

Prospera Digital: Improving maternal and neonatal health through digital tools and data driven strategies

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Executive Summary

Prospera Digital (PD) was designed to innovate the way in which Prospera (the largest social policy and conditional cash transfer program in Mexico) communicates with its 7 million household beneficiaries through new technologies and mobile tools.

Prospera Digital sends personalized two-way SMS messages through RapidPro. These messages encourage future moms to adopt healthy habits during their pregnancy; help them identify signs of concern; remind them to attend their medical check-ups and take nutritional supplements; help them establish an emergency plan with their family at the moment of delivery; provide them with useful information to hold health service providers accountable, which allows them to evaluate the quality of the care received in their local healthcare facilities.

With the support from the United States Fund for UNICEF and Johnson & Johnson, in 2016, UNICEF Mexico and partners implemented Prospera Digital as an experimental intervention. PD reached 2,965 pregnant women beneficiaries of Prospera across 326 health clinics located in 5 states of Mexico: Puebla, Guanajuato, Hidalgo, Chiapas, and Estado de México. The project has helped 90% of the female participants, who live in the most disadvantaged communities, to safely deliver healthy babies. PD generates quantitative and qualitative evidence on the impact of personalized, targeted and socio-emotional communication on knowledge and behavioral change.

The Mexican Government has expressed interest to scale up the project for people who obtain health care services at the hospitals and clinics managed by the Ministry of Health (MoH), which attend to more than 1 million pregnancies every year.

1. Context and background

Approximately 7 million Mexican families with a per capita monthly income below the value of a basic food basket¹ (MX\$1,373 or USD\$72 for urban areas and MX\$970 or USD \$51 for rural areas) receive Conditional Cash Transfers (CCTs) under the government's Prospera program. Prospera is a nationwide program that benefits more than 30 million Mexicans in poverty. Every two months, the head of the beneficiary household—over 95% are women—receives a cash transfer from the program under the condition that their children attend school regularly and are taken to the clinic.

Prospera is Mexico's largest social development initiative and the second largest CCT in the world. It has been extensively studied and rigorously evaluated by independent academic institutions. Studies show that the program has a positive impact in 1) school enrollment and educational levels, 2) improvements in nutritional status, 3) better health prevention, and 4) reduction of income poverty in rural areas.²

Beginning in 2014, Mexico's Office of the President launched Prospera Digital (PD), an ambitious initiative that seeks to modernize Mexico's flagship program of social development through technology-based tools. In this new phase, the Mexican government seeks to make Prospera more open, inclusive, efficient, and increase the development outcomes of beneficiaries with the implementation of modern mobile and data technologies. PD seeks to use new data-driven tools and mobile technologies to promote digital and financial inclusion that plans to reach Prospera's 7 million household beneficiaries. Health and nutrition being among the main components of the program play a key role in Prospera Digital's efforts.

1.1 Purpose of the intervention

Mexico was committed to work in order to achieve the Millennium Development Goals (MDGs), however, despite the public budget and social programs targeted to achieve the MDGs on maternal and children's health, the country lagged behind in these indicators. For instance, the maternal mortality ratio declined since 1990 from 89 deaths per 100,000 live births to 43 in 2011, but the country did not reach the MDG goal of 22 by 2015. Similarly, under-five mortality decreased from 47 per 1,000 live births to 16.7 between 1990 and 2011, however it remains

¹ Poverty measurement in Mexico relies on two income lines: the *línea de bienestar mínimo* which is equivalent to the value of a basic food basket per person / per month; and the *línea de bienestar* which is equivalent to the value of the basic food basket and the basic non-food basket per person / per month.

<http://www.coneval.org.mx/Medicion/MP/Paginas/Lineas-de-bienestar-y-canasta-basica.aspx>

² Studies and impact evaluations are available: <https://prospera.gob.mx/EVALUACION/es/docs/docs2012.php>

high in the poorest southern states of the country. The main problem for the country is the huge disparities at the subnational and municipal level: The probability for pregnant mothers living in poverty to die during childbirth in the disadvantaged southeastern states of Mexico is five times higher than in the industrialized northern states.

UNICEF's programme cooperation with the Government of Mexico (2014-2018) recognizes the importance of strengthening capacities at the national and subnational levels, in order to design and implement programs to improve health and nutrition outcomes for children. UNICEF Mexico is involved in the design, implementation and evaluation processes of Prospera Digital; which seeks to improve Mexico's largest social development initiative through innovation.

Prospera has been traditionally focused on preventive health by requiring beneficiaries to attend health workshops and to undergo regular clinic visits, which should be frequent (at least five) during pregnancy. Despite Prospera's orientation towards preventive health, its beneficiaries still lag behind in health outcomes: Prospera's population reports a high rate of stillbirths in previous pregnancies (close to 12% of Prospera mothers had at least one previous stillbirth), 14% of children under 5 years have low height-for-age and 23% present anemia, while only 14% of babies were exclusively breastfed during their first six months of life. Among the babies born, 3.2% report being born with an ICD-10 disorder. Key determinants that have been identified to explain low take-up rates of preventive health, include: (i) lack of access to information, (ii) information asymmetry and poor health education, (iii) lack of trust in health providers, (iv) low quality of health services, (v) lack of agency from end-users, and (vi) the difficulty to communicate directly with beneficiaries living in remote and inaccessible areas of the country.

Prospera Digital seeks to improve the delivery and impact of health services provided by Prospera to pregnant women and their children. It was designed with the purpose of improving maternal health, birth outcomes and early child development of Prospera beneficiaries through timely, personalized and targeted two-way SMS communication.

PD uses RapidPro, an open source communication platform designed by UNICEF, to send personalized two-way SMS that encourage expectant mothers to adopt healthy habits during their pregnancy; help them identify signs of concern; remind them to undergo their medical check-ups and take nutritional supplements; help them establish an emergency plan with their family at the moment of delivery; provide them with useful information to hold health service providers accountable, and evaluate the quality of the healthcare received in their local healthcare facilities. The messages were personalized and tailored to the specific circumstances of each participant using three sources of information: beneficiary's' response to messages, Prospera administrative information, and clinical history information.

PD messages include a variety of topics relevant for pre- and post-natal care, such as: appointment reminders, prompts to plan for birth and emergencies, identification and what to do in case of potential concerns and alarm signs, preventive health care advice, breastfeeding tips, vaccination reminders, etc. Additional messages enable beneficiaries to seek emergency care, express health concerns, and change their checkup appointments through the platform. All these components are thought as complementary to their regular clinic visits, which remain one of the conditionalities of Prospera.

