyakram (RKSK)** launched in 2014 focuses on adolescent health and improving their nutritional status through iron and folic acid supplementation among other initiatives. POSHAN - Proactive and Optimum care of children, through Social-Household Approach for Nutrition is a program aimed at community based management of malnourished children under the age of 5 years.

This paper analyses the impact of three interventions - breastfeeding promotion, promotion of immunizations and, conditional cash transfers for accessing ante natal services on child survival. The justification for these interventions was based on logit regression³ estimations

³ Regression run on last born children of mothers who were interviewed in IHDS-II survey (2014-15). This analysis (in the appendix) finds that the likelihood (odds in favour) of a child being alive increases by almost 9.43 time higher for those who are breast-fed beyond 19 months than the children who were not breast-fed at all. Impact of prolonged breastfeeding on child mortality is huge; and jointly with early breastfeeding soon after birth, and exclusive breastfeeding for at least 3-4 months yields extraordinary child survival gains in India. Additional independent child survival gains are observed through the frequency of 'antenatal checkups' and 'child immunizations'.

on last-born children (both dead and alive at the time of survey). The mandate was to identify key elements, catalytic in nature within the MCH program which augment and sustain child survival in the state of Rajasthan.

These interventions are designed primarily to foster demand for MCH services, though two of the interventions have supply driven elements (extra staff for breast feeding promotion, and establishment of immunization camps for lagging areas).⁴

Numerous recent studies lay out current evidence on improvements in maternal and child mortality and health in India and around the world, including Sankar et al (2015), McGovern and Canning, (2015), Kuhnt and Vollmer (2017). The data shows clear patterns in the improvement of infant mortality and health outcomes through use of exclusive breastfeeding practices, immunizations and antenatal care services.

Drawing upon these studies and others, this paper indicates that the most effective (highest benefits-to-costs) intervention is immunization promotion, while promotion of exclusive breastfeeding to new mothers has the largest net benefits.

Breastfeeding Promotion

Background and Evidence

Breastfeeding is as an important factor to promote survival in early childhood (Sankar et al, 2015). It has been found that poor and suboptimal breastfeeding practices, including non-exclusive breastfeeding, contribute to more than 11% of mortality in children under 5 years of age (Black *et al.*, 2013). Lamberti et al. (2013) studied the impact of breastfeeding on the risk of pneumonia morbidity and mortality and found that breastfeeding prevents illnesses and provides essential nutrients for optimal child growth and development during the first two years of life. Chowdhury et al. (2013) found that breastfeeding also has several benefits for the mother, improving her health significantly. Victora *et al.*, (2015) studied the impact of breastfeeding on intelligence, educational attainment and income showing that there was a significant positive correlation with long-term effects on IQ and income. The World Health Organization's recommendation is that initiation of breastfeeding should occur within 1 hour of birth, exclusive breastfeeding should be practiced till 6 months of age and breastfeeding

⁴ It should be noted that we are agnostic as to whether the interventions analyzed in this paper should be established as new programs, wrapped up in existing programs mentioned in this section or delivered via related avenues e.g. Village Health Nutrition Days or Yashoda birth companions. The only point to emphasize is that more tasks cannot simply be placed upon the existing health worker cadre, and new real resources will need to be spent to see the improvements suggested in this paper.

should be continued until 2 years of age at the least.

A systematic review in 2015 provided strong evidence that a multitude of interventions combined and delivered through different platforms would be more effective than single interventions (Sinha *et al.*, 2015). The interventions with the greatest effect on exclusive and continued breastfeeding were those that involved both the health system and the community (where the definition of community also included mass media). The study recommended the integration of a combination of strategies using complex adaptive systems for scaling up. Menon *et al.*, (2016) conducted cluster-randomized impact evaluations in Bangladesh and Viet Nam of intensified and non-intensified interventions to promote breastfeeding. Part of the *Alive and Thrive* programs in each country, these interventions included interpersonal breastfeeding counselling mass media, community mobilization and policy advocacy. They found significant positive impact of the intervention on breastfeeding practices in both the countries, with stronger responses from intensified arms. This study corroborates earlier experiences in Bolivia, Ghana and Madagascar in which mass media promotion of breastfeeding led to significant increase in rates of exclusive breastfeeding (Quinn et al, 2001).

Description of Intervention

This intervention is based on the intensive arm of the Bangladesh experience of *Alive and Thrive* as documented in Menon et al (2016). To spread awareness about the importance of breastfeeding, two programs are proposed. Firstly, TV advertisements are broadcasted on different TV channels during prime time shows when highest number of viewers is exposed to such ads. Menon et al (2016) describes that in Bangladesh, 24 ads were shown on the 3rd day of each week for four channels, for a total number of TV ads of 96 per week. They also state that radio stories were broadcast across four stations, plus additional community based video, quizzes, dialogues and policy advocacy were implemented, though do not indicate the frequency of these elements of the program. In this analysis, we assume 30 ads of 30 seconds length will be broadcast two days per week on 10 national and regional TV channels in Rajasthan. This implies 600 ads of 30 seconds each per week - significantly higher rate of advertisement than in Bangladesh, but also without radio stories or additional community engagement.

