



Swiss TPH

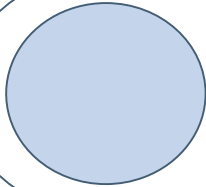


Household-Level Interventions to Improve Child Development

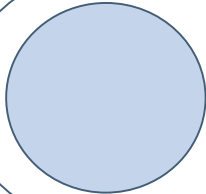
Stella M. Hartinger

29, June 2021

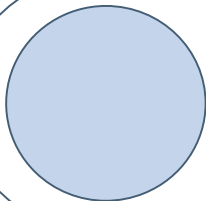
What are we talking about today



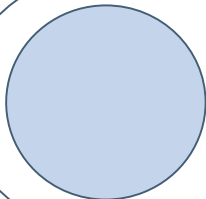
Swiss Peruvian Research Platform



**Integrating home-based environmental interventions (IHIP-1):
A community-randomised trial to improve indoor air and
drinking water quality and child nutrition**



**ECD in an integrated home-based environmental health
programme in rural Andean homes: IHIP-2**



**Digital Support Systems to Improve Child Health and
Development in Low Income Settings**

Swiss-Peruvian Research Platform



Promote and foster joint projects to strengthen research capability in Infectious diseases, NCDs, **ECD**, environmental public health, epidemiology, Health systems and Policy analysis

Strengthen collaboration in the field of **teaching and training** related to the joint research project

Promote **staff and student exchange** between UPCH and Swiss TPH

Strengthening local **research capacities**, MSc and PhD programmes.



Areas of Research

- **Integrated Household-based Approaches**
- Livelihoods and HH economics
- Household Behaviour
- Environmental Exposures
- Household Air Pollution
- WASH, Nutrition
- Farm-to-Fork, One Health, AMR
- MNCH, m-Health & Access to Care
- Adaptation to Climate Change
- **Early Child Development**
- NCDs



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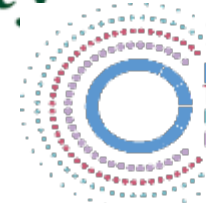
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LANCET COUNTDOWN:
TRACKING PROGRESS
ON HEALTH AND
CLIMATE CHANGE



Swiss TPH



Integrating home-based environmental interventions (IHIP): A community-randomised trial to improve indoor air and drinking water quality and child nutrition in rural Peru.



Health and developmental risks in low- and middle-income countries and rural Andean Peru



Household Air Pollution (HAP) is the main risk factor of acute respiratory infections (ARI) and affects cognitive development in children.

Exposure to unsafe **drinking water**, **sanitation and inadequate personal hygiene (WASH)** increases the risk of diarrhoea and malnutrition.

Early child development (ECD) is one of the main social determinants of health. Cognitive disparities has lifetime adverse consequences.

