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How to Change Behavior to Improve Maternal and Neonatal Health in Rural Areas of Latin America

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Abstract[*]

The objective of this paper is to review the most relevant, recent and rigorous literature on strategies to promote changes in demand for maternal and neonatal health services in rural areas of Latin America and to identify the strategies with most impact and lowest cost. The evidence shows that: i) covering direct expenses increases the use of prenatal care and institutional delivery and appears to be cost-effective; ii) community interventions have positive impacts on indicators related to social norms (contraceptive use and institutional delivery); iii) monetary incentives have moderate impacts on use of prenatal care but lead to very few changes in institutional delivery or contraceptive use, while non-monetary incentives do increase institutional delivery at a much lower cost; iv) sending reminders to women could increase the use of prenatal and postpartum visits in a cost-effective way; and v) postpartum and puerperium visits need to be promoted.

JEL classifications: I12, I15
Keywords: Health behavior, Maternal and neonatal health, Latin America

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1. Introduction

In 2013, around the world 289,000 women died from causes related to pregnancy and childbirth, and 2.6 million babies died due to premature childbirth during the last three months of pregnancy or during delivery along with 2.7 million newborns (UN, 2015). The review of the Millennium Development Goals (MDGs) and their achievements in 2015 has revealed major advances in both maternal and infant mortality. Specifically, the goal for child health—a two-thirds reduction between 1990 and 2015—was achieved. However, neonatal mortality (during the first 28 days of life)[1] has hardly fallen. Currently 45 percent of all deaths of children under five are due to neonatal causes and complications related to early birth (Victora et al., 2015), indicating that efforts to further reduce infant mortality need to be channeled into neonatal mortality.

Significant improvements have also been made in maternal health, with maternal mortality falling by 50 percent globally since 1990 (Victora et al., 2015). Despite this improvement, the indicator failed to achieve the target set in the MDGs: three-quarters reduction between 1990 and 2015; consequently, a special effort is required to improve this result. In response to these challenges, the new Sustainable Development Goals call for a reduction in maternal and neonatal mortality to below 70 deaths per 100,000 live births and below 12 deaths per 1,000 live births respectively in each country, together with promotion of universal access to sexual and reproductive health services by 2030.

In Latin America there have also been significant improvements in maternal and infant mortality. The infant mortality goal was achieved in the region, although not in all countries, but, like the worldwide level, neonatal mortality fell only slightly. For maternal mortality, the goal was not reached. In 2013, there were 85 maternal deaths per 100,000 live births, a 39 percent reduction compared to 1990, far below the 75 percent commitment in the MDGs (United Nations Economic Commission for Latin America and the Caribbean, ECLAC, 2015). Moreover, the maternal mortality rate varies significantly between countries in the region: from 16 and 17 per 100,000 live births in Uruguay and Chile to 157, 116 and 109 in Haiti, Guatemala and the Dominican Republic (ECLAC, 2025).

[1] We must distinguish 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.

But differences exist not only between countries in the region but also between different population groups. In Latin America, for example, the fertility of women aged 15 to 19 is 75.5 live births per 1,000 women, only exceeded globally by Sub-Saharan Africa (ECLAC, 2015), and much higher than fertility in other age groups. Since the probability that a woman will die for reasons related to childbirth and pregnancy is much higher for adolescents (World Bank, 2012), maternal mortality in Latin America is concentrated in this population group. There are also significant differences in coverage of essential services for maternal and neonatal health, being much lower among rural and poor populations in Latin America (Neal et al., 2015; Mokdad et al., 2015).

Most maternal deaths occur at home, in rural areas, in the poorest communities, during peripartum, the last three months of pregnancy until the first week after giving birth (Ronsman and Graham, 2006). However, peak deaths occur 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 adolescent and/or late-age pregnancies which have the highest risk. But it is difficult to promote the use of these services in rural areas because of remoteness, lifestyle and socioeconomic and cultural levels which act as barriers and create a perception of the value of health and healthcare lower than in urban areas (Kolstad, 2011).

Neonatal mortality occurs primarily due to complications at the time of delivery, such as premature birth, low birth weight, and prolonged or obstructive labor (Berlinski and Schady, 2015; Bartlett et al., 1993; Kusiako et al., 2000). According to the WHO (2006), a quarter of neonatal deaths take place during delivery or the first 24 hours of life, while three-quarters of neonatal deaths happen in the first week of life. Some of the complications that lead to neonatal death are preventable through prenatal and postpartum care, and are easier to deal with if delivery is institutional. But the habits and beliefs of rural communities often lead to behaviors that are inconsistent with adoption of these interventions.

It is therefore necessary to implement differentiated strategies for rural areas, and identify the difficulties faced by this population in contrast to those existing in urban areas.

First, the rural population is less dense and has more difficulty accessing health services because of remoteness. In Latin America, 20 percent of the population live in rural areas (Dolea et al., 2010), but growing urbanization in the region is leading to an ever more dispersed rural population. Geographical barriers also mean that these populations have to contend with the cost of transport and the opportunity cost of accessing health services. Second, the supply of health services in rural areas is limited. Economies of scale do not justify building hospitals or health centers in sparsely populated areas, and the professionals who provide health services in rural areas are difficult to recruit and retain. Finally, the rural population is more heterogeneous than the urban in terms of culture, social norms and beliefs. In Latin America, with the presence of indigenous and rural populations, people do not seek treatment in health services because their customs and culture are not valued (King and Behrman, 2009). These societies are often rural and patriarchal which value certain customs, such as home delivery, as a symbol of the strength of women (García Prado and Cortez, 2012).

Consequently, the rural population has lower life expectancy, higher incidence of disease and more exposure to risk factors (more chronic malnutrition, more non-spaced pregnancies, a higher incidence of diarrhea and respiratory illnesses in children) and worse health indicators (maternal mortality, chronic malnutrition, neonatal and infant mortality). In addition, out-of-pocket health spending is higher and financial protection lower than in urban areas (ILO, 2015).

In the past, strategies to improve maternal and neonatal health in rural and poor areas were mainly focused on building up the supply of health services, in an attempt to bring supply closer to rural areas through itinerant modalities and/or infrastructure expansion. However, given the persistence of inequities between rural and urban and indigenous versus non-indigenous populations, more emphasis has been put on demand and on meeting the challenge of how to change behavior and promote the use of health services (prenatal care, institutional delivery, puerperium and postpartum visits and family planning) which can reduce maternal and neonatal deaths.

However, achieving changes in demand behavior in health is complex. In addition to the barriers themselves in rural areas (geographical, financial and cultural or personal), the rural and poor population, like the urban, tends to prefer the present to the future, making it difficult to promote preventive interventions that bring positive health outcomes in the long run but which

involve a present cost. Moreover, poor rural and urban populations share the stress associated with poverty which can reduce their cognitive capacity to make decisions (Mani et al., 2013).

This study focuses on identifying which strategies aimed at making behavioral changes in demand for health in rural and poor areas have positive impacts on indicators related to maternal and neonatal health. We emphasize rigorous empirical evidence and experimental and quasi-experimental studies; although we also identify other studies that describe potentially successful interventions whose rigorous evaluation in the area of maternal and neonatal health could be of interest in the future. This work is useful both for policymakers in the health sector and for academics and researchers interested in rigorous evaluation of some of the promising strategies identified.

2. What Are the Key Services for Improving Maternal and Neonatal Health?

The extensive evidence on the most effective interventions for reducing maternal and neonatal mortality is based on the principle of continuous care throughout the lifecycle, including pregnancy, birth and childhood, and adolescence, not only in health centers and hospitals but also with participation of the community (WHO, 2005).

The critical interventions for preventing maternal and newborn deaths include: prenatal care, institutional delivery, puerperium visit, care of the newborn and family planning. These are the indicators on which we focus primarily in this study. Campbell et al. (2006) add other additional interventions such as early stimulation, hygiene and environmental health measures. We decided to concentrate on the former because delivery of these services depends above all on the Health Ministry, while delivery of the latter requires inter-ministerial coordination for which a separate analysis is preferable. We will briefly analyze each intervention.