1.2 Design of the Prospera Digital pilot

Since its launch in December 2015, PD has been implemented through a Randomized Controlled Trial (RCT) pilot program to assess the effect of the messages content and the response to technology in maternal and child health outcomes. 655 clinics in the states of Puebla, Hidalgo, Guanajuato, Estado de México and Chiapas³ were randomly selected from a universe of 16,836 clinics in Mexico's 32 states,⁴ and randomly assigned⁵ to three different treatment groups and one control group:

- **Control (329 clinics):** No intervention
- **Treatment 1 (107 clinics):** Participants receive PD messages.
- **Treatment 2 (111 clinics):** Participants receive PD messages + Community participation through Prospera local health promoters (known by the community as *vocales*) to reinforce the intervention. This variation seeks to test whether the support of a local network can influence the behavior of pregnant women and encourage the use of the platform. Community members' participation happen in two ways: First, community members attend the initial training session and sign mock contracts with the beneficiaries to obtain a commitment from them on either attending all their prenatal checkup visits, taking their pregnancy supplements (e.g. folic acid) or responding to all the messages. Second, community members are encouraged to send pre-designed messages with certain regularity to support the beneficiaries' pregnancy.
- **Treatment 3 (108 clinics):** Participants receive PD messages + Incentives to best performing clinics. This variation enables the users to send feedback on the service provided by the clinic. Beneficiaries are able to report compliance of basic protocols that doctors should follow during checkups. They are also able to evaluate the quality of the

³ Annex 1 presents a map with the location of the 655 treatment and control clinics.

⁴ Criteria applied to further filter the sample: 1) 5 states (Estado de México, Chiapas, Guanajuato, Hidalgo and Puebla). 2) Health centers with a more administrative orientation were excluded. 3) More than 5 Prospera pregnant beneficiaries on average. 4) Cell phone coverage for at least 80% of the beneficiaries. 5) At least 80% of the feminine population between 13 and 35 years speaks Spanish.

⁵ Annex 2 presents a statistical analysis that shows there are no statistically significant differences among treatment and control groups, thus the sample is balanced.

clinic and the service received through the platform. To protect the beneficiaries, only a subset of the beneficiaries receive messages asking them to evaluate the clinic, and anonymity is guaranteed at all times. Based on the information gathered, clinics receive information of the beneficiaries' aggregated responses and how they compare to similar clinics in terms of geography and size. The best performing clinics receive a set of incentives.

1.3 Prospera Digital implementing partners

PD is being implemented with the collaboration of diverse Mexican federal government agencies: the Office of the President of Mexico, the Ministry of Health, the Prospera Social Inclusion Program; as well as the United Nations Children's Fund (UNICEF), Behavioral Insights Team (BIT), the Autonomous Mexican Institute of Technology (ITAM), the University of Chicago, *Qué Funciona para el Desarrollo* (QFD), BabyCenter, *Instituto de Investigaciones para el Desarrollo con Equidad* (EQUIDE), Ideas42, the MIT Media Lab and mobile phone operators.

2. Actions, progress and results (January 2016 - April 2017)

With the support from the United States Fund for UNICEF and Johnson & Johnson, UNICEF Mexico financed the implementation of Prospera Digital's RCT pilot for one year. A qualitative assessment of the intervention was undertaken through random interviews and focus groups with beneficiaries, as well as the extension of the original content of the intervention--which considered pregnancy, puerperium and the first 40 days of the newborn--to provide health information for disadvantaged mothers with children up to 2 years old. BabyCenter's involvement in the project, as an implementing partner, has been critical for content development, to exchange experiences of maternal mHealth deployments, as well as to discuss the most appropriate mechanisms to achieve behavioral change through an mHealth intervention.

2.1 Prospera Digital RCT deployment

Prospera Digital was rolled out in the **326 clinics** that comprise the treatment groups through two rounds of enrollment workshops held at each clinic. UNICEF's implementing partner, *Qué Funciona para el Desarrollo* (QFD), coordinated the execution of **578 workshops** (from 625 originally planned) to enroll pregnant women beneficiaries of Prospera into the PD intervention. A total of **2,965 pregnant women Prospera beneficiaries** and **351 local health promoters** (*vocales Prospera*) attended the workshops and were enrolled in the intervention.

Since the intervention consists of sending personalized SMS messages to Prospera beneficiaries, participants need to have a cell phone to enroll in the program. Consequently, in order to avoid excluding pregnant women without a cell phone (which would tamper the random selection in the experiment), QFD handed out **1,167 basic feature mobile phones** to women, who declared they did not own a cellphone (35% of the women who participated in the workshops), while **2,149 pregnant women used their own cellphones** (65% of the workshop participants, including PD beneficiaries and local health promoters).

Table 1. General results from PD deployment

State	Clinics in the sample	Scheduled workshops	Implemented workshops	Prospera beneficiaries enrolled on PD	Local health promoters enrolled on PD	Received cell phone	Used own cell phone*
Chiapas	64	128	115 (90%)	968	85	419 (40%)	634 (60%)
Guanajuato	51	102	97 (95%)	425	66	158 (32%)	333 (68%)
Hidalgo	37	74	63 (85%)	167	27	110 (57%)	84 (43%)
Estado de México	113	226	198 (88%)	874	142	326 (32%)	690 (68%)
Puebla	61	122	105 (86%)	531	31	154 (27%)	408 (73%)
Total	326	652	578 (89%)	2,965	351	1,167 (35%)	2,149 (65%)

*Includes PD beneficiaries and local health promoters participating in the program.

Source: *Qué Funciona para el Desarrollo*, March 2017.

To implement these enrollment workshops, QFD trained **200 Prospera liaison workers** for ten sessions--so each liaison could conduct the workshops in the clinics assigned by Prospera. QFD was in charge of preparing the training guides, protocols, materials and documentation required to conduct the workshop and enroll Prospera beneficiaries in the PD intervention.

Table 1 shows that Guanajuato was the state with the highest implementation rate (95%), followed by Chiapas (90%), Estado de México (88%), Puebla and Hidalgo (85%). Healthcare personnel strikes in Chiapas, the absence of pregnant women in some clinics in Estado de

México, and scheduling problems with the local health authority in Puebla were some of the reasons for the lower rates of implementation in these states.

Table 1 also shows that **351 local health promoters were enrolled in Prospera Digital**. However, the participation from these community members was not as expected: 23% of PD beneficiaries in Treatment 2 (T2) do not have yet a local health promoter assigned by Prospera, which limits the possibility of T2 having a differentiated impact from the community participation component.⁶



© QFD / Adriana Paz. Prospera beneficiaries in Chiapas attend an enrollment workshop in the Comitán health jurisdiction.

⁶ 26 health clinics (out of the 111) in T2 do not have a vocal or local health promoter interacting with Prospera Digital beneficiaries: In 73% of the cases (19 clinics) there is at least one vocal registered in PD, however none of them is actively interacting with beneficiaries through PD. While in 27% of the cases no vocal showed up to the enrollment workshops.