IHIP-Trial: Selected Interventions



IHIP health impact / Pediatric oxygen saturation



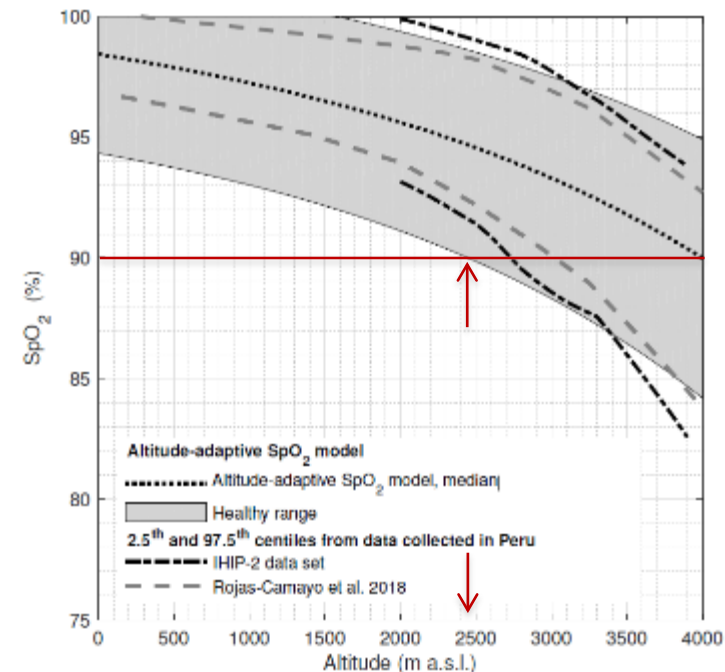
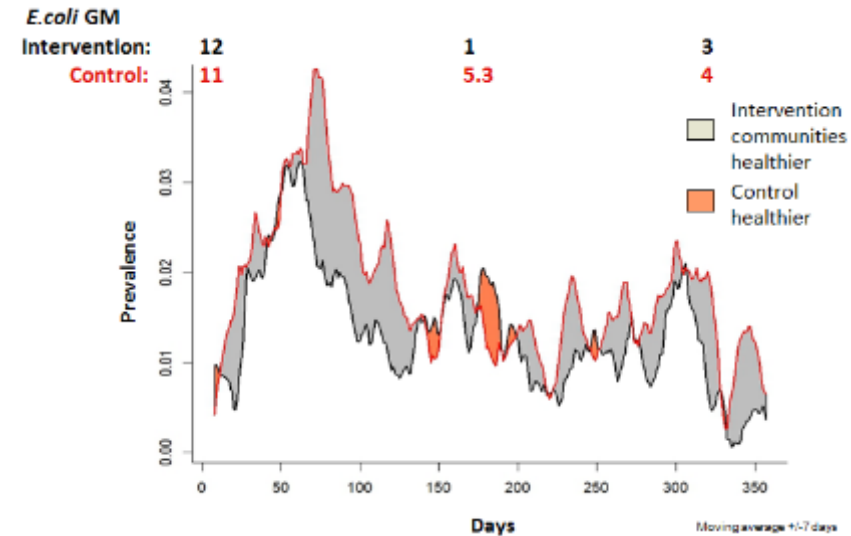
Improving household air, drinking-water and hygiene in rural Peru: A community randomised controlled trial of an integrated environmental home-based intervention package to improve child health.

S.M. Hartinger, C.F. Lanata, J. Hattendorf, H.Verastegui, A.I. Gil, D. Mäusezahl
Int.J.Epidemiology 2016, 1–11