2.1 Prenatal Care

Prenatal care consists of medical visits that women should have during pregnancy to prevent risk of premature birth and other potential risks during childbirth. These visits offer medical, nutritional and educational interventions to reduce risk of low birth weight and other pregnancy-related problems and promote breastfeeding and safe delivery. When prenatal care is inadequate, the probability of low birth weight or premature birth increases along with neonatal and maternal

mortality (Kogan et al, 1994; Herbst et, al., 2003). Low birth weight, for example, contributes to 60-80 percent of neonatal deaths in Latin America (WHO, 2012).

What is meant by adequate prenatal care? The World Health Organization (1996) recommends a minimum of four prenatal care visits (before or about week 12, week 26, week 32 and week 36-38). However, each country sets its own clinical protocols, so these figures vary considerably. In principle, prenatal care should be provided at the first care level, although in some cases, in isolated and remote rural settings, it can even be provided in the community itself (Neal et al., 2015). This means that, like all interventions which can take place at community level and which are preventive, they are highly cost-effective (Campbell and Graham, 2006). To ensure their adequacy, the content must conform to clinical guides, such as those presented in Table A of the Annex.

In most of the studies analyzed in this work, prenatal care is measured only by number (not by content) and only one case specifies that the care is provided in a health center. This is not the best way to measure prenatal care because it is not clear that more care visits lead to better health outcomes.

2.2 Institutional Delivery

Institutional delivery is defined as delivery that takes place in a health center or hospital authorized for childbirth, attended by skilled personnel, as reflected in the global strategy document for the health of women, children and adolescents published by the United Nations in 2015 for the period 2016-2030 (UN, 2015). However, the literature reviewed shows that often what is measured is delivery attended by skilled personnel.[2] This type of delivery promotes behavior change more easily among rural women because it takes place in the community and succeeds in reducing some of the risks of home delivery with a traditional midwife.

However, the existing evidence shows that it is desirable to promote institutional delivery in a health center authorized for childbirth attended by a health professional with the equipment needed to cover every possible contingency, thus avoiding unwanted and unexpected

[2] The term skilled personnel or provider refers exclusively to people with childbirth skills (for example, doctors, midwives, nurses) who have been trained to proficiency in the skills necessary to offer competent care during pregnancy and childbirth. Skilled personnel must be able to manage labor and normal delivery, recognize the onset of complications, perform essential interventions, start treatment and supervise the referral of mother and baby for interventions that are beyond their competences or not possible in that particular setting (based on WHO, 1999).

complications that are difficult to deal with away from the hospital (Jowett, 2000; Filippi et al., 2006). Empirical evidence also shows that delivery outside a health center should be less than two hours away from a center with access to safe blood (Lassi et al, 2010; Campbell and Graham, 2006). For institutional delivery, women have to leave their community with all the financial, opportunity and cultural costs that this entails. As an intervention that requires clinical access and care 24 hours a day, 7 days a week, more resources are needed but, despite this, it is still considered cost-effective given the high impact on reduction of maternal and neonatal mortality[3] (Campbell et al., 2006).

2.3 Puerperium Care and Postpartum Visits

These care visits are essential for the health of the mother and newborn. The evidence indicates the need for at least three types of visits after childbirth: the first postpartum visit which should take place within the first 24 hours; the second (visit to mother and newborn) should be between 48 and 72 hours after birth, and the third visit (late puerperium) during the first 10 days of life (WHO, 2013). However, there is substantial variability of visits between the each country's clinical guidelines.

The need for care in the immediate postpartum period is widely recognized (Li et al., 1996) but often late puerperium care is forgotten or neglected altogether (Kowalewski and Jahn, 2001). Moreover, in some low-income countries the mother often returns home within 24 hours after giving birth (García Prado and Cortez, 2012). Although more than half of maternal and many neonatal deaths occur more than 24 hours after delivery, use of these visits is extremely rare in developing countries (Kowalewski and Jahn, 2001).

As in the case of prenatal care, visits to newborns can be provided in the community and so are very cost-effective (Campbell and Graham, 2006).

2.4 Family Planning

Family planning services are a set of activities offered by health professionals to help the family, or woman, to decide freely and responsibly the number and spacing of children, selecting the

[3] The cost-effectiveness could be lower in very isolated populations due to the high costs of mobility.

most convenient means available. It is a key service for the adolescent population and in the postpartum period immediately after childbirth.

In the studies analyzed, family planning is measured in terms of contraceptive use, with a few exceptions without specifying whether or not modern methods are used.

All these indicators are considered intermediate to achieving an impact on final health indicators: low birth weight, maternal mortality, neonatal mortality and fertility rate.[4] They will have greater or lesser impact depending on the content and quality of prenatal care, institutional delivery and postpartum and neonatal visits. There are some internationally recognized clinical guides promoted by the WHO which specify which particular services need to be provided at each stage of the continuum of care for women and newborns. They can be found in Table A of the Appendix,[5] which also indicates at which care levels these interventions can be provided (community, primary, referral).

2.5 Coverage in Latin America

The data for Latin America offers information on prenatal care and delivery mainly attended by skilled personnel. Table 1 presents a summary of the coverage for these two indicators throughout the region, in some selected countries and in rural areas in these countries.

In 2014, 92 percent of births in Latin America were assisted by a specialized health professional, an increase of 11 percentage points compared to 1990. Most countries have increased their levels of care according to the latest available data: 18 countries have values above 95 percent, and 10 are between 90 and 95 percent; care levels in Bolivia, Honduras and Nicaragua are between 80 and 90 percent, while Guatemala and Haiti have values below 70 percent (ECLAC, 2015).

With respect to coverage of prenatal care, the numbers are high relative to other regions of the world: 97 percent of women aged 15 to 49 with a live birth in 2014 received prenatal care by skilled health personnel (doctors, nurses and birth attendants) at least once during pregnancy.

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[4] In the case of fertility, the studies reviewed mostly evaluate interventions aimed at spacing pregnancy, and reducing unwanted pregnancies or adolescent pregnancies.

[5] Table A of the Annex summarizes the guidelines based on evidence published by the World Health Organization in partnership with Aga Khan University in Pakistan in 2011 on maternal and child health (Partnership for Maternal, Newborn, and Child Health, 2011). The table presents the most cost-effective interventions based on the evidence, adjusted to the context of low- and middle-income countries.

According to the latest available data, in this respect most countries have values above 90 percent. However, one prenatal care visit is clearly insufficient according to WHO guidelines. When the four prenatal care visits are measured then average coverage in the region is 89 percent, with significant variations between countries, ranging from 67 percent coverage in Suriname and Haiti or 77 percent in Bolivia, compared to 95 percent in Peru (ECLAC, 2015).

Table 1. Coverage of Prenatal Care and Delivery Attended by Skilled Personnel

Indicators	Latin America	Colombia	Peru	Dominican Republic	Bolivia	Haiti
Prenatal care (%)						
At least one prenatal care visit (urban)	97	97	97	98	90	90
Four care visits (urban)	89	89	95	93	75	67
Childbirth (%)						
Delivery attended by skilled personnel	92	99	90	97	84.8	37.3
Delivery attended by skilled personnel (rural population)	na	82	65	91	<40	<20

Source: ECLAC (2015) and Neal et al. (2015).

When we look specifically at rural populations and the lowest income quintile, coverage indicators are significantly lower. Neal et al. (2015) use data from the DHS surveys at three points in time for 35 countries and disaggregate indicators by population groups according to income quintile and rurality. Their analysis shows that in countries like Colombia, Peru and the Dominican Republic, where more than 80 percent of women receive skilled care during birth, there are still considerable differences between rural and urban populations, even though coverage of the most disadvantaged groups in these countries has improved most in recent years. In countries where coverage is below 80 percent, such as Haiti and Bolivia, the differences between income quintiles and between rural and urban populations are much wider; moreover it is the poor and rural populations that have made the least progress (Neal et al., 2015).

The behavior of the prenatal care indicator is a little different: for countries with most coverage this indicator has reached high levels but is no longer improving and has stagnated, while for countries with low coverage the indicator has grown less for rural and poor populations but improved more on average than the indicator of skilled care at delivery (Neal et al 2015).

In short, in many countries with coverage of skilled care at delivery and high prenatal care, poor and rural people are still lagging and, although these differences have narrowed, there are still inequalities and work to reduce them must continue. Mesoamerican countries are a clear example of these inequalities, which exist even among poor and rural populations (Mokdad et al., 2015). Improving health indicators in rural areas and closing these gaps in coverage are essential goals for achieving more equitable health systems, something that is already part of the post-2015 agenda (Samarasekera and Horton, 2014).

