
FINAL TECHNICAL PROPOSAL: Digital Financial Services on Health Outcomes & Health Systems December 16, 2019

COLOMBIA DIGITAL FINANCIAL SOLUTIONS IN HEALTH

Executive Summary

Moving from a reactive health care system to a proactive health promotion model, our efforts focus on providing digital financial services that addresses the gap in health services in a subsidized health system for low-income families. We argue that health systems should be understood as social determinants themselves and DFHS should address social development gaps, which can function as spaces to mitigate the risk of exclusion and weave together a fragmented and at times polarized healthcare system. Access to dental health services and collective purchasing in nutrition are proactive health services examples not covered under the current system. Services such as post care disability payments are not available to informal workers (i.e. childbirth and work related injuries). We also know that the lack of access to afore-mentioned services contribute to a proliferation of the main non communicable diseases in our society, driving up the cost of our healthcare system. Therefore, always putting health promotion on a second plan. Our digital solutions leverage the data on 13 million Colombians to produce actionable information, offering them access to relevant and cost-effective financial instruments (ie. savings, micro insurance, collective sourcing). Our aim is through a process of micromapping we can identify patterns in our patients' behaviour in order for us to distill the right financial solutions within the specific context of the user. Going forward this detailed mapping will allow us to develop Precision Public Health Policies.

i.Consortium Team

Led by GESTARSALUD, our alliance brings together public health service providers that reaches more than 13 million Colombians who are receiving subsidized health services. The alliance is further strengthened by expert organizations in blockchain, artificial intelligence, geomapping, innovative finance, food distribution (association of foodbanks), retail services, and big data. Gestarsalud and its members work directly with government agencies on improving access to health services for low-income families as well as chairs several global networks for the solidarity economy. Gestarsalud's mission is to improve the utilization of health services, which in turn will lead to higher productivity of its affiliates as members of society.

TOPL brings expertise in the implementation of blockchain solutions in order to be able to provide digital financial health services to the targeted population. Our work to date has focused on the customer interface as well as the processes to leverage the collective purchasing power of low-income families to access health promotion and disease prevention solutions. The specific blockchain architecture is designed to award impact credits to funders. This opens up a unique opportunity to develop a sustainable transition pathway towards a proactive health services model.

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Together with QUADRATYX, we will use Artificial Intelligence for Big Data analysis to run deep learning exercises whereby the system is able to understand what type of information is relevant based on marker detection in the existing dataset. This allows to significantly speed up the process in identifying which affiliates would be a good match for the DFHS products, based on their financial, socio-economic and health status. Instead of reaching out to all 13 million affiliates in Colombia, AI and deep learning will allow us to identify patterns in the connections and subsequently pinpoint which affiliates are a good fit for the specific financial instrument offered. Through these technological tools we can achieve better access to clinical information, facilitate interaction with patients and generate specialized resources to make better clinical and administrative control of pathologies by Colombia's health insurance companies.

Access to economic and social data on one-third of the Colombian population provides a unique opportunity to develop the right solutions with impact at scale. We are able to design strategies suitable at scale, avoiding the pilot model paradigm. Our team is acutely aware that we can not make the water in the ocean boil. Therefore we will be very targeted in our approach of pathologies, affiliates and their interactions. The team is already working with the Ministry of Health in the promotion of innovative financial solutions supported by AI and Machine Learning.

ii.Project Description

1. Problem statement

In multiple reports by multilateral finance institutions, NGO's and even the UN, a number of different financial instruments have been identified to address the social development gap in the most vulnerable communities. The unique context of many middle income countries is painting a fractured picture though. Middle income countries often already have a well developed private sector, a regulated financial sector and a robust public sector able to deliver on implementing the required policy frameworks. Even with the regulatory and executive infrastructure in place, delivering these financial instruments to the most vulnerable people in the communities, remains a challenge as adoption rates stay low. What barriers still exist?

What we already learned during the current phase of the project is that the landscape of healthcare, promotion and prevention in middle income countries, like Colombia, is very fragmented. A large number of national programs funded by different Ministries are addressing related health issues in the same communities but due to lack of data sharing and communication, significant gaps in knowledge and understanding exist. Nobody is offering a comprehensive health services approach, which considers all determinants contributing to a specific pathology.

During the landscaping assessment we therefore first want to understand how consumers in low-income communities are dealing with health related expenses. How are they able to cover these expenses currently and on what type of health related issues do they tend to spend their time and money on? Having the knowledge on the consumer's behaviour, we are able to

determine current spending patterns and eventually make predictions on future spending. This allows us to understand what financial instruments would be a good fit for which consumer.