2.2 What do we know from Prospera Digital beneficiaries?

The Office of the President and QFD designed three data collection formats to obtain relevant information from the beneficiaries during program implementation:

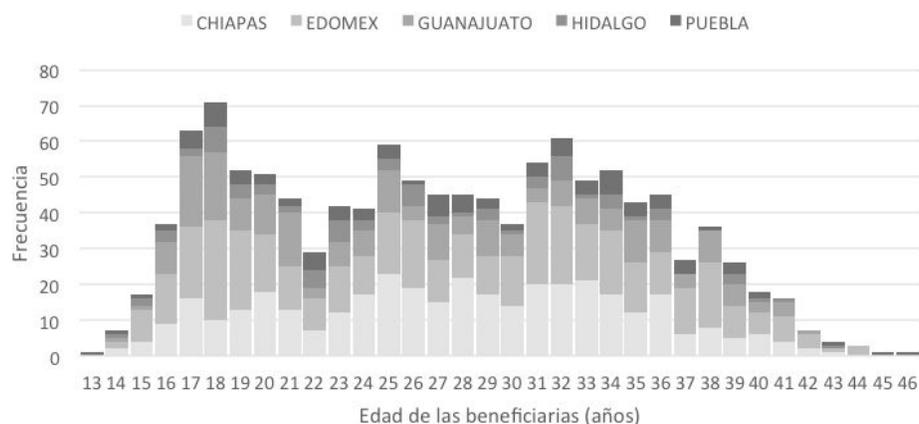
- PD1 formats collect information about identity, Prospera affiliation, cell phone ownership and usage, pregnancy situation (gestational age, due date, risk status, complications, previous prenatal care checkups, and previous pregnancies, among others), next appointment and workshop dates.
- PD2 formats collect information about identity, cell phone ownership and usage, as well as an informed consent to participate in Prospera Digital.
- PD4 formats only apply to beneficiaries in treatment 2, as they are the mock contracts that beneficiaries sign with Prospera vocales to commit to take their nutritional supplements, attend their prenatal care appointments or answer to all PD messages.

QFD has been in charge of collecting these formats, however there have been important delays to get them back from the clinics. For instance, only 49% of all PD1 formats--which are filled by health care workers in the clinics previous to the workshops--have been recovered so far.⁷ This is important because any characterization of Prospera Digital beneficiaries presented for this progress report has been created with the available data (to complement this analysis we will need to recover the remainder 51% of PD1 formats, which is still a work in progress).

2.2.1 Age

The age range of Prospera Digital beneficiaries is 13 to 46 years old, with an average age of 27 years: 11% of the women are under 18 years old, 66% between 18 and 33 years old, 23% between 34 and 43 years old, and less than 0.4% has more than 44 years old.

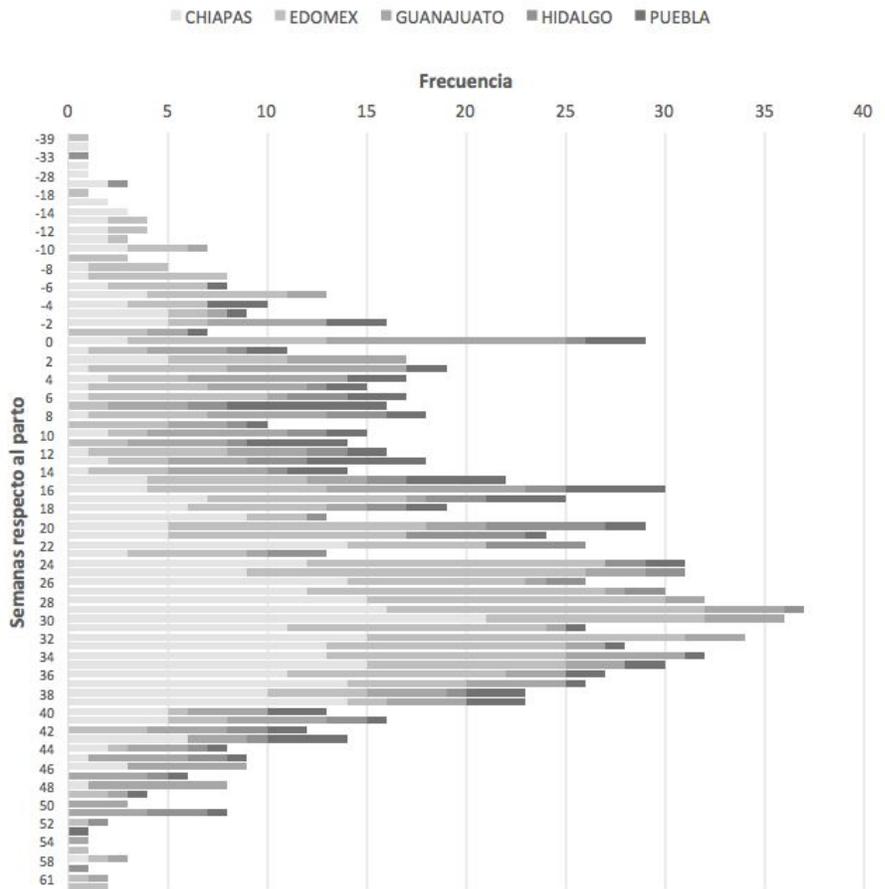
Graph 1. Age of Prospera Digital Beneficiaries



⁷ 80% of PD2 formats and 78% of PD4 formats (both of them filled by the Prospera liaison when they enroll beneficiaries during the workshop) have been recovered so far.

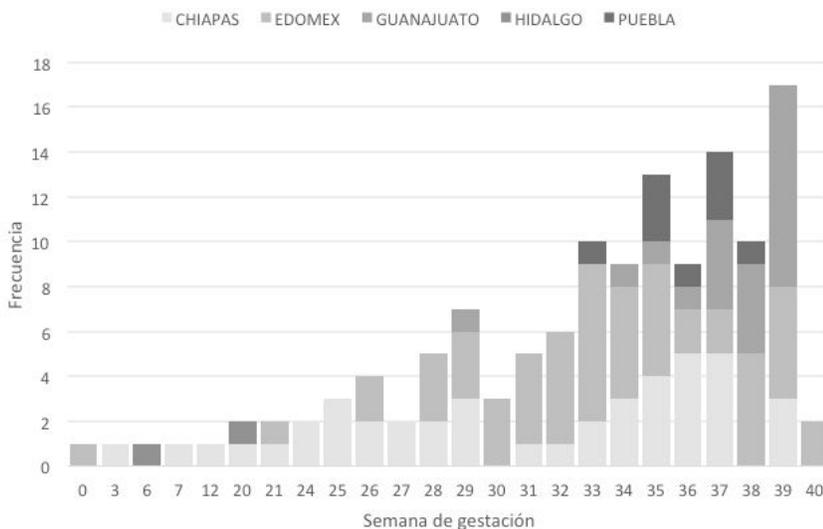
2.2.2 Gestational age and baby's age

Graph 2. PD beneficiaries age distribution around due date week



The average Prospera Digital beneficiary is around the **21st week after her due date**. 9.63% of Prospera Digital beneficiaries are still pregnant, while the great majority (90.37%) have already gave birth.