3. What Can Governments Do To Improve Coverage of Maternal and Neonatal Health Services in Rural Areas?

The interventions described in the previous section are cost-effective; however, it is not simple to implement them. The difficulty lies in how to ensure that these essential services are provided, that potential patients use them, and that they receive timely care of appropriate quality, leading to good health outcomes. To meet this challenge, governments in Latin America and developing countries in general have implemented various strategies, mainly and notably focused on improving the supply and quality of these services.

The supply approach, although necessary, does not completely solve the problems of the barriers to access common among rural and poor populations. It does little good to have a well-equipped supply with well-trained health personnel who do not absent themselves, if demand is not motivated, informed and does not use the services (Figueroa and Kincaid, 2007). Bringing supply closer to demand could alleviate the financial and geographical barriers, but not necessarily the personal barriers, including culture, the social norms proper to the communities in which people live and the perception of their own health. These barriers are significant in many rural indigenous contexts. As a result, in recent years there has been a significant increase in the number of strategies attempting to motivate behavioral changes in demand so that women increase their use of essential maternal and neonatal health services and potential patients adopt behavioral changes to contribute to reducing maternal and neonatal deaths.

Demand interventions are also crucial for reducing some of the most common delays in accessing maternal and neonatal services in case of an obstetric or neonatal emergency in the community. According to the Three Delays Model (Thaddeus and Maine, 1994) three levels influence to what extent individuals receive adequate healthcare in time or not. The first is a delay in seeking help when there is a health problem and is normally related to lack of knowledge about health, being unable to identify signs of risk, and/or lack of autonomy to make the decision. The second is delay in accessing the health center because of physical distance, lack of transport or high cost of access. The third refers to delay in receiving adequate healthcare in the health center due to absence of medicines, equipment of the health centers or poor training or absenteeism of health personnel (Kumar and Murray, 2014). The interventions on the demand side presented here can encourage use of prenatal, institutional delivery, puerperium and postpartum services as well as responding to the first and second delays. The interventions from the demand side include the following:

3.1 Strategies To Cover Direct Costs

The evidence clearly shows the economic barriers facing poor and rural populations. They relate mainly to the cost of medicines and medical consultations (O'Donnell, 2007), and cost of transport (Frew et al., 1999; Ensor and Cooper, 2004) which are direct costs incurred when using the formal health services. This section presents the strategies to cover the main direct costs of using formal health services.[6] These take the form of two options: first, removing user fees in the public sector. Second, giving vouchers to users to cover the cost of transport to the health center and the user fees charged for accessing the services provided by the public or private sector.

The evidence shows that reducing the cost of using health services to zero is very important, even if the price for access to these services is very low. For example, Kremer and Miguel (2007) show that 80 percent of the population analyzed take de-wormer medication if it is free, while this percentage drops to 20 percent if the price increases to 0.30 dollars. Cohen and Dupas (2010) conclude that most pregnant women use anti-malaria nets when they are given free during the prenatal visit, while only 40 percent would be willing to buy them at a price of 0.60 dollars per unit. Similarly, individuals' willingness to use drops to treat non-potable water

[6] We leave analysis of the cost of medicines for a separate study given the complexity of the drug market in developing countries.

increases the less it costs: Ashraf, Berry and Shapiro (2010) find that the use of this water treatment decreases from 80 percent to 50 percent when the price changes from 0.10 to 0.25 dollars. Demand for health services appears to be very sensitive to small price increases, especially in the band where the price is close to zero and vice versa. Consequently, eliminating user fees, even when they are very moderate, can have very positive effects on use of the services.

Another way to encourage the community to move to the formal health system, particularly the emergency system, is to set up a community fund, as in Honduras (García Prado and Peña, 2010). These strategies address the financial barriers against access to health services and in the case of obstetric or neonatal emergency can reduce the second delay of the Thaddeus and Maine (1994) model.

One advantage of covering direct costs is that this strategy is expected to have more impact on the poorest sectors, where demand should in principle be more sensitive to price changes.

3.2 Strategies To Change Cultural and Social Aspects

Strategies to promote imitation of healthy habits include communication campaigns, provision of courses and training for mothers, and use of television soaps. Reminders have also been used to respond to the common problem that poor people are subject to the stress of the heavy demands of everyday life and in many cases forget to go to the doctor’s appointment. But most strategies are community-level interventions, ranging from community health workers who provide crucial information on maternal and infant health and link the community with the formal health system, to formation of women's groups in the community to train mothers in basic aspects of healthcare for themselves and their babies.

On other occasions, work in the community focuses on identifying the agents who act as promoters of change in the community and on using their influence in community networks. All these initiatives are important and can have a decisive influence on reducing personal or cultural barriers to access, as well as the first delay. Promoting community participation is crucial for creating a sense of belonging to the reforms from the grassroots, and for achieving their sustainability (Rifkin, 2014).

3.3 Monetary and Non-Monetary Incentives

Incentives on the demand side can be monetary and non-monetary. Both try to motivate behavior change and somehow compensate for the effort that women make to visit the health center for prenatal care, or to give birth (opportunity cost[7]). Attending prenatal visits or having an institutional delivery involve a present cost for these mothers and some future benefits for their own and the baby's health. As Busso, Cristia and Humpage (2015) affirm, people can value future health gains even though they are not willing to sacrifice present consumption or time for such gains. This is common in preventive health as is the fact that people postpone certain health appointments for a future time and when that time comes postpone them again (Loewenstein, 1992). Incentives are intended to offer a gain in the present in an attempt to change these behaviors.

In the case of *non-monetary incentives* this gain or incentive consists of providing food or baby clothes to users of the service to compensate them for the effort of visiting the health center. In Guatemala, for example, all mothers who give birth in the health center receive a kit with the products needed to care for the newborn during the first days of life (Salud Mesoamerica 2015, Guatemala).

Monetary incentives are offered through *Conditional Cash Transfer* programs. These programs offer money conditional on receiving prenatal visits or tetanus vaccine in the case of pregnant women, or other types of intervention. Latin American countries have been pioneers in implementing these programs, although they are now found in many other countries.

Figure 1 presents the theoretical framework that explains how demand-side strategies can help reduce maternal and neonatal mortality and morbidity through behavior change at the household level (nutrition and supplements, essential care for the newborn such as exclusive breastfeeding or care of the umbilical cord, and access to contraceptives) as well as encouraging visits to the health center to access prenatal care, give birth, and for the first postpartum visit (in the first 24 hours after giving birth), the puerperal and neonatal visit, between 48 and 72 hours after birth, and the second puerperal visit, during the first 10 days of life (Salud Mesoamérica 2013).

