

PROSPERA DIGITAL

OPENING PROSPERITY

Innovating Mexico's largest social
development programme

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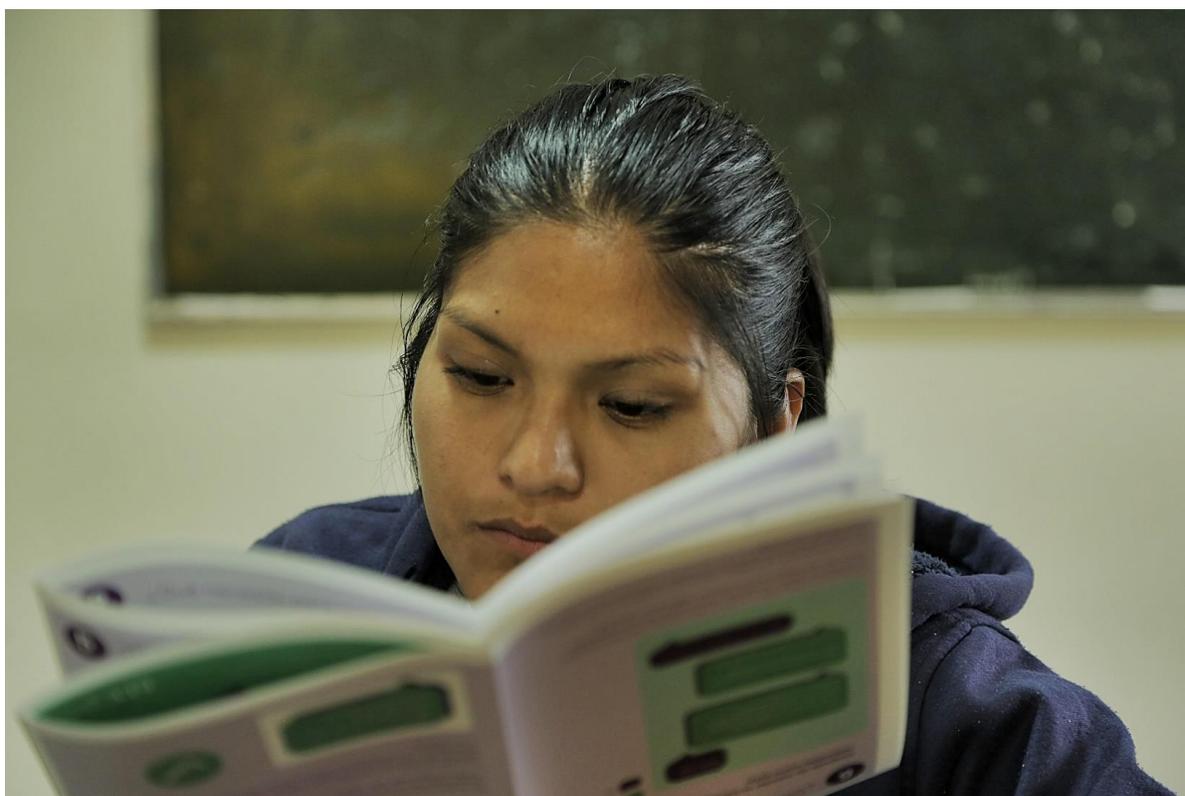


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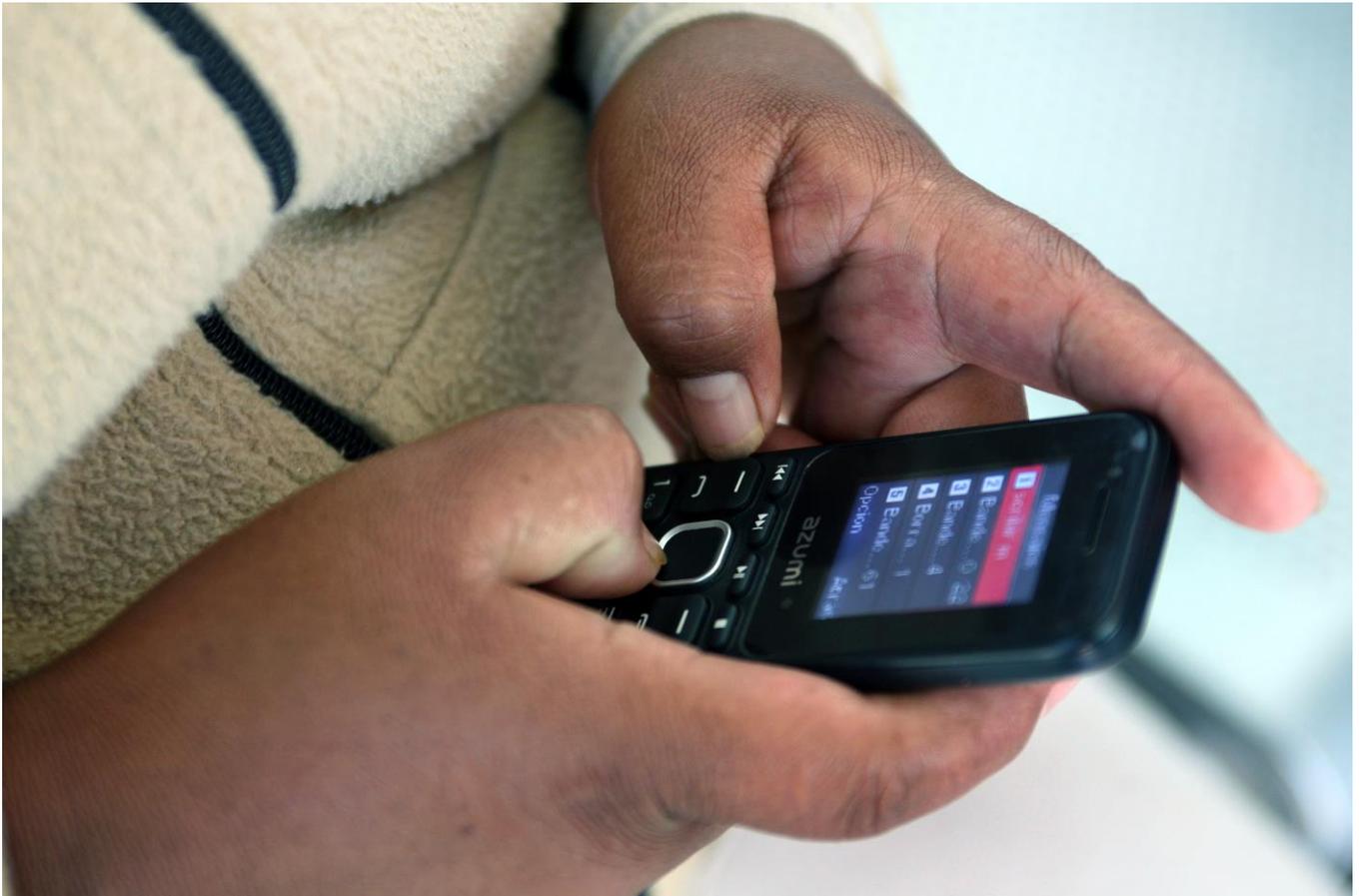
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1. Introduction



1.1. Overview and Challenges of Maternal and Child Health

Maternal and child care is one of the main lines of action of health policies around the world. In the frame of the goal that aims to ensure healthy lives and to promote to reduce the global maternal mortality ratio to less than 70 per 100,000 live births. Also intends to end by 2030 with the preventable deaths of newborns and children under 5 years of age; all countries aim to reduce neonatal mortality to at least as low as 12 per 1,000 live births, and under-five mortality to at least as low as 25 per 1000 live births. The Agenda also focus in nutrition, and mentions an international agreement that includes the commitments of reducing stunting and wasting in children under 5 years of age and of addressing the nutritional needs of pregnant and lactating women.¹

The precedent efforts in this matter have had considerable results. According to the 2015 Report of the Millennium Goals, since 1990 the maternal mortality ratio has declined by 45 per cent worldwide, and the global under-5 years of age mortality has dropped from 90 to 43 deaths per 1,000 live births between 1990 and 2015. On the other hand, it must be considered that in developing regions, under-five mortality rates are almost twice as high for children in the poorest households, compared with the richest ones, and children from the poorest 20 per cent of households are more than twice as likely to be stunted as those from the wealthiest 20 per cent. Globally 5.9 million children under- five years of age died in 2014 form mostly preventable causes.²

The access to appropriate nutrition and health care is still limited and there is still plenty work to do, especially in low income countries or in middle income countries with considerable levels of inequality. Good maternal health and nutrition are determinant contributors to child survival, and the social returns for investment in these areas are considerable. There exist interventions with proven outcomes, such as the promotion of breastfeeding in the first two years of life, practice that could prevent undernutrition and almost 12 per cent of deaths in children under five. The Global Strategy for Women's, Children's and Adolescent's Health (2015-2030) mentions that the investment in health and nutrition for women, children and adolescents yield at least a 10-fold return through better educational attainments, workforce participation and social contributions (scaled up nutritional interventions can reach a benefit cost ratio of 16).³

1.2. Maternal and Child Health in Mexico

Mexican government has implemented several actions to improve maternal health, such as the following. In 2008 the Government implemented the *Healthy Pregnancy Program*, which provides universal access to health services for pregnant women. *The strategy provides attention during the pregnancy, the childbirth and during puerperium. Nutritional supplements are provided during pregnancy* ⁴. In 2009 the Health Ministry implemented the *Integral Strategy to Accelerate the Reduction of Maternal Mortality in Mexico* to promote good practices of attention of obstetric emergencies. In 2015 Mexico committed to follow the recommendations of the Every Woman, Every Child strategy. These efforts achieved a relatively low maternal mortality rate. According to 2015 World Bank data, the maternal mortality ratio in Mexico is 38 per 100,000 live births.⁵

