Changing Behavioral Patterns Related to Maternity and Childbirth in Rural and Poor Populations: A Critical Review

Ariadna Garcia-Prado

While life expectancy has increased worldwide in recent decades, dramatic health inequalities persist across and within countries and between different population groups. Maternal mortality in low- and middle-income countries is almost fifty times that of high-income countries, while neonatal mortality is nine times higher, and both are consistently higher in rural, poor, and indigenous populations. Despite important efforts to expand the supply of health services to disadvantaged populations, these inequalities have not fallen as expected. As a result, more emphasis is now being placed on demand strategies in an effort to change behavioral patterns related to maternity and childbirth. This review surveys the experimental and quasi-experimental literature in the area of maternal and neonatal health in rural and poor areas of developing countries to identify strategies that are capable of modifying demand behavior and thereby impacting key indicators. We analyze three kinds of strategies: those covering direct costs, promotion of social and cultural changes, and introduction of incentives. We find significant results from the combination of individual counselling and women groups in the community, as well as from the introduction of small incentives as opposed to more expensive Cash Conditional Transfers (CCTs). We conclude with lessons for impact evaluation and policy-making.

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Keywords: Health Behavior, Maternal and neonatal health, Demand strategies.
Goal (MDG) for the reduction of child mortality was reached in 2015, neonatal mortality has barely changed and now accounts for 45 percent of all deaths of children under five (Victora et al. 2015); meanwhile maternal mortality has fallen by 50 percent since 1990 (Victora et al. 2015) but has failed to reach the target set by the MDGs (reduction by three quarters by 2015). Furthermore, dramatic health inequalities persist across and within countries. Maternal mortality in low- and middle-income countries is almost fifty times that of high-income countries, while neonatal mortality is nine times higher (World Bank 2017). Moreover, notable differences are found within countries between different population groups, with coverage of essential services for maternal and neonatal health being much lower among rural and poor populations (Mokdad et al. 2015; Scheil-Adlung 2015; WHO 2016a). Using Demographic and Health Surveys (DHS) surveys for 31 countries, Neal et al. (2015) show that the percentage of urban dwellers receiving skilled attendance at birth is more than four times that of their rural counterparts, while substantial differences in prenatal care are found between richest and poorest income quintiles.

In response to this situation, the United Nations Sustainable Development Goals (SDGs) call for a further reduction in maternal mortality to below 70 deaths per 100,000 live births and a reduction of neonatal mortality to below 12 deaths per 1,000 live births, together with the promotion of universal access to sexual and reproductive health services by 2030 and call for the reduction of inequalities. The need to reduce maternal and neonatal deaths and to address these persistent inequalities is made more urgent by the fact that many of these maternal and neonatal deaths could be prevented by interventions whose cost-effectiveness is proven—such as prenatal care, institutional delivery, postpartum and newborn care, and family planning (Campbell and Graham 2006; Darmstad et al. 2005; Bhutta et al. 2014, Dickson et al. 2014). The impact of these cost-effective interventions, however, is limited by the scarcity of rigorous evidence concerning the best operational strategies for their implementation.

In the past, strategies to improve maternal and neonatal health in rural and poor areas focused mainly on extending the supply of health services in an attempt to reach rural populations through itinerant modalities and/or infrastructure expansion. However, given the persistence of health inequities suffered by poor, rural, and indigenous populations (Victora et al. 2017), more emphasis is now being placed on changing demand in conjunction with strategies for increasing and improving the quality of the supply of services. With respect to demand, the biggest challenge is to change behavioral patterns related to maternity and childbirth and promote the use of health services that can reduce maternal and neonatal deaths.

Unfortunately, achieving this kind of behavioral change is not an easy task in any context, and rural populations of developing countries face a number of additional barriers stemming from poverty and low levels of education. For instance, the costs of accessing health services tend to be higher in areas where these services are
limited, indicating how problems of supply and demand can be interrelated. Moreover, the heterogeneity of rural cultures, social norms, and beliefs often present barriers to behavioral change. Rural populations commonly have a lower perception of the value of healthcare, and many traditional practices reinforce behaviors that are inconsistent with the adoption of effective health interventions (Kolstad 2011). For instance, within many rural societies home delivery is regarded as the norm for strong and healthy women, and this perception has become a barrier for institutional birth (García Prado and Cortez 2012). Rural populations account for 46.7 percent of the total population in low- and middle-income countries (World Bank 2016) and even though growing urbanization is reducing their prevalence, it is also leading to greater dispersion of rural populations, aggravating the challenge of increasing rural access and use of health services. Furthermore, rural populations are still disadvantaged even after controlling for differences in household wealth and a broad range of household socioeconomic and demographic factors (Van de Poel et al. 2007).  

Surprisingly, many studies that focus on reaching the poor and closing the inequality gap between the poor and the rich overlook the fact that poverty is still a predominantly rural phenomenon (FAO 2017) and as such, requires differentiated analysis and the development of strategies that respond to the special difficulties faced by rural populations.

With these challenges in mind, an urgent task for health providers and policy makers is to identify demand-side strategies that have been demonstrated to have positive impacts on maternal and neonatal health indicators in rural areas of less developed countries. Here we review the most recent and rigorous evidence (experimental and quasi-experimental studies) related to those demand-side strategies that can “jump-start” a process of behavioral change that eventually leads to new habits and attitudes toward health care, such that acquired behaviors persist after the assistance, intervention, or incentive ends. This review and its conclusions contribute not only to the literature on maternal and neonatal care but also offer valuable lessons to policymakers and evaluators. It especially indicates the need for evaluations that include quality indicators as relevant outputs/outcomes and the need for a two-pronged approach that addresses both demand and supply, promoting behavioral changes and raising health service quality.