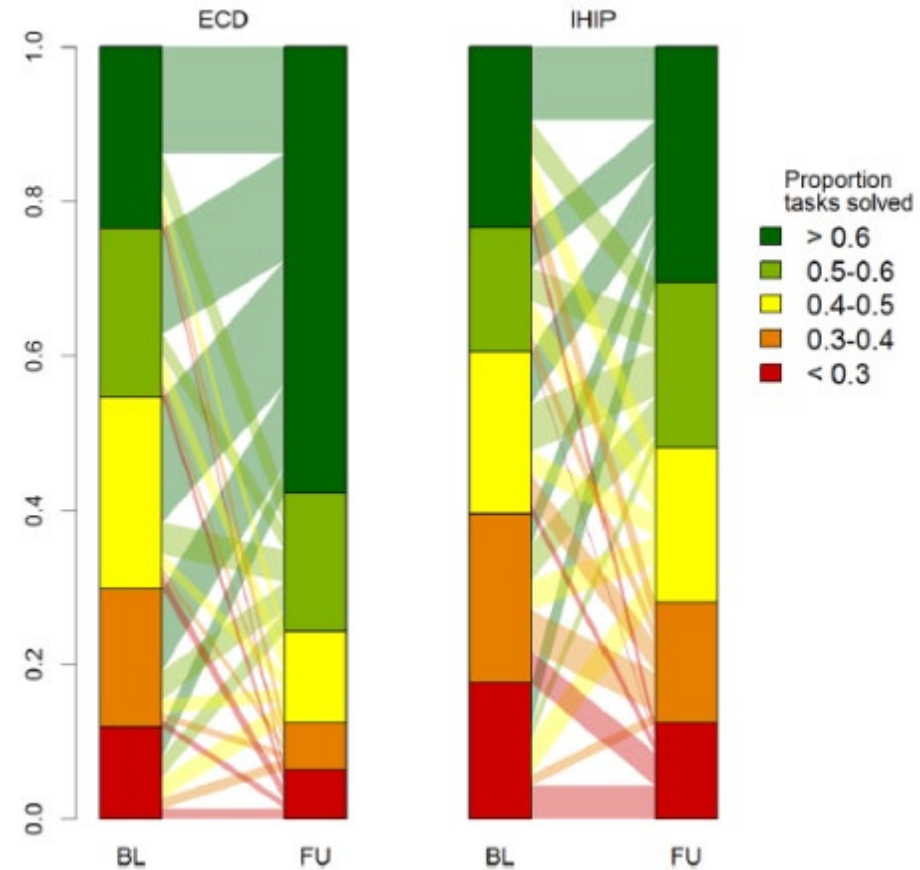


Physiologically driven, altitude-adaptive model for the interpretation of pediatric oxygen saturation at altitudes above 2000 m a.s.l.

Monica Moreo, Laura Tüshaus, Jia Zhang, Stella Maria Hartinger, Daniel Mäusezahl, Walter Karlen
doi: <https://doi.org/10.1101/334482> 2019, *Journal of Applied Physiology* (in press)



Early child development / WawaWasi



Impact of a child stimulation intervention on early child development in rural Peru: a cluster randomised trial using a reciprocal control design

Stella Maria Hartinger,^{1,2,3,4} Claudio Franco Lanata,³ Jan Hattendorf,^{1,2} Jennyfer Wolf,^{1,2} Ana Isabel Gil,³ Mariela Ortiz Obando,⁵ Magaly Nobrega,⁶ Hector Verastegui,^{3,4} Daniel Mäusezahl^{1,2}

J Epidemiol Community Health, 2016; doi:10.1136/jech-2015-206536

Sustainability 12 months after end of study...

Interventions	End of study N=216	12 months after N=177
OPTIMA-improved stove		
Do you use the stove?	194 (90%)	152 (85%)
Do you use it everyday?	185 (86%)	143 (80%)
Kitchen sink		
Do you use the sink?	177 (82%)	135 (76%)
Sink in good conditions	160 (73%)	101 (57%)
SODIS		
Do you use SODIS	147 (71%)	11 (6%)

Integrating early child development in home-based environmental interventions in rural Peru: setting up a randomised evaluation trial



Programa Nacional CunaMas -MIDIS

SCD: Niños y niñas entre 6 y 36 meses de edad y gestantes residentes en los distritos focalizados por el PNCM



SAF: Familias con niños y niñas entre 0 y 36 meses de edad y gestantes residentes en los distritos focalizados por el PNCM



Implementation / Methodology

- San Marcos y Cajabamba provinces, Cajamarca Region
- 2x2 full factorial design
- Age: <18 meses at enrolment
- 12 month FU (Abril 16 – Abril 17)



	IHIP+	ECD
Condición exp. 1	1	0
Condición exp. 2	1	1
Condición exp. 3	0	1
Condición exp. 4	0	0

Interventions

Environmental package

- ICS-model **culturally accepted** that reduce HAP.
- **Kitchen sinks**, water treatment (**boiling**) and **hand-washing** and food **hygiene** training to improve WASH.