There are some particular challenges for young mothers. 2014 data of the National Institute of Statistics and Geography show that the pregnant women under 15 years of age showed the lowest percentages of assistance to the antenatal appointments, and 30.6% of pregnant women under 19 years of age did not assist to antenatal appointments. In 2013 18.7% of abortions, and 17.9% of stillbirths corresponded to teenage mothers.⁶



Child mortality data shows more alarming results. According to data from the Mexican Ministry of Health, the under-five mortality rate dropped from 41 to 15.7 per cent between 1990 and 2013. The main causes of child mortality are acute respiratory infections and acute diarrheal diseases; these ailments affect greatly low income households because are related with poor health and nutritional conditions. These pathologies are critical for children under one year of age, and mortality depends of availability of proper treatment, but also of previous health conditions (malnourished or immunocompromised infants are at higher risk of complications from such conditions). Information is crucial to face the former diseases because of the importance of early detection of warning signs.⁷

Data from Nacional Institute of Statistic and Geography (2012) shows that 2.8% of under-five children present low weight, 13.6% low height, 1.6% acute malnutrition and 23.3% present anaemia, also 17.9% of pregnant women presented anaemia. Additionally, reduced breastfeeding is a severe problem in Mexico. Only 38.8% of the babies receive early breastfeeding, 14.4% receive exclusive breastfeeding during the first six months of life and only 39.8% receive appropriate breastfeeding during the first year of life. Malnutrition causes adverse effects on growth and health of children and has effects in medium and long term related to the development of capabilities.⁸

1.3. Prospera: Mexico's Largest Social Development Programme

In September 2014, the Mexican federal government announced the evolution of Oportunidades (formerly known as Progresa) into Prospera. Created in 1997, with 7 million current beneficiaries and their families (which represent more than 30 million Mexicans), Prospera became a global reference of a conditional cash transfer program focused on aiding the poor, and it has an important impact in health conditions of the



poorer households in Mexico. Its goal is to contribute to effectively achieve social rights that enhance the capabilities of the poor through actions focused on developing nutrition, health and education capabilities, as well as providing access to other welfare dimensions in order to break the poverty transmission cycle

Prospera is a conditional cash transfer program that targets poor households in both rural and urban areas across Mexico. Selected households receive treatments primarily in health, education and nutrition. Related to health, Prospera is focused on preventive health, with the following Components:

- Basic health package administered through prescheduled, individual appointments at the families' assigned health clinic and through mandatory attendance to orientation sessions. The appointment schedules differ by the beneficiaries' age, gender and specific situation (e.g. pregnancy).
- 27 interventions of public health: they include several vaccination programs for different age groups as well as preventive action packages, to be delivered by medical staff through scheduled appointments.
- A cash transfer is given to families, conditional on their compliance with the basic health package. This transfer takes into account rises in international food prices and is increased with every child in the household between 0 and 9 years of age.

However, less developed individuals still lag behind in health outcomes. Key determinants that have been suggested to explain low take-up rates of preventive health, include:

- Access to information
- Information asymmetry and poor health education,
- Lack of trust in health providers
- The complexity to communicate directly with beneficiaries living in remote and difficult areas of the country.

Since Prospera was initially rolled out as a randomised control trial in 1997 several studies have assessed the impact of the CCT on health and education outcomes. A number of studies point to positive impacts of the CCT on both of these outcomes, however there is

limited evidence that CCTs increase preventative healthcare seeking behaviour outside of conditionalities.

- Gertler and Boyce (2001) show that two years after the programme's implementation the usage of public clinics for preventative care increased by 53%, there was a 23% reduction in the incidence of illness in children, an 18% reduction in anaemia and a 4% increase in the average height of children. Fernald et al. (2008) show that the transfers made by the programme resulted in better nutritional status, improved motor skills, and higher levels of cognitive development in children. Both studies indicate positive effects on targeted behaviours linked to conditionalities.



- Policy makers are also interested in whether CCTs have positive spillovers to other related behaviours, and whether they lead to sustained behaviour change. A study performed by De Brauw and Peterman (2011) in El Salvador showed that a CCT programme increased the likelihood of a mother giving birth at a health centre and with a skilled attendant, but found that subsidising health-seeking behaviours (prenatal and postnatal care) had no effect. A similar study in Nicaragua by Vakis et al. (2012) found that a CCT had positive effects on early childhood outcomes,

but that sustained behaviour change after the introduction of the CCT could not be exclusively attributed to the cash incentives. Rather, the authors believed that an additional social network effect could have caused the increase in health-seeking behaviours leading to improved early childhood outcomes.

- Overall the evidence shows that cash transfers have had large positive effects on compliance with programme conditionalities such as increasing health appointment visits, and that these conditions have ultimately led to improved health outcomes. There is however limited evidence of the impact of CCTs on health seeking behaviour outside of the direct CCT conditionalities.

1.4. eHealth and mHealth Interventions

The current health challenges demand creative solutions. The Global Strategy for Women's and Children's Health promote the innovative use of ICTs to solve health issues, such as the provision of medical information and the gathering and monitoring of timely data. Reliable and accessible data are essential to the process of accountability, including the assessment of the results of public policies.

International agencies promote the use of m-Health technology, particularly if the initiatives take place within the context of integral health systems; this allows the assessment of the initiative considering health outcomes of interest. However, large-scale implementation of m-Health innovations has been limited, because of limited empirical evidence supporting their value in terms of cost, performance and health outcomes.



Some of the benefits of these initiatives is the positive behaviour changes through communication, appropriate tracking of vital events (births and deaths), and generation of near-instantaneous reporting of survey or patient data.¹³

There are several examples of the use of m-Health innovations in the reproductive, maternal, newborn and child health field. Some examples are the following:

- **The Mobile Alliance for Maternal Action:** e-Health service package used to deliver vital health messages to new and expecting mothers in Bangladesh, South Africa, Nigeria and India.¹⁷
- **Project Mwana:** this project allows the secure delivery of HIV tests from the lab to health clinics, provides appointment reminders for newborn children and a free-text “chat” for health clinic workers and Community Health Workers in Malawi and Zambia. Project Mwana uses the UNICEF software RapidSMS, the precursor of RapidPro (the software used by Opening Prosperity).¹⁴
- **Wired Moms:** randomized controlled trial in Zanzibar. The intervention consisted of an automated SMS service that provided simple health care education and medical appointments reminders, as well as the possibility of two-way communication between the expectant mothers and primary health care providers. The results showed an increase in the proportion of women who received the recommended four antenatal care visits during pregnancy, and more women with antepartum complications identified and referred.¹⁵
- **Liga Inan, Mobile Moms:** Project in Timor-Leste. Consists on the delivery of health promotional information during pregnancy and during the first six weeks of life of the newborn. The system allows the midwives to write personalized messages to a network of women.¹⁶

1.5. Project objectives

The main goal of this project is to design, pilot, evaluate and scale the first stage of Prospera’s most important reform to date, which consists of an innovative strategy that involves the use of customized SMS engagement technologies that seek to:

- Improve the program’s efficiency
- Impact beneficiaries’ health conditions
- Strengthen the relationship between the program and its beneficiaries, following open government principles.

To contribute to the former objectives, the project intends to:

- Improve health outcomes for mothers and newborns.
- Increase the number of health visits by pregnant mothers (conditional and unconditional health visits)
- Increase their uptake of nutritional supplements
- Improve their planning for emergencies and birth
- Empower women by giving them appropriate information to improve their decision making process about her health and her baby's health.

The trial also aims to test whether the source of the information is relevant by seeing if existing social networks within a community can be leveraged by the platform in order to improve the above outcomes. In addition, we aim to test the impact of the use of the mobile phones to empower beneficiaries, through the possibility to give feedback on clinic performance.

In this new phase, which started on April 2015, the Mexican government seeks to make Prospera more open, inclusive, and efficient, and to increase the development outcomes of beneficiaries with the implementation of modern mobile and data technologies.

The presented project (hereon **Opening Prosperity**) seeks to improve the delivery and impact of health services provided by Prospera, through the use of



personalized two-way SMS, catered according to the specific circumstances of each participant. Also, the mobile will enhance Prospera's communication channels by providing a tool to track compliance and quality of health services. The pilot is a first step towards institutionalizing mobile-based solutions for development in Mexico, building a

strong case study and providing material for a series of capacity building workshops for Prospera's project leaders and planning team.

1.6. Strategic Partners

This project is being implemented by the Mexican Federal Government through different agencies, namely Prospera, the Ministry of Health, the Ministry of Social Development, and National Digital Strategy team of the Office of the President (NDS). Other key stakeholders that will participate include: Qué Funciona para el Desarrollo (QFD), UK's Behavioural Insights Team (BIT), Research Institute for Sustainable Development and Social Equity (IIDSES), UNICEF, the MIT Media Lab and the University of Chicago's Centre of Data Science and Public Policy. The United Kingdom's Foreign Commonwealth Office and the Mexican Government are funding this project. Hereafter are presented the functions of the main stakeholders of the project.