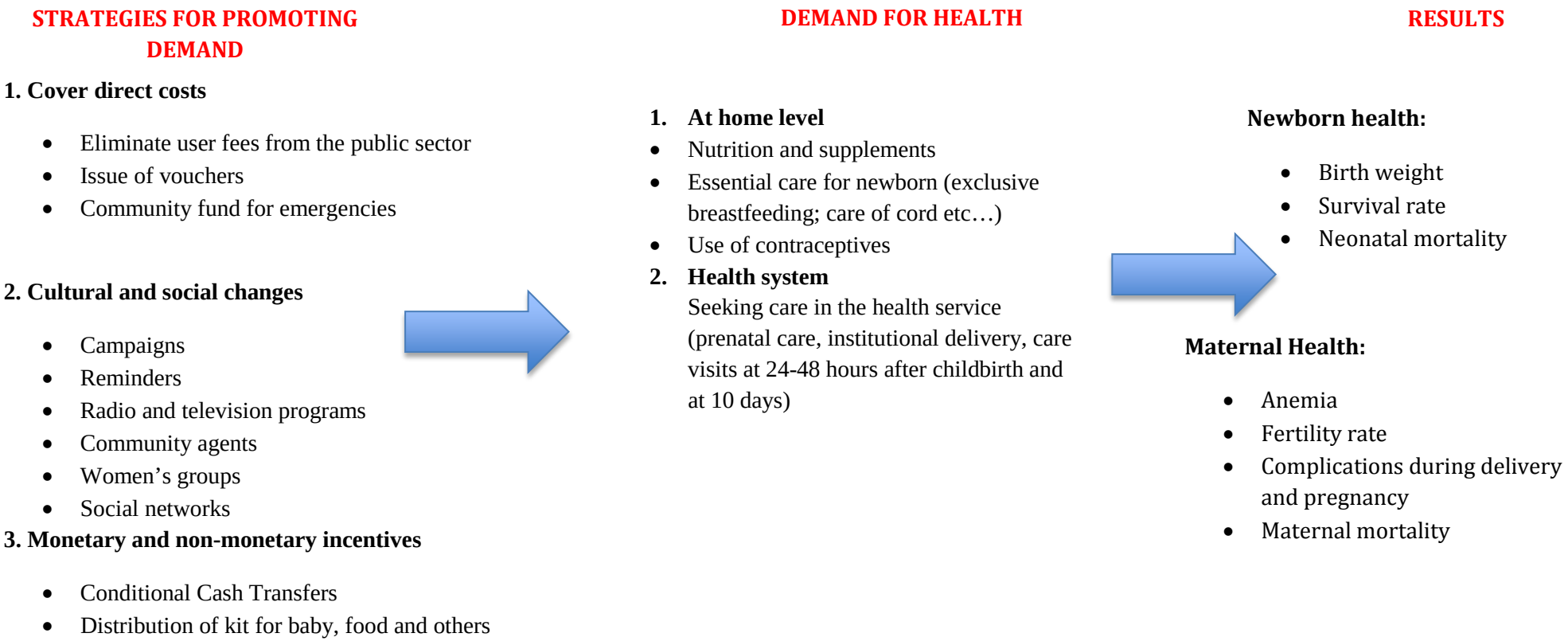
[7] The opportunity cost of lost working days when travelling to the formal health system is considered a barrier to access to health services (Khan et al., 2002; Ensor and Cooper, 2004).

The emphasis on promoting behavioral change in demand has also revealed the need to design integrated approaches where demand and supply strategies are integrated and coordinated, by improving primary care and community initiatives, incorporating vertical health programs (vaccination, women's health, among others) still common in health systems, into an integrated services platform, ensuring continuity of both regular and emergency care (Walley et al., 2008). The evidence shows that interventions on the supply side are more effective if supplemented by interventions on the demand side and vice versa (Regalia and Castro, 2009; Gaarder, Glassman and Todd, 2010; Ranganatham and Lagarde, 2012) and that, despite the coordination effort, governments are increasingly implementing this type of strategy.

Finally, in addressing the risk factors affecting maternal and neonatal health, it should be borne in mind that the health sector is jointly responsible with other sectors. Consequently, some governments are trying to implement inter-sectorial actions such as access to safe water and sanitation in coordination with the health interventions. In many cases this type of integrated and inter-sectorial approach encounters serious obstacles: sometimes due to lack of political will or lack of knowledge of the advantages, but mainly due to the weakness of operational and local managements (Kerber et al., 2007), as well as lack of health personnel trained in a more integrated view of health.

A good example of an integrated and inter-sectorial approach to health is the Salud Mesoamérica 2015 (SM2015) initiative, which invests in provision of maternal-infant health and nutrition services of proven cost-effectiveness in populations living in extreme poverty in rural and remote areas of Mesoamerica. SM2015 is a pioneering experience of results-based funding mechanisms in the region and globally, and also a strategy for an integrated approach and inter-sectorial collaboration. There are several ongoing evaluations of this initiative, which will certainly contribute important findings in the area of maternal and neonatal health.

Figure 1. Conceptual Framework: Behavioral Changes in Maternal and Neonatal Health[8]



[8] Prepared by the authors based on the conceptual framework of Elmusharaf et al. (2015).

4. Empirical Evidence

4.1 Methodology

In this section we review the evidence of the impact of programs implemented on the demand side aimed at increasing use of prenatal care, institutional delivery, contraceptives and visits during puerperium and postpartum in order to improve maternal and neonatal health. Evidence is presented to identify which programs have the greatest impact, and how much they cost (only in cases where this information is available). The search is exhaustive, mainly in PubMed, Econlit, Medline and the Cochrane Collection, along with Scopus and Google Scholar. The final selection focuses on studies which are recent, rigorous from a methodological point of view, and relevant to Latin America and the Caribbean. We give priority to studies with large scale experimental or quasi-experimental evaluations in developing countries. However, we also include some studies that are not experimental, or are pilots that have not been implemented on a large scale. We considered it necessary to discuss them since they analyze strategies that could have great potential in terms of impacts on maternal and/or neonatal health and are therefore suitable for future impact assessments.

We also included studies in countries and regions other than Latin America. Although the results of these evaluations cannot be directly extrapolated to other contexts, some of the studies conducted outside Latin America can serve as inspiration and be evaluated for contexts proper to the region. Moreover, if certain types of programs have generated consistent effects in different contexts, similar results can be expected in Latin America and the Caribbean.

Table 2 lists the experiments we found after reviewing the literature. Studies are classified by area, according to the points of Figure 1, together with the name of the country involved.

Table 2. Experimental and Quasi-Experimental Studies on Maternal and Neonatal Health in Rural Areas

Demand interventions		Country	Experiment
Coverage of direct expenses	Issue of vouchers	Uganda	Alfonso et al. (2013)
Cultural and social strategies	Campaigns	Various countries	Naugle and Hornick (2014)
	Interactive telephone information	Ghana	Rokicki et al. (2015)
	TV soaps	Bangladesh	Do and Kincaid (2006)
		Brazil	La Ferrara et al. (2012)
	Women's groups	Bangladesh, India, Malawi, Nepal	Prost et al. (2013)
	Home and group visits for neonatal care and breastfeeding	India, Bangladesh, Nepal, Pakistan, Indonesia and Gambia	Lassi et al. (2010b); Haroon et al. (2013)
	Community health agents (institutional delivery)	Kenya	Adam et al. (2014)
Incentives	Conditional Cash Transfers	Honduras	Morris et al. (2004)
		Mexico	Barber and Gertler (2009) Feldman et al. (2009) Urquieta (2009) Lamadrid-Figueroa et al. (2010) Stecklov (2007)
		Guatemala	Gutiérrez (2010)
		Uruguay	Amarante et al. (2011)
	Distribution of kit	Zambia	Wang et al. (2016)

Source: Authors' compilation.

4.2 Selected Studies

4.2.1 Coverage of Direct Costs[9]

The study by Alfonso et al. (2013) focuses on issue of vouchers to women in rural Uganda who attend prenatal care and/or have an institutional delivery. These vouchers are redeemable for round trip transportation to clinics or health centers and can also be used to pay for maternal and neonatal services at these clinics, which can be public or private. The voucher scheme is combined with improvements in the supply of health services. The results of the study are measured in terms of prenatal care and institutional delivery.

4.2.2 Strategies to Change Cultural and Social Aspects

This section describes various communication, information and educational strategies along with community-oriented strategies.

Naugle and Hornick (2014) review the literature on health-related campaigns. They identify several sound studies in the area of maternal health and sexual and reproductive health.

Another way to inform, educate and communicate is to use the new technologies. Rokicki et al. (2015) use mobile phones to send information on sexual and reproductive health (family planning) to adolescents in Ghana. Three groups were selected randomly: two treatment groups and one control group. One treatment group was sent information relevant to adolescent girls who received it passively, while the other treatment group received an interactive questionnaire and got free mobile minutes for each correct answer.

Lastly, two studies are included which evaluate TV soap operas in Brazil (La Ferrara, 2012) and in Bangladesh (Do and Kincaid, 2006). These television series offer the possibility of portraying situations and characters similar to those experienced by the rural and poor population. Consequently they have great educational potential, and viewers who follow them are more inclined to adopt the kind of preventive care which they promote. In this case the topic is family planning, and TV soap operass are used an incentive for use of contraception.