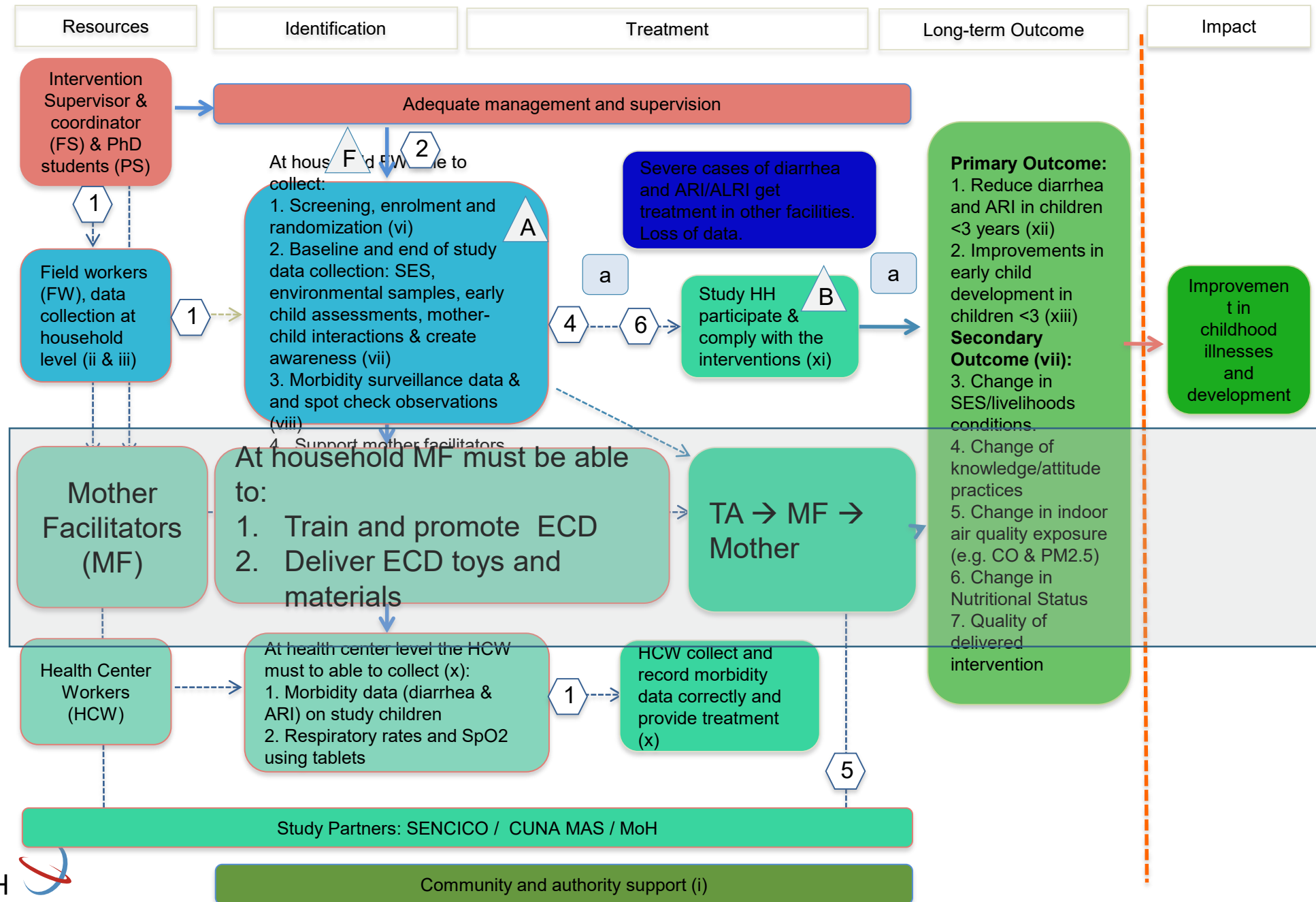
ECD programme

Women living in the participant communities conduct:

- **1-hour weekly play-oriented, semi-structured activities with the** participant mothers and the children.



Title: Integrating early child development in home-based environmental intervention in rural Peru.



Implementation



Rincones de Juego



Madre Facilitadoras (MF) entrenando



Impacts on child's health status and ECD

- Children from the ECD arm obtained **better results** in all domains (ESDI)
- Statistical differences in the **overall score** (OR: 2.8; 95%CI: 1.6 – 4.9) and **cognitive domains** (OR: 1.9; 95%CI: 1.1 – 3.5)

Table 6. ESDI results for children in rural Andean Peru.