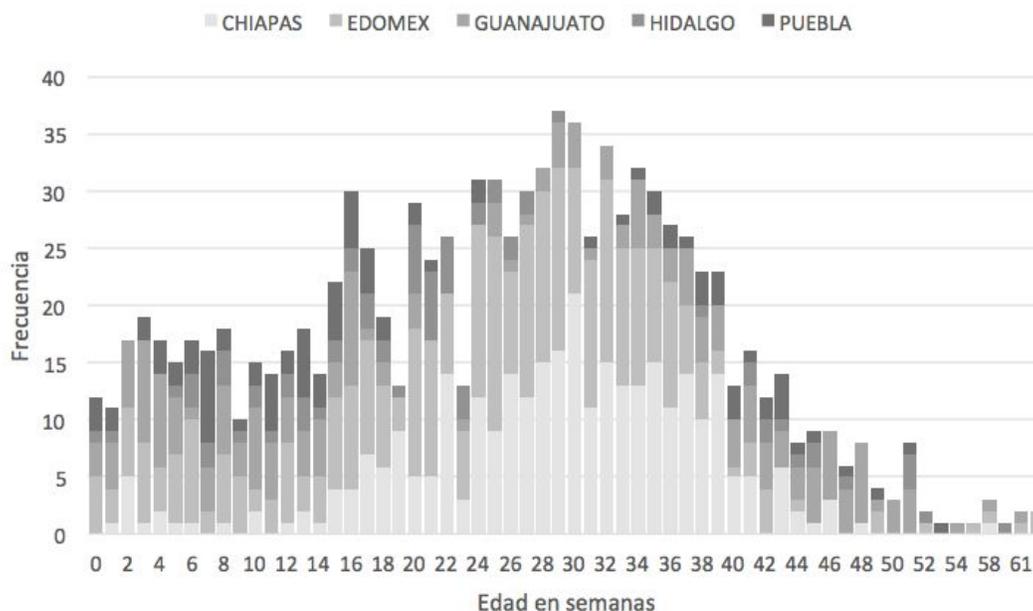
Graph 3. PD pregnant beneficiaries gestational age in weeks



For the Prospera Digital beneficiaries who are still pregnant, the **average gestational age is 32 weeks**: 3.85% of pregnant women are in the first trimester, 26.92% in the second, and 69.23% in the third.

In terms of the babies' age, among Prospera Digital beneficiaries, the average is 25 weeks: 17.62% of the babies are less than 3 months, 24.25% are between 3 and 6 months, 56.86% are between 6 and 12 months, and only 1.27% are older than 1 year. This information is especially relevant for Prospera Digital content development, as UNICEF, QFD and BabyCenter have already produced and validated with the Mexican Ministry of Health the messages for babies 0 to 1 year old. However, the partners involved in the project are still working in the messages for babies older than 1 year.

Graph 4. PD Babies age in weeks



2.2.3 Previous pregnancies

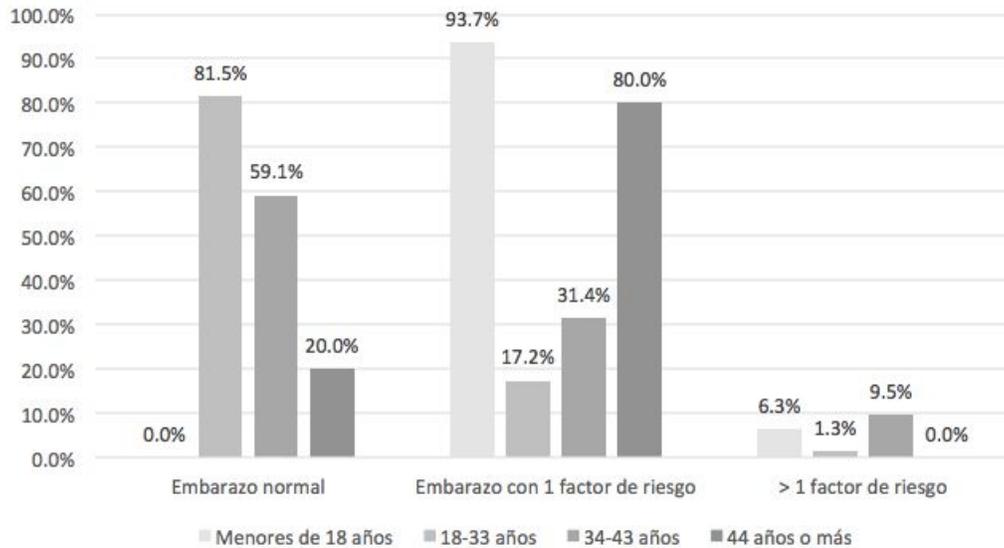
On average, PD beneficiaries have been pregnant two times prior to their current pregnancy. For 21.3% of beneficiaries it is their first pregnancy, while for 13.1% this is their sixth time or higher. This analysis provides useful insights for UNICEF's child protection work in disadvantaged rural communities, where **25% of PD teenage women have already been pregnant once before their current pregnancy.**

2.2.4 Risk factors

29.7% (363) of PD beneficiaries present a risk factor during their current pregnancy, while 65% (794) have a normal pregnancy. The **leading cause for a women to have a risk factor during pregnancy is her age (61%), followed by multi gestation (12.5%), and not observing the intergenesic period 4.6%**--the recommended interval between a pregnancy and the next one. Women between 18 and 33 years old are the age group who has the lowest prevalence of a risk

factor during pregnancy: 81.5% (630) do not present a risk factor. PD beneficiaries with the highest risk prevalence are women between 34 to 43 years: 80% have one risk factor while 9.5% of them have more than one risk factor. Graph 5 shows that **93.7% of teenage pregnancies** among Prospera Digital beneficiaries present at least one risk factor.

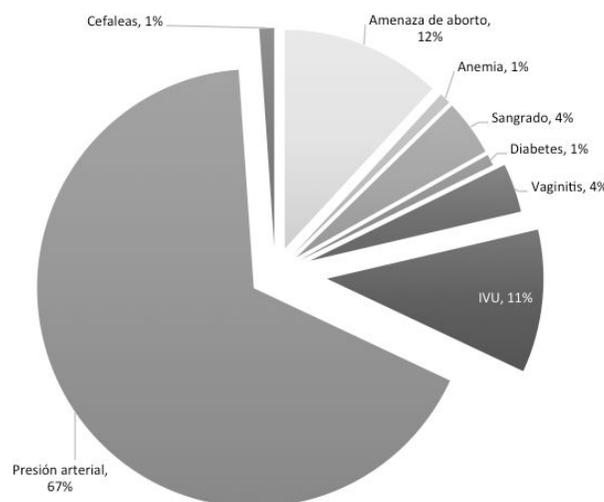
Graph 5. Risk factor in pregnancy by age group



2.2.5 Complications during pregnancy

Based on health care facilities' administrative records, 18.8% of PD beneficiaries presented a complication during their current pregnancy: 67% (241 women) presented a complication related to their blood pressure, 12% (43) suffered miscarriage symptoms, and 11% (38) presented urinary tract infections.

Graph 6. Complications during pregnancy for PD beneficiaries



2.3 Meet Beatriz⁸



Age: 29 years

From: Estado de México, México

Lives in: A house in the top of a hill at San Pedro Chiautzingo, a rural community with 2,636 inhabitants.