In the area of community participation there are several meta-analysis-type studies. The study by Prost et al. (2013) is a meta-analysis of seven cluster-randomized experiments with a total of 119,428 births which analyze the impact of the organization of women's groups at

[9] We have not found experimental or quasi-experimental evidence on elimination of user fees in the area of maternal and neonatal health.

community level on maternal and neonatal mortality. The studies focus on four countries: Bangladesh, India, Malawi and Nepal. The strategy is to provide training on basic aspects of maternal and neonatal health to several women in the community, who are later charged with forming women's groups (between 9 and 13 groups) and organizing monthly meetings (in rural areas) or biweekly (in urban areas). This community initiative also includes improving the services provided by the health system. The groups discuss the importance of prenatal care, hygiene during childbirth, risk signals to be identified, and also organize transport for pregnant women and set up a community fund to cover the costs associated with transport and care in an obstetric emergency.

Other community strategies such as those described in Lassi et al. (2010) and Haroon et al. (2013) focus on review of cluster-randomized experiments for neonatal care and breastfeeding, respectively. Finally, we also included another study which reviews several cluster-randomized experiments for promotion of institutional delivery in Kenya (Adam et al., 2014).

4.2.3 Monetary and Non-Monetary Incentives

In the case of monetary incentives, the most important studies evaluate the impact of Conditional Cash Transfers (CCTs) on various indicators of maternal and infant health. We have only included studies for Latin America (and only those that target the rural population), along with a review of the literature by Glassman et al. (2013) since the literature is extensive. There are other impact assessments of CCT programs in countries such as Nepal or India. CCTs are based on transfer of money to families prioritized by income. Payment is conditional on the families taking their children to school and having medical checks. Each country sets different conditions with respect to health. Only Honduras and Uruguay included attending prenatal care as a condition, while Mexico, El Salvador and Guatemala only required preventive visits for children. In El Salvador the intervention was accompanied by education for women to improve their knowledge of childbirth.

The empirical evidence is much more limited with respect to rigorous evaluations of non-monetary incentives in maternal and neonatal health. We highlight here the study by Wang et al. (2016) which, using a randomized experiment with control and treatment groups in two rural districts of Zambia, assessed the impact of providing a maternal-neonatal kit (with clothing and

hygiene articles necessary for the baby) whose distribution is conditional on giving birth in a health center authorized for delivery.

4.3 The Impacts

Tables 3, 4 and 5 summarize the impact of each of the studies described above. We cannot summarize the results in a single indicator because, although the studies are designed to improve maternal and neonatal health, they use different intermediate or final indicators.

Table 3. Impact of Strategies to Cover Direct Costs

	Prenatal Care	Skilled Delivery	Institutional Delivery	Postpartum visits	Contraceptives	Fertility	Low birth weight	Breast feeding
Vouchers								
Alfonso et al. (2013)			0.523					
Uganda			[0.054]***					

*10%, **5%,***1%

Table 4. Impact of Strategies to Change Cultural and Social Aspects

	Prenatal care	Skilled delivery	Institutional delivery	Postpartum visits	Contraceptives	Fertility	Low birth weight	Breast feeding
Rockiki et al.[10] (2015)					0.15 [0.03-0.86]			
Le Ferrara et al.[11] (2012)						-0.0078 [0.0024]***		
Do and Kincaid (2006)					0.105 [1.9]**			
Haroon et al. (2013)[12]								RR 1.43 [1.09-1.87]
Lassi et al. (2010)[13]								RR 1.94 [1.56-2.42]
Adam et al. (2014)			0.46 [3.83]**					

*10%,**5%,***1%

[10] Refers in particular to the probability of reducing unwanted pregnancies in adolescents who had relations in the previous year.
[11] 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 35-44 age group, the probability decreases by 0.6 percentage points.
[12] The study presents the effect for breastfeeding on the first day of life. The effect on breastfeeding during the first month is RR 1,32 (1,19-1,42).
[13] The study also shows impacts on reduction of neonatal mortality: RR 0.76 (0.68-0.84)

Table 5. Impact of Monetary and Non-Monetary Incentives

	Prenatal Care	Skilled Delivery	Institutional Delivery	Postpartum Visits	Contraceptives	Fertility	Low birth weight	Breast feeding
Monetary incentives								
De Brauw and Peterman (2011)	-0.065	0.123	0.153	-0.059				
El Salvador	[0.072]	[0.070]*	[0.076]*	[0.100]				
Morris et al. (2004)	0.187			-0.056				
Honduras	[0.060]***			[0.052]				
Barber and Gertler (2009)							-0.046	
Mexico							[0.096]	
Gutiérrez et al. (2011)	0.11	0.04						
Guatemala	[0.067]**	[0.031]*						
Amarante et al. (2011)	0.144	-0.002				0.001	-0.015	
Uruguay	[0.059]**	[0.009]				[0.00]***	[0.005]***	
Urquieta et al. (2009)		0.114						
Mexico		[0.048]**						
La Madrid-Figueroa et al. (2010)					0.049			
Mexico					[0.036]			
Stecklov et al. (2007)						-0.03		
Mexico						[0.003]		
Feldman et al. (2009)					0.16			
Mexico					[0.097]**			

Table 5., continued

	Prenatal Care	Skilled Delivery	Institutional Delivery	Postpartum Visits	Contraceptives	Fertility	Low birth weight	Breast feeding
Non-monetary incentives								
Wang et al. (2016)		1.63						
Zambia		[0.01]**						

*10%, **5%, ***1%

4.3.1 Impact of Strategies To Cover Direct Costs: Issue of Vouchers

The strategy of vouchers in Uganda has had a very positive impact on improving institutional delivery, with an increase of up to 52 percentage points, of which 9.5 are new users of the health center. This study also shows that the intervention is cost-effective (Alfonso et al., 2013).[14]

4.3.2 Impacts of Strategies to Change Cultural and Social Aspects

With respect to Information, Education and Communication, information campaigns do not seem to have a clear impact on rural populations: in some cases they increase knowledge but not use, while others may initially increase breastfeeding, for example, but there is no continuity and after three years both knowledge and use decay (McDowell and McDivitt, 1990; Naugle and Hornick, 2014). It is common for rural women, as well as having a low education level, to have less exposure to the media; consequently these campaigns do not seem to be a good idea unless they are designed differently or are accompanied by other more individualized interventions. Only two of the studies analyzed by Naugle and Hornick (2014) provide data on the cost of the campaigns: they require an additional cost of 0.05 dollars per user of prenatal care. Although not costly, campaigns do not seem to be a decisive way of making behavioral changes in rural areas, unless they are implemented in combination with some of the strategies we describe below.

Rokicki (2015) finds interesting impacts on adoption of knowledge of family planning among rural girls. Those who received unidirectional non-interactive messages on their phones, improved their responses to a knowledge test by 11 percentage points three months after starting the program, while those who received interactive messages, improved their responses by 24 percentage points. This knowledge was retained for up to 15 months after the program. In the group of girls who had sexual relations in the previous year, the probability of becoming pregnant fell by 8 percent in both the unidirectional and interactive programs 15 months after starting the program.

[14] Other studies applying the same strategy (vouchers redeemable for transport and payment of maternal and neonatal services) also obtain positive results. For example, in Bangladesh prenatal visits increase by 55 percent compared to 34 percent in the control group, giving birth with a skilled provider up to 64 percent versus 27 percent, giving birth in a health institution increases 38 percent versus 19 percent, and finally, having a postpartum visit increases by 30 percent compared to 15 percent (Nguyen et al., 2012).

Finally, TV soaps have positive impacts as much in Brazil as in Bangladesh. In Brazil women stop having children at a younger age but the age at which they start is not delayed (La Ferrara et al., 2012). In Bangladesh the fertility rate fell by 11 percentage points, and visits to family planning clinics increased by 7 percentage points (Do and Kincaid, 2006). Do and Kincaid 2006 also show that the effect on knowledge of family planning methods is stronger than the effect on behavior, confirming similar findings in the literature.

Among strategies for *community participation*, work with women's groups has a high impact on reducing maternal and neonatal mortality. For example, in studies in which more than 30 percent of women who formed the groups were pregnant, reductions in maternal and neonatal mortality reached 55 percent and 33 percent, respectively. These reductions are very strong mainly because the strategies have been evaluated in contexts where maternal and neonatal mortality is among the highest in the world (Bangladesh, India, Malawi, Nepal) and where small changes in health and education in the community can have a massive impact. Some rural communities in Latin America share these characteristics and have a potential for steep reductions in maternal and neonatal mortality.