The second aspect is to educate and psychologically condition mothers about the importance of breastfeeding. Dedicated staff (educated and specifically having knowledge of human psychology) must be hired at hospital / PHC level – one for every 120 visiting mothers – who can teach the importance of breastfeeding to mothers who make pre-natal visits or those mothers who delivered a baby and are admitted in the hospital. They will also be provided with printed fliers/ pamphlets which contain the communication material which is given orally at health care facilities. Clearly researched oral communication protocols / counselling must be developed so that the mothers are educated during the anti-natal and post-natal periods about the extraordinary benefits of breastfeeding. The prevailing protocols and mechanism of engagements appear inadequate and ineffective.

After a careful review of a large amount of literature relating to breast-feeding we recommend 17-point interactive communication opportunities between the mother (and child) and the professionals as follows:

Seventeen Point Interactive Breastfeeding Counselling Protocol			
4 times during ANC checks	4 times in the hours and days after birth ⁵	6 times Every month for 3 months and 3 more time for 9 more months	3 times After one year of age of the child

Source: Authors adapted from Menon et al (2016).

In a given year we estimate there are 15.2 lakh women giving birth per year. This is based on an assumed population of 771 lakhs (Copenhagen Consensus project assumption based on Census 2011) and a crude birth rate of 20 per 1000 (Registrar General of India's office).

Calculation of Costs and Benefits

Costs

The cost of TV Ads is calculated by assuming that each second of air time costs 5000 rupees. For 600 ads per week, this amounts to 468 crore per year.

For estimating the cost of counselling in hospitals and PHCs, it is assumed that one professional staff will be on average counselling 8 pregnant women each day for one hour

⁵ Counselling is provided to the mothers and relatives during intra partum and post partum periods

each. For the 17 points of contact and 250 working days per year, this implies 12,915 additional counselors need to be hired. Professional salaries of these individuals are assumed to be Rs. 20,000. Also, a printed pamphlet needs to be given to each woman after each counselling session and cost of one pamphlet is estimated at 5 rupees. Total costs for counselling are therefore estimated at Rs. 323 crore per year.

The final cost is that of the caregiver's time. We assume 2 hours per visit including travel time, and apply 50% of the daily wage rate of Rs 337 (Copenhagen Consensus assumption based on NSS 68). An additional Rs 109 to account for travel costs and food is included for each counselling visit (NSS 71). For the 17 visits, the cost equals 390 crore per year for all mothers of newborns in the state.

The total cost from the intervention is 1,181 crore per year.

Benefits

The findings from Menon et al (2016) indicate that after the intensive treatment of breastfeeding promotion, rates of exclusive breastfeeding increased substantially from 48.5% to 87.6%. This implies a reduction of 76% in the 'breastfeeding gap' i.e. those mothers who do not exclusively breastfeed. We apply that same effect to the breastfeeding gap in Rajasthan. Currently 42% of women in the state do not exclusively breastfeed and 25% of women do not continually breastfeed up to 23 months (NFHS-4, IHD2). As a result of the intervention we assume that rates of exclusive breastfeeding will reach 90% and extended breastfeeding will reach 94%. This implies an additional 4.8 lakh children more who will be exclusively breastfed, and 2.8 lakh who will be breastfed between 6-23 months.

Sankar et al (2015) undertake a meta-analysis of studies examining the relationship between breastfeeding and child mortality. They document a 49% reduction in mortality when moving from partial breastfeeding to exclusive breastfeeding and a 46% reduction in mortality when moving from limited breastfeeding between 6-23 months to continuous breastfeeding to 23 months. We use these effect sizes to estimate the avoided infant mortality and morbidity from increased breastfeeding. The intervention will avoid 12,628 child deaths and 80,684 YLDs per year.

We value lives saved by converting each death to avoided DALYs (discounted at the appropriate rate). For an infant this implies 19.3 DALYs avoided at a 5% discount rate. Each DALY is valued at 3x GDP per capita as per Copenhagen Consensus assumptions (i.e. Rs 2.9 lakh). YLDs are also valued at the same rate. The total benefit is therefore 9,277 at a 5% discount rate. The benefit to cost ratio is 8.

Infant and Child Immunization

Background and Evidence

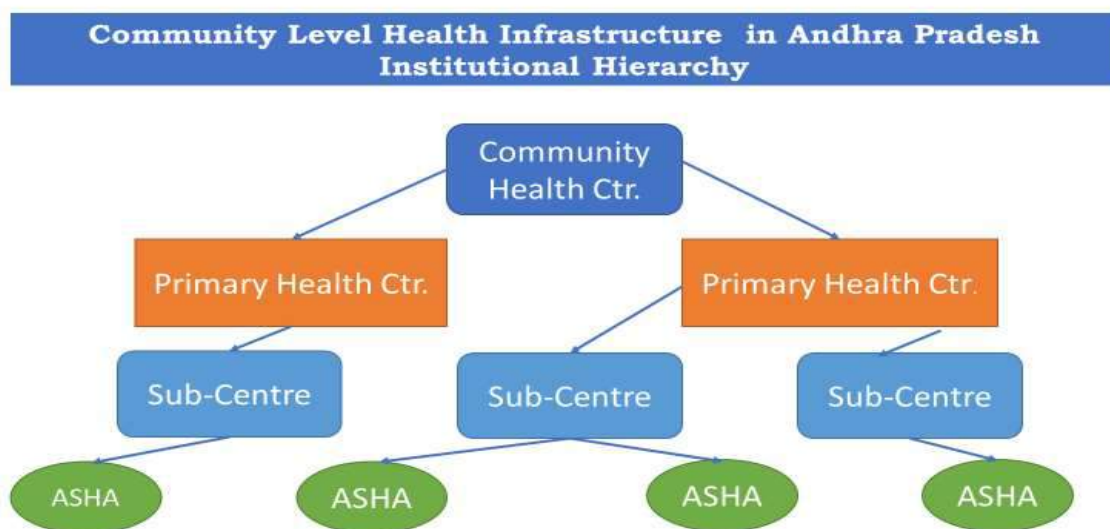
Historically, immunizations are the most cost-efficient interventions the medical system has found in reducing infant and childhood mortality. Several studies have shown the value of incentives for improving immunization uptake. Robertson *et al.*, (2013) studied the impact of cash transfers on immunization uptake in Zimbabwe and found that there was a significant improvement of immunization. In a clustered randomized controlled evaluation of incentivized and non-incentivized immunization campaigns in rural Rajasthan, Banerjee *et al* (2010) found that small non-financial incentives and improved reliability together help boost immunization rate. They suggested immunization provided through incentivized reliable camps are much cost effective than purely improving supply. Johri *et al.*, (2015) in a systematic review and meta-analysis of strategies to increase the demand for childhood vaccination in low and middle income countries find that cash and in kind incentives have a positive effect on the uptake of immunization services.