The current generic approach by the financial sector in middle income countries on health related spending is not considering the wide disparity in social development in the different communities. High social strata and low social strata are by definition not homogenous on their spending behavior. Health care cost for people in low economic strata takes up a much larger percentage of their disposable personal income, compared to people in high economic strata.

Colombia counts with one of the highest rates of inequality in Latin America. These social inequalities are exacerbated in the access to public services like healthcare. Like many other countries in Latin America, Colombia has enshrined the human right to access comprehensive universal healthcare in legislation. This has opened up the system to interventions through the judicial process, demanding comprehensive treatment. As a consequence, the cost of health care has gone up and, ironically, has reduced the access to UHC services especially for the most vulnerable members in society.

While 96% of low-income families receive subsidized health services in Colombia, the program doesn't provide opportunities for the 22 million Colombians in the public health care system to receive dental services, micro insurance, collective savings, and access to affordable and healthy food. With one of the highest rates of labor informality, low-income individuals do not have access to social programs (i.e. for women to stay at home after childbirth, or workers who have suffered an injury on the job). Our alliance has been working with a diverse group of partners to gauge access to digital financial solutions for low-income families to unlock the afore-mentioned services as part of the UHC system they have a right to.

Several studies have demonstrated that investment in Early Childhood Development, dental hygiene, and nutrition will positively impact health outcomes. Preventive measures and access to such services are not accessible to low-income families with limited financial resources. The legacy financial service providers often argue that the lack of financial resources with low-income families would not make for a sustainable business model to offer these type of services.

Other relevant frame factors lie around culture, education and skills. Cultivating an understanding that nutrition, early childhood development, dental hygiene and other programs are proactive solutions for disease prevention and health promotion. We now have the opportunity for subsidized health services providers in Colombia to provide digital financial instruments to cover health services providing benefits to the health system as a whole. Being able to reduce the burden of chronic diseases through health prevention, frees up resources that can then be reallocated to improve coverage.

The opportunity to receive a grant from Digital Square would help implement the blockchain technology solution to a large pool of identified affiliates as well as cover expenses on Big Data

analysis and deep learning tasks. The investment from Digital Square would serve as catalytic funding for other actors that are able to crowd in with private capital.

2. Approach

Building on our recent study of needs in the target population, we are crossing multiple sets of data from Health Service Providers and government agencies. Using our theory of change offers several benefits. In particular, it helps to construct an evaluation framework focused on relevant outcomes and not just activities. The process of reflecting on intended goals and pathways will help to review the design of engagement activities. Challenges include practical considerations around time to consider evaluation plans among practitioners, and more fundamental difficulties related to identifying feasible, replicable and agreed upon outcomes.

Together with Gestarsalud and its members, the subsidized health care insurance companies in Colombia, we have direct access to over 13 million unique data points. We would be able to place markers in their datasets and within the sample group follow over a fixed period of time the consumers' behaviour (ie. affiliates of the health insurance companies).

During thePhase A of the project we are able to collect the raw data in real time from the field study. This phase of the project allows us to provide a general understanding of health care expenditure by type. It allows us to formulate different hypotheses around specific health care cost categories like for example dental care, health prevention, noncommunicable diseases related to nutrition, as well as work related accidents, and childbirth. To prepare our hypotheses during Phase B, Inputs and Outputs are identified, Indicators tested and Valuations determined.

Now during the Phase B we are to run multiple (likely 4) separate test groups in different parts of the country which provides a different mix in social structure, geography and ethnicity. This allows us to prepare our hypotheses with the input of real life data under different circumstances.

A minimal viable product of the financial tool is tested with a sample population during a test period and determine for example adoption rate, claim rate, risk profile, and financial sustainability. Also we will conduct 'in app' polls with users of the tools, as well as periodic meetings with consumer focus groups to understand user experience and ways to improve on instruments with a strong focus on usability and affordability.

After the fixed term of the test period we expect to be able to determine on the basis of the collected dataset whether the hypotheses hold or not. If inconclusive we would loop the same process until we can dismiss or confirm.

Finally, based on the field work conducted during Phase B, we will now be able to evaluate our real world interventions with DFHS products and determine if and how the financial instruments best suit the needs of the health care consumer.