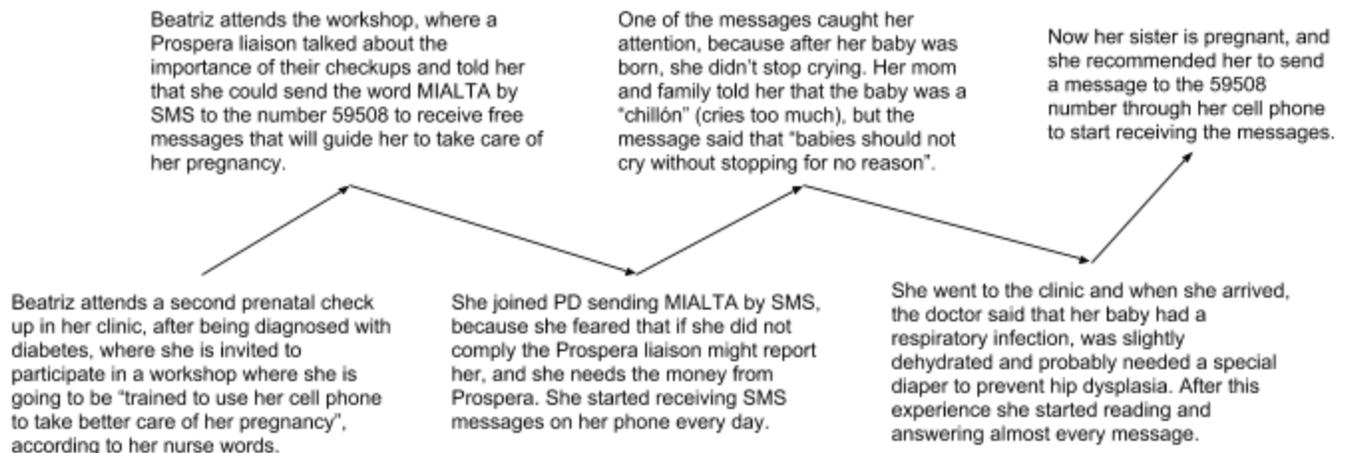
Language: Spanish

Interests: She studied up to secondary school and would like to study more, she used to work in a convenience store on the side of the road from Tepetlaoxtoc to San Pedro.

Attitude + beliefs: Beatriz believes medical checkups are useless, she rarely attended a checkup before her pregnancy because she had to walk more than 7km from her home to the center of San Pedro, and she considered the trip back home to be exhausting as it was uphill. Besides, she has other things to take care of at home.

Health challenges: Beatriz is pregnant for the first time and she did not attend a medical check up until the second trimester, when the doctor diagnosed her with gestational diabetes.

Beatriz's Journey



⁸ The information for this persona card was obtained through an interview that the Reforma newspaper did to a randomly selected Prospera Digital beneficiary in December, 2016. You can watch the video blog here: <http://www.reforma.com/libre/players/mplayer.aspx?idm=60429&te=100&ap=1> and the newspaper entry here: <http://www.reforma.com/aplicacioneslibre/articulo/default.aspx?id=996449&md5=18f22da3c4e8fd69f076b994f976cd84&ta=0dfdbac11765226904c16cb9ad1b2efe>

2.4 Beneficiaries interactions with Prospera Digital

Since the launch of Prospera Digital in December, 2015, the program sent 710,765 messages to its beneficiaries through RapidPro: 41% of the messages provided information on babies' health and development (295,262 messages); 33% give information for pregnant women (236,172 messages); and 26% (179,331 messages) are related to the assessment of health services (for treatment 3), administrative information, and trial flows used during the workshops to train beneficiaries on the use of RapidPro. 64% of all sent messages are two-way (which require an answer from the beneficiary), while 36% are one-way informational messages.

2.4.1 Active users and response rates analysis

If we define **active users** as all beneficiaries who have **sent replies in the current month**, then **80%** of the pregnant women enrolled in the activation workshops are actively using Prospera Digital. We can also define **response rate** as the **total number of responses sent by beneficiaries, divided by the total number of two-way messages that required an answer from the user**. According to this definition, there is an **average response rate of 40%** for all the duration of the program among Prospera Digital beneficiaries.

Table 2. Active PD beneficiaries and overall response rates

State	Beneficiaries enrolled in PD through workshops	Beneficiaries who sent MIALTA to 59508 and enrolled to PD by themselves	Active beneficiaries in PD*	Overall response rate**
Chiapas	968	489 (51%)	562 (84%)	38%
Guanajuato	425	218 (51%)	263 (83%)	42%
Hidalgo	167	76 (46%)	98 (88%)	42%
Estado de México	874	396 (45%)	446 (73%)	37%
Puebla	531	175 (32%)	207 (76%)	36%
To be defined***		680	820 (78%)	40%
Total	2,965	2,034 (68%)	2,396 (79%)	40%

*Beneficiaries who have sent at least one message in the current month.

**Total number of responses sent by beneficiaries divided by the total number of two-way messages that required an answer from the user

***Beneficiaries interacting with Prospera Digital for whom we currently do not have administrative records (PD1 formats).

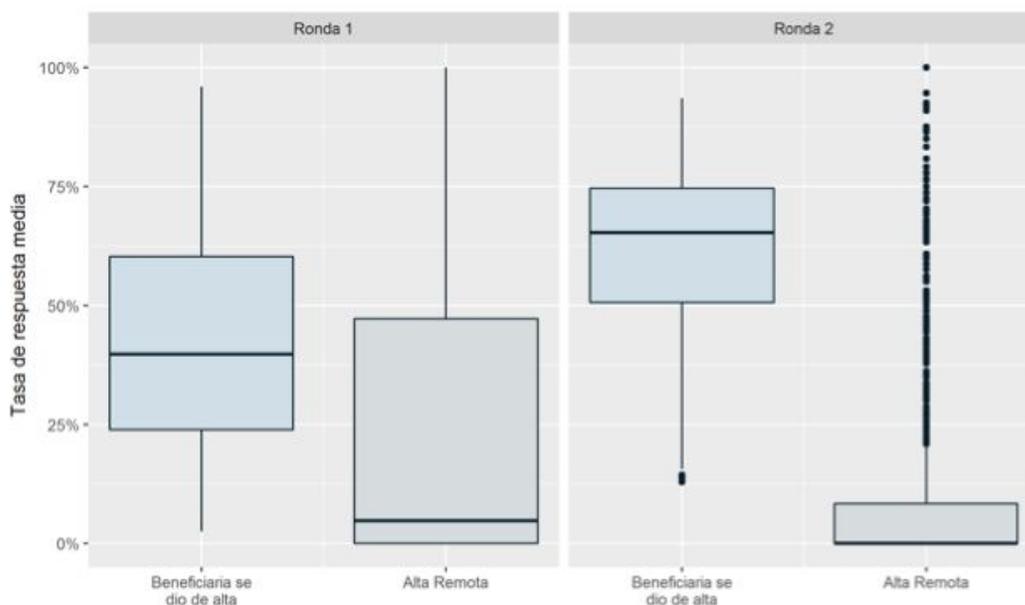
Table 2 and 3 show that 68% (2,034) of Prospera Digital beneficiaries were able to enroll themselves in the program (by sending an SMS with the word “MIALTA” to the short code 59508), while the remaining 32% (996) could not enroll by themselves during the workshop (Prospera liaisons collected their information and they were “remotely enrolled” through providing their data to RapidPro). Women who could not complete the enrollment during the workshop are usually the ones with lower digital skills, whose cell phones were not working properly during the workshop, or did not have proper signal coverage.