Description of Intervention

The proposed intervention is based on Banerjee *et al*, 2010, where as mentioned, immunization camps were established in hard to reach areas of rural Rajasthan. Vaccination was incentivized with the provision of lentils and a hot meal worth Rs 685 in current INR. There were also promotion efforts by local field workers to let villagers know about the immunization camps.

A complete set of Infant and Childhood immunizations (ICI-package) has been a part of national health strategy since at least the early 1950s and partly sensitized by international agencies such as the World Health Organization, the UNICEF and the World Bank during the

1970s. The national health policy supported and promoted the ICI-package as a part of its public health institutional and infrastructural network to reach children even in rural outback and urban peripheries and slums. The extension services for the ICI-package was anchored on a network of Primary Health Centres and a larger number of Auxiliary Nurse midwives (ANM) Sub-Centers across the nation. However, the health personnel development and deployment for extension work differed extensively across states and more recently large shortages of such personnel have affected the ICI-Package. Since immunizations are also dispensed by the private health sector the role of public health care services has stumbled and deteriorated. A hierarchical list of the public health care institutional system is presented in the following figure.



Source: Authors

Despite this extensive network only 55% of children across the state are fully immunized. Additionally, several districts in Rajasthan lag behind the state average in terms of percentage of full immunization (Jalore, Barmer, Jaisalmer, Jodhpur, Chittorgarh, Udaipur, Nagaur, Banswara, Sawai Modhopur, Sirohi and Alwar). The average rate of immunization in these districts is 43%. This intervention targets these districts where 5.6 lakh children are born every year.

Costs and Benefits

Costs

The first step in calculating the costs is to estimate the number of new children fully vaccinated as a result of the intervention. In Banerjee et al (2010) immunization camps with incentives had 39% rate of complete immunization compared to only 6% in control villages. This implies an almost 700% boost to immunization from the intervention, albeit from low levels. In this study we make the more conservative assumption that the intervention will be able to raise rates of full immunization from 43 percentage points in lagging districts to the state average of 55 percentage points, an increase of 25%. These data are taken from NFHS-4 state reports. This implies an extra 67,589 children immunized in these districts.

We also assume, due to the incentive, 70% of children who would otherwise be vaccinated in the normal health care system such as in schools and health centers will be diverted to the immunization camps. This implies an additional 169,121 children will be vaccinated in the camps. The total number of children passing through the camps in a year is therefore 236,710.

We use variable and fixed cost data provided in Banerjee et al. (2010) to estimate the costs of this intervention. Incentives were USD 6.6 in the year of the experiment (2005) and this implies a value of Rs 685 per child in 2017 after adjusting for inflation. The fixed cost per camp per day is Rs 2149 covering all staff, equipment and infrastructure, and each camp vaccinates 11 children on average per day. The cost of vaccination per child (Rs 185) is drawn from Chatterjee et al. (2016), and is only applied to new children vaccinated. As in the previous intervention we also account for the cost of caregiver time, assumed to be 2 hours per visit.

The total cost therefore is 24.2 crore per year, Rs 16.2 crore of which is the cost of the incentive and Rs 4.6 crore is the fixed cost of the camp.

Benefits

Immunization is one of oldest and largest programs of the national and state governments in India. Immunizations are popular and broadly accepted to be useful in reducing many types of sickness amongst the infants and children. The cost of immunization is highly subsidized as a

pro-poor government policy and approved by the international multi-national university. They are also found to be highly efficient in terms of benefit-cost ratios (Jamison et al, 2012). To estimate the benefits of interventions we draw upon McGovern and Canning (2015). Utilizing data from 149 Demographic and Health Surveys, from 1985 to 2011 the authors estimate the association between vaccination coverage in a survey cluster and all cause child mortality, including adjustments for potential bias in missing data from children who died before surveys were conducted. They find that moving from 0% coverage to 100% coverage within a cluster reduces all cause child mortality for all children in an area by 24%. The study therefore takes into account not only benefits to the immunized children but potential spillover benefits, including for example, from herd immunity to other children in the area. Applying this rate and assuming a linear relationship between coverage and child mortality, we estimate that a 12pp movement in the lagging districts (from 43pp to 55pp) will lead to a 2.9% reduction in child mortality and morbidity for the 5.6 lakh children born each year. This implies 827 deaths and 8,675 YLDs avoided each year from the immunization drive. This is valued at 720 crore per year at 5% discount rate. We also include the value of the incentives, 16.2 crore as a benefit. The benefit cost ratio at the 5% discount rate is 30.