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Please note that this phase will be financed locally and not as part of this application. We believe it to be inevitable that this investment will be leveraged through local private sector buy-in. The Digital Square investment allows us to create an evidence based sandbox to test hypotheses, underlying future tailor made financial products in health services for vulnerable communities.

3. Risk Mitigation

3.1 Silo thinking

The diversity of individuals and organizations that form part of the Alliance provide opportunities to mitigate risk associated with the research, the direct participation of patients and health service providers. By breaking down traditional silos between Academia, Private Sector and Government, we believe the collaborative effort will allow for an integrated approach. As the communities in which our target population resides are not compartmentalized but rather integrated, the same thinking should be reflected in our work.

3.2 Decision horizon

Engagement of both government agencies and private sector partners can help address the risk of the administration's policy horizon. We will be working closely with partners from both sectors, to include our current efforts within a multi-year regulatory and funding framework. Some elements of the project have already been discussed with public and private sector partners and some of the work has already commenced in different regions.

3.3 Decision making

Considering the diversity of the actors in the Alliance, and avoiding decision making paralysis, a core project team will be appointed that lead the effort. The key organizations that form part of the Alliance and are mentioned in the Team section of this Application, will each appoint a representative of their organization to the project team.

3.4 Financial sustainability

The project and interventions are built on a (results based financing, 'RBF') model that would offer a pathway to financial sustainability; hence reducing the risk associated with continuous funding requirements, guaranteeing operational continuity. Considering the size of the dataset available to us, it allows us for RBF solutions at scale. This would be a prerequisite to ensure government buy-in to act as the RBF 'market maker' by acting as the (main) Buyer of Impact delivered.

3.5 Data Transparency vs Protection

We will be making use of blockchain technology allowing us to tag users, track activities and record health care stats. Blockchain ID's are linked to Social ID numbers. Reporting will only be performed on the complete dataset without disclosure of individual data. Considering the nature of the information collected and analysed, we will obtain consent from all users in test and control groups. We expect to mitigate this risk through users accepting General Terms & Conditions when installing the app (Phase B).

4. High-level budget summary

The activities described below as Phase A (Research)) are included in the Work Package 1 and covers the first four months of the project. Work Package 2 includes the Report and covers the final two months of the project.

Gestarsalud will contract some of the members for the project team and specific (technical) services like the blockchain architecture and consultancy are outsourced to third party providers. Relative to the total budget we believe a significant percentage will be spent on Travel. This is because of the consultation with the stakeholders

During the landscaping assessment we are not foreseeing any (significant) cost on Equipment, Supplies, or Others. Our indirect cost are contingency funds for any unforeseen expenditure at this stage.

Description	Work Package 1 (USD)		Work Package 2 (USD)		Total Cost (USD)	
Personnel (Salaries & Wages)	\$	9,720.00	\$	3,240.00	\$	12,960.00
Fringe Benefits	\$	980	\$		\$	
Travel	\$	13,500.00	\$	4,500.00	\$	18,000.00
Equipment	\$	980	\$		\$	
Supplies	\$	900.00	\$	300.00	\$	1,200.00
Other Direct Costs	\$	(10)	\$		\$	
Contractual	\$	29,160.00	\$	9,720.00	\$	38,880.00
Consultants	\$	48,000.00	\$	12,000.00	\$	60,000.00
Other Expenses	\$	1,500.00	\$	300.00	\$	1,800.00
Total Direct Costs	\$	101,280.00	\$	29,760.00	\$	132,840.00
Indirect Costs	\$	10,128.00	\$	2,976.00	\$	13,104.00
Total Project Costs	\$	111,408.00	\$	32,736.00	\$	145,944.00

5. Objectives and activities

World Bank Group President Jim Yong Kim addressed the 66th session of the World Health Assembly in May 2013, called for the global community to "bend the arc of history to ensure that everyone in the world has access to affordable, quality health services in a generation." But is 100% coverage financially sustainable without incorporating elements of innovative finance and DFHS that reduces the burden on the healthcare system?

The objectives of our work focuses on using a precision public health filter to implement new and innovative digital financial health services that members of our Alliance have identified: (i) complement services that are currently available to the subsidized population (ii) develop models for financial products required (informal workers and young mothers), (iii) collaborate with financial service providers to design DFHS specifically to address existing gaps (prevention and post care).

In order to be able to identify gaps within the different subsets of our Affiliate group, we would need to test different assumptions. We argue that health systems should be understood as social determinants themselves and that the development and implementation of DFHS should include solutions, which can function as spaces to mitigate exclusion and weave together a fragmented and at times polarizing health system.