The added value of this paper stems from its two main tasks: first, the paper offers a classification of demand-side strategies for changing health-related behaviors based on targeted barriers to access and utilization (coverage of direct cost, cultural barriers, and indirect costs) and second, following this classification, the paper reviews relevant quasi-experimental and experimental studies with a focus on rural areas, directing attention to populations that face the greatest barriers to access. Finally, the demand-side focus of the paper contributes to the state of current knowledge: compared to what we know about how to improve services, there is a clear need on the demand side to determine the most effective strategies for promoting behavioral
changes in rural and poor populations. This knowledge gap constitutes one of the biggest challenges for policy-makers around the world. As far as I know, this review is the first of its kind.

A Framework for Action: Demand-Oriented Strategies for Changing Maternal and Neonatal Related Behaviors

In order to change maternal- and neonatal-related behaviors it is relevant to know when, how, and where maternal and neonatal deaths occur.

The majority (98 percent) of neonatal deaths occur in low- and middle-income countries and many of these newborn babies are born and die at home (Lawn et al. 2014; Davieaud et al. 2017). The largest number of maternal deaths also occur at home—more precisely, they occur at home, in rural areas, within the poorest communities, and during the period that lasts from the final three months of pregnancy until the first week after giving birth (Ronsman and Graham 2006). The maternal mortality rate peaks during the period known as intrapartum, in the dates near delivery and one day after (Campbell and Graham 2006). More than half the deaths are due to hemorrhages, hypertension, and sepsis, all of which are preventable by provision and use of quality prenatal, delivery, and postpartum services. Contraceptive use is also essential for reducing deaths by spacing pregnancies and births, or avoiding high-risk adolescent and/or late-age pregnancies. Similarly, the most common complications that lead to neonatal death are preventable through prenatal and postpartum care, and are easier to deal with if delivery is institutional. Neonatal mortality occurs primarily due to complications at the time of delivery such as premature birth, low birth weight, and prolonged or obstructive labor (Bartlett, Paz de Bocaletti, and Bocaletti 1993; Kusiako, Ronmans, and Van der Paal 2000; Berlinski and Schady 2015). According to the WHO (2005), one-quarter of neonatal deaths occur during delivery or the first 24 hours of life, while nearly all of the rest occur during the first week of life.

Some of the interventions that curb maternal and neonatal morbidity and mortality can be implemented at the household or community level (through outreach services and/or community health workers/community groups), while others require a visit to a health care facility (e.g., institutional birth). In all cases, it is critical that the mother, her family and the community understand the risks associated with pregnancy, delivery, and the postpartum period in order to prevent potential maternal and neonatal complications and facilitate a timely and appropriate response to these complications when they arise. It is in this respect that supply-oriented interventions are clearly insufficient: in rural contexts, demand-oriented strategies are needed to promote awareness of these risks as well as provide incentives that lead to behavioral change.
Demand interventions are also crucial for reducing some of the most common delays in accessing maternal and neonatal services in cases of obstetric or neonatal emergency. According to the “Three Delays Model” (Thaddeus and Maine 1994), the hindrance of timely and adequate healthcare can be broken down into three common delays. The first is the delay in seeking help when confronted by a health problem and is normally related to lack of knowledge about health, inability to identify signs of risk, and/or females’ lack of autonomy to make healthcare decisions. The second is the delay in accessing a health center because of physical distance, lack of transport, or high cost of access. The third is the delay in receiving adequate treatment due to a lack of medicines or equipment in health centers or poor training or absenteeism of health personnel. Demand-side interventions can encourage the use of institutional delivery as well as prenatal, newborn, and postpartum care and family planning services, while also responding to the first and second delays and can also promote healthy preventative habits at the household and community levels.

Most of the demand-side strategies fall into one of three main categories (García Prado 2016): (1) coverage of direct costs, (2) promotion of cultural and social change, and (3) introduction of incentives.

Coverage of direct costs includes strategies such as reducing or eliminating fees to access health services and/or vouchers. Considering the low income levels of rural areas, it is not surprising that the demand for health services is influenced by direct costs such as consultation fees, the price of medicines, and transportation (Enisor and Cooper 2004; O’Donnell 2007). Nevertheless, it is critical to have accurate information about this influence, as demand can be highly sensitive to small changes of cost. A program evaluation in Kenya found that the demand and use of anti-malaria nets that were distributed for free to pregnant women dropped by 60 percentage points when they were 90 percent subsidized and sold at a price of 0.60 US dollars per unit (Cohen and Dupas 2010). Similarly, a field experiment in Zambia (Ashraf, Berry, and Shapiro 2010) found that the use of a water purifying treatment decreased from 80 percent to 50 percent when the price rose from 0.10 to 0.25 dollars. These examples illustrate the sensitivity of demand for health services to small price increases, even or especially when the price is already close to zero.

When dealing with rural populations, it is especially relevant to address barriers at the social and cultural level and design and implement strategies that try to affect long-term demand changes. Removing these barriers without clashing with community norms is a challenge for policy-makers and practitioners, especially in areas such as institutional birth and family planning, where decisions depend more on the community’s social norms than on individual decisions (Munshi and Myaux 2006). Accordingly, in recent years some of the most common strategies in this area are community-based, linking the rural community with the health system and identifying local agents who can promote behavioral change (Kim et al. 2015).
Community-based approaches can help foster a sense of local ownership of health reforms and are therefore critical for assuring their long-term sustainability.