Table 3. Distribution of beneficiaries by type of enrollment in Prospera Digital

Workshop round	Self-enrolled beneficiaries	Remotely-enrolled beneficiaries	Total number of beneficiaries enrolled in PD per round
Round 1	1,064 (80%)	262 (20%)	1,326 (44%)
Round 2	970 (56%)	734 (44%)	1,704 (56%)
Total	2,034 (68%)	996 (32%)	3,030

The difference between “self-enrollment” and “remote-enrollment” is crucial to understand the variations in response rates among PD beneficiaries: the average response rate among self-enrolled beneficiaries is 51%, while it is only 14% among remotely-enrolled beneficiaries. Graph 7 shows that this situation is even more stark if we consider the difference in the beneficiaries’ rates of response by the round they enrolled: the rate of response among “self-enrolled” beneficiaries in round 2 is 61% versus 11% for “remotely-enrolled” beneficiaries.

Graph 7. Differences in response rates by type of enrollment (round 1 and 2)



This insight is particularly relevant for UNICEF and government partners involved in the project scale-up, as workshops need to emphasize the sense of ownership of the technology and program content. If beneficiaries perceive Prospera Digital as an imposed product, an initiative for which they did not consciously decide to opt-in, their participation rate in the program could diminish. Workshops require an adjustment to provide the less tech-savvy prospective beneficiaries with the tools they need to fully participate in the intervention.

2.4.2 Use of Prospera Digital special features (triggers)

Beneficiaries can activate specific functions of Prospera Digital by sending a keyword trigger by an SMS message to the short code 59508. They can report whatever they perceive could be an emergency by sending “**MIALERTA**”, change the date of their next medical appointment by sending “**MICITA**”, or cancel the Prospera Digital messaging service by sending “**ALTOPD**”.

The most used functionality among beneficiaries is “**MIALERTA**” used to report an emergency; 197 beneficiaries have used this feature in 297 times, where they have been instantly referred to the Linea Materna hotline to be attended by a Ministry of Health’s specialist.

Table 4. Use of Prospera Digital’s special functions

State	MIALERTA	MICITA	ALTOPD
Chiapas	48 trigger activations (34 beneficiaries)	3 (3)	10 (5)
Guanajuato	58 (26)	6 (2)	42 (10)
Hidalgo	20 (15)	4 (2)	6 (3)
Estado de México	50 (37)	2 (2)	8 (6)
Puebla	21 (17)	0 (0)	3 (3)
To be defined*	100 (68)	25 (8)	46 (30)
Total	297 (197)	40 (16)	115 (57)

* Beneficiaries interacting with Prospera Digital for whom we currently do not have administrative records (PD1 formats).

2.4.3 Differences in response rates to pregnancy and babies' messages

Response rates among beneficiaries during their pregnancy is **18 percentage points** higher than among beneficiaries that already gave birth to their babies. This difference is statistically significant and persists even after controlling by time elapsed (measured as the number of weeks after the due date). Time elapsed has an effect in reducing beneficiaries' rates of response, which could be interpreted as being "tired of receiving PD messages". Even after controlling by time elapsed, the rate of response to pregnancy messages is still 14 percentage points higher in comparison to an infant and child care messages.

2.5 Qualitative analysis results

The United States Fund for UNICEF and Johnson & Johnson grant has allowed UNICEF Mexico to finance a qualitative assessment of the Prospera Digital intervention in terms of its usage by beneficiaries, knowledge acquired, and trust in the messages' content. The qualitative evaluation has been accomplished by the Iberoamerican University's EQUIDE team.⁹

2.5.1 Platform usage

In terms of frequency and type of messages, Prospera Digital beneficiaries have expressed that they prefer more messages than fewer; as well as a combination of one-way (informative) messages with two-way messages that ask for specific input from them. Beneficiaries recognized that they prefer to have a pre-established and predictable pattern for message timing, so they can expect to have, for example, one one-way message every afternoon and one two-way message every evening. This insight has led the implementing partners involved in PD to readjust the pattern and timing of messages accordingly.

Beneficiaries recognized the value of PD's messages, they believe the information is clear and expressed in an easy-to-understand language. Women have recognized that the messages are very well-timed according to the stage of their pregnancy or the age of their babies, and that

⁹ For the qualitative evaluation of Prospera Digital, the EQUIDE team collected information from direct observations during enrollment workshops in 28 health clinics in the states of Hidalgo, Puebla, Guanajuato, Estado de México, and Chiapas; un-structured individual interviews with 39 Prospera Digital beneficiaries and 37 health care workers (doctors and nurses); as well as focus groups in six clinics of three states (Puebla, Guanajuato and Chiapas) with the participation of 32 beneficiaries. Then, with the objective to assess the usage of PD, EQUIDE conducted 36 phone call interviews with beneficiaries in the 5 states where PD is deployed, as well as focus groups in Puebla, Guanajuato and Chiapas. In all these cases, the samples cover all the three PD treatment arms.

messages are useful to solve different situations and anticipate the changes that pregnancy and a baby entails.

The preferred issues among beneficiaries in the focus groups were nutrition, childhood development and breastfeeding, and they view positively that the project was extended to cover contents for children up to 2 years old.

In terms of interaction with the platform, beneficiaries have pointed out that sometimes the service is unavailable with one of the mobile networks, so they were unable to answer questions and keep receiving a “Without service” message. As a consequence, the implementing partners in PD have been working with that specific mobile network operator to minimize the unavailability of the SMS service.

2.5.2 Knowledge assessment

Most of PD beneficiaries during the focus groups and interviews expressed that the messages helped them to learn the signs of alert during pregnancy, and when they noticed one of them, they went to the clinic.

Beneficiaries also recognized that the messages have brought learnings not only on health issues, but also in thinking ahead to define a financial plan to cover different expenses for the due date: transportation, hospitalization, among others.

Women who have been participating in PD mentioned that the project is changing the way in which they make decisions related to what do they eat during their pregnancy, or how to stimulate and interact with their baby.

“There was learning for both first time mothers and experienced mothers. First time mothers appreciated the information because there are many things they ignore, while experienced mothers appreciated the reminder”.

Breastfeeding and nutrition were the most attractive issues among people in the focus groups, but the messages related to childhood development are among the most remembered and appreciated by mothers.

2.5.3 Trust in message's content and socio-emotional discoveries

PD beneficiaries have expressed that the messages have become a close source for reliable information. Even if their mothers, mothers-in-law, and health providers are still the main source of information during pregnancy and baby's development stages, Prospera Digital has positioned itself as a more reliable source of information than that provided by the family.

One of the main findings of the qualitative assessment is that the beneficiaries are not only satisfied with the information received, but they have established an emotional link with the program. They describe certain moments of interaction with the platform as if they were talking with another person: "my phone was angry with me", "she is caring", "she is concerned with my health and my baby's health".

Among the most remembered messages, the beneficiaries mentioned the congratulations message that they received from PD when their baby was born: "PD was the first one to congratulate me when my baby was born". These findings motivated QFD, EQUIDE, the Office of the President, BabyCenter, and UNICEF to design and implement a socio-emotional sub-trial to assess the effect of this component for behavioral change.

2.6 Socio-emotional sub-trial preliminary findings

In order to test the impact of socio-emotional content for engagement, knowledge, behavioral change and response rates among PD beneficiaries. QFD, in coordination with BabyCenter, UNICEF and the Office of the President, designed a sub-trial within the original RCT: 400 PD beneficiaries from T1 were randomly assigned to a control group and 400 more were assigned to the socio-emotional treatment group.