Strategic Partners and Funding
Mexican Federal Government through the following agencies:
▪ National Digital Strategy team of the Office of the President
▪ Ministry of Health
▪ Ministry of Social Development
▪ Prospera
Other key stakeholders:
▪ Qué Funciona para el Desarrollo (implementing agency)
▪ UK's Behavioural Insights Team
▪ Research Institute for Sustainable Development and Social Equity
▪ UNICEF
▪ MIT Media Lab
▪ University of Chicago's Centre of Data Science and Public Policy.
The United Kingdom's Foreign Commonwealth Office and the Mexican Government are funding this project.

Box 1. Strategic Partners and Funding

Coordination of National Digital Strategy in the Office of the President

The National Digital Strategy leads the government side efforts to implement the Opening Prosperity project and is the contact between the Ministry of Social Development, the Ministry of Health and National Savings Bank and Financial Services (BANSEFI). Activities involving government actors are coordinated directly by the Office of the President.

Ministry of Social Development (SEDESOL)

The Ministry of Social Development is directly responsible for the programme. Direct communication between QFD, NDS and the Ministry has been key to the design of this project. All activities are implemented and designed to suit the ultimate needs of SEDESOL. This project in particular has been personally approved by the Minister of Social Development with high interest in incorporating the findings into Prospera's operation.

Human Dynamics Lab at the MIT MEDIA LAB

The MIT, hired through the NDS, worked closely with QFD to select the localities in which the pilot programme is being implemented.

UNICEF

Through Mexico's UNICEF representation, the NDS secured access to UNICEF's RapidSMS/RapidPro platform. A technical mission by the UNICEF's innovation unit was responsible for the deployment of a local instance of RapidSMS and the training of SEDESOL public officials who have administrative privileges of the software. During this period the NDS and QFD are responsible for communication with UNICEF's team so as to assure those objectives are completed. UNICEF's Innovation Unit and UNICEF Mexico are very interested in fostering the use of their ambitious RapidSMS platform, and this project will help inform the effects of their platform on social development objectives.

Implementing Agency, QFD

Qué Funciona para el Desarrollo (QFD) is a nonprofit organization that performs rigorous impact evaluations to find out and disseminate which programmes work to further economic and social development in Mexico. Renowned national and international economic researchers are in its advisory board, including academics from Stanford, UCLA, Berkeley, Maryland, Brown and ITAM, among others. QFD has experience implementing research projects funded by USAID and the International Initiative for Impact Evaluation. QFD has experience implementing Randomized Control Trials (RCTs) protocols, conducting impact evaluations, and implementing surveys.

Health Ministry

The Mexican Health Ministry is responsible for the generation of the content that will be distributed to beneficiaries. In particular, they create information that helps to reduce the problematics established for the programme. The relationship with the Ministry are managed by the NDS. Work is being undertaken in partnership with the Health Ministry's Centre for Gender Equality and Reproductive help which has been directly tasked with reducing maternal mortality and improving maternal health in Mexico. The NDS is in constant contact to help obtain and create the information deemed relevant by the Health Ministry.

The Behavioural Insights Team (BIT)

Institution dedicated to the application of behavioural sciences, it aims to make public services more cost-effective and easier for citizens to use and to improve outcomes by introducing a more realistic model of human behaviour to policy. BIT collaborates with QFD by giving feedback on a series of key protocols for the proper implementation of the program, and by helping in the design of the labour and deliver campaign to help women prepare before they go into the delivery stage.

Research Institute for Sustainable Development and Social Equity (IIDSES for its acronym in Spanish)

Applied research centre focused on the design and evaluation of public policies in Mexico. IIDSES is conducting the qualitative research for the project, and is in constant contact with QFD for improving the implementation of the strategy.

1.7. Funding

The pilot project has relied, among other sources, on the financial support through the Prosperity Fund of the Foreign and Commonwealth Office of the United Kingdom and the Government of Mexico.

Additional support such as SMS traffic has kindly been donated by Telefónica Movistar Mexico and by TELCEL (by mid-April 2016 AT&T is expected to be fully participating).

The Office of the President, along with UNICEF, negotiated with Alcatel a donation of 1000 phones, in addition to an initial donation of 150 phones (mainly from Samsung). Later, the Office of the President secured funds that were used to finance the acquisition of an additional set of 750 phones.

2. Intervention Design



2.1. Trial Design

The trial is a cluster randomised controlled trial and involves 4 trial arms in order to test variations in the intervention design:

- **Control group** - beneficiaries of the Prospera program in its current form;
- **Opening Prosperity (T1)** - beneficiaries will receive the full programme of Opening Prosperity messages. If they do not have a mobile phone they will receive a basic mobile phone;
- **Opening Prosperity + Local Support (T2)** - Same as T1 but with Prospera Vocales (beneficiaries elected at the community level to act as local programme representative) or Health Promoters, enabled to send messages to beneficiaries in their community via Prospera Digital; and
- **Opening Prosperity + Feedback (T3)** - Same as T1 but with beneficiaries enabled to provide feedback on the health services received.



Box 2. Treatment Arms

2.2. Sample Selection

Preamble

The unit of randomisation is the primary-level health clinic and the unit of analysis is the pregnant woman. Each health clinic in the country is associated with a set of localities. Thus, the clinic conforms a cluster, with units of analysis located in associated localities.

We start by defining the population that we are interested in extrapolating to. Then, we restrict this population to the clinic space from which we executed the actual sampling, in the states of *Chiapas*, *Estado de México*, *Guanajuato*, *Hidalgo* and *Puebla*. Finally, we discuss the sample selection process and random treatment allocation. The number of clinics excluded are computed with a sequential application of filters.

Population Definition

Our initial universe consists of 16,836 clinics in all 32 states of Mexico. From this universe:

1. First,, we exclude hospitals, administrative buildings and clinics administered by municipalities, The clinic must belong to one of the following categories: brigada móvil; brigadas de salud; centro de atención rural obstétrica; centro de salud con hospitalización; centros avanzados de atención primaria a la salud (caaps); centros de salud con servicios ampliados; microregión; no especificado" (non-municipal); rural de 01 núcleo básico; rural de 02 núcleos básicos; rural de 03 núcleos básicos y más; unidad medica movil; unidad móvil; urbano de 01 núcleos básicos; urbano de 02 núcleos básicos; urbano de 03 núcleos básicos; urbano de 04 núcleos básicos; urbano de 05 núcleos básicos; urbano de 06 núcleos básicos; urbano de 07 núcleos básicos; urbano de 08 núcleos básicos; urbano de 09 núcleos básicos; urbano de 10 núcleos básicos; urbano de 11 núcleos básicos; urbano de 12 núcleos básicos y más. This excludes a total of 703 clinics.
2. We then exclude clinics with fewer than one Prospera pregnant beneficiary registered on average at the clinic according to any of our sources (Sistema de

Información en Salud (jan-may 2014), or SINAC (jan-mar 2014)). This excludes 3,274 health clinics.

3. Finally, at least 80% of Prospera population associated to the clinic must reside in a locality with either Telcel, Movistar or Iusacell connectivity. This excludes 3,253 clinics. Thus, our population consists of 9,606 clinics located in all states of Mexico.

Pre-Sample Definition

Because of operational concerns, the population was further restricted before proceeding with the sampling. The restrictions were the following:

1. Clinics must not be moving clinics. We exclude: brigada móvil; unidad medica móvil; unidad móvil; brigadas de salud; microregión. This excludes 1,039 health clinics.
2. Clinics must be located in the states of *Chiapas*, *Estado de México*, *Guanajuato*, *Hidalgo* and *Puebla*. A further 5,592 clinics are excluded.
3. On average, there must be at least five Prospera pregnant beneficiaries registered at the clinic according to any of our sources (Sistema de Información en Salud (jan-may 2014), or SINAC (jan-mar 2014)). This filter excludes 1,212 health clinics.
4. The locality in which the clinic is located must have connectivity in either Telcel or Movistar. Excluding Iusacell from our connectivity partners takes away 127 clinics.
5. At least 80% of Prospera population associated to the clinic must reside in a locality with either Telcel or Movistar connectivity. 17 clinics are left out.

Based on the exclusion criteria outline above, we are left with a total of 1,710 health clinics.

SUTVA

The outcomes of pregnant women associated to one health clinic should be independent from the treatment assignment of another health clinic. Our selection of a random sample enforced the Stable Unit Treatment Value Assumption by minimizing a measure clinic interference. This measure was constructed using

1. The clinic-localities association
2. The geographical distance between localities of different clinics, pondered by

3. A simple measure of pregnant women concentration: the ratio of a locality Prospera population and Prospera pregnant beneficiaries.

Sample Selection

A greedy algorithm executed the selection of the sample considering the previously defined network of interference.

Treatment Allocation

Our method for random treatment allocation was Coarsened Exact Matching, implemented in three rounds. This method yields a trial that approximates a fully blocked experiment, instead of a fully randomised one. During the first round, the strata were constructed using:

1. A social lag index
2. The type of clinic
3. The federal Mexican entity (state)
4. The percentage of female population above 15 years of age with incomplete secondary schooling.

For every 6-tuple within a stratum, one clinic was assigned for each (of three) treatment arms, and three were assigned to control. The remaining clinics were re-stratified using:

1. The type of clinic
2. The federal Mexican entity (state)

Again, for every 6-tuple within a stratum, one clinic was assigned for each treatment arm and three were assigned to control. The remaining clinics were re-stratified using:

1. The type of clinic

And the same procedure follows.

This method was executed twice. The first execution yielded 600 clinics, out of which 300 were in the control group and 100 clinics belonged to each treatment arm.

Afterwards, we re-sampled in two Mexican entities: *Chiapas* and *Estado de México* to increase our overall sample size. The final sample consists of 655 clinics, out of which

329 are in the control group, 107 are in treatment arm 1, 111 are in treatment arm 2 and 108 are in treatment arm 3.