Finally, whenever a woman leaves her village to seek health services, she incurs not only direct costs but also opportunity costs associated with reductions in paid and unpaid work, the need to find alternative caregiving arrangements for children, and the time and effort needed for travel. As a result, even when mothers value the future health gains offered by preventative health services, they may not be willing to incur these opportunity costs in the present (Busso, Cristia, and Humpage 2015). To ensure that future health benefits outweigh present costs, some strategies offer monetary and non-monetary incentives to promote demand.

Figure 1 presents a theoretical framework that explains how demand-side strategies can help reduce maternal and neonatal mortality and morbidity by encouraging behavioral changes at the household level (nutrition and supplements, access to contraceptives, and essential care for the newborn such as exclusive breastfeeding or care of the umbilical cord) as well as health center visits for prenatal care, delivery, and three postpartum check-ups (24 hours after birth, between 48 and 72 hours after birth, and during the first 10 days of life; WHO 2013).

The Empirical Evidence

In this section we review evidence for the impact of programs that seek to improve maternal and neonatal health by increasing the use of prenatal care, institutional delivery, contraceptives, and newborn and postpartum care. This evidence is used to

![Figure 1. Conceptual Framework: Behavioral Changes in Maternal and Neonatal Health](https://academic.oup.com/wbro/article-abstract/34/1/95/5492441)

Source: Prepared by the author based on the conceptual framework of Elmusharaf, Byrne, and O'Donovan (2015).
identify programs with the greatest impact and also to gauge cost-effectiveness (where information about cost is available). Relevant studies were collected by an extensive search in PubMed, Econlit, Medline, and the Cochrane Collection, along with Scopus and Google Scholar. From these, a selection was made that focused on the most recent and methodologically rigorous studies, giving priority to studies with large-scale experimental or quasi-experimental evaluations in developing countries.

Among the studies reviewed here, the indicators most frequently used to measure impact are intermediate outcomes (prenatal care, institutional delivery, postpartum care, among others); in addition, some studies use indicators of final health outcomes such as maternal mortality, neonatal mortality, and low birth weight. Consequently, although all the selected studies were designed to improve maternal and neonatal health, it is not possible to summarize their results using a single indicator.

Table 1 lists the experimental studies that were found after reviewing the literature. Studies are classified following the sections of figure 1.

In the review process, we also found other interesting studies that were not experimental, were not implemented in rural areas, or featured impact assessments of indicators not directly related to maternal and neonatal health. These studies are included here because of their innovativeness and their potential to be evaluated and applied to studies of maternal and neonatal health in rural areas.

**Impact Assessment**

**Coverage of Direct Costs**

The study by Alfonso et al. (2015) focuses on the distribution of vouchers to women in rural Uganda who accessed prenatal care services and/or had an institutional delivery. The vouchers were redeemable for round-trip transportation to clinics or health centers and could also be used to pay for maternal and neonatal services at public or private clinics. In this case, the voucher scheme was combined with improvements in the supply of health services. This strategy notably increased the use of prenatal care services among rural women in Uganda and bumped institutional deliveries by 9 percentage points. This study also shows that the intervention is cost-effective relative to the status quo (Alfonso et al. 2015).5

Van de Poel et al. (2014) evaluate the impact of vouchers on antenatal care, birth, and postnatal care by a skilled provider in Cambodia. This program included two types of voucher schemes: one universal scheme that distributed vouchers to all women, while the other targeted the poorest women. In both schemes, local health volunteers distributed the vouchers to pregnant women and provided advice on safe motherhood at village meetings. Both variants of the voucher scheme showed positive impacts, with a gain of 10 percentage points in the probability of having an institutional birth, and an increase of 5.3 percentage points in the probability of receiving postnatal care. No data on costs were available.
Table 1. Experimental and Quasi-Experimental Studies on Maternal and Neonatal Health in Rural Areas

<table>
<thead>
<tr>
<th>Demand interventions</th>
<th>Country</th>
<th>Experimental Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage of direct expenses</td>
<td>Uganda</td>
<td>Alfonso et al. (2015)</td>
</tr>
<tr>
<td></td>
<td>Cambodia</td>
<td>Van de Poel et al. (2014)</td>
</tr>
<tr>
<td></td>
<td>Bangladesh</td>
<td>Nguyen et al. (2012)</td>
</tr>
<tr>
<td></td>
<td>Various countries</td>
<td>Naugle and Hornick (2014)</td>
</tr>
<tr>
<td></td>
<td>Ghana</td>
<td>Rockiki et al. (2017)</td>
</tr>
<tr>
<td></td>
<td>Ghana</td>
<td>Do and Kincaid (2006)</td>
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<tr>
<td></td>
<td>Brazil</td>
<td>La Ferrara, Chong, and Duryea (2012)</td>
</tr>
<tr>
<td>Cultural and social strategies</td>
<td>Bangladesh, India, Malawi, Nepal</td>
<td>Prost et al. (2013)</td>
</tr>
<tr>
<td></td>
<td>India, Bangladesh, Nepal, Pakistan, Indonesia and Gambia</td>
<td>Lassi et al. (2010); Haroon et al. (2013)</td>
</tr>
<tr>
<td></td>
<td>Kenya</td>
<td>Adam et al. (2014)</td>
</tr>
<tr>
<td>Incentives</td>
<td>Honduras</td>
<td>Morris et al. (2004); Barber and Gertler (2009); Feldman et al. (2009)</td>
</tr>
<tr>
<td></td>
<td>Mexico</td>
<td>Urquieta et al. (2009); Stecklov et al. (2007), Lamadrid-Figueroa et al. (2010)</td>
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<td></td>
<td>Guatemala</td>
<td>Gutiérrez (2011)</td>
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<td></td>
<td>Uruguay</td>
<td>Amarante et al. (2011)</td>
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<td></td>
<td>Zambia</td>
<td>Wang et al. (2016)</td>
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Source: Prepared by the author.
Note: *Van de Poel et al. (2014) and Nguyen et al. (2012) are included here even though their focus is not exclusively rural.