Beneficiaries in the control group are receiving messages that have been modified to provide information without any kind of socio-emotional language or connection. While beneficiaries in the treatment group are receiving messages with a very charged content of emotional support (for instance, saying their name and the name of their babies, praising mothers for their hard work, among others).

QFD ran a preliminary econometric analysis¹⁰ and found out that comparing the response rates of women in the original trial with the rate of response of women in the control and treatment

¹⁰ OLS with a cluster standard errors at the beneficiary level using a panel database.

groups of the socio-emotional trial, there is a **positive and statistically significant relationship between socio-emotional content and rates of response**. There is a **difference of 10 to 11 percentage points** between the socio-emotional trial treatment group and control group, in comparison to the original trial's difference between treatment and control groups.¹¹

3. Resources and financial implementation

Table 5. Total approved budget according to project work plan 2016-2017

AWP UNICEF-QFD 2016	Approved budget per quarter				Total
	Q1	Q2	Q3	Q4	
Develop one-way and two-way SMS messages with contents for maternal health care during postpartum and for children up to 2 years	\$22,349.19	\$10,682.52	\$4,899.38	\$-	\$37,931.09
Impact evaluation for the Prospera Digital intervention (pregnancy, puerperium and 40 days of newborn)	\$19,933.11	\$15,085.56	\$15,049.31	\$18,206.96	\$68,274.93
Impact evaluation for the Prospera Digital intervention (newborns and children first two years of life)	\$11,596.21	\$19,395.23	\$19,640.15	\$15,384.43	\$66,016.03
Sub-total	\$53,878.51	\$45,163.31	\$39,588.84	\$33,591.39	\$172,222.05
Overhead (7%)	\$4,055.37	\$3,399.39	\$2,979.81	\$2,528.38	\$12,962.95
Total	\$57,933.88	\$48,562.70	\$42,568.65	\$36,119.77	\$185,185.00

Source: AWP UNICEF-QFD 2016

¹¹ This model is already controlling for time elapsed (measured by number of weeks from due date) and a dichotomic variable for pregnancy, which clears out the possibility that this effect is generated by the fact that these women are at the first stages of the program (where response rates tend to be higher).

Table 6. Financial implementation

Expenses	Reporting period 2016-2017			
	Payment 1/4	Payment 2/4	Payment 3/4	Total
Develop one-way and two-way SMS messages with contents for maternal health care during postpartum and for children up to 2 years	\$21,583.48	\$10,759.69	\$5,366.03	\$37,709.20
Impact evaluation for the Prospera Digital intervention (pregnancy, puerperium and 40 days of newborn)	\$19,383.22	\$14,769.27	\$14,608.91	\$48,761.40
Impact evaluation for the Prospera Digital intervention (newborns and children first two years of life)	\$11,791.37	\$18,693.82	\$18,789.48	\$49,274.67
Total	\$52,758.07	\$44,222.78	\$38,764.42	\$135,745.27

Source: Fund Monitoring by Grant SC 150719 and Funding Authorization and Certificate of Expenditure (FACE) formats. As of 31 Mar 2017.

4. Future plans

UNICEF, the Office of the President and QFD are currently working in the definition of the outcome and impact indicators that will help to assess the effect of the intervention in maternal and children's health outcomes. QFD is currently collecting the missing PD1 formats with the administrative information from 51% of Prospera Digital's beneficiaries.

The parties involved in the evaluation of the program are designing RapidPro questionnaires and quizzes, to assess the level of knowledge of Prospera beneficiaries who have already received messages related to a specific issue (i.e. exclusive breastfeeding, ECD, nutrition) vis-a-vis Prospera beneficiaries who have not yet received messages about the issue that is being assessed. This will allow to implement a quasi-experimental analysis, through a regression discontinuity, which will help to provide an assessment of the effects of the messages on beneficiaries' knowledge.

The partners involved in the evaluation of PD are also planning the implementation of a biometric household survey among the treatment and control groups of the intervention, in order

to be able to track more precisely changes in outcome indicators such as height and weight of children.

UNICEF, QFD and BabyCenter are also working on the design of a trial to test the use of Facebook Messenger as a channel for Prospera Digital. An analysis will be made to see if the FB Messenger could work as a more effective communication channel compared to SMS for this population (to reduce the scale-up costs of the project), in terms of engagement and knowledge by using links and images. At a later stage, this trial will delve into using machine learning techniques in order to prioritize the content that users consider more valuable.

Finally, the Mexican Government has expressed interest to scale up the project for people who obtain health care services at the hospitals and clinics managed by the Ministry of Health, which attend to more than 1 million pregnancies every year. UNICEF and partners will be working with the government on a plan to scale up Prospera Digital.

Expression of thanks

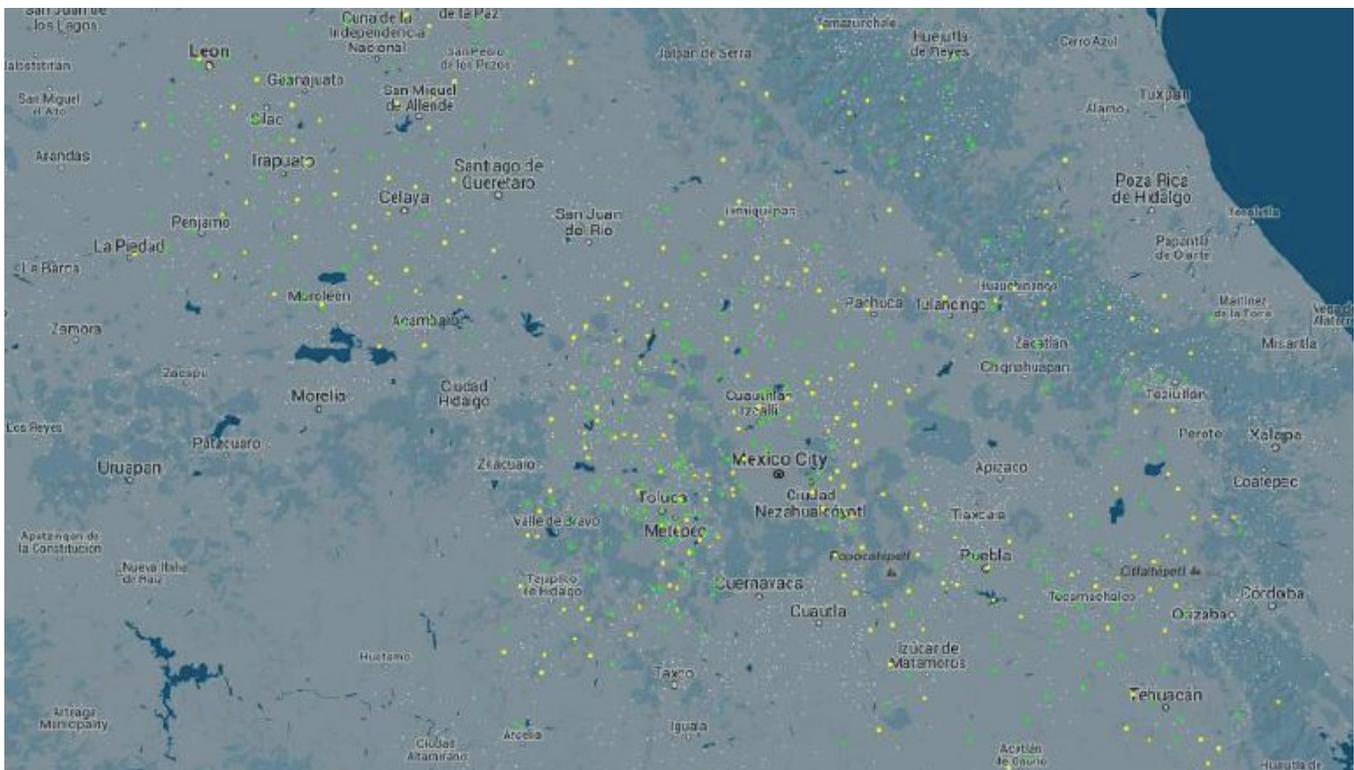
UNICEF Mexico acknowledges the crucial leadership role that the National Digital Strategy Office (CEDN) from the President's Office has played throughout the implementation of PD. CEDN's participation was pivotal to achieve favorable negotiations with mobile network operators, which opened opportunities of collaboration with national and subnational health authorities, among others.