Individual level

Prospera targets poor households in marginalized rural, semi-urban and urban areas, selected based on their socioeconomic characteristics and the likelihood of being extremely poor.

The sample of Prospera beneficiaries eligible for the trial consists of pregnant mothers up to 32 weeks pregnant in our sample of health clinics. There will be a one-month window from trial start to find women meeting this criterion. Women over 8 months pregnant will be ineligible to be in the trial due to the limited duration to receive the programme and so lower likelihood of an effect, however they will be given the option to receive the messages (however not be a part of the analysis).

Based on our experiences in different stages of the trial implementation, we expect an average of four pregnant women in each treated clinic. From our sample size of 655 clinics (326 in treatment), we expect the active participation of 2,620 pregnant women in the trial, 1,304 of whom receive Prospera Digital.

2.3. Data Gathering

Data is routinely gathered by the health care centres and the Prospera programme. To protect participant confidentiality, Ministry of Social Development officials will clean this data of any information that could be used to identify individual beneficiaries, before transferring data securely to QFD and BIT. Data is also expected to be gathered through a mobile survey at midline (only for treatment arms, except in the case of gastrointestinal diseases) and a household survey at end line.

Data storage and transmission

Data will be anonymised and only available to BIT and QFD staff working on the project. Data will not be transmitted to third parties, except where this is appropriate under the

conditions of appropriate data sharing agreements. After the study is completed and data quality is revised, the data will become open source and will be publicly accessible.

2.4. Power Calculations

The power calculations use baseline data, and are based on the following key aspects of this Randomised Controlled Trial:

- Our unit of analysis is the pregnant woman. All primary outcome measures will be measured at this level
- Our unit of randomisation is the health clinic
- Pregnant Women are grouped in localities
- Health clinics form a cluster of localities
- We use blocks to group health clinics in a way that variance with respect to the outcome measure is low within blocks.

We segment clinics in blocks according to the type of locality where they are located and the number of functional health subunits they contain. These subunits are composed of a doctor and two nurses, or a doctor and one nurse, or a doctor intern and nurse intern, or technical health personnel depending on availability. One such subunit is called *nuclei*. We have five blocks, defined in the following way:

1. **Small, rural clinics:** located in rural localities (<2,500 inhabitants) with up to two nuclei.
2. **Large, rural clinics:** located in rural localities with more than two nuclei.
3. **Small, urban clinics:** located in urban localities with up to three nuclei.
4. **Medium, urban clinics:** located in urban localities with more than three and up to seven nuclei.
5. **Large, urban clinics:** located in urban localities with more than seven nuclei. This incorporates advanced health centres with hospitalization services.

We treat block effects as fixed effects, since we are not interested in generalizing to a larger population of blocks. Ignoring the locality-level clustering, we have a 3-level multi-site cluster randomised trial:

1. Pregnant Woman
2. Health Clinic
3. Block of clinics

Based on our experience in the field, four pregnant beneficiaries per clinic is a moderate estimate. Below we outline power calculations based on two major outcome measures; birth size and birth weight.

Birth weight

Our source of information is the **SINAC** (Birth Information Subsystem). This is a national registry of birth information. We use it exclusively on births such that the mother is affiliated to Prospera.

Elements needed for the calculations:

1. Sample size within cluster (= 4)
2. Number of blocks (= 5)
3. Number of clusters per block (= 156)
4. Intra-cluster correlation, ρ (= 0.108)
5. Proportion of variance explained by block (we fix it at 0.1)
6. Standardized effect size, δ

The intra-cluster correlation was computed as:

$$\rho = \frac{\tau_{\pi}}{\tau_{\pi} + \sigma^2},$$

where τ_{π} is the between-clusters variance and $\tau_{\pi} + \sigma^2$ is the total variation of our outcome measure. As ρ increases, the between clusters variation takes a larger share of total variation and more clusters are needed to hold power constant, given a fixed standardized effect size. On the other hand, the standardized effect size was computed as:

$$\delta = \frac{\gamma_{010}}{\sqrt{\tau_{\pi} + \sigma^2}},$$

where γ_{010} is the average treatment effect.

The following table relates average treatment effects and power:

Table 1. Treatment effects and power - Birth

Average Treatment Effect (grams)	Standard Treatment Effect	Power
47	0.1022	0.71
50	0.1087	0.76
55	0.1196	0.83
61	0.1326	0.9

Thus, detectable effects start at 47 grams in birth weight, or a 1.5% change given a population mean of 3107 grams. This magnitude is below impacts found in the literature. Regarding the Prospera programme, Barber and Gertler (2008) find that beneficiary status was associated with 127.3 higher birth weight (grams) among participating women. In a study related to doctor-patient contractual relationships based in Denmark, Jensen (2014) finds a 1.8% lower birth weight for those born from women treated by general practitioners under capitation contracts relative to a mix of capitation and fee-for-service contracts.

Birth size

Our source of information is the same as in birth weight. Now, the intra-cluster correlation, ρ , was estimated at 0.115.

The following table relates average treatment effects and power:

Table 2. Treatment effects and power - Birth size

Average Treatment Effect (mm)	Standard Treatment Effect	Power
2.6	0.1028	0.7
3	0.1186	0.82

Thus, detectable effects range above 2.6 millimetres in birth size, a 0.5% change given a population mean of 498 millimetres.

2.5. Analysis

Intention to treat (ITT)

Our primary analysis will be the Intention to Treat (ITT) analysis. All of our outcome measures will be evaluated by either a Linear Prediction Model, or an ordinary least square multiple regression (OLS).

For each of our outcome variables we estimate the parameters of the following model:

$$Y_{ijkl} = z + \beta_1 T_{1j} + \beta_2 T_{2j} + \beta_3 T_{3j} + \gamma a_i + \rho b_j + \theta c_k + \nu d_l + U_{ijkl}$$

Where; Y_{ij} is our outcome of interest for the pregnant woman i in health clinic j of sanitary jurisdiction k in state l , z is a constant; T_{1-3} are our three treatment arms; a is a vector of control variables comprising of individual-level characteristics, b is a vector of control variables comprising health clinic-level characteristics, c is a vector of control variables comprising sanitary jurisdiction-level characteristics, and d is a vector of control variables comprising state-level characteristics; and U_{ij} is the error term. We control for heteroscedasticity in U_{ijkl} using robust standard errors clustered at the clinic level.

Treatment on the treated (TOT)

If we have data on message delivery we will further conduct a Treatment on the Treated (ToT) analysis using treatment conditions as instrumental variables to estimate the impact of receiving the messages on our outcome variables, that is, the local average treatment effects (LATE).

2.6. Robustness Checks

We will conduct post-hoc balancing tests to confirm that our randomisation has been successful. As a robustness check we will perform additional analyses without individual and Locality level controls. As such, again for each outcome measure, we will estimate the parameters of the following model:

$$Y_{ij} = z + \beta_1 T_{1j} + \beta_2 T_{2j} + U_{ij}$$

Where our variables are defined as above.

2.7. Ethics

The trial has been granted ethical approval by the University of Bristol Faculty of Social Sciences and Law Committee for Research Ethics. The approval was granted in December 2015, study number 26101.

2.8. Outcome Measures

Our outcome measures will be extracted from the following sources:

- **SINAC** (Sistema de Información sobre Nacimientos): This is a country-wide birth registry that is administratively recorded by the Health Ministry and made available through the Dirección General de Información en Salud.

The following measures will be used:

1. Weight of baby at birth (g)

2. Size of baby at birth (mm)
3. Apgar grade (1-10)
4. Silverman grade (1-10)
5. ICD-10 catalogued congenital diseases or complications

This registry is updated every two months and contains unique identifiers that allow for identification of individual beneficiaries.

- **Prospera:** the administrative information we will retrieve from Prospera consists of the total bimonthly monetary amount awarded to the families of pregnant beneficiaries in treatment and control. This information is released by Prospera every two months and is available to the general public by law. Such monetary amount will be used to proxy the general compliance of families in Prospera digital with the conditionalities set by Prospera.
- **Primary-level Health Clinics:** At the end of the trial, medical records will be retrieved from all clinics in the trial for all beneficiaries in control and treatment arms: Such records will allow us to formulate the following outcome measures:
 1. Incidence of gastrointestinal diseases amongst pregnant women
 2. Total number of scheduled clinic visits
 3. Attendance rate to scheduled clinic visits.
 4. Newborn characteristics: birthweight, ICD-10 disorders.
 - **Post-participation survey:** We will implement a survey by the end of the intervention (circa February 2017) to gather additional outcome measures:
 1. Knowledge of pregnancy and newborn care
 2. Diet
 3. Supplement consumption
 4. Behaviour changes in maternal breastfeeding
 5. Planning for emergencies and birth
 6. Empowerment facing health services
 7. Health protocols satisfaction
 8. Malnutrition and obesity rates in both the mother and the newborn
 9. Incidence of premature babies

10. Maternal mortality rate
11. Infant mortality rate
12. Size and weight of infants
13. Incidence of gastrointestinal diseases in infants
14. Incidence of risk conditions during pregnancy: tobacco and alcohol consumption, gestational diabetes, pre-eclampsia, puerperal sepsis.

