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CENTRO DE INTELIGENCIA ARTIFICIAL Y SALUD PARA AMÉRICA LATINA Y EL CARIBE

ENABLING CONDITIONS FOR IMPLEMENTING ARTIFICIAL INTELLIGENCE SOLUTIONS IN SEXUAL, REPRODUCTIVE, AND MATERNAL HEALTH (SRMH) IN LATIN AMERICA AND THE CARIBBEAN

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Contents

Executive Summary

This document examines the enabling conditions for the responsible implementation of artificial intelligence (AI)–based solutions in sexual, reproductive, and maternal health (SRMH) in Latin America and the Caribbean. Its objective is to identify the key elements required for these technologies to be developed, adapted, and scaled in contexts marked by institutional, social, and regulatory vulnerability, while upholding principles such as equity, autonomy, privacy, and reproductive justice.

The study was conducted using a qualitative, exploratory, and documentary approach, applying an inductive methodology based on the analysis of real-world cases with verified outcomes. Selection criteria included evidence of impact, thematic relevance, implementation in restrictive contexts, and public availability of information. Four concrete experiences were analyzed: Aya Contigo (Venezuela), the Predictive Platform for HIV Treatment Adherence (Chile), CITOBOT (Colombia), and TeleNanu (Peru), each illustrating different combinations of enabling factors, operational challenges, and opportunities for scalability.

The analysis identifies as key enabling conditions: the availability of secure and context-specific data; institutional support from universities, health centers, or community organizations; the presence of interdisciplinary teams with an ethical focus; sustained funding, particularly from international cooperation; and a regulatory environment that, while not necessarily specific, does not hinder the development and deployment of these solutions.

It is emphasized that these conditions can be progressively built and that, even in the absence of formal state support, it is possible to develop effective and culturally relevant AI tools through partnerships among civil society, academia, and international cooperation. However, to ensure sustainability, equity, and long-term impact, it is essential to advance toward their integration into public policies, specific regulations, and stable institutional structures.

The document concludes with a series of technical, regulatory, institutional, and ethical recommendations for the responsible implementation of AI in SRMH and proposes principles for anticipatory governance, regional co-creation, and the structural integration of these technologies into health systems. It concludes that the enabling conditions not only exist but can be strengthened, and are essential for AI to contribute to reducing historical gaps in access to sexual, reproductive, and maternal health in Latin America and the Caribbean.

1. Introduction

Artificial intelligence (AI) is gradually being integrated into public policies across Latin America and the Caribbean. While adoption remains limited in many sectors, governments, civil society organizations, and international agencies are exploring its potential to improve management, expand coverage, and enhance decision-making—particularly in contexts where resources are scarce or state capacities are weak.

In the health sector, AI offers important opportunities to strengthen fragmented systems, expand access to essential services, and support both clinical and administrative processes. At the same time, its use raises critical challenges regarding legitimacy, security, transparency, and the protection of rights—especially in relation to vulnerable populations or regions with low institutional capacity.

In the field of sexual, reproductive, and maternal health (SRMH), AI adoption in the region remains limited. Applications have largely emerged from civil society initiatives, international cooperation, and the technology innovation sector. Frequently, these solutions are developed for adverse contexts marked by humanitarian crises, limited state presence, or restrictive regulations, and are designed to address structural barriers that disproportionately affect adolescents, migrants, and rural or Indigenous women.

The debate, therefore, is not about whether AI should be used in SRMH, but under what conditions it can effectively safeguard rights, improve access, and reduce inequalities without reinforcing existing disparities or creating new risks.

This document aims to identify and analyze the enabling conditions that have made it possible to implement AI-based solutions in SRMH in Latin America and the Caribbean. Drawing from real-world experiences with documented outcomes, it highlights how these tools have been deployed while upholding principles such as **human dignity, autonomy, and privacy**. Building on these lessons, the report seeks to inform public policy, support the uptake of AI solutions by new actors, and promote their responsible adaptation in diverse contexts across the region.

2. Objetive

The objective of this report is to identify, analyze, and promote the enabling conditions for responsible, equitable, and sustainable implementation of AI-based solutions in SRMH in Latin America and the Caribbean. Special attention is given to settings marked by institutional fragility, criminalization, structural barriers, and historical inequalities that limit effective access to services.

Grounded in a human rights–based approach and a people-centered perspective on AI, the report seeks to contribute to the creation of ethical, regulatory, and technical environments that ensure these solutions expand access to rights, respect bodily autonomy, reduce gender and social inequalities, and respond in context-sensitive ways to the cultural, social, and political realities of the region.

3. Methodology

This study adopts a qualitative, exploratory, and documentary approach. Given the emergent nature of the field, an inductive methodology was employed—examining concrete cases to derive broader principles—based on a detailed research of documented experiences.

This strategy enables analysis of a limited number of cases without compromising the validity or regional applicability of findings. The aim is to generate, from exceptional but well-documented cases, a knowledge base to inform public policies that are adaptable and replicable across different contexts.

Data collection and analysis: Secondary sources were reviewed, including reports from international organizations, private sector documents, regulatory frameworks, public policies, national strategies, and impact evaluations.

Case selection criteria:

-Documented evidence of impact**:** Demonstrated usability (ease of use, sustained engagement, effective functionalities) and user perceptions of support and accompaniment.

-Implementation in restrictive or fragile contexts: Cases from settings with restrictive legal frameworks, humanitarian crises, limited public services, or weak institutional capacity were included to identify minimum conditions for feasibility.

-Thematic and methodological relevance: Selected experiences specifically focused on SRMH that employed digital technologies with elements of automation, personalization, or intelligent information processing. Even where advanced AI techniques (e.g., machine learning or deep neural networks) were not applied, solutions with automated or intelligent digital components were included.

-Public availability of information: Initiatives with accessible documentation—through publications, organizational reports, academic resources, or interviews—were prioritized to ensure transparency and traceability.

4. Context

According to the investigation conducted by the Center for Implementation and Innovation in Health Policy (CIIPS) in its report "Artificial Intelligence and Sexual, Reproductive, and Maternal Health (SRMH): A Study of Experiences in Latin America and the Caribbean"[1], most AI-based solutions in this field remain in an early stage of development. **Of the 143 studies analyzed, nearly half corresponded to laboratory projects without robust clinical validation or systematic evaluation of their impact**. This is reflected in the predominance of grey literature, such as university theses and non-indexed documents, which reveals that many initiatives have yet to achieve the scientific or institutional maturity required to inform sustainable public policies.

The analysis highlights a **thematic concentration in prenatal care and early detection of reproductive organ cancers**, particularly cervical cancer, which are the areas with the greatest diversity of approaches and implementation levels. By contrast, **other essential dimensions of SRMH remain markedly underrepresented, including access to safe abortion, contraception, sexual function and satisfaction, and comprehensive sexuality education**. These omissions are closely tied to persistent structural barriers in the region, such as the criminalization of abortion in most countries—exceptions include Argentina, Puerto Rico, and Colombia—as well as regulatory and cultural resistance to addressing gender diversity and sexual rights.

The solutions reviewed[2] span a wide technical spectrum, ranging from symbolic models to advanced machine learning and deep learning approaches, including chatbots,

[1] https://www.researchgate.net/publication/384030127_Inteligencia_Artificial_y_Salud_Sexual_Reproductiva_y_Materna_SRMH_Un_estudio_de_experiencias_en_America_Latina_y_el_Caribe_Inteligencia_Artificial