	ECD		no-ECD		p-value
	N	% (N)	N	% (N)	
Domains	101		102		
Socio emotional		66.3% (67)		56.9% (58)	0.09
Fine motor skills		53.5% (54)		44.1% (45)	0.25
Gross motor skills		60.4% (61)		47.1% (48)	0.08
Communication		63.4% (61)		50.0% (51)	0.09
Cognitive		62.4% (63)		46.1% (47)	0.03
Overall score		64.4% (65)		39.2% (40)	0.01

Nuño *et al.* Effectiveness of a home-environmental intervention package on child health and early child development in rural Andean communities, a cluster-randomised controlled trial. *Submitted.*



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Swiss Federal Institute of Technology Zurich

Swiss TPH 

Swiss Tropical and Public Health Institute
Schweizerisches Tropen- und Public Health-Institut

Digital Support Systems to Improve Child Health and Development in Low Income Settings - A Randomized Controlled Trial



Programa Nacional CunaMas

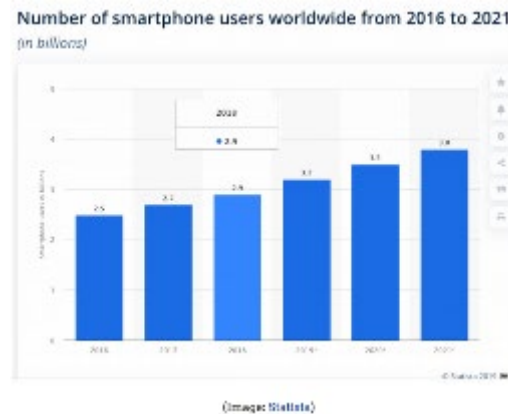
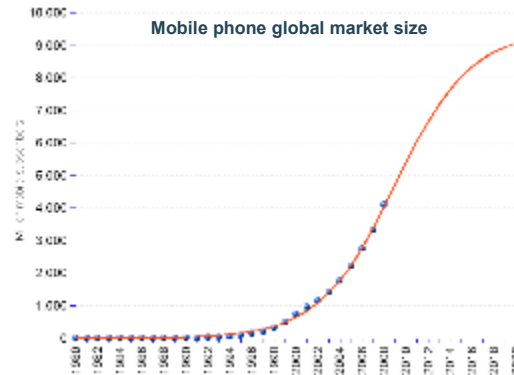
SCD: Niños y niñas entre 6 y 36 meses de edad y gestantes residentes en los distritos focalizados por el PNCM



SAF: Familias con niños y niñas entre 0 y 36 meses de edad y gestantes residentes en los distritos focalizados por el PNCM



New Opportunities through Mobile Networks



- Cell phone ownership has increased incredibly fast over the past decades; even among the poorest, **access to cell phones is now almost universal**
- Given that smartphones and full data plans remain relatively expensive, **new “mini-data plans”** have emerged in many settings
- These light data plans allow basic **chat** interactions but also support transmission of photos and **videos**

Afinidata: Idea & Core Components



Main idea: use new mobile networks to provide support to parents with young children

Key features of the platform:

- **Artificial intelligence chatbot** interacting with parents 24/7; natural language understanding and processing algorithms to optimize parent-system interactions
- **Machine learning algorithms** to select age, development and caregiver-specific activities

Over 500,000 user-interactions to date



Objectives

- 1) To assess the general **feasibility** of using this platform **to systematically reach vulnerable** populations in low income settings
- 2) To compare the relative **cost and cost-effectiveness** of this type of remote support to home visiting programs currently considered the gold standard in early development
- 3) To further **improve the platform** through high frequency feedback from local population
- 4) To **assess the overall scalability** of this approach in other settings

Main Approach

How: Mixed methods evaluation, centered around a cluster- randomized controlled trial