3. Implementation



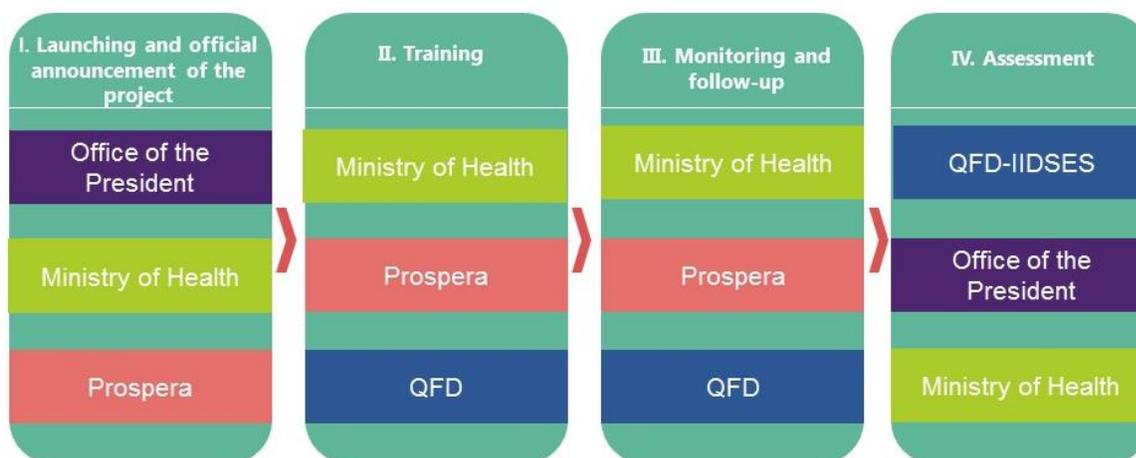
The implementation of the Opening Prosperity strategy began on December 2015, and to this date, the intervention has already started in the states of Hidalgo, Puebla and Guanajuato. The current progress of the work is presented below.

3.1. Pilot stages, Activities and Protocols

The implementation of the strategy is divided in the following stages:

1. Launching and official announcement of the project
2. Training
3. Monitoring and follow-up
4. Assessment.

Figure 1. Project Stages



The stakeholders involved in those stages are the Coordination of National Digital Strategy in the Office of the President, Ministry of Health (for operative control the Ministry divides each state in health jurisdictions, basic instances for the operation of health services and programs), Prospera, IIDSES and QFD.

QFD with feedback and advice from BIT and with information from the qualitative evaluation (conducted by BIT and IIDSES) developed the protocols for the program's operation. The protocols are reflected mainly in the training guides and supporting material. Still, an important part of the qualitative evaluation is focused towards improving the protocols.

Some of the most challenging protocols to design have been:

- **The delivery of the mobiles.** Here, the implementing team noted the challenge that beneficiaries that owned a mobile had to be motivated to use their own phone, without creating conflict with beneficiaries that do not own a mobile and are given one during the training session for free. The protocol established that emphasis will always be given to the access to the platform, where the value of the project relies. Also, a very simple phone with a commercial value under \$150 pesos (US\$10 dollars) was delivered. This is among the cheapest and most simple models available and beneficiaries owning a mobile had a higher value mobile most of the time. So far, the protocol seems to be working since there have not been reports of beneficiaries complaining about the differential treatment nor beneficiaries hiding their mobiles.
- **Motivating beneficiaries to sign up early during pregnancy.** We are aware that beneficiaries usually attend their first clinic visit late in their pregnancy. Emphasis is given with the clinic personnel to use the resources available to motivate women to attend their clinic visits or at least to sign up in the program early during pregnancy. A possible reason for attending late in pregnancy is that Prospera establishes mandatory visits at different stages of pregnancy, thus not declaring pregnancy early allows them to avoid some of those mandatory visits. We will report if any success is achieved here by comparing the gestational age at the first visit between treatment and control clinics. However, since the program does not have an explicit component for this we do not foresee an important difference unless clinics increase their efforts.

The main actions and protocols for the Ministry of Health and for Prospera are presented in the following boxes.

Figure 2. Activities of Ministry of Health Staff

Figure 3. Activities of Ministry of Health Staff

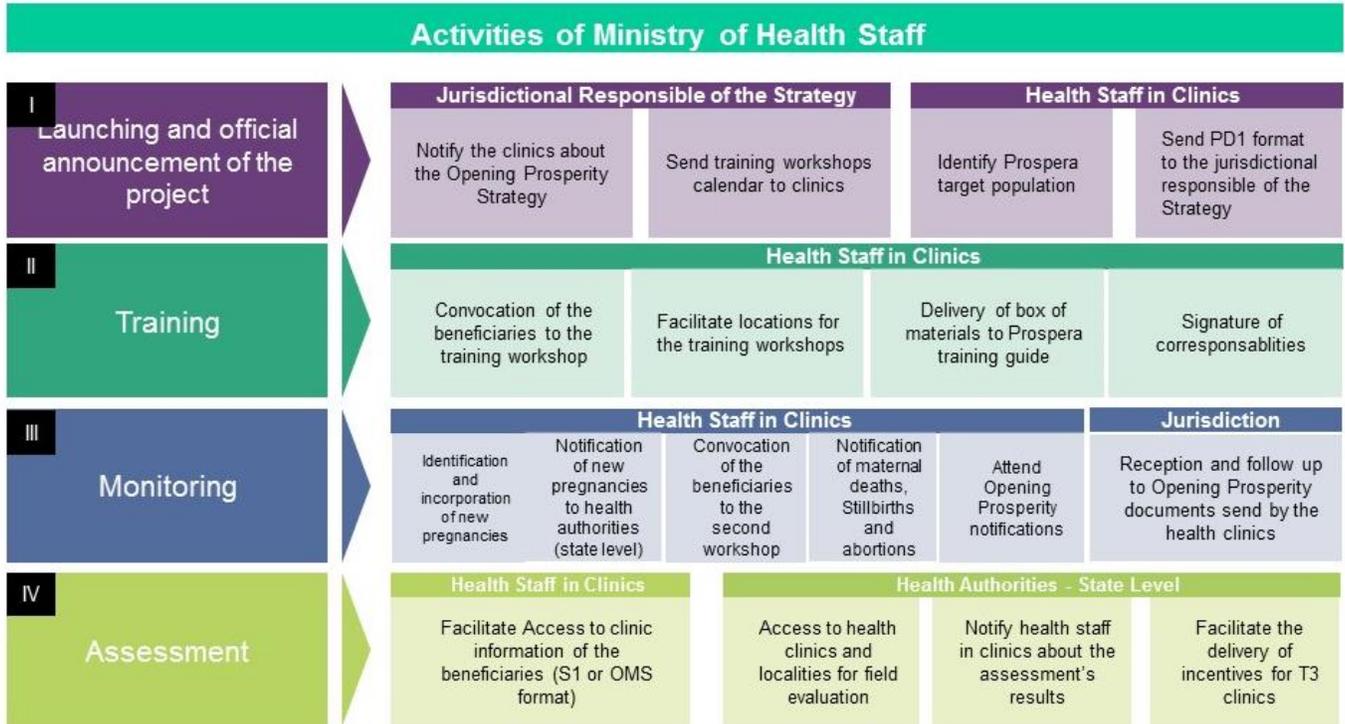
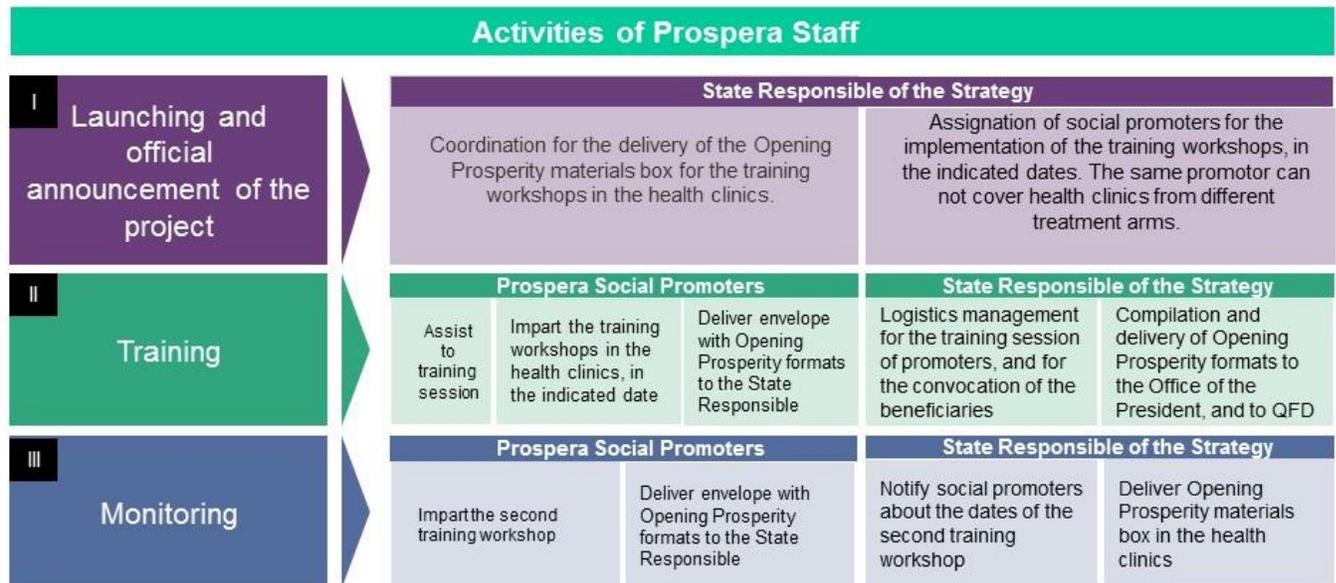


Figure 4. Activities of Prospera Staff



3.2. Programming Messages Flows

Opening prosperity uses the SMS system designed by UNICEF (in collaboration with the software engineering firm, Nyaruka), RapidPro, which is a free and open source framework designed to send and receive data using basic mobile phones, manage complex workflows, automate analysis and present data in real-time. Opening Prosperity uses RapidPro to build logical flows that use beneficiaries' responses as input to provide ad-hoc information via SMS.