Cash Transfers for Antenatal Services

Background and Evidence

Delivery of maternal health care services remains a challenge for most of the country. While it has been established that antenatal care services are an important component of the health system for controlling maternal mortality and morbidity the uptake of ANC services continues to be poor in most of India. The literature on the efficacy of ANC visits supports the notion that they can prevent some amount of neonatal mortality, though the effects vary between studies. Kuhnt and Vollmer (2017), in a study on antenatal care services and implications for health outcomes of children across 69 low and middle income countries found that having at least one ANC visit, regardless of quality of the service, reduced the probability of neonatal mortality by 1.04pp and infant mortality by 1.07pp. Having at least four ANC visits and having at least once seen a skilled provider reduced the probability by an additional 0.56% and 0.42% points, respectively. In the Indian context, where there is a 2.8% risk of neonatal mortality (i.e. 28 per 1000 live births, NITI Aayog, (2013)), ensuring women receive four ANC visits (and assuming most women already receive at least one ANC visit)

would lead to a 20% (0.56pp/2.8pp) reduction in neonatal mortality. Darmstadt et al (2005) in a review of efficacy of interventions along the spectrum of maternal and infant care estimate that ANC visits that provide physical examination, tetanus toxoid vaccination and detection and treatment for syphilis and pre-eclampsia can reduce neonatal mortality by 10-20%. In terms of India specific evidence, Singh *et al.*, (2014) studied the association between ANC care and neonatal mortality in India and found that the odds of neonatal mortality were significantly lower in neonates whose mothers had had availed four or more ANC visits (odds ratio 0.69 relative to no ANC visits, 30% reduction in neonatal mortality). Gupta *et al.*, (2015) in the context of EAG states in India, showed that babies whose mothers had had 4-6 ANC visits experienced reduced odds of neonatal mortality (0.73 relative to no ANC visits, 26% reduction in neonatal mortality). A study in Bangladesh (Abir *et al.*, 2017) found that ANC visits, iron and folic acid supplementation along with vaccinations during pregnancy significantly reduced child mortality (odds ratio 0.6, 39% reduction in child mortality). Arunda *et al.*, (2017) examined the effectiveness of ANC services in reducing neonatal mortality in Kenya. They found that the highest odds of neonatal mortality were amongst neonates whose mothers did not attend any ANC visit (adjusted odds ratio 4.0 relative to four ANC visits, 74% reduction in neonatal mortality). Babies whose mothers attended only 1-3 visits experienced higher neonatal mortality odds of 1.8 (44% reduction in neonatal mortality).

Description of Intervention

The intervention seeks the provision of (a maximum of) Rs 2000 for accessing 4 ANC visits during pregnancy. This inducement is designed to foster demand and cover wage losses, opportunity cost and transportation costs in accessing ANC services. This intervention is similar in spirit to the Maternity Benefit Program (MBP) announced in 2016 by the national government. At the time of writing this paper, it had not been scaled up and there were no evaluations available. The MBP provides support for the first child and one ANC visit along with other services such as immunization. It therefore differs from the intervention analyzed in this paper, which includes all children and is only focused on incentivizing 4 ANC visits.

We assume the Rs. 2000 incentive will boost uptake of ANC services from current levels. This is based on similar success of Janani Suraksha Yojana (JSY), a nationwide conditional cash transfer program introduced in 2005 that incentivized women to give birth in health facilities. It is the largest conditional cash transfer program in the world (Lim et al 2010). Powell -

Jackson et al (2015) indicates that by 2008, in districts where the program had greater than 50% coverage, women were 7.5pp (19%) more likely to give birth in an institution compared to before the introduction of the program. Other studies echo this broad finding that cash incentives have increased the proportional of institutional births significantly (Randive et al, 2013, Lim et al 2010). The latest round of survey data (NFHS4 data gathered in 2015-2016) shows that across India, institutional births have continued their upward trend and have now risen to almost 80%. In Rajasthan this figure is 84%. While no studies (up to now) have tested to what extent this recent surge is due to the JSY program, it appears likely that incentives have played a large part.

While we can be confident of the direction of the impact, estimating the size of the effect of a conditional cash incentive program on ANC visits, based on the JSY program is not a straightforward process. Effect sizes from studies mentioned above suggest improvements ranging from 19% (Powell - Jackson et al, 2015) to 45% (Lim et al 2010) to 145% (Randive et al 2013). The latest NFHS4 data suggest even larger effect sizes are possible, over time.

In the case of Rajasthan, the proportion of women receiving at least 4 ANC visit is quite low at 38.5% (the Indian average is 51.2%, NFHS4). In a study of nine large states of India, Randive et al 2013, shows that Rajasthan mothers were most responsive to the cash transfer of the JSY program increasing institutional births from around 25% in 2005 to almost 70% in 2010. As stated, the last NFHS4 figure puts this currently at 84%. We assume that cash transfers for ANC visits might be able to boost ANC visits to the same level, but apply a conservative discount, assuming that the incentive is only able to bridge half the gap between current status of 38.5% and the empirical maximum (up to now of) 84%. In other words, we assume that the incentive will bring the rate of 4 ANC visits to 61%.