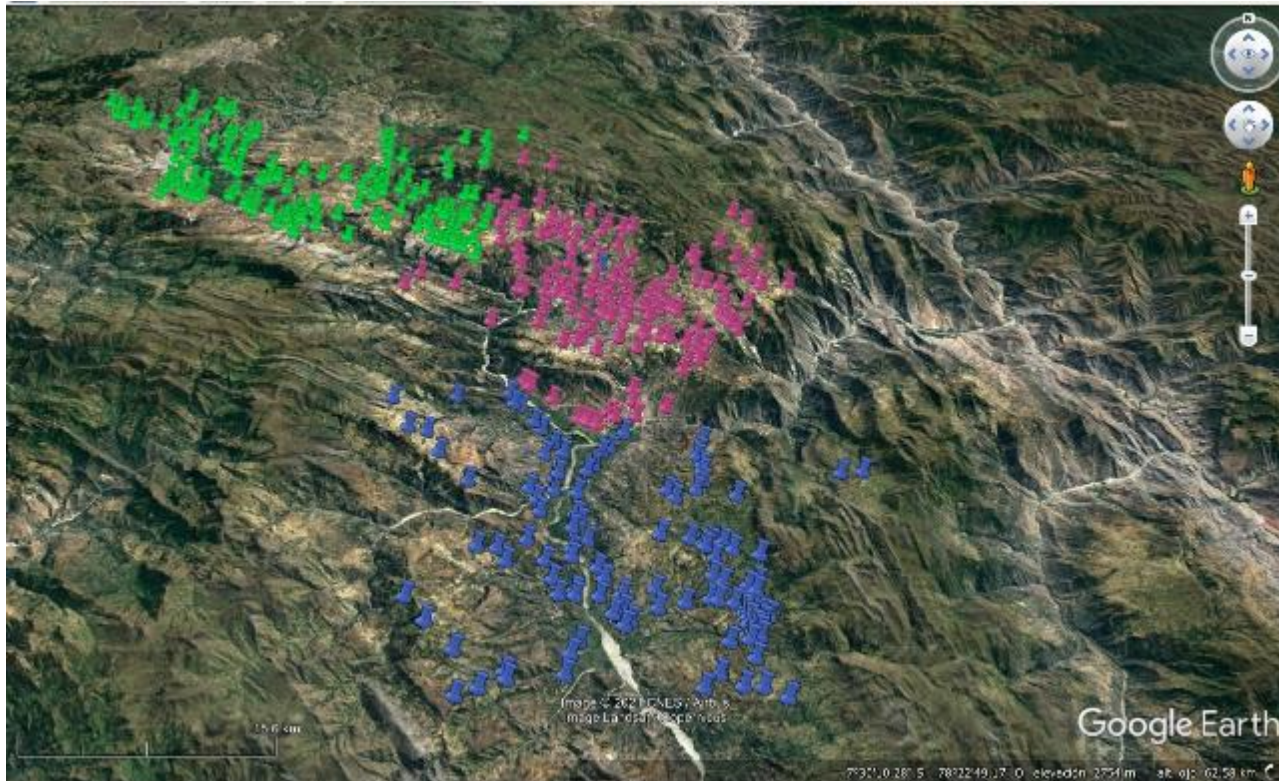
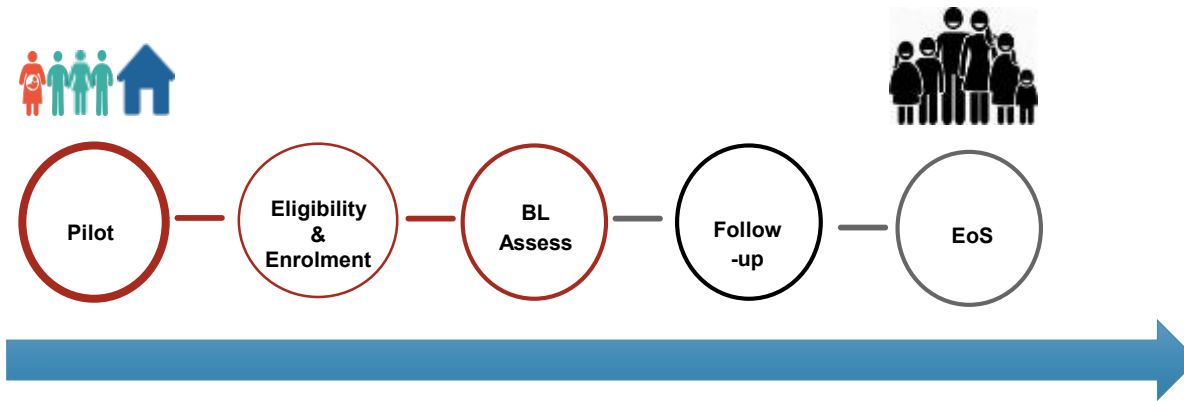
Where: San Marcos Province, Andean Peru