Finally, Nguyen et al. (2012) evaluate a voucher program in Bangladesh that functions in 46 of the country’s 489 sub-districts. The program distributes vouchers to pregnant women, giving them free access to antenatal care, safe delivery care in a health facility or at home with a qualified provider, emergency care for obstetric complications, and one postnatal check-up within six weeks of delivery. In addition, women also receive money for routine transport costs, for emergency transport, as well as a cash incentive and a gift box after delivery with a qualified provider. The study estimates a 46 percentage point increase in the probability of delivering with qualified providers while the increase is smaller (13 percentage points) for
Table 2. Impact of Strategies to Cover Direct Costs

<table>
<thead>
<tr>
<th>Vouchers</th>
<th>Prenatal Care</th>
<th>Skilled Delivery</th>
<th>Institutional Delivery</th>
<th>Postpartum visits</th>
<th>Contraceptives</th>
<th>Fertility</th>
<th>Low birth weight</th>
<th>Breast feeding</th>
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</thead>
<tbody>
<tr>
<td>Alfonso et al. (2015)</td>
<td></td>
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<td></td>
<td></td>
<td>0.523</td>
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<tr>
<td>Uganda</td>
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<td></td>
<td></td>
<td></td>
<td>[0.054]**</td>
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<tr>
<td>Nguyen et al. (2012)</td>
<td>0.464</td>
<td>0.136</td>
<td></td>
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<td></td>
<td></td>
<td>[0.043]**</td>
<td>[0.047]**</td>
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<tr>
<td>Bangladesh</td>
<td>[0.043]**</td>
<td>[0.047]**</td>
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<td>Van de Poele et al. (2014)</td>
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<td></td>
<td>0.105</td>
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<tr>
<td>Cambodia</td>
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<td>[0.045]**</td>
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</table>

Source: Prepared by the author.

Note: Table 2 shows estimated coefficients from Difference in Difference Regressions. Numbers in parentheses show standard errors. Significance at the levels 1%, 5%, and 10% level is denoted by ***, ** and * respectively.

institutional delivery. This study could not perform a cost-effectiveness analysis in relation to other programs due to a lack of cost data. Results from these three studies are presented in Table 2.

Other initiatives that cover direct costs can be promising, such as community-based loan funds for transport in the event of obstetrical emergencies. Loan funds are designed to allow people to pool and borrow money so that in the event of an emergency, money is available to pay for the costs of timely access to medical care. Nowlise et al. (2015) make a systematic review of this literature in various countries (Bangladesh, India, Malawi, Nepal, and Nigeria) and indicates that these types of loans increase the use of health facilities for deliveries and emergency obstetric care. The challenge for this strategy is to guarantee the sustainability of these funds. Also, as most of the studies reviewed are not robust controlled experiments, this strategy is a candidate for more rigorous evaluation.

Strategies to Promote Cultural and Social Changes

One of the most common strategies for dispersing information and education to populations about health issues is the traditional information campaign—public announcements on television and radio, billboards, pamphlets, etc. Naugle and Hornick (2014) review several sound studies of this strategy in the maternal and neonatal area and conclude that information campaigns do not have a clear impact on rural populations. In some cases, these strategies increase knowledge but cannot change behavior, while in other cases they may initially change behavior—increasing breastfeeding, for example—but the change is not supported and after three years knowledge decays and behavior returns to previous patterns (McDowell and McDivitt 1990; Naugle and Hornick 2014). While information campaigns have
relatively low cost (e.g. $0.05 per user of prenatal care), they do not seem to be effective in rural areas. Reasons for this lower impact may include lower education levels among rural women as well as less exposure to the media; accordingly, perhaps information campaigns can be made more effective if they are specially designed for rural populations or if they are accompanied by other more individualized interventions.

In an effort to provide more individualized interventions and to foster stronger connections with rural communities, some strategies rely on local agents—trained women in the community or a “health community agent”—so that women have access to individual counseling as well as the support of women’s groups. Such efforts have consistently demonstrated a large impact on breastfeeding, postpartum care, and institutional birth (Lassi, Haider, and Bhutta 2010; Haroon et al. 2013; Prost et al. 2013; Adam et al. 2014). The study by Prost et al. (2013) is a meta-analysis of seven cluster-randomized experiments with a total of 119,428 births that analyzes the impact of specially organized community women’s groups on maternal and neonatal mortality in four countries: Bangladesh, India, Malawi, and Nepal. It seems that women’s groups were especially effective at improving the cleanliness and hygiene of childbirths that take place in the community as well as immediate postpartum care and breastfeeding initiation. Reductions in maternal and neonatal mortality are attributed to these aforementioned improvements in hygiene and immediate postpartum care in the community.

The studies by Lassi, Haider, and Bhutta (2010) and Haroon et al. (2013) focus on the review of cluster-randomized experiments for neonatal care and breastfeeding, respectively. These studies conclude that the combination of individual counseling and group work has the most impact on neonatal care and breastfeeding. Breastfeeding increases by 43 percent the first day, and 30 percent in the first month (36 percent on average) (Haroon et al. 2013). Lassi, Haider, and Bhutta (2010) find that early breastfeeding increased by 94% as shown in Table 3.