Costs and Benefits

Costs

As stated above, 38.5% of women make the recommended quota of 4 ANC visits during pregnancy. For the remaining women, the average number of visits is 1.02. Given 15.2 lakh new births per year, the intervention will therefore induce 3.5 lakh women to undertake 10.3 lakh new visits.

The costs of the intervention represent the provision of incentive (Rs. 2000) for 38.5% of all pregnant women who would have gone to 4 ANC visits without the incentive, and for the new women making 4 ANC visits (23% of all pregnant women). Given 15.2 lakh new births per year, this cost comes to 186 crore.

Shankar Prinja *et al.*, (2016) estimate that the government cost to supply one ANC visit is Rs 166 (average of Rs 171 for PHCs and Rs 162 for CHCs). NSS 71st round data indicate that additional private costs (which includes doctors' fees, cost of medicine, diagnostics tests, transportation etc.) is Rs. 325 for Rajasthan. Lastly, we incorporate a cost for the women's time, assuming, like in the case of breastfeeding promotion that a visit takes 2 hours and the average daily wage in Rajasthan is 337. We apply these unit costs to the number of new ANC visits made as a result of the program. The total marginal health system and private costs are 55 crore. The total cost of the intervention is therefore, 241 crore.

Benefits

The preceding literature review suggests that 25% reduction in neonatal deaths is a reasonable estimate of the impact in the Indian context from increased ANC visits. Applied to Rajasthan, where neonatal mortality is 32 per 1000 deaths, this would result in 2,765 fewer neonatal deaths and 13,558 fewer YLDs per year. The health benefit is valued at 1911 crore and with the incentive benefit of 186 crore, the total benefit is therefore 2,097 crore (5% discount). The benefit cost ratio is 9.

Conclusion and Quality of Evidence

The preceding analysis suggests that immunizations provide the highest benefit-to-cost ratio while breastfeeding promotion yields the largest net benefits. Summary results are presented below at discount rates of 3%, 5% and 8%.

Intervention	Discount Rate	Benefit	Cost	BCR	Quality of Evidence
Mass media promotion and intensive counselling of breastfeeding	3%	12,774	1,181	11	Strong
	5%	9,277	1,181	8	
	8%	6,796	1,181	6	
Promotion, incentivization and supply of immunization in lagging districts	3%	947	24	39	Strong
	5%	720	24	30	
	8%	558	24	23	
Conditional cash transfer for ANC visits	3%	2,855	241	12	Strong
	5%	2,097	241	9	
	8%	1,556	241	7	

It is important to note while all interventions do generate great benefits, they may produce many types of externalities not accounted for in this analysis and estimation of benefit-cost ratios. For example, enhanced investments in MCH may also improve health and survival of pregnant and lactating mothers thus reducing maternal mortality. Further, there are many synergies and mutually beneficial effects of all these three inventions can generate. Such synergistic benefits can be very high and developmental in nature.

We assess the quality of evidence for all interventions as “strong”. The basis for each intervention comes from either a randomized controlled trial (Menon et al, 2015, Banerjee et al 2010) or a high quality observational study using survey data (Powell - Jackson et al 2015). All of these are from the Indian context, except in the case of Menon et al (2015), for breastfeeding promotion. However, we are confident in the external validity of the intervention due to the fact that meta-analyses (Sinha et al, 2015) and experiences from other countries (Quinn et al, 2001) suggest that breastfeeding promotion via mass media has significant and large effects on breastfeeding practice in developing countries.

The effects of each intervention in terms of health impacts are fully or partially based on meta-analyses (Sankar et al, 2015), or analyses of thousands of observations from scores of demographic and health surveys across the developing world (McGovern and Canning, 2015, Kuhnt and Vollmer, 2017). This provides confidence that the effects of increased breastfeeding, vaccination and ANC visits do indeed lead to the benefits assessed in this paper.

Perhaps the intervention with the greatest uncertainty is the conditional cash transfer for ANC visits. The JSY program was motivated by evidence that institutional births lead to lower levels of maternal and child mortality. However, careful analysis suggests that JSY has not lead to a reduction in either metric, despite the large increase in institutional births (Powell - Jackson et al 2015). This is most likely due to the poor quality of infrastructure and equipment in birthing facilities. To the extent that health system shortfalls also affect the provision of ANC services it is possible that the benefits assessed here may not materialize. That said, the services provided during ANC services that reduce mortality risk (e.g. tetanus toxoid, provision of iron-folic acid) are not as complex or costly as the services that reduce mortality risk during intrapartum (e.g. caesarean sections, incubators). For this reason, we retain the assessment quality as strong.

Appendix: 1

Empirical Evidence from a Recent all India survey

The authors consulted the unit level records data for a large nationally representative sample survey to understand the dynamics of relationships and relative importance of the variables and factors that are in play in the domain of Maternal and Child Health. The regressions were undertaken using Infant and Child Mortality as the dependent variable.

Although India is unique and has a long history of generating a lot of data in various areas of public health, MCH, family planning and health care management; most data flows out of the service statistics of the government departments and from a few specialized surveys. Data that can be analysis in the multi-variate context are rare. One exception has been the exclusive Human Development Surveys of the NCAER conducted regularly since 1992 (see Shariff 1999, Desai and Shariff 2004). In the following we have used data from a recent NCAER survey to find out the relative importance of many independent variables through Logit Regression models.