SMS flows received by beneficiaries can be classified in two types:

- Automatically received
- Triggered by the user

The flows triggered by users allow the users to perform the following actions:

- Sign-up
- Change health appointment
- Change registered mobile

- Report emergencies (this function is associated with an emergency phone number)
- Unsubscribe (intended only for emergency situations, e.g. fetal mortality)

The flows automatically received are organized in campaigns (the messages are sent in specific dates relative to the user due date, or to their medical appointments dates), and are classified according to their content in the following categories:

- **Training.** These flows are designed to teach the users the appropriate format to respond to the question messages of Opening Prosperity. The response messages types are the following: Yes/No answer, categorical, numerical, text, date.
- **Reminders.** These messages intend to motivate the attendance of the users to regular prenatal care, through reminders of the dates of their medical appointments.
- **Planning.** The users are motivated to design an emergency plan for childbirth and for possible medical urgencies
- **Potential Concerns.** These flows ask the users if they have experienced common alert and emergency signs, information about those signs is provided afterwards.
- **Preventative Behaviour.** Information about healthy action, appropriate nutrition, and risky behaviours is provided to the users.

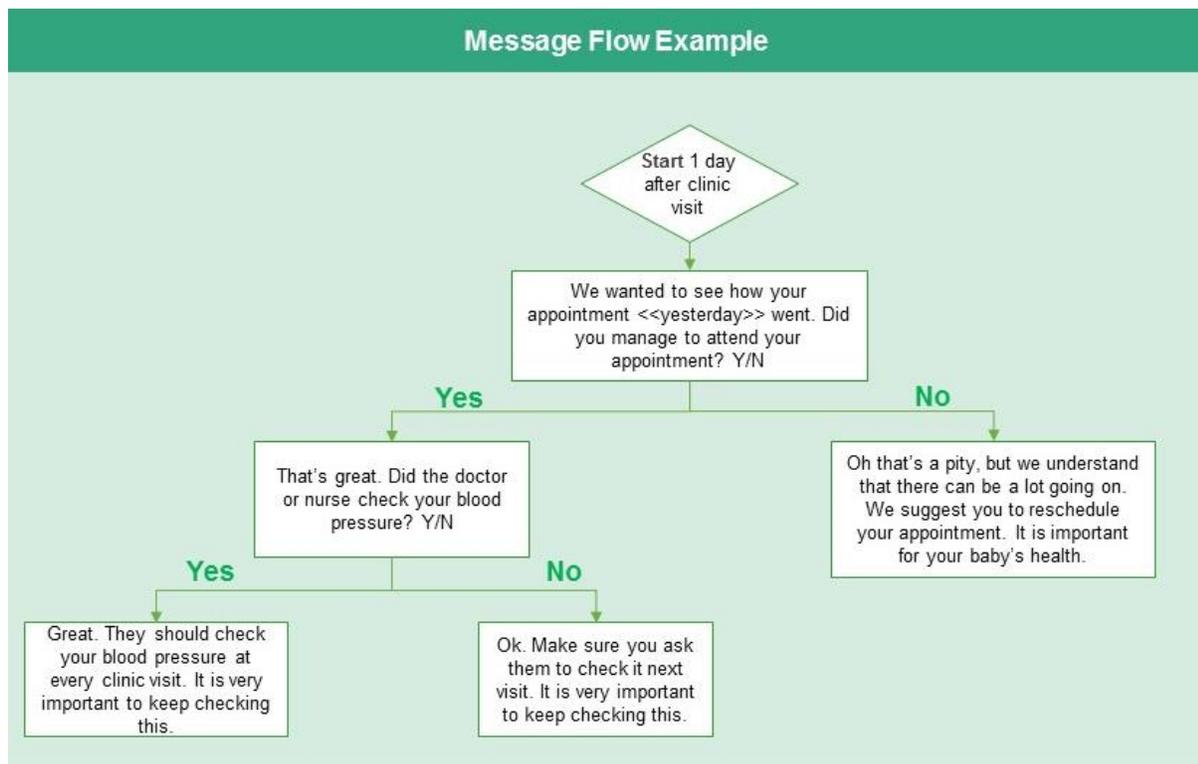
So far, **376 SMS flows** have been developed for pregnancy care, of which, 256 are currently active.

The most challenging functionalities of the program are two flows that according to qualitative work are greatly valued by the users:

- **MICITA** is a functionality that allows beneficiaries to change their appointments. This functionality has been currently restricted to one change per beneficiary and special attention to its benefits will be paid during the evaluation. In general, the personnel from the clinics have been very receptive about MICITA during the training sessions. It is yet to be analyzed its use in practice. MICITA is functional in the RapidPro platform since March 2016.

- **MIALERTA** is a functionality that allows beneficiaries to seek attention in extreme situations where access to clinics is difficult. As part of MIALERTA, coordination has been established with the phone line that gives emergency care and information to beneficiaries (01-800-MATERNA from the Ministry of Health). QFD coordinated with the personnel from the Ministry of Health the information that they would receive each time a beneficiary triggered this message. Coordination has also been established with clinic personnel as part of the protocols. Finally, QFD will analyze information from the MIALERTA activity that the Ministry of Health gathers to assess its demand and benefits

Figure 5. Message flor example



3.3. Developed Materials

Training guide materials were developed by QFD. These materials will be improved based on the qualitative information gathered if the program is scaled to the national level to be

used as a key input for the training activities. The following is a list of the materials developed by QFD (available upon request):

- **Manual for clinic personnel.** This manual includes all the activities that are requested from the clinic personnel involved in the project. It describes in detail the actions requested from them and general information of the project. Variations of the manual were developed for each intervention variation.

- **Guide for beneficiaries.** This is part of the material used during the training sessions to show beneficiaries how the program works. Each beneficiary takes one of these guides for future reference. Wording is simple and content is very graphical. This was developed by QFD and the Office of the President.

- **Guide for Prospera personnel.** This guide shows the Prospera personnel that will give the training sessions to beneficiaries all the steps of such training session.

- **FAQ sheets for beneficiaries.** This material is delivered to beneficiaries during the training sessions and it contains the most common questions that beneficiaries could have regarding the project.

- **Presentations for State authorities, jurisdiction authorities and clinic personnel.** The protocol established to introduce the program in the States was a 3-step process: first, a presentation with general information about the objectives and activities of the program is given to State authorities; second, a presentation with general information about the program and basic collaboration requested (e.g. help with logistics or gathering information from clinics) is given to jurisdiction authorities; and third, a presentation with general information about the program and specific activities requested is given to clinic personnel. These presentations were implemented by QFD personnel.



- **Posters.** QFD with support from the Office of the President created posters that are delivered to each clinic in the sample. Posters are delivered to clinics during the clinic’s personnel training session and they are instructed to place the poster in a visible part of the clinic where information is usually made available to the clinics’ beneficiaries. A space in the poster is designated for clinics to put the date and location of the training session for beneficiaries. The poster is designed to be reusable to inform also about the second training session.
- **Other material.** This includes formats that gather information, formats to control delivery of resources as part of the program’s operation, call scripts to confirm training sessions, among other.

3.4. Commitment Contracts

The participation of local representatives from the community (vocales) or from the clinics (auxiliaries de salud), for clinics in Treatment Arm 2, consists of having some interaction through RapidPro. However, they also “sign an agreement” with the beneficiaries during the training sessions. This agreement was proposed by BIT and invites the beneficiary to think which of the following three actions is most difficult to complete:

- Attend all their clinic visits
- Take all the pills recommended during pregnancy (e.g. folic acid)

- Respond to all the RapidPro messages.

As part of this activity, each beneficiary writes down why each activity is difficult and commits with the local representative to complete the activity which he considers the most difficult one. The commitment forms part of one of the documents that QFD prepared as part of the project. So far we have 115 forms signed by the beneficiaries. Moreover, 28 health auxiliaries and 41 community health advisors (vocales de salud) have successfully registered in the RapidPro platform.

It is expected that an additional 200 forms will be filled in the State of Mexico and Chiapas and that 150 health auxiliaries and community health advisors will sign up during the training sessions.

3.5. Training Workshops

The training workshops to introduce the Opening Prospera strategy to the Prospera beneficiaries, are being implemented by staff from the Ministry of Social Development, who are previously trained by QFD staff. The structure and the main contents of the workshops for the beneficiaries are explained below.

The training workshop consist of five stages:

1. Theoretical session (35 minutes).
 - Welcome message and attendance control
 - Integration Dynamic
 - Distribution of materials to the beneficiaries
 - Explanation of the following activities
2. Signature of the informed consent of participation, and when appropriate, distribution of instruments to participate in Opening Prosperity (30 minutes).
 - Signature of the PD2 format
 - Distribution of cell phones, which are only available for the beneficiaries who do not own one.
3. Practical session (40 minutes).
 - Basic functioning of the cell phone.