An even greater challenge is to affect indicators that are closely tied to social norms such as institutional birth and the use of family planning (Munshi and Myaux 2006). However, the evidence indicates that institutional birth benefits noticeably from community workers individual advice: Adam et al. (2014) review several cluster-randomized experiments for the promotion of institutional delivery in Kenya, finding that women exposed to messages from community health workers in rural areas significantly increased both their knowledge and use of institutional delivery: on average, in the three regions analyzed, the figures for institutional delivery reached 73 percent compared to 56 percent before the intervention. Institutional delivery could also be promoted by inviting traditional midwives to accompany pregnant women when giving birth in a health center or hospital. Traditional midwives are present during delivery and are paid to accompany the women, which compensates them for income lost from not attending births in the community, while the pregnant women
Table 3. Impact of Strategies to Change Cultural and Social Aspects

<table>
<thead>
<tr>
<th>Study</th>
<th>Prenatal care</th>
<th>Skilled delivery</th>
<th>Institutional delivery</th>
<th>Postpartum visits</th>
<th>Contraceptives/Pregnancy Fertility</th>
<th>Low birth weight</th>
<th>Breastfeeding</th>
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<tbody>
<tr>
<td>Rockiki et al. (2017)(^a)</td>
<td></td>
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<td></td>
<td>0.15 [0.03–0.86]</td>
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<tr>
<td>La Ferrara et al. (2012)(^b)</td>
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<td>−0.0078 [0.0024]**</td>
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<tr>
<td>Do and Kincaid (2006)(^c)</td>
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<td></td>
<td>10.5 [1.9]**</td>
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<tr>
<td>Haroon et al. (2013)(^d)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RR 1.43 [1.09–1.87]</td>
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</tr>
<tr>
<td>Lassi, Haider, and Bhutta (2010)(^e)</td>
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<td></td>
<td></td>
<td></td>
<td>RR 1.94 [1.56–2.42]</td>
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</table>

Source: Prepared by the author.

Note: \(^a\)The coefficient 0.15 is the Adjusted Odds Ratio and it refers in particular to the probability of reducing unwanted pregnancies in adolescents who had relations in the previous year. That is, getting pregnant is 85% less likely. Numbers in brackets indicate the 95% Confidence Interval.

\(^b\)The coefficient -0.0078 is the OLS coefficient for women group age 25-34 and indicates that the influence of TV soap operas decreases the probability of having a child in the 25 to 34 age group by 0.8 percentage points. In the 35 to 44 age group, the probability decreases by 0.6 percentage points. Number in brackets shows standard error.

\(^c\)The authors use Propensity Score Matching. The number 10.5 is the percentage points difference between the treatment and matched control groups regarding the use of modern family planning. Number in brackets shows standard error.

\(^d\)The coefficient 1.43 is the Risk Ratio (RR) and indicates that the combination of individual counseling and group work increases breastfeeding by 43 percent the first day. The effect on breastfeeding during the first month is RR 1.32 with a 95% Confidence Interval [1.19-1.42]. Numbers in brackets indicate the 95% Confidence Interval.

\(^e\)The coefficient 1.94 is the Risk Ratio (RR) and indicates that the community based packages increased early breastfeeding by 94% with a 95% Confidence Interval (CI) [1.56-2.42]. The study also shows impact on reduction of neonatal mortality, RR 0.76 with a 95% CI [0.68-0.84]. Numbers in brackets indicate the 95% Confidence Interval.

Significance at the 1%, 5% and 10% levels is indicated by ***, ** and *, respectively.
benefit from support from the midwife and the presence of local community members in the hospital. \textcite{Satti2012} evaluate this kind of program in rural Lesotho and \textcite{GarciaPradoPeña2010} in rural Honduras; both studies find very large increases of institutional births. Although none of these studies have been evaluated following an experimental approach, their promising results call for a more rigorous evaluation of these types of programs. Incentives must be designed carefully as they can have unintended consequences such as neglect of non-incentivized tasks or “gaming the system.” The latter occurred in India with ASHAs (accredited social health activists) when some reported home deliveries as institutional births in order to obtain their cash incentives \textcite{Lahariya2009}. In any case, the smaller the incentive, the lower the risk of perverse outcomes and/or gaming the system \textcite{Roland2016}.

To confront the challenge of increasing the use of family planning, some strategies take advantage of the opportunities afforded by the spread of wireless technology and social media to educate women and promote social change in rural communities. For example, \textcite{Rockiki2017} used mobile phones to send information on sexual and reproductive health (family planning) to rural adolescents in Ghana. Three groups were selected randomly: two treatment groups and one control group. Members of one treatment group were passive recipients of information relevant to adolescent girls, while the other group received an interactive questionnaire with free mobile minutes for each correct answer. The first group improved their responses to a knowledge test by 11 percentage points three months after starting the program, while the second group improved their responses by 24 percentage points. This knowledge was retained for up to 15 months after the program. Among those who had sexual relations in the previous year, the probability of becoming pregnant fell by 86 percent and 85 percent in both the passive and interactive groups 15 months after starting the program. Other strategies tried to educate rural women through TV soap operas, which offer the possibility of portraying characters and situations that are familiar to rural and poor populations and thus may have more cultural and social leverage than other means of communication. Two of the selected studies find positive effects of TV soaps in Brazil \textcite{LaFerraraChongDuryea2012} and Bangladesh \textcite{DoKincaid2006} on contraceptive usage. In Brazil the impact was a reduction in late-age pregnancies with no effect on adolescent pregnancies \textcite{LaFerraraChongDuryea2012}. In Bangladesh the fertility rate fell by 11 percentage points, and visits to family planning clinics increased by 7 percentage points \textcite{DoKincaid2006}. \textcite{DoKincaid2006} also show that the effect on knowledge of family planning methods is stronger than the effect on behavior, confirming similar findings in the literature. Selected results from these studies are shown in Table 3.