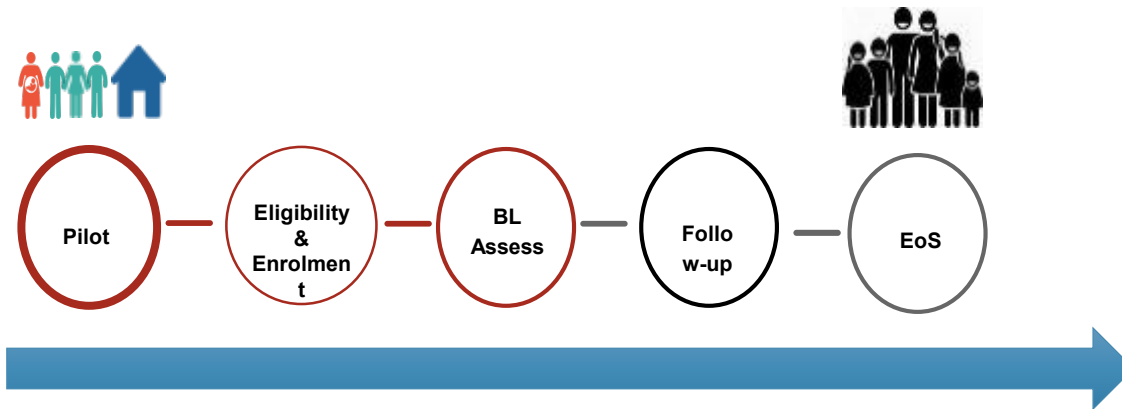
Design: 3 Arms: control, in-person home visits (“gold standard”), and digital support through Afinidata platform

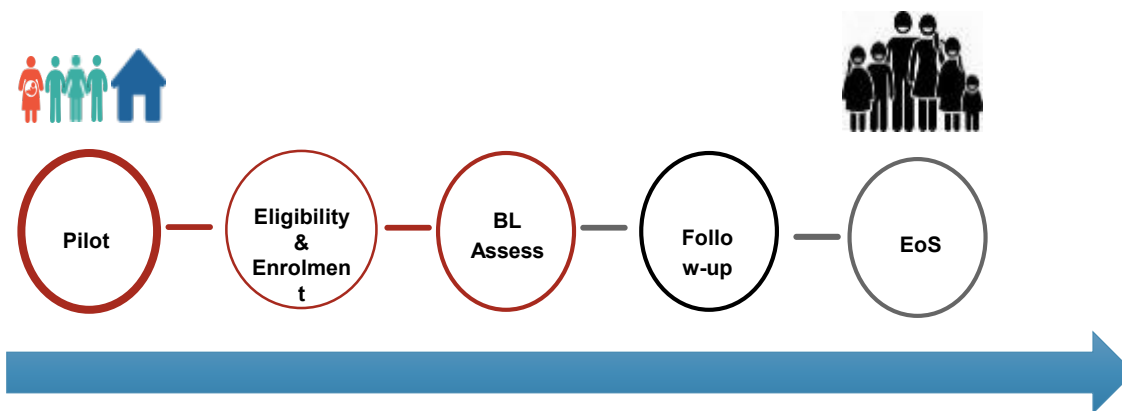
Outcome: Physical and mental well-being, ECD at age 2 years

Domains assessed: impact, equity, and cost-effectiveness









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Pilot's Lessons learned:

- ~ 10% of the household visits did not have access to a smartphone.
- ~ 2% of the household visits were unable to install facebook messenger on their cellphones.
- Instalation on FB messenger: protocol for the field workers and participants
- Manuels: Technical error
- Personal Instalations: **Ownership**
- Protocol and script call every 3 months is recommended if users will be contacted if inactive.
- How to **deal with “drop out”**
- **Re-registration** on the Afini platform (backend programming to associate users who re-register)
- **What to do when we get blocked**
- **Credits to improve the engagement** of the families in the platform



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¡Gracias!

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