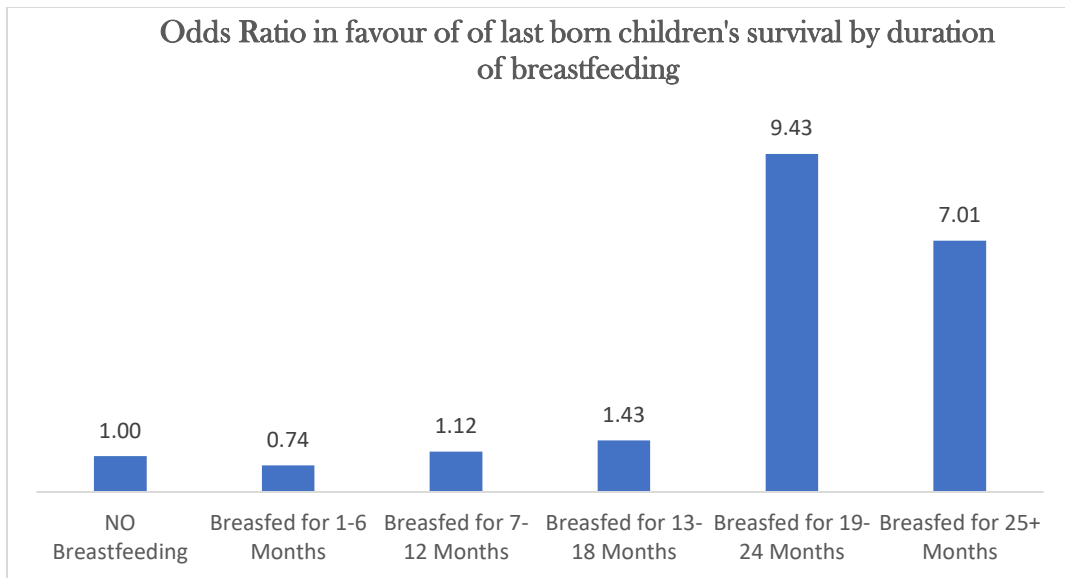
Logit regression on last born child's being alive

(Household Data: India Human Development Survey 2011-12, NCAER)

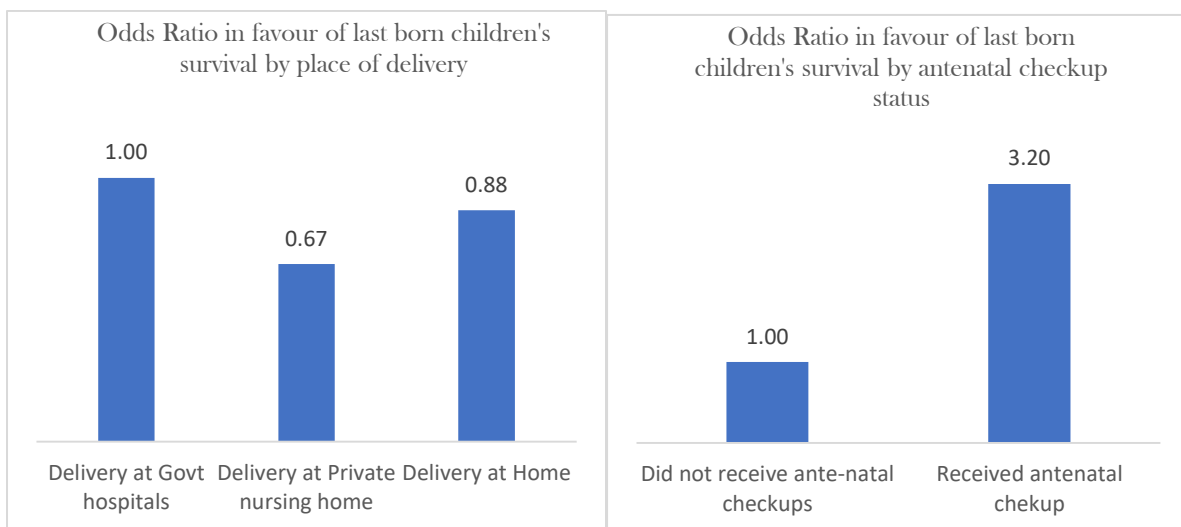
Dependent variable: Current survival of last born child

Independent variables:

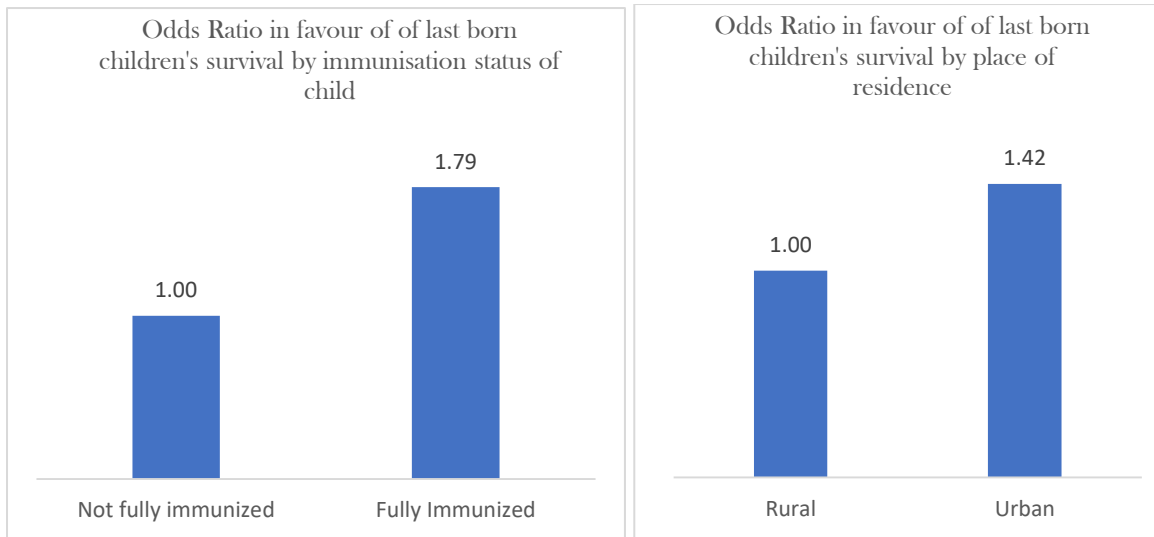
- Number of months for which child was breastfed
- Whether mother got antenatal checkup
- Place of delivery
- Rural/Urban residence
- Mother's years of schooling/education