It seems that these women's groups had a special effect on improving cleanliness and hygiene in the childbirths that take place in the community and on immediate postpartum care and breastfeeding initiation. Only two of the studies reviewed by Prost et al. (2013) show positive impacts on prenatal care and one on institutional delivery. It seems then that reductions in maternal and neonatal mortality are mainly due to improvements in hygiene and immediate postpartum care in the community.

The reviews of community strategies by Lassi et al. (2010) and Haroon et al. (2013) conclude that the combination of individual counseling and group work is what has 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). In the case of Adam et al. (2014), women exposed to messages from community health workers in rural areas of Kenya significantly increased their knowledge of institutional delivery and the percentage 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.

4.3.3 Impact of monetary and non-monetary incentives

The results of these studies show that monetary incentives seem to have an effect on the adequacy of prenatal care[15] (with improvements ranging from 8 percentage points difference between the control and treatment groups in Mexico to 19 percentage points increase in Honduras); also births attended by skilled personnel improved in several cases (from 4 percentage points in Guatemala to 11.4 percentage points in Mexico). Only in the case of El Salvador do institutional deliveries in hospital increase. Postpartum visits[16] 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 on contraceptive use, while Lamadrid-Figueroa et al. (2010), also in Mexico, found no significant impacts. When the impact is measured in terms of fertility rates there are no significant impacts, 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 impacts on low birth weight and found improvements.

The impacts, shown in Table 5, can be said to be moderate. While it is true that CCTs are also intended to have an impact on the consumption of prioritized households, in this study we are only interested in their impact on health.

The results of the study on non-monetary incentives which is included show that this intervention increased the probability of institutional delivery by 9.9 percentage points. The cost of each kit is 4 dollars and the authors calculate its cost-effectiveness at $5,183 per death averted.

4.4 Results

A comparison of the impacts obtained with strategies such as vouchers, interventions aimed at changing cultural and social behaviors in maternal and neonatal health and CCTs clearly shows

[15] We use the term "adequate prenatal care" because it is used in most of the studies 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." It is not clear, however, that more prenatal visits lead to better health outcomes (Glassman et al., 2013)

[16] As in the case of adequate prenatal care, the definition of postpartum care varies by country. In the study of Honduras the term is defined as visit that takes place 10 days after childbirth; it is not clear whether a postpartum visit can have an impact on health outcomes (Glassman et al., 2013).

that CCTs have more limited impacts on health. In the case of vouchers, the money invested is concentrated on the service covered (transport and payment of health services) which perhaps permits stricter compliance with the "conditions" than in the case of CCTs. Another possible explanation is that indicators, such as childbirth or contraceptive use, appear to respond better to community strategies or vouchers than to monetary incentives.

Although most of the studies do not provide cost information, we know that the costs associated with CCTs are considerable (direct costs of the transfers plus costs of monitoring and supervision and other transaction costs) (Fiszbein and Shady, 2009). Other strategies, such as vouchers or community based, probably involve lower costs than CCTs and are more cost-effective. In the few existing studies, non-monetary incentives also have a low cost ($4 per kit) and high cost-effectiveness.

5. Promising Studies

Although our primary mission is to identify the experimental and quasi-experimental studies that show what strategies lead to improvements in maternal and neonatal health, we also identify other promising studies. Some of these studies are not experimental, others are impact assessments but the result analyzed is infant nutrition or vaccinations, not maternal and neonatal health, while others have not been implemented in rural areas. All of them have in common the potential to be applied in the area of maternal and neonatal health in rural areas. Table 6 presents these interventions classified by category, as in Table 2, indicating if the study in question is experimental or not and if it was conducted in rural areas.

Table 6. Promising Studies in Maternal and Neonatal Health			
Demand Interventions		**Country**	**Studies**
Strategies to change cultural and social aspects	Vaccination dose reminders	Guatemala, rural, experimental	Busso et al. (2015)
	Telephone education for pregnant women	India, rural, non-experimental	Merck for Mothers (2015)
	Issue of family planning voucher only to women versus couples	Zambia, urban, experimental	Ashraf et al. (2014)
	Community agent informs women versus couple on family planning	Tanzania, rural, experimental, pilot	McCarthy (2015)
	Accompanied by midwives	Lesotho, rural, non-experimental	Satti et al. (2012)
	Community health clubs	Zimbabwe	Waterkeyn and Cairncross (2005)
Non-monetary incentives	Distribution of lentils to women who vaccinate their children	India, rural, experimental	Barnerjee et al. (2010)
	Distribution of soup, bucket, mosquito net, sugar and oil (prenatal care)	Ethiopia rural, non-experimental	Khogali et al. (2014)
	Distribution of kit (Institutional delivery)	Malawi rural, non-experimental	Van den Akker et al. (2011)

Source: Authors' compilation.

5.1 Strategies To Change Cultural and Social Aspects

Sending reminders can be a way of giving information about a doctor's appointment the patient should not miss. Busso et al. (2015) evaluated a strategy that involves sending reminders through community health workers to mothers in a rural area of Guatemala whose children need to receive the second and third doses of vaccines. Lists of children who need to be vaccinated were

available because Guatemala has been operating the PEC, Program for Extension of Coverage of basic health services, for many years in rural areas whose operation has created a comprehensive data system on the target population .Using these listings and with the help of community health workers who were already working for the PEC in rural areas, it was possible to increase completed vaccination among children aged 1 to 5 by 2.2 percentage points compared to the control group. The strategy requires a very low incremental cost and is therefore considered highly cost-effective.

In second place, we have selected a pilot evaluated without experimental methods. The pilot is a Merck for Mothers initiative which is currently being implemented in Jharkhand, India. The pilot aims to educate women by telephone about the services they should receive during pregnancy, childbirth and postpartum. Subsequently, the mothers are given the opportunity to evaluate, anonymously, by telephone the quality of care received in accordance with what they learned. Finally, based on the information received from the women, the health providers are given feedback on how they provide the services based on the women's evaluation. Evidence to date seems to suggest that the 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 demand and supply from the point of view of quality, although the moving force of this strategy comes from demand.

The study by Ashraf et al. (2014) in Zambia is experimental and is aimed at improving adoption of family planning methods among urban women in Zambia. They evaluate two strategies of distribution of family planning information. In both cases the cost of the visit is financed by a voucher. Two different groups are formed: in one, a voucher is given to the husband and wife to go to the family planning clinic and receive advice; in the other group the voucher is only given to the woman without the husband's knowledge. The results show greater impact on contraceptive use when the voucher is given only to women. This implies imbalances decision-making at the home level. It is unclear what impact this strategy would have on rural areas where access to free injectables, which women use without their husband's knowledge, is not common.

Another recent study (McCarthy, 2015) in rural Tanzania confirms this result. When women talk alone (without their husband) with the community agent about family planning pregnancies fall sharply (up to 16 percentage points). However, when husbands accompany their

wives to community family planning meetings, the formers' desire to have many children decreases as well. The inclusion of husbands in educational consultations on family planning to reduce their desire to have many children can be combined with individual visits by the women. This gives an immediate response to the demand for contraceptives from the women and has greater impact in the long term on the joint desire to have children. The study was small scale, but it would be interesting to have a large scale and longer term study of the impact.

We also note that having traditional midwives accompany pregnant women when giving birth in the health center or hospital is a strategy with significant potential because it combines community intervention with access to the formal health system. 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's need for support from the midwife is satisfied and they have the presence of elements of the community in the hospital. The article by Satti et al. (2012) evaluates this experience in rural Lesotho and shows interesting results: the average number of prenatal visits increased from 20 to 31 per month, and the clinic recorded 178 institutional deliveries in the first year of the program, 216 in the second year compared to 46 institutional deliveries before implementation of the program. In Latin America there is evidence of this experience in Honduras (García Prado and Peña, 2010) with very high increases in institutional delivery. It has also been implemented in some Mesoamerican countries under the Salud Mesoamérica 2015 initiative. Rigorous evaluation of this strategy would be very useful.