Other studies identify imbalances within couples regarding decision-making about family planning. For instance, in a poor urban context of Zambia, the experimental study by \textcite{AshrafFieldLee2014} shows that to promote family planning,
it is better to direct private and individual informative visits at women only (as opposed to husband and wife together). It is unclear what impact this strategy would have in rural areas where it is uncommon to have access to the kinds of contraception that women can use without their husband’s knowledge (e.g., contraceptive injections).

The spread of wireless technology has also been in areas other than family planning. Cell-phones have been used, for instance, to send reminders as a way of reinforcing the importance of health visits (Busso, Cristia, and Humpage 2015) to increase the number of children with complete vaccination in rural Guatemala. The impact evaluation performed by Busso, Cristia, and Humpage (2015) has the additional value of calculating the incremental costs of sending reminders, which leads them to conclude that this is a highly cost-effective strategy. The area of maternal and neonatal health can benefit from this strategy as a way of promoting the four prenatal visits recommended by WHO (1996). Cell-phones have also been used to educate women about the type of services they should receive during pregnancy, childbirth, and postpartum in rural India (Merck for Mothers 2015). In addition, based on an anonymous survey conducted after these services have been delivered, the health providers are given feedback on their service provision. Evidence to date suggests that women participate actively in the training and in the later survey, and that the healthcare providers are receptive to the feedback. It is a promising initiative that strengthens both demand and supply with respect to quality, although the driving force of this strategy comes from demand.

Finally, with respect to the effective implementation of interventions, it is worthwhile to highlight the importance of identifying and working with the strongest nodes and pathways of influence within a community: who makes healthcare decisions, and whose opinion matters most? Effective use of this knowledge can lead to changes in the most recalcitrant indicators, and can facilitate the expansion of changes once they have taken effect (Banerjee et al. 2016). With regard to decisions, a recent qualitative study that focuses on rural Guatemala (Kolodin, Rodríguez, and Alegria-Flores 2015) finds that when deciding where to give birth, pregnant women have little say: instead, the decision is made by the mother-in-law, the husband, and the midwife. Meanwhile, in an obstetric emergency, the first to decide is the husband, then the midwife, and lastly, the mother-in-law. With regard to influence, recent quantitative analyses based on experimental data (Kim et al. 2015; Sato and Takasaki 2015) show that the influence of friends seems to be greater than that of the most popular person in the community for promoting the consumption of multivitamins in Honduras, and that willingness to be vaccinated in a rural area of Nigeria increases by 17 percentage points if a friend has already been vaccinated. This kind of information can be used to design interventions that are specially adapted to the specific networks of each community or rural context.
Monetary and Non-Monetary Incentives

The most common monetary incentives are Conditional Cash Transfers (CCTs). These programs make cash transfers to low-income families, conditional on school enrollment and regular medical check-ups for children. In the case of maternal and neonatal health, the evidence indicates that the impact of this strategy is concentrated on prenatal care (Glassman et al. 2013), with an effect on the adequacy of prenatal care ranging from 8 percentage points of difference between control and treatment groups in Mexico to 19 percentage points in Honduras. Few CCTs include institutional birth as the targeted indicator: the exception is El Salvador, where significant improvement was achieved. Other CCT programs included births attended by skilled personnel instead of institutional birth, obtaining improvements that range from 4 percentage points in Guatemala to 11.4 percentage points in Mexico. Similarly, postpartum visits are only measured in two of the studies, El Salvador and Honduras, and there is no impact in either one. Finally, with respect to contraceptives and fertility only one of the studies in Mexico, Feldman et al. (2009), found positive effects of monetary incentives on contraceptive use, while Lamadrid-Figueroa et al. (2010), also in Mexico, found no significant impact. When the impact is measured in terms of fertility rates there are no significant effects, except in the case of Uruguay where the effect is very weak (only 1 percentage point difference between the control and treatment groups). The study by Amarante et al. (2011) in Uruguay also measures the impact on low birth weight and found reductions of 15 percentage points. Overall, the impact of monetary incentives, as shown in table 4, varies across indicators without a clear pattern.

Here, we focus on the Glassman et al. (2013) review of the impact evaluations of maternal and neonatal care. All of these evaluations were implemented in Latin American countries, as this region was a pioneer in implementing CCTs. Other impact evaluations of health-related CCT programs in countries such as Nepal or India have been conducted with similar results.

However, because of the high cost of CCTs (Fiszbein and Schady 2009), attention has recently turned to non-monetary incentives. Evidence for the effectiveness of such programs is scarce but promising. For example, an experimental evaluation shows that the distribution of a maternal-neonatal kit conditional on delivery in a health center increased the odds of delivering at a health facility by 63% (p-value < 0.001) in rural Zambia (resulting in an increase of 9.9 percentage points in institutional birth), with a moderate cost of $4 per kit (Wang et al. 2016; see table 4). Other non-experimental studies in Malawi and Ethiopia also show the potential of this strategy: Van de Akker et al. (2011) find positive results in Malaria when a kit with items needed for infant care during the first weeks of life is offered as an incentive to women who have an institutional delivery, and Khogali et al. (2014) find increases in the use of the first prenatal visit after offering a small non-monetary incentive for each prenatal visit.
### Table 4. Impact of Monetary and non-Monetary Incentives