5.1 Hypotheses

As part of the research project, we are planning to test various hypotheses on our target groups with a number of different DFHS tools (ie. insurance products). By using, amongst others, the null hypothesis model we expect to determine the extent of the correlation. When we reach this point we would be able to test the insurance products with different subsets in our target groups.

As an example might serve: Persons with a sisben¹ score over 55 can not afford medical insurance (H_0 : $\mu > 55$)

Although not covered as part of this landscaping assessment, we plan during a follow up phase to work with the financial sector to see how the current insurance products could be further tailored to this specific audience (not previously considered). Part of this deep dive on the product dynamics would be i) price point, ii) understanding risk, iii) coverage, iv) credit score, v) savings behaviour etc.

Our modeling is based on 3 main components: i) the person, ii) his/her status, and iii) product. We explain these components in more detail below.

5.1.1 Person

The persons in this canvassing are all existing affiliates of one of the member organizations of Gestarsalud. Data over the past 18 years has been collected. It will be investigated in order to look at the number of persons that have been admitted for specific conditions (ie. Childbirth, workplace injuries, and malnutrition/desnutrition). The data allows us to drill down to the level relevant to different pathologies.

5.1.2 Status

The characterization of the persons in the target groups are defined based on their i) Health status, ii) Financial Status, and iii) Socioeconomic Status. We define health status as the person's medical history in combination with dynamic data received from Gestarsalud's member organizations and other stakeholders in the ecosystem. We define financial status as their credit rating in national credit databases, their savings pattern, and their access to banking products. Finally the socioeconomic status is mainly derived from their sisben score which is awarded by

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¹ Sisben is a socioeconomic score for Colombian citizens based on which eligibility to government subsidized programs is determined

the Colombian government that determines whether or not a person is allowed access to subsidized national programs.

5.1.3 Product

The product is defined as the specific (micro) insurance product available in the market. Although Colombia's financial sector is rather robust for a middle income country, there are (many) blank spots that are not covered for a variety of reasons. Just to name a few: i) Out Of Pockets payment (OOP) (transportation, drugs, etc), ii) Catastrophic Health Expenditures (CHE) iii) Total health expenditures.

Based on this frameworking we will research, design, implement and evaluate our project.

5.2 Activities

1. Phase A - Research (6 months)

In addition to the above-mentioned framework, we will be focussing on specific research areas (ie. pathologies) in the health services sector where evidenced based decisions can be made, we have a clear intervention strategy, and stakeholders agree on the plan of action (the so-called 'low hanging fruits').

1.1. Identify Target & Control Groups

Within every one of the 4 regions we will form target groups as well as control groups that consist of persons with comparable status (health, socioeconomic, financial).

- 1.1.1. Data Mining of 13 millions affiliates;
- 1.1.2. Data Compilation per region, ethnicity, and gender;
- 1.1.3. Data Compilation on refugees by region, ethnicity, and gender;

1.2. Identify Distribution Infrastructure

- 1.2.1. Survey distributed to 1600+ offices.
- 1.2.2. Survey to regional members of AIM
- 1.2.3. Survey Distributed to Municipal and Governor's Office (Sec of Health)

1.3. Identify Insurance products

In Colombia already a number of insurance products exist. We plan to long list the insurance products that would have most potential with the target groups identified. We will form this list upon consultation with the main stakeholders in the sector through High Level Meetings ('HLM').

- 1.3.1. HLM Minister of Health, Finance, and labor
- 1.3.2. HLM Financial Service Providers
- 1.3.3. HLM Industry Partners
- 1.3.4. HLM Insurers (Mapfre, SURA, others)
- 1.3.5. HLM International Partners

1.4. Determine Common Taxonomy

For health professionals and DFS providers to clearly understand each other it is fundamental to determine a common language. Following our consultation with the main stakeholders in the sector we are able to define a common taxonomy allowing financial service providers and health care providers to speak the same language. This will be included in the final report as well.

1.5. Reporting

Finally, after conducting a thorough research of the DFHS landscape we will be able to draft our report summarizing our work conducted. It will include, amongst others, qualitative data collected during the HLM with stakeholders as well as relevant information from our data analysis work. As this is very much a collaborative effort we will allow stakeholders to provide feedback on our draft report.

- 1.6.1 Draft Report
- 1.6.2 Request input from stakeholders on draft report
- 1.6.3 Final Report

For more information on the Phases B (Consultation) and C (Evaluation) of this project, we refer to the Annex to this document which is included in the following LINK.