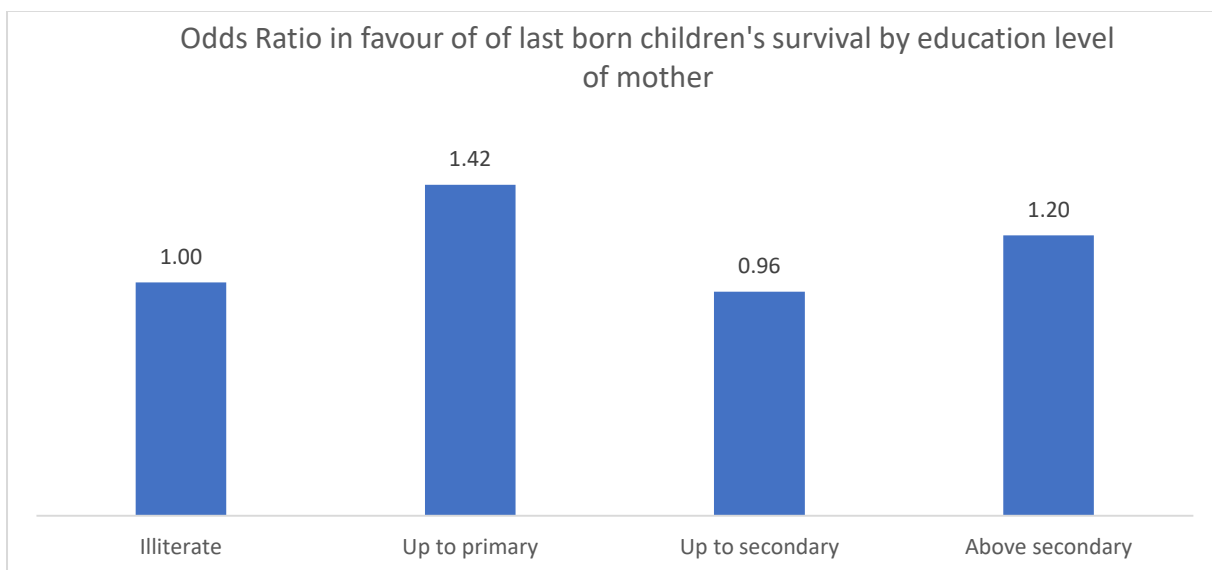
Source: Authors' estimation using IHDS-II data



Source: Authors' estimation using IHDS-II data



Source: Authors' estimation using IHDS-II data



Source: Authors' estimation using IHDS-II data

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Sector Expert Review

Rajasthan Priorities An India Consensus Prioritization Project

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Strategic initiatives to improve Maternal and Child Health (MCH) in Rajasthan

Regarded as an important marker of the overall functioning of the health care delivery system, Maternal and Child Health (MCH) remains a priority for governments across the globe. Building on the gains from the Millennium Development Goals (MDG) era, Ending Preventable Child and Maternal Deaths (EPCMD) remains a core commitment of the Sustainable Development Goals (SDGs) framework. While impressive gains have been achieved over the last few decades in improving maternal and child health outcomes, challenges persist in all countries particularly so in the Low and Middle Income Countries (LMICs). India has kept pace with the global development, infact on many fronts has exceeded global declines in key MCH mortality indicators. The Maternal Mortality Ratio (MMR) in the country has reduced from 310 (2001-03) to 167 (2013) per 100,000 live births, similarly the Infant Mortality Rate (IMR) has decreased from 66 to 34 per 1000 live births from 2001-2016. However the progress has been uneven in the country and geographical pockets of high maternal and child mortality and morbidity offset the gains. More than 659,000 newborn babies die every year in India – amongst the highest number of newborn deaths in the world. India also accounts for twenty percent of all maternal deaths worldwide, with more than 150 women dying in India each day due to preventable causes related to pregnancy and childbirth.

In line with the global efforts to potentiate progress on the MCH front, the national Ministry of Health and Family Welfare (MoHFW), Government of India (GOI) has taken the lead to further accelerate progress on the MCH front. The launch of the National Rural Health Mission (NRHM) now christened as the National Health Mission (NHM) and its associated programs in 2005, expanding the scope of MCH interventions through the Reproductive Maternal Newborn Child and Adolescent Health (RMNCH+A) strategy in 2013 and the launch of the National Health Policy in 2017 are some of the transformational policy level changes undertaken in the recent years. Very recently the roll out of the Transformation of Aspirational Districts Programme in 2018 is another remarkable and path-breaking advancement on improving overall social outcomes including health with due emphasis on MCH. Spearheaded and anchored by the Niti Aayog, the programme promotes intersectoral coordination and consolidates the efforts of all line ministries to improve outcomes across the 115 identified aspirational districts.