<table>
<thead>
<tr>
<th>Monetary incentives</th>
<th>Prenatal Care</th>
<th>Skilled Delivery</th>
<th>Institutional Delivery</th>
<th>Postpartum Visits</th>
<th>Contraceptives</th>
<th>Fertility</th>
<th>Low birth weight</th>
<th>Breast feeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>De Brauw and Peterman (2011)</td>
<td>-0.065</td>
<td>0.123</td>
<td>0.153</td>
<td>-0.059</td>
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<tr>
<td>El Salvador</td>
<td>[0.072]</td>
<td>[0.070]*</td>
<td>[0.076]*</td>
<td></td>
<td>[0.100]</td>
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<tr>
<td>Morris et al. (2004)</td>
<td>0.187</td>
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<tr>
<td>Honduras</td>
<td>[0.060]**</td>
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<td>[0.052]</td>
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<tr>
<td>Barber and Gertler (2009)</td>
<td>0.081</td>
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<td>-0.046</td>
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<td>Mexico</td>
<td>[0.026]</td>
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<td>Gutiérrez (2011)</td>
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<td>Guatemala</td>
<td>[0.067]**</td>
<td>[0.031]*</td>
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<tr>
<td>Amarante et al. (2011)</td>
<td>0.144</td>
<td>-0.002</td>
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<td>0.001</td>
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<td>-0.015</td>
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<tr>
<td>Uruguay</td>
<td>[0.059]**</td>
<td>[0.009]</td>
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<td>[0.00]**</td>
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<td>[0.005]**</td>
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<td>Urquieta et al. (2009)</td>
<td>0.114</td>
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<tr>
<td>Mexico</td>
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<td>La Madrid-Figueroa et al. (2010)</td>
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<td>0.049</td>
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<td>Stecklov et al. (2007)</td>
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<td>-0.03</td>
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<td>[0.003]</td>
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<tr>
<td>Feldman et al. (2009)</td>
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<td>0.16</td>
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<td>Mexico</td>
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<td></td>
<td></td>
<td>[0.097]**</td>
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<tr>
<td>Non-monetary incentives</td>
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<tr>
<td>Wang et al. (2016)</td>
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<td>1.63</td>
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<tr>
<td>Zambia</td>
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<td></td>
<td></td>
<td>[1.29-2.06]**</td>
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</table>

**Source**: Prepared by the author.

**Note**: Significance at the 1%, 5% and 10% levels is indicated by ***, ** and *, respectively.
However, although the use of non-monetary incentives seem to have more potential in terms of cost-effectiveness than traditional CCTs we should remark that the use of monetary incentives can be refined: there is evidence that providing small, immediate payments after specific health behaviors are performed leads to greater impact as shown in a recent study by Celhay et al. (2017).\textsuperscript{12,13}

Discussion and Conclusion

The objective of this review has been to survey experimental and quasi-experimental literature in the area of maternal and neonatal health in rural and poor areas, while highlighting other promising strategies that might be further evaluated, in an effort to identify strategies that are capable of modifying demand behavior and having an impact on key indicators. The reason for focusing exclusively on strategies for changing demand is that demand appears to be a critical but undervalued factor in rural areas, especially with respect to changing social norms, attitudes, and beliefs.

The literature on changes in demand for health has typically concentrated on other areas of health, promoting public health, and sanitation interventions with positive externalities such as the expansion and use of latrines, deworming, access to safe water, or vaccinations for children. Several of these interventions have been evaluated with methodological rigor (e.g., see Miguel and Kremer 2004; Ahuja et al. 2015; Duflo et al. 2015), showing positive changes in demand behavior. But even when these interventions can be delivered at the community level, achieving the relevant behavioral change is not easy. Affecting such changes is even more difficult when, as in the case of maternal and neonatal health, rural and/or indigenous women are required to leave their community (e.g., to give birth in a health center or hospital). Accordingly, this review has emphasized the finding that supply strategies need to be supplemented by a demand approach that not only succeeds in getting women out of the community and into the formal health system, but can also establish a link between the community and the formal health system by involving local and community agents.

Strategies with Notable Impact

Several strategies seem to achieve a positive impact on key maternal and neonatal indicators.

Among community-oriented strategies, one of the outstanding results of this review is the repeated finding that individual counseling by trained women in the community or by a health community agent, in combination with women’s groups, can have a high impact on various neonatal and maternal indicators, including breastfeeding, postpartum care, institutional birth, and neonatal and maternal mortality.
Community-based interventions seem to have especially positive impacts on indicators related to social norms such as contraceptive use and institutional delivery.

The review also highlights the effectiveness of small incentives or “nudging”, which, whether in the shape of a small payment or a non-monetary incentive, seems to have the potential not only to compensate for the present costs of visiting the doctor or leaving the community but also to address the informational, educational, or psychological restrictions that prevent rural populations from adopting better health practices. In addition, the few studies that evaluate these strategies indicate that they are cost-effective. For these strategies to work, the use of small incentives needs to be clearly related to the particular behavior being targeted (e.g., prenatal check-ups) and immediately delivered.

Another important finding is that direct costs—including transportation costs—should be eliminated whenever possible, as even the small costs of heavily subsidized services can have a negative impact on demand in rural and poor areas. In this context, providing vouchers for transportation and/or eliminating user fees can be a powerful strategy with positive impact.

This review also suggests that more modest strategies such as vouchers or small incentives can be fairly effective and yet still cheaper than larger monetary incentives delivered via CCTs. Although most of the studies reviewed here do not include cost information, we know that the costs associated with traditional CCTs are considerable, as they include direct costs of the transfers plus costs of monitoring and supervision and other transaction costs (Fiszbein and Schady 2009). In addition, CCTs seem to have a positive impact on the use of prenatal care but lead to small changes in contraceptive use and moderate changes in births attended by skilled personnel.