- How to answer to the messages of Opening Prosperity?
 - How to use messages activated by triggers?
 - Use of the first training flow
4. Sign up of the beneficiaries in the Opening Prosperity strategy (15 minutes)
 - Registry of the beneficiaries in the strategy with the sign up message flow
 5. Session closure (10 minutes).
 - Questions and answers session
 - Motivational closure

To this date, the training workshops have been performed in the states of Hidalgo, Puebla and Guanajuato. The following tables present relevant information about the sessions in each of the mentioned states.

Table 3. Training workshops in Hidalgo

Planned training workshops	37
Performed training workshops	29
Number of assistants to the training workshops	76
Delivered cell phones	97

Table 4. Training workshops in Puebla

Planned training workshops	61
Performed training workshops	34
Number of assistants to the training workshops	199
Delivered cell phones	63

Table 5. Training workshops in Guanajuato

Planned training workshops	51
Performed training workshops	49
Number of assistants to the training workshops	232
Delivered cell phones	65

During the months of April, May and June, 177 training sessions will take place in the remaining states: Chiapas and México, which are expected to enroll more than 650

pregnant women.

Up to date, all the training sessions with the personnel from the selected 326 clinics has been completed, this includes clinics from the five states selected for the evaluation: Hidalgo, Guanajuato, Puebla, México and Chiapas. Also, over 49 Prospera enlaces have been trained to be able to implement the sign-up sessions with beneficiaries.

3.6. Digital Coverage

Currently, 274 pregnant women are actively participating and receive up to four messages per week. Additionally, 260 beneficiaries continuously receive reminders to attend their clinic appointments.

Up to now, 88% of the two-way message flows are completed by beneficiaries that have successfully signed-up. This allows them to receive personalized information.

In the following tables is presented relevant information about contacts' interaction with RapidPro flows, including the number and type of users that are currently receiving messages from Opening Prosperity, and also, about messages flows completion rates, mistake rates, response rates, and answer time. The analysis general information, and focus on the two first flows a user needs to respond: the first training flow, and the sign up flow.

Table 6. Contact types

Pregnant Prospera Beneficiaries	291
Vocales Prospera	41
Health Auxiliaries Prospera	25
Spillovers	18
Total	375

One of the expectations of the Project is to achieve spillover effects to pregnant women that do not belong to Prospera but are willing to pay the costs of the messages to receive information and benefits of using the tool. As indicated in the former table, eighteen pregnant women that do not belong to Prospera are interacting with the tool, paying for the messages they receive.

Table 7. Miscellaneous information

Flow completion rate	.54
Response rate to the first question in a flow	.5
Flow completion rate conditional on mistakes on the first question in a flow	.72
Contacts that started the first training flow	516

Contacts that finished the first training flow	272
Contacts that started the sign up flow	415
Contacts that finished the sign up flow	342
Contacts in due-date campaigns	273
Contacts in reminders campaigns	257
Average time to complete a flow	2:47 hours

Up to the date, more than 12,000 messages have been sent through RapidPro. The rate of messages that should be sent each week was suggested by BIT. Given the rate of messages per week that is currently being used, it is expected that in a typical week 250 messages would be sent once the trial is underway in all the states. Also, if the program was scaled up at the national level, 600 messages would be expected to be sent during a usual week.

Table 8. Analysis by response type - All contacts

Response Type	Answer Time	Mistake Rate	Response Rate	Send messages
Yes/No	1:47:14	0.13	0.70	9064
Categorical	0:52:44	0.14	0.83	1286
Numerical	0:11:50	0.17	0.69	605
Text	0:23:27	0.28	0.62	2162
Date	0:30:28	0.25	0.88	2476

Table 9. Analysis by Response Type - Contacts that finished the sign

Response Type	Answer Time	Mistake Rate	Response Rate	Send messages
Yes/No	1:43:44	0.09	0.80	7391
Categorical	0:58:3	0.15	0.94	958
Numerical	0:11:36	0.20	0.90	374
Text	0:20:24	0.22	0.90	1297
Date	0:31:10	0.26	0.90	2272

An assessment of response and mistake rates will continue through the life of the project. Also, QFD is analyzing the possibility to send the key information content to beneficiaries even if they do not respond to the messages after a given amount of time.

3.7. Qualitative Research

The qualitative component of Prospera Digital is intended to both complement, and expand upon, the quantitative data collected through the randomized controlled trial. It will serve the following purposes:

- Monitor the implementation of the program to inform process improvements for scale up of the strategy.
- Provide information about, context for, and explanation of the impact of the program on beneficiary health knowledge, behaviours and outcomes, to complement the quantitative evaluation.

The team for the qualitative research, IIDSES, focus on two areas for the assessment of the pilot:

1 Processes assessment (with emphasis on fidelity). This assessment intent to evaluate if the stages of the project are being implemented as planned (training for the beneficiaries and for the training guides from the Ministry of Social Development and continued use of the platform). It includes the following components:

- 1.1 Dose delivered.** Assessment of the completion of the intervention (analysis of training sessions).
- 1.2 Dose exposure.** Evaluation of the start and the continued use of the platform.
- 1.3 Dose satisfaction.** Assessment of the satisfaction about the intervention process (training, cell phones and messages from the platform).
- 1.4 Barriers/facilitators.** Aspects of the environment that facilitate or difficult the implementation or the results.



Table 10. Research methods for processes

Fidelity	Dose delivered	Dose exposure	Dose satisfaction	Barriers/facilitators
Closed Observation	Closed Observation	Semi-structured telephonic interviews to beneficiaries	Semi-structured telephonic interviews to beneficiaries	Semi- structured telephonic interviews to beneficiaries
Semi-structured telephonic interviews to beneficiaries	Semi-structured interviews on the field to health providers and auxiliaries.		Focus groups with beneficiaries	Focus groups with beneficiaries
Focus groups with beneficiaries			Semi-structured interviews on the field to beneficiaries	Semi- structured interviews on the field to beneficiaries
Semi-structured interviews on the field to beneficiaries				Semi- structured interviews on the field to health providers and auxiliaries.
Semi-structured interviews on the field to health providers and auxiliaries.				

Research about mHealth

IIDSES proposed the following research questions and research methods, in order to analyse the proposed mHealth system.

Table 11. Research about mHealth

Research Questions	Research Methods
<ul style="list-style-type: none">• mHealth: is it an empowerment mechanism for the users in the maternal and child health area? Does it help the health providers to improve their performance?	Interviews to beneficiaries (on the field and via telephone), and focus groups.
<ul style="list-style-type: none">• What are the perceptions of users about received messages? Are they culturally appropriate?	Telephonic interviews to beneficiaries.
<ul style="list-style-type: none">• What motivates and demotivates a beneficiary to use the platform?	Interviews to beneficiaries (on the field and via telephone), and focus groups.
<ul style="list-style-type: none">• What are the perceptions of users about the platform? (i.e. When and for which situations is it used)	Interviews to beneficiaries (on the field and via telephone), and focus groups.
<ul style="list-style-type: none">• What are the implications for the beneficiaries and for the health providers?	Interviews on the field to health providers.
<ul style="list-style-type: none">• What incentives generates the mHealth system for the health providers?	Interviews on the field to health providers.
<ul style="list-style-type: none">• Which social and behavioural influences affect the use of the mHealth system? Is it a feasible and viable tool for Mexico?	Interviews to beneficiaries (on the field and via telephone), and focus groups.
<ul style="list-style-type: none">• Does mHealth improve the equity, the effective coverage, or the quality of the medical attention?	Interviews to beneficiaries and health providers.
<ul style="list-style-type: none">• Which evidence comes from good practices? (i.e. Difference among treatment arms)	Interviews (on the field and via telephone), and focus groups.
<ul style="list-style-type: none">• What are the perceptions of users and health providers, Vocales and health auxiliaries	Interviews (on the field and via telephone), and focus groups.

- | | |
|---|---|
| <ul style="list-style-type: none"> • about the key words for the triggered activated messages? • How is affected the success of the implementation by the rural/urban dimension? • What are the perceptions of beneficiaries and health providers about the role of the Vocales and health auxiliaries? What are the perceptions of the Vocales and health auxiliaries about their own role? • Networking: Is it allowed the entrance to non-Prospera users? What is the peer effect, or the secondary effect, of Opening Prosperity? | <p>Closed Observation and interviews on the field to health providers and Vocales/ health auxiliaries.</p> <p>Interviews on the field to health providers and Vocales/ health auxiliaries.</p> <p>Telephonic interviews (post).</p> |
|---|---|

The qualitative research team has already performed the following interviews and observations in the state of Hidalgo:

1. Preparation for training guides
 - a. Open observations: 1
2. Beneficiaries training workshop
 - a. Open observations: 2
 - b. Closed observations: 2
 - c. Semi-structured interviews to health providers: 2
 - d. Semi-structured interviews to Prospera beneficiaries: 1
3. Post-training follow up
 - a. Semi-structured interviews to health providers: 6
 - b. Semi-structured interviews to Prospera beneficiaries: 2

IIDSES is currently in the process for developing a strategy to contact diverse actors via telephone, in order to answer to the previously mentioned research questions. Also, the current work for the qualitative research team implies the transcription of the 54 existent recordings and observations (there is about 1,000 minutes of information and 26 materials have been transcript). After the transcription, the information is codified and analysed (21 materials have already been codified and analysed).

4. Learnings for further scale-up



4.1. Learnings and testimonials

The qualitative research team identified difficulties, successes and lessons of the program during the pre-pilot of the project, which were taken into account to improve the implementation of the pilot. The sources of the first sections come from focus groups, closed observations and interviews to Enlaces (Ministry of Social Development staff who perform the training workshops), to doctors and nurses. Learnings from the first training workshops of the pilot (in the states of Puebla, Guanajuato and Estado de México) are also included; these observations were registered by QFD staff during the workshops. In the final part are included conclusions resultant from focus groups with beneficiaries.