Waterkeyn and Cairncross (2005) study community health clubs in rural Zimbabwe. This strategy focuses on changing hygiene habits and demand for sanitation in two rural districts in Zimbabwe. Education sessions are organized for members of community health clubs using illustrated cards based on the daily life of the people, which even illiterate people can understand. The course is given by local health agents who receive a week of training in the use of these materials and are also responsible for organizing the clubs. The meetings were weekly. Each club elected a leader and had an executive committee, constitutive rules and annual elections. After each session of the education course, participants were given a task (home improvements and behavioral changes that had to be put into practice for the next session). Visits were organized to the homes of different members of the group to monitor their progress in making changes in hygiene in their home. Once the courses ended, the clubs continued to meet to

discuss other health-related issues in the community. Local health technicians continued to support the groups and the approach was institutionalized with the backing of the Ministry of Health. The results were very positive, with very significant differences in measures of household hygiene among families with members in the community health club versus those that did not participate in these clubs. The key to the success of this initiative seems to be that individuals are better prepared to deal with the change in behavior, without fear of failure, with the support of the group rather than individually. The approach also reinforces the idea that in semi-illiterate rural communities the people have great faith in the power of knowledge to break the vicious circle of poverty.

Finally, although it is not an intervention in itself, knowing which nodes of influence are strongest in a community and working with them can make some interventions more effective, leading to changes in indicators that are difficult to make, as well as being able to expand these changes more easily (Barnerjee et al., 2016). A recent qualitative study focused on rural Guatemala (IDB, 2015) finds that when deciding where to give birth, pregnant women are the last to decide; in their place the decision is taken by the mother-in-law, the husband and the midwife. However, in an obstetric emergency, the first to decide is the husband, then the midwife and, lastly, the mother-in-law. Other recent quantitative analyses (Kim et al., 2015; Sato and Takasaki, 2015) using experimental data show that the influence of friends seems to be greater than the most popular person in the community with respect to 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 information can be used to design interventions adapted to the specific networks of each community or rural context.

5.2 Non-Monetary Incentives

Barnerjee et al. (2010) distribute lentils to rural mothers who bring their children for vaccination during vaccination campaigns in Uttar Pradesh state in India. This experiment had two treatment groups and one control group. One of the treatment groups was subjected to an information

campaign with the message that vaccination is "reliable,"[17] and mothers who brought their children to be vaccinated were given lentils. The second treatment group received no incentive for vaccination except the campaign with the "reliable" message. The complete vaccination (with all doses) reached 39 percent in the "reliable" vaccination with incentives group, compared to 18 percent vaccination in the "reliable" vaccination without incentives group, and 6 percent in the control group. The average cost per vaccination is higher in the "reliable" vaccination without incentives group ($56) than in the "reliable" vaccination with incentives group ($28); therefore the strategy with the non-monetary incentive is more cost-effective. It would be very useful to evaluate the effects of a program of this nature on a large scale. Although the study focuses on measuring the impacts on vaccination, this strategy could easily be extended to other indicators such as prenatal, puerperal/postpartum and institutional delivery.

In Latin America non-monetary incentives have hardly been used to promote changes in demand. Under the SM2015 initiative in Guatemala a kit with the items needed for the baby during their first weeks of life is offered to women who have an institutional delivery, but the results of the evaluation are not yet known. In addition to the experimental study measuring the impact on institutional delivery of distribution of a kit in Zambia (Wang et al., 2016), Van den Akker et al. (2011), in a non-experimental work, analyze a program that promotes institutional delivery in Malawi in which a kit is distributed at the time of delivery with good results. Non-monetary incentives have also been used to promote the use of prenatal visits. For example, in another non-experimental study in Ethiopia, Khogali et al. (2014) analyze a program that offered a small non-monetary incentive for each prenatal visit made.[18] The program lasted three years and greatly increased the use of the first prenatal visit although with limited impact on the other controls because the program ran out of non-monetary incentives with the consequent loss of credibility. The total cost of nonmonetary incentives was $10 per person.

[17] Since the Seva Mandir NGO has worked in the area and has the confidence of the rural population, it should be noted that vaccination is offered by this NGO. The confidence of rural populations in providers of public health services is very low in some rural areas of India (Nitchter, 1995), which is the reason for the launch of the "reliable" message.

[18] For attending the first prenatal care visit women received a bar of soap and a bucket, on the second visit a mosquito net, in the third sugar, cooking oil and a jar of jam, and on the last visit a kit of basic items necessary for the birth.

6. Discussion and Conclusions

In this study we have reviewed the experimental and quasi-experimental literature in the area of maternal and neonatal health in rural and poor areas in Latin America in an effort to identify which strategies are capable of modifying demand behavior and of having an impact on the key indicators in the area of maternal and neonatal health. We focus exclusively on the literature that includes demand strategies because it is in rural areas where these strategies appear to be critical, especially in relation to changing the social norms, attitudes and beliefs that are deeply rooted in these populations.

The literature on changes in demand for health has normally concentrated on promoting public health and sanitation interventions with positive externalities such as expansion and use of latrines, deworming, access to safe water or taking children for vaccination. Several of these interventions have been evaluated with methodological rigor (for example Ahuja et al., 2015; Duflo et al., 2015; Miguel and Kremer, 2004) showing positive changes in demand behavior. Although this type of intervention can be delivered in the community, achieving these behavioral changes is not easy. All the more so if rural and/or indigenous women are required to leave their community; for example, to give birth in a health center or hospital. This study shows that the supply approach that has prevailed with respect to maternal and neonatal health needs to be supplemented by a demand approach which succeeds in getting women out of the community when necessary and into the formal health system, without clashing with the community's own customs.

Our review of studies in rural areas produced several interesting results. First, the vouchers to cover transport costs and treatment in the health center have positive impacts on the use of institutional delivery and prenatal care. The cost is low and vouchers are therefore considered cost-effective. However, we found no evidence of experimental evaluations of the effect of vouchers in Latin America, likewise we did not find evidence of their use to promote postpartum and puerperium visits. In combination with other strategies, such as community strategies to promote cultural and social changes, vouchers can be a very useful intervention for encouraging women to leave the community to give birth in a health center.

Second, the strategies to make cultural and social changes, although very heterogeneous, have significant impacts on the indicators most closely linked to the community's social norm, such as institutional delivery and contraceptive use, although positive impacts are found on other

indicators such as use of prenatal care. Again, there are very few interventions in this area to promote postpartum and puerperium visits.

Third, the impact of the use of incentives varies depending on whether they are monetary or non-monetary. There is abundant evidence on the former, in the form of Conditional Cash Transfers, in both Latin America and other regions and countries. CCTs have moderate impacts compared to the other strategies discussed; above all their impact is on use of prenatal care, although moderately. There is hardly any impact on institutional delivery or contraceptive use. With respect to non-monetary incentives we have only found one experimental study in the area of maternal and neonatal health (Wang et al. 2016 for Zambia) with positive impacts on institutional delivery. These incentives are less costly than CCTs and appear to be most promising in terms of impacts (for example Barnerjee et al., 2010 with vaccination, or other non-experimental studies that we mention and their impact on use of prenatal care).

It is interesting to mention that the review of the literature shows that most of the efforts in the area of maternal and neonatal health have been channeled into promoting prenatal care and childbirth attended by skilled personnel or institutional delivery. For prenatal care, the evidence shows a good response to the strategies analyzed (CCT, women's groups in the community, vouchers), although with moderate impacts. It is generally easier to expand and improve coverage of prenatal care than childbirth, for example, since the service does not require 24 hour coverage and supply at lower levels of the health system (Neal et al., 2015). However, existing data in Latin America show that coverage of four prenatal visits, recommended by WHO, has not yet been achieved in many of the countries of the region and much less in rural areas (Neal et al., 2015). We identified several promising strategies which have not yet been tested in this area, and which could promote prenatal visits and even postpartum visits. These include sending reminders for each visit, and offering non-monetary incentives in exchange for making prenatal and/or postpartum visits.

With respect to childbirth attended by skilled personnel and/or institutional delivery, most studies set the objective of promoting childbirth attended by skilled personnel. Moreover, the evidence reveals that it seems easier to increase births attended by skilled personnel than institutional delivery: in the CCTs and in some of the community strategies analyzed, the impacts are always higher in the indicator for births attended by skilled personnel rather than for institutional delivery. Among the strategies to change cultural and social aspects, vouchers and

non-monetary incentives seem to have much higher impact on this indicator than CCTs. This is probably because indicators that are most subject to social norms, as is the case with the preferred place for giving birth, do not respond as well to monetary incentives. There is hardly any evidence of the impact of vouchers and non-monetary incentives on institutional delivery in Latin America. Implementing and evaluating these strategies in this context would be of interest for the future.