As a member and Vice President of the International Association of Mutuals (AIM), we look forward to engaging our regional partners to contribute to the research and provide local and contextualized information. This allows us to make our research relevant not only to Colombia but also other Middle Income Countries (especially in the region).

6. Background

Constituted as Cooperatives and Mutuals, Gestarsalud's members receive relatively limited subsidies from the Colombian government to offer comprehensive universal health care services to low-income Colombians. As Colombia has reached a national coverage of 96% of its population, the shift towards a proactive healthcare system is a must in order to instill sustainability in the provision of comprehensive services as well as increase the quality service provision. The foundation of such a shift will be built on leveraging technology solutions and improving services currently not covered by the health system.

Building on the success in coverage, Gestarsalud's members are now focussing on identifying gaps and needs for a population that is characterized by its low socio-economic status highly dependent on the local informal economy for their livelihoods. Through years of experience in designing and implementing a wide variety of social programs in the areas they operate, they have acquired a wealth of actionable information on how and where to intervene. Looking at Colombia's national statistics on 'access to healthcare', the country as a whole is performing relatively well. Unfortunately a different picture exists in specific neighborhoods. High inequality reigns. By micromapping theses areas we would be able to develop a Precision Public Health Policy.

The same applies for DFHS products developed. Even if they might be a good fit in certain subsets of the population, this is no guarantee that the same services might result in the same positive outcomes as previously recorded. Therefore, a clear need exists to adjust existing DFHS products to the specific context.

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Gestarsalud and her members have already identified the most vulnerable areas where its affiliates that are highly dependent on the informal sector for their livelihoods. Some financial services have been tested in certain areas but nothing at scale. We aim to test with scaling in mind. Therefore the value proposition of the DFHS product needs to be clear and concise to its future consumer that is living under some of Colombia's most complex social circumstances.

Colombia offers a very representative setting for research on Digital Financial Health Services as it would help inform other middle income countries, not only on increasing coverage, but also to address health promotion, post care cost, and quality of healthcare services. The health system is traditionally reactive and provide services based mostly on care (ie. hospitalization).

Our project innovates as it looks to mobilize digital financial service providers in support of the patient and the healthcare system in general. As we are already collaborating with Financial Service Providers (FSPs) providing such services to individuals with some capacity to pay, we will be able to more accurately present innovative finance solutions beyond micro health insurance. Our project takes into consideration the following information:

- As coverage of health services increased by making comprehensive universal healthcare a human right under Colombian law, so did the number of complaints, class action lawsuits and legal filings against Health Insurers (public health), driving up the overall health cost exponentially;
- Largely as a result of the regulatory shortcomings in Colombia's health system, patients who are refused treatments, exams, and pharmaceuticals—whether or not these are included in the baskets of health services—are left with no better alternative than to file a lawsuit using an informal judicial mechanism for the protection of basic rights, widely known as tutela, which was incorporated into the 1991 Constitution;
- The rapid growth of the subsidized population places significant pressure on the government's health budget. In 2011, for example, 68% of the funds used to finance the subsidized regime were public (transfers from the national to the local government through the General System of Participation). Only 25% of the funding came from payroll taxes. Furthermore, municipalities (1%) and departments (6%) are very small contributors to the funding for the subsidized regime;
- The government has recognized that part of Colombia's population is still uninsured. More significantly, the Ministry of Health has classified this population as the Uninsured Poor Population (UPP);
- Informal workers (~50% of all Colombian workers) and low-SES pregnant women for example, have access to subsidized health services but are left unprotected during postpartum or post hospitalization;

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- Health risks are a major source of adverse financial challenges to . Protection against such risk doesn't exist in Colombia for low-income individuals / families. Yet we know remarkably little about their exposure to financial challenges due to health risks;
- Access to Early Childhood Development for low-income families is normally paid for by the state. But access (only infants in the age bracket 18 60 months have access) is limited as well as its coverage (70% nutritional value provided during school hours);
- Geographically health care coverage in Colombia is high and equally distributed among departments (also referred to as hard infrastructure) There are however strong indications that health outcomes and effective access to health services vary dramatically (also referred to as soft infrastructure). This multi-dimensional problem requires a micro mapping approach as described in the activities of our landscaping assessment;

7. ADDITIONALITIES

Although the focus of our research will be on improving access to health services and managing health costs, the introduction of DFHS products might have an indirect effect generating positive outcomes at a household level as well as for the economy in general. As measuring increased levels of productivity falls outside the scope of our research, we believe research in this area will be a great catalyst in mobilizing both policy makers and private sector around this topic.