Training workshop issues

- **Limited technical abilities of the beneficiaries.**

Some of the users are not familiar with the use of cell phone equipment, in particular those with literacy deficiencies. Those beneficiaries require additional explaining time in order to comprehend the functionality of Opening Prosperity; the staff in charge of the workshops is aware of this issue, but it remains a difficulty. Further efforts must be focused in the beneficiaries with limited technical abilities to assure the program's success and scalability.

“Another issue is the knowledge, maybe I didn't explain myself right, but they may say <I don't have the skill of the knowledge, and well, I'm embarrassed>”

- **Assistance and required materials.**

A concern during the pre-pilot was the precision of the beneficiaries calling. The following difficulties were identified: Health staff misspecification of the limit pregnancy week of the participants, space restrictions (i.e. more assistants than expected), and materials box for the training workshops not received in the clinic. In order to avoid possible difficulties in the pilot, the QFD call to the health clinics, previous to the workshops, includes questions to gather information and to prevent mistakes related to the previous issues.

“It may be the space restrictions, the amount of people called, if it exceeds the capacity it won't work... about attention, isn't it? That I may be dedicating each one, that they may tell me <we are calling 20> and that I get 60.”

Technological issues

- **Localities with telephonic signal difficulties.**

The selected clinics for the trial are in localities with connectivity in either Movistar or Telcel. However, the available data about connectivity is not precise and many clinics experience signal problems, this implies difficulty or impossibility of the workshops performance. In order to identify potential problems, QFD established a protocol for previous communication with the clinics. QFD staff call the responsible of the Strategy in each clinic before the workshop to gather

information about connectivity, among others; this protocol helps to improve planning and resources management. If the health clinic does not have connectivity, but the signal is available in a different place in the locality, then the workshop location is redefined. If there is no connectivity in the locality, then the implementation of the program is cancelled in the correspondent health clinic.



“Well, problems, what you can find is just the accessibility to the community because of the communication nets”.

- **Technical problems with the beneficiaries sign up** (i.e. SMS system not working correctly). As an emergent measure, QFD staff performed remote sign up procedures for the beneficiaries whose cell phones presented problems during the workshops. The Office of the President commented the problems with Telcel and Movistar, to ensure the proper sign up during the training workshops

- **Compatibility of Opening Prosperity with personal cell phone chip.** During the pre-pilot, the use of the beneficiaries' personal cell phone chips was not compatible with the free SMS service provided by the telephonic companies Telcel and Movistar. This problem was corrected during the pilot, increasing efficiency and simplicity.

Communication issues and program expectations

- **Direct communication need.**

The health staff expressed the beneficiaries' need of direct telephonic communication (i.e. Telephonic call) for emergencies, such as childbirth signals. In order to respond to that need, Opening Prosperity allows the users to send a trigger to activate an emergency flow. This flow includes responses for three situations: emergencies, alert signs and general doubts. When a beneficiary activates the flow for emergencies and warnings a message with the situation and the contact information of the user is sent to the **Maternity Attention Line** (a free national line that provides medical orientation for pregnant women), as well as to the responsible of the strategy in the health clinic. A member of the line staff calls the user to provide orientation, and the telephonic number of the line is reminded to the user.

"I will also suggest that in the training will be annexed or suggested to the families to write as frequent contact or speed dial the 01800, because if I am in a childbirth situation, of a situation. Maybe I won't be writing, <my child is coming>, isn't it? Maybe it will be better with the phone call."

- **Adequate expectations.**

Regarding the warning signals report, some doctors expect for the beneficiaries to learn to identify the signals. On the other hand, some beneficiaries expect to get attended by a specialist at any time. In the training workshops (and in the informative materials) is specified that Opening Prosperity is not an online doctor, nor it substitutes medical appointments. In order to provide realistic expectations, the continuance of this precision is important.

"That it will be a very good tool for them, and I believe a challenge for us. Because they would arrive and tell us <look miss, look, I presented bleeding> and how her bleeding was. <And look that my child is not moving, but here in my cell phone says it is a warning sign>. Then, we will be speaking about the same situation."

Incentives and evaluation

- **Response to incentives.**

The proposed incentives (i.e. Extra holiday's days, recognitions signed by health authorities and cell phones, randomly assigned to some of the staff members of the clinic) were well received, according to the preliminary qualitative evaluation results. However, it is important to emphasize the nature of the incentives, because some of the health professionals have expressed their desire to improve the clinic infrastructure conditions, option which is not considered in the incentives system.

"Well, the infrastructure, to improve the infrastructure... Well I don't know, but it is true, our unit is very small, we don't have enough spare. For example, the laboratory is very reduced. Then I don't know: not, well, for the attention we will amply the laboratory, we would have much more demand. In other services. Well, in infrastructure, to have a better attention".

- **Positive response to evaluation.** In the preliminary results of the pre-pilot evaluation, T3 beneficiaries don't mention any concerns about possible retaliations from the health professionals regarding the possibility of evaluation. Positive commentaries about the evaluation are also presented by enlaces and health staff.

"The fact that they will measure the attention of the health centre through questions that they would be making to all of them who want to get into this program, you don't know. I mean, it will be a benefit not only individual, but a benefit of micro-zone level, or municipality, as you want to call it. Because there are times when the health centre gives a very, very, very bad attention. I mean, there are times when they give only five daily turns, for nothing more they don't even weight them... That they only sign for them and <ok, goodbye>. And if they don't go to that medical appointment bimonthly they don't the aid, so it would be something good for that medical appointment, if they leave at five in the morning to form something that is worth it, I mean, that at least they be well taken care of, that they do check them".

4.2. Conclusions from Focus Groups with Beneficiaries

Sources of health information

Beneficiaries mostly seek health information from health professionals and clinics, but they also ask their families –especially their mothers- for advice. Both sources are not mutually exclusive. It is likely that the intertwining of advices will continue during the intervention. A few beneficiaries look for specialized health information in sources that do not require human interaction, such as books and the Internet. This suggests that using their cell phones to receive information might be familiar to them.

“My mom is the one who tells me everything that has to do with my pregnancy and breastfeeding... I mean, she knows everything about all that”.

General perceptions of cellphone

Most beneficiaries had a cell phone and they use it to communicate (i.e phone calls and text messages). Some use advanced functions that involve Internet, such as Facebook and music services. Previous knowledge about their own cell phones seems enough to use the platform. Some disadvantages associated with the use of cell phones were: complexity, waste of time, thefts and fragility. These issues might be obstacles to use the platform.

“I don't know how to use it really, with so much technology. I know how to send messages and answer, the basics”.

Interaction with the platform

Beneficiaries expressed overall confidence to interact with the platform. They valued the training and the written materials as reference guides. The ability they more often recognized was answering messages. A few had difficulties with specific functions and some felt insecure about their abilities. However, the beneficiaries consider they will achieve it with practice.

“I do feel able to know how to answer. To understand how they're going to ask and how to answer”.

Benefits of Prospera Digital

Beneficiaries recognized the information as the main benefit, however, among the benefits, they *mistakenly* valued the interaction with a health expert who is going to answer their questions. They highlighted the importance of changing an appointment and sending an

“You go to the clinic and they can't treat us right away and through this I feel I will be more protected, more connected”.

alarm. Two other perceived benefits were: time savings because they will not need to go as often to the clinic, free information.

Role of the health auxiliary/vocal (T2)

Beneficiaries struggled to identify and differentiate between the health auxiliary and the vocal in the Prospera Digital strategy. It seldom appears in the beneficiaries' discourse. The main functions they believe a health auxiliary or vocal should do are answering questions and supervise if they are following the program.

“To oversee our doubts and comments and if they see we are making a mistake, well ...supervise. So they could be telling us and checking on us; how's it going or what are you doing. And to tell us about the talks, to invite us to this, to come and do that”.

Opinions about the possibility of evaluating clinics (T3)

Beneficiaries value the possibility of evaluating clinics and health services. They believe it will help improve the health services and its impact will benefit other clinics as well. Some may take it as an opportunity to react against maltreatment.

“And the good thing is we have the right to talk, to say what we feel, what we need”.



4.3. Perspectives and Scaling Up Potential

The next step to Opening Prosperity implies to extend the period of coverage to include post-partum care, as well as early childhood development. QFD has secured funding to follow-up the development of the project until March 2017, which allowed to extend the project to provide information to beneficiaries up to the babies' second year. The intervention's impact in a longer run will be shared with the FCO.

QFD is currently working with the Ministry of Health, and with BabyCenter to develop useful health content for the first two years of life of the baby. The messages will include information for mother and baby care, some of the topics included will be the following:

- Recommendations for mother care during puerperium
- Appropriate breastfeeding
- Vaccination
- Warning signs for different development stages of the baby
- Diet recommendations
- Reminders for medical appointments

Additionally, Opening Prosperity team is working to extend the content about childbirth, to include relevant information about symptoms of labor, medical rights, and pain management options, among others.

If the expected results of the strategy are achieved, according to the robust scientific assessment of the pilot results, Opening Prosperity will be scaled-up at the national level, through the operational and administrative structure of Prospera, the Ministry of Social Development and the Ministry of Health. The program would potentially support 700k pregnancies per year, which would lead to a US\$ 1.7 M cost per year of SMS (calculation based on a cost of 7 cents per message and an estimate of 10 messages per beneficiary per week), which amounts to 0.03% of the annual budget for Prospera.

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