It is important to mention that we found hardly any strategies to promote postpartum and postnatal visits. In the few cases which include this objective, no significant changes were observed.[19] This suggests that these visits are not easy to promote, especially if they involve travel to the health center or hospital or a longer stay there after giving birth. Consequently more attention needs to be paid to these visits and to a more active promotion, especially because many maternal and neonatal deaths occur in this period.

Finally, several of the studies analyzed focus on stimulating demand for family planning services. Changing behavior related to family planning is a challenge because, as Munshi and Myaux (2006) show in rural and poor contexts, fertility decisions depend more on the community's social norms than on individual decisions. Our review of the literature demonstrates that monetary incentives do not seem to improve contraceptive use; however, other interventions that attempt to change the social norms of the community, such as TV soaps or social networks, do have moderate positive impacts on this indicator. The use of technology in this area to send interactive messages by mobile phone to promote contraceptive use and prevent unwanted pregnancies among adolescents seems to have a high impact. This result opens the way for the possibility of using mobile telephony in the area of maternal and neonatal health, which so far has been used mainly to prevent, treat and monitor chronic diseases.

This work has limitations. First, we are not working with a definition of rurality. In fact, the category of rural is not universally defined and varies between countries and even between regions and states within a country (Hart, Larson and Lishner, 2005). It can also range from peri-urban to extremely remote populations; as a result our analysis can mask more complex patterns within rurality (Neal et al., 2015). The main classifications of rural population have used

[19] A recent article on a peri-urban area in Kenya found positive impacts on seeking health services during the postpartum period when a community worker informs mothers during the three days after delivery on the risks and symptoms to watch for during this period (McConnell et al., 2016).

measures of size, population density and proximity to urban areas, but the absence of a uniform approach limits the possibility of a deeper analysis of the problems of rural health (Weinhold and Gutner, 2014).

Second, only some of the studies analyzed include information on costs so, even though some of the strategies seem to have an impact on the indicators analyzed, we cannot make comparisons of the cost of the various alternatives and their cost-effectiveness.

Third, the indicators on which the impact of the strategies is measured are frequently indicators of intermediate outcomes (prenatal care, institutional delivery, postpartum care, among others); only in some studies is the impact measured in terms of indicators of final health outcomes such as maternal mortality, neonatal mortality and low birth weight. Although achieving intermediate results brings us closer to obtaining the final results it is not always the case and the final outcome will depend on other factors such as the quality of the services provided.

Several topics remain outstanding for future research. It would be interesting to analyze what strategies the Latin American countries that have achieved rapid and equitable coverage of maternal health have used and the factors that have made this progress possible. Dickson et al. (2014) follow this approach at global level and identify four countries, out of a total of 13 analyzed, which reduced neonatal mortality more rapidly and the strategies they followed. The countries selected include Peru (the only country in Latin America) where the keys to success in reducing neonatal mortality are mainly expansion of health insurance for the poor (the percentage of insured in rural areas grew from 24.7 percent in 2004 to 73 percent in 2011) and implementation of a conditional cash transfer program (JUNTOS) together with other public-private initiatives to reduce inequality in maternal and infant health between rural and urban, and poor and rich areas.

In addition, an analysis of barriers to access by country would identify which strategies with positive impacts on maternal and neonatal health are more appropriate in some countries and which in others. For example, analyses of barriers in the Mesoamerican countries (SM2015) suggests that some (Nicaragua, Honduras and Guatemala) require strategies that work with the community and with individual perception of health more intensively than countries like El Salvador or Panama. In the former countries, surveys show that the main barriers identified by the poorest 20 percent of the population (which coincides mainly with rural populations) are

preference for giving birth at home and receiving home healthcare and the self-perception of not being sick or needing healthcare. In El Salvador and Panama the main reasons for not accessing maternal and infant health services are the cost of medicines and the cost of access. In these cases, interventions that cover these costs could solve the problems of coverage and use. Extending this analysis to other countries in the region would clarify what strategies are most appropriate in different countries and rural contexts.

Finally, it is important to note that, although this study concentrates on rural populations, the poor in some urban areas in Latin America have also been left behind. Rapid urbanization is creating very large concentrated cities with peri-urban populations with unmet health needs, while rural populations are increasingly dispersed in small communities (Atun et al., 2015). An analysis of peri-urban populations could be part of an agenda for future research, along with the study of other types of diseases prevalent in the region. The focus on maternal and neonatal health is relevant in Latin America but it is important to bear in mind that these problems coexist with the increase in chronic diseases, the high mortality and morbidity caused by traffic accidents and violent deaths related to drug trafficking. This is what Atun et al. (2015) call the triple health burden. Attacking these problems, which generally have greatest impact on poor populations and not only those related to maternal and neonatal health, is essential for continuing to reduce disparities in equity in Latin America.

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Annexes

Table A1. Essential Interventions To Reduce Maternal and Neonatal Mortality Based on the Evidence

Care level	Before pregnancy	Pregnancy	Delivery	Puerperium	**Postpartum**
Community First level Referral	Family Planning (guidance, hormonal and barrier methods	Iron and folic acid supplements	Prophylactic uterotonics to prevent postpartum hemorrhage	Family planning: guidance and contraceptives	Immediate thermal care (to keep baby warm)
	Prevent and treat sexually transmitted diseases, including those caused by HIV	Anti-tetanus vaccine	Treatment of postpartum hemorrhage with uterine and uterotonic massage	Nutritional guidance	Early start of breastfeeding (in the first hour)
	Folic acid fortification or supplements to prevent defects of the neural tube	Malaria prevention and treatment			Hygienic care of umbilical cord and skin
		Prevention and treatment of sexually transmitted diseases			Postpone baby's first bath (Dickson, 2014)
		Calcium supplements to prevent high blood pressure			

Table A1., continued

Care level	Before pregnancy	Pregnancy	Delivery	Puerperium	Postpartum
First care level and Referral	Family planning (hormonal, barrier and some surgical methods)	Low dose of acetylsalicylic acid to prevent pre-eclampsia	Active care of delivery (expulsion of placenta to prevent postpartum hemorrhage, uterotonics and controlled traction of uterine cord)	Treatment of maternal anemia	Reanimation of newborn with ambu (by professional personnel) when baby does not breathe at birth
		Antihypertensive medications	Treatment of puerperal hemorrhage with uterine and uterotonic massage and manual extraction of placenta	Tamizaje of the HIV infection and start or continuation of treatment	Kangaroo mother method for premature and underweight babies (less than 2000 grams)
		Magnesium sulfate to treat eclampsia	Tamizaje and treatment of HIV if this test has not been done before		Additional support to feed small and premature babies
		Antibiotics to treat permanent rupture of membranes	Use of partogram to diagnose complications (Dickson, 2014)		Treatment of newborns with jaundice
		Corticosteroids to prevent respiratory distress syndrome in premature babies			Start prophylactic administration of anti-retroviruses to babies exposed to HIV
		Abortion without risks and posterior assistance			Sick or small newborns (intravenous fluid, nutritional support and provision of oxygen) (Damstard, 2005)
		Syphilis (tamizaje and treatment)			

Table A1., continued

Care level	Before pregnancy	Pregnancy	Delivery	Puerperium	Postpartum
	Family planning (surgical methods)	Reduce anomalous fetal presentation by the external cephalic version	Caesarean due to maternal or fetal indications (to save life of mother or baby)	Detection and treatment of puerperal septicemia (serious infections after childbirth)	Presumptive antibiotic therapy for newborns with risk of bacterial infection
		Induction of delivery to treat membrane rupture in term pregnancy (start delivery)	Prophylactic antibiotics for the cesarean		Use of pulmonary surfactant (respiratory medicine) to prevent respiratory distress syndrome in premature babies
Referral			Labor induction in prolonged pregnancy		Continuous positive pressure to the respiratory tract to treat babies with respiratory distress syndrome
			Treatment of puerperal hemorrhage (as detailed previously plus surgical methods)		Treatment of septicemia, meningitis and pneumonia in newborn
			Access to safe blood (Dickson, 2014)		
Community strategies	Home visits to treat women and children during the continuous care process Women's groups				

Source: Authors' compilation based on World Health Organization (2012), Darmstad et al. (2005) and Dickson (2014).