In addition to the activities described above, we believe our work would contribute to the development of appropriate and equitable policy actions, as well as research avenues to pursue. Because the severity of health shocks, household economic status and health system characteristics matter for outcomes, policy makers would need to consider these factors in tailoring their social protection policies for specific sub-groups.

Policy makers also need to consider non-health sector mechanisms, such as introducing of disability insurance, safety nets, or supporting existing informal mechanisms for the protection of households against losses in income and consumption from health shocks. Future research can answer the feasibility and effectiveness of such mechanisms in protecting low-income households from the overall economic consequences of health shocks. Other areas where research can be fruitfully directed, include harmonization of indicators used for assessing health shocks and economic outcomes. Some of the additionalities to consider are:

- Consultation and information gathering on programs available to the high socioeconomic strata 4, 5, and 6;
- Recommendations on potential innovative finance solutions for funding new DFHS;
- Collection of rigorous empirical evidence on the performance of Colombia's health care system due in large part to the lack of detailed individual- or household-level data on health spending

- Application of innovative finance principles to help design new funding mechanisms;
- Consultation with private sector actors on effects in human capital productivity due to comprehensive health care coverage;

As most focus on access alone, and not specifically on quality healthcare, our work would help inform governments (LMICs) aiming for Universal Health Coverage (UHC) to implement DFHS that will reduce the financial burden on their healthcare system. Funding efforts could be directed to address gaps and increased quality of services. Engagement of the private sector would become feasible due to a proven increase in worker productivity.

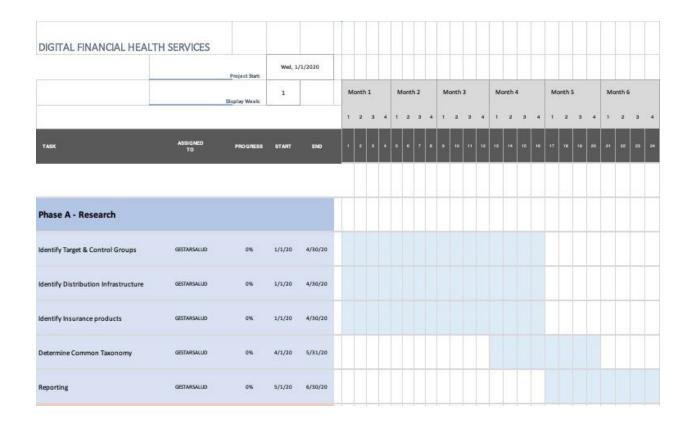
6. Schedule

As part of our work as providers of healthcare servicing 13 million Colombians covered under the subsidized healthcare system, several of our members (Cooperatives and Mutuals) have already begun to look at addressing gaps in the way healthcare services are provided (access and OOPE). The social programs will serve as a point of departure for our research on identifying Target Population, Distribution Infrastructure and Insurance Products.

The financing from Digital Square Open will set in motion a series of dedicated activities that will substantially support and help coordinate all efforts between the multiple actors that are also concerned with the quality access to digital financial health services. As soon as the funding is confirmed, Gestarsalud will engage their member organizations to plan activities, timelines, and deliverables. Below is a schedule based on activities described above.

Please note that Phase A activities would qualify under the Digital Square scope of funding. Activities under Phases B & C will build on the work delivered during Phase A, and will be funded through separate sources.

The total timeframe of Phase A of the project will be 6 months as from the moment of initiation. This includes the 2 month reporting period, which includes recommendations on common taxonomy and interventions for the delivery of DFHS solutions.



7. Deliverables

We expect that within sixfour (64) months from initiation of the project, we will have completed the above-mentioned work and consultation. Gestarsalud in collaboration with its member organizations and other stakeholders will produce a report containing the following information:

- 1. A regional context on access to healthcare services, applying a micro-mapping approach to bring to the fore health challenges for low-income communities;
- 2. Identification of tThe gaps and opportunities in digital health financial services relevant to Colombia and potentially the region;
- 3. A common taxonomy on current digital and non-digital health financial services applicable to Colombia and the region;
- 4. Recommendations on a Precision Public Health Policy agenda and Innovative Finance opportunities through the application of DFHS products;
- 5. Projections on opportunities to reduce the burden on healthcare systems by focusing on DFHS for a proactive healthcare system

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