Further Implications for Policy-Makers and Evaluators

Most of the studies analyzed here focus on intermediate health indicators (e.g., number of prenatal check-ups, number of institutional births, contraceptive use, etc.) and only few studies include final health outcomes (e.g., reducing maternal or neonatal mortality, fertility rates, etc.). Although intermediate health indicators are important markers of progress toward targeted health outcomes, they do not guarantee success, as final outcomes can depend on other factors such as quality of services. For instance, increasing the number of prenatal visits, as recommended by the WHO (1996, 2016b), does not guarantee that tests required for the prevention of maternal and neonatal complications are being performed during each visit. Indeed, it seems that more attention should be paid to the evaluation of impact on indicators that account for quality as well as quantity. A recent review paper (Montagu et al. 2017) finds that even when institutional birth rates have increased notably, there is no corresponding decrease in mortality and morbidity rates. Accordingly, these authors point at the need to improve the quality of health care facilities where women deliver, thereby reducing the number of rural clinics that are not well equipped to deal
safely with a delivery. Further, a recent evaluation of a CCT program in Indonesia finds increases in the utilization of prenatal care but not improvements in the quality of these visits (Triyana 2016; Triyana and Shankar 2017). Policy makers and evaluators alike should make an effort towards measuring and improving quality; this means including the corresponding indicators in evaluation, as well as implementing a mix of incentives and strategies to promote both demand and quality of services.

Most of the reviewed papers focus on promoting prenatal care and childbirth attended by skilled personnel, while relatively few strategies promote postpartum visits. Moreover, in the few studies that sought to affect this outcome, no significant changes were observed. Nevertheless, strategies for the promotion of postpartum visits need more attention, as many maternal and neonatal deaths occur in this period. Similarly, many programs focus on childbirth attended by skilled personnel rather than institutional birth. The latter is clearly more difficult to achieve, and, as a result, most of the evidence for impact concerns the former. While the debate over what type of birth should be promoted is still on-going (Blum, Sharmin, and Ronsmans 2006; Joseph et al. 2016), some promising strategies for the promotion of institutional delivery are being implemented, such as training traditional midwives from the community to identify signs of risk, and to refer and accompany rural women to deliver at a health center.

Finally, it should be noted that we have not addressed the question of which strategies should be implemented in a given context and we have not been able to perform a comparison across strategies. There is an urgent need for more rigorous and comprehensive evaluations, as well as more information about costs, to enable comparisons of cost-effectiveness across strategies. A recent program conducted by Save the Children’s Saving Newborn Lives has opened a path towards this goal by commissioning large effectiveness and cost evaluations of seven community-based maternal and newborn care (CBMNC) strategies in seven countries (Barger et al. 2017). These authors calculate the time and costs of implementing CBMNC and assess the reductions in neonatal mortality that this program would need to achieve to be considered cost-effective. Moreover, since the methodology used to evaluate each strategy is the same, it is possible to compare them. More efforts are needed in this direction. However, the ultimate goal of such comparisons should not be to determine a single best strategy applicable to all contexts, but rather to develop the kind of knowledge that will allow policy makers and health providers to determine the right blend of community-based, monetary, and non-monetary assistance that can achieve sustainable long-term improvements in health behaviors.

Notes

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1. A distinction is made between neonatal deaths, which occur in the first 28 days of life, and post-neonatal deaths, which occur between the first 28 days of life and the first year of life.

2. Van de Poel et al. (2007) found that controlling for differences in household wealth reduces the median rural-urban risk ratio in under-five mortality in a set of 47 developing countries by 59 percent. They also found, after controlling for a broad range of household socioeconomic and demographic factors, that the urban advantage in child mortality remains significant in about one-third of the analyzed countries.

3. Some neonatal deaths are also due to genetic anomalies. The strategies presented here cannot address this type of problem.

4. The search of the literature did not turn up any experimental or quasi-experimental evidence on eliminating user fees in the area of maternal and neonatal health.

5. A cost-effectiveness analysis comparing the status quo and voucher’s most conservative effectiveness estimates shows that the vouchers had an incremental cost-effectiveness ratio per DALY averted of $302 and per death averted of $20,756. Although there are limitations in the data measures, a favorable cost-effectiveness ratio persists even under extreme assumptions (Alfonso et al. 2015).

6. A similar experience about pooling community funds to pay for obstetric emergencies transport in Honduras is documented by García Prado and Peña (2010).

7. These authors’ strategy was to provide training on basic aspects of maternal and neonatal health to several women in the community, who were later charged with forming women’s groups (between 9 and 13 groups) and organizing monthly or biweekly meetings. This community initiative was supplemented by improvements to services provided by the health system. The groups discussed the importance of prenatal care, hygiene during childbirth, risk signals to be identified, and also organized transport for pregnant women and set up a community fund to cover the costs associated with transport and care in an obstetric emergency.

8. WHO (2016b) has recently raised the number of recommended prenatal visits from four to eight. However, it is not clear how this will be accomplished in the context of rural and poor populations of developing countries.

9. This use of the term “adequate prenatal care” follows the literature on CCTs. However, “adequate prenatal care” has different meanings depending on the country or context. In most of the studies analyzed here, the term is defined as “number of prenatal visits,” except in the case of Guatemala, where it is “number of prenatal visits to the health center,” (Glassman et al. 2013).

10. While it is true that CCTs are also intended to have an impact on the consumption of prioritized households, in this review we are only interested in their impact on health.

11. For attending the first prenatal care visit, women received a bar of soap and a bucket; on their second visit they received a mosquito net; in their third visit they received sugar, cooking oil, and a jar of jam; and on the last visit they received a kit of basic items necessary for the birth. The total cost of this non-monetary incentive kit was $10.

12. However, CCTs can also be seen as poverty programs that have multiple objectives (aside from health) and include an investment dimension. Accordingly, they may not be a good fit for one-dimensional estimates of cost-effectiveness.

13. The average rate of stillbirths is reduced by 9.5 percent to 22.3 percent and the survival rates of birth cohorts exposed to the program is increased by 3.5 percent to 16.8 percent.
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