UNICEF also wants to acknowledge the professional work of *Qué Funciona para el Desarrollo (QFD)*, our implementing partner for Prospera Digital. QFD is a vital partner in the implementation of the intervention, training of Prospera liaisons, designing randomized controlled trials, coding in RapidPro, among others.

Finally, UNICEF Mexico gives a special appreciation to the United States Fund for UNICEF and Johnson & Johnson, who believed in the potential of mHealth interventions to improve the lives of thousands of children from the moment they are born. UNICEF is also grateful to BabyCenter's involvement and participation in the initiative; their experience in generating content to produce behavioral change in millions of mothers worldwide has been an invaluable resource for Prospera Digital.

Annex 1. Geographic Coverage of Prospera Digital

Map 1: Spatial distribution of Prospera Digital clinics in Estado de México, Guanajuato, Hidalgo and Puebla

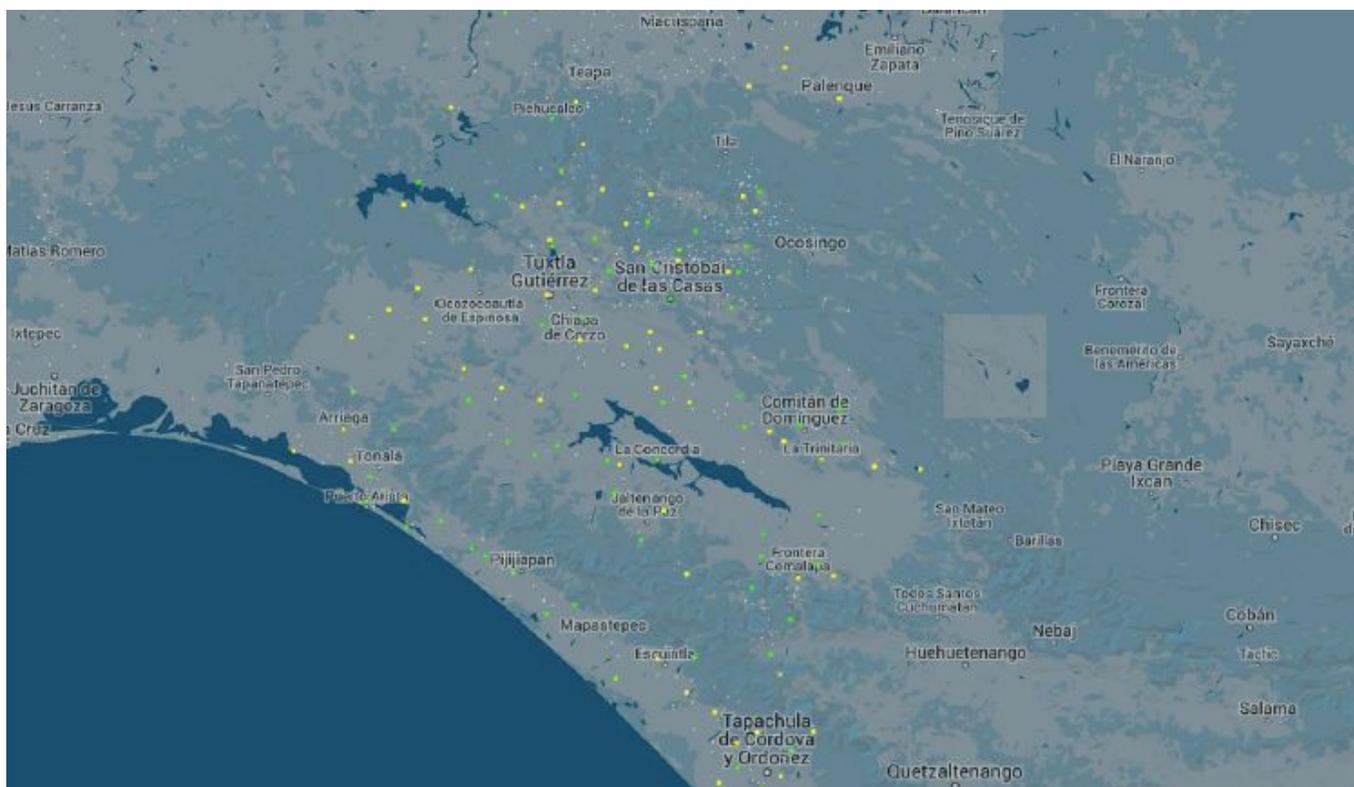


Green: Control

Yellow: Treatment

Source: *Qué Funciona para el Desarrollo*, 2016.

Map 2: Spatial distribution of Prospera Digital clinics in Chiapas



Green: Control

Yellow: Treatment

Source: *Qué Funciona para el Desarrollo*, 2016.

Annex 2. Sample Balance

Table A1 shows that there are no statistically significant differences among the control and treatment groups for variables of interest such as the social lag index, percentage of children 6 to 11 years out of school, illiteracy, indigenous language, cell phone possession or average size of a baby. This means that the sample is balanced and that any result from Prospera Digital in health outcomes can be assumed to be caused by the intervention.

Table A1: Sample Balance

VARIABLE	Kolmogorov Smirnov p-Value	$\mu(\text{Control})$	$\mu(T1)$	$\mu(T2)$	$\mu(T3)$	F-test p-Value
Índice Rezago Social	0.99	-0.57	-0.56	-0.57	-0.57	0.99
Prop 6-11 sin escuela (%)	0.23	0.03	0.03	0.03	0.03	0.99
Prop Analfabetismo 15+ (%)	0.94	0.13	0.14	0.13	0.13	0.93
Lengua Indígena Censo 2010 (%)	0.75	0.1	0.1	0.12	0.08	0.64
Prop Fem. Prospera 10-64 (%)	0.3	0.41	0.41	0.41	0.41	0.21
Hogares con celular (%)	0.35	0.42	0.38	0.42	0.43	0.39
Tamaño promedio bebé (mm)	0.81	49.83	49.79	49.99	49.76	0.56
Crímenes exp. p.cápita	0.52	0.07	0.06	0.07	0.07	0.39
Número de clínicas		329	107	111	108	

Source: *Qué Funciona para el Desarrollo*, 2017.