It is envisaged that these policy level initiatives will definitely lead to significant improvements in health outcomes more so on the agenda of maternal and child health. As stated above the pressing need in the country is to prioritize efforts in geographies that are most vulnerable and require immediate attention and support. The state of Rajasthan is an important focus area for GOI and though it has made consistent progress on critical maternal and child health indicators, issues do exist which need comprehensive and coordinated efforts to be overcome. In Rajasthan, only 58 percent of women exclusively breastfeed, 39 percent of women had at least 4 antenatal care (ANC) visits during pregnancy and only 55 percent of children are fully vaccinated (NFHS-4). To address these issues and drive forward the MCH priorities in the state it is imperative that programmatic interventions with maximum benefits are identified, prioritized and implemented to fast-track improvement. It is this important question that the current paper on “Strategic initiatives to improve Maternal and Child Health (MCH) in Rajasthan” authored by Dr. Abusaleh Shariff and Mr. Amit Sharma addresses.

Of the gamut of interventions identified within the broader MCH framework the authors analyze the impact of three interventions: breastfeeding promotion, promotion of immunizations and conditional cash transfers for accessing ante natal services on child survival. The authors narrowed down to these three interventions based on logit regression estimates on last born children during reference surveys and help identify key elements, catalytic in nature within the MCH program which augment and sustain child survival in the state of Rajasthan.

Overall drawing upon available scientific evidence the paper indicates that while the immunization program offers the highest benefits to costs ratio and thus is most effective, the promotion of exclusive breast-feeding has the largest net benefits. Individually the paper provides a detailed analysis of each intervention and arrives at the benefit cost estimates by comparing to a standardized design intervention. For the breast-feeding promotion intervention, the analysis is based on a mixed approach involving mass media outreach and Interpersonal Communication (IPC) at health facilities. The mass media programme draws insights from a similar intervention implemented in Bangladesh to improve breast-feeding rates. The design put forward to be implemented in Rajasthan include a series of television advertisements totaling to 600 advertisements of 30 seconds each per week, which are to be coupled with appointment of 12, 915 dedicated and trained staff at health facilities who

counsel women through a seventeen point interactive breastfeeding counselling protocol. The combined costs for both the interventions based on current population and birth estimates works out to be 1,181 crores per year and the corresponding benefits are estimated to be 9,277 crores per year.

On the immunization front, the paper proposes immunization camps in 11 under-performing districts to increase full immunization coverage from an average of 43% in these districts to the state average of 55% (NFHS 4), thereby contributing towards improved child survival. While the cost for the camps is estimated to be 24.2 crore per year, the benefits are valued at 720 crores annually arriving at a benefit cost ratio of 30.

The paper further proposes for the introduction of a cash transfer initiative of Rs 2000 for accessing 4 Ante Natal Care (ANC) visits. Accounting for confounding variables and external variabilities the authors estimate an improvement of 4 ANC coverage from the current 38.5% (NFHS 4) to 61%. The cost of this intervention is estimated to be 214 crores and the concomitant benefit stands at 2,097 crores.

The current paper has identified three interventions which are supported by strong quality evidence and estimates the cost and benefit implications for the same. While this is appreciable and the way forward, the authors can further conduct similar analysis for other MCH interventions which can subsequently provide policy makers the options of contextualizing interventions as per requirements. In addition the interventions selected in the paper can be further segregated, for instance the design suggested for breast-feeding promotion through television spots can have variable impact in rural and urban areas. It is also suggested that the authors can explore the cost-benefit implications of using m-health and e-health designs to potentiate the 3 identified MCH interventions. Further the cost implications for each intervention also need to be factored according to the annual resource envelope at disposal of state government officials.

In conclusion, the paper takes up a pragmatic approach in identifying interventions and undertaking benefit-cost estimates. It also provides operational frameworks for the three identified interventions which will definitely pave the way forward for discussions and deliberations not only with Government of Rajasthan officials but also have implications for other states and the country as a whole.

Rajasthan is the largest Indian state. It has a diversified economy, with mining, agriculture and tourism. Rajasthan has shown significant progress in improving governance and tackling corruption. However, it continues to face acute social and economic development challenges, and poverty remains widespread. What should local, state and national policymakers, donors, NGOs and businesses focus on first, to improve development and overcome the state's remaining issues? With limited resources and time, it is crucial that priorities are informed by what can be achieved by each rupee spent. To fulfil the state vision of "a healthy, educated, gender sensitive, prosperous and smiling Rajasthan with a well-developed economic infrastructure", Rajasthan needs to focus on the areas where the most can be achieved. It needs to leverage its core competencies to accelerate growth and ensure people achieve higher living standards. Rajasthan Priorities, as part of the larger India Consensus – a partnership between Tata Trusts and the Copenhagen Consensus Center, will work with stakeholders across the state to identify, analyze, and prioritize the best solutions to state challenges. It will commission some of the best economists in India, Rajasthan, and the world to calculate the social, environmental and economic costs and benefits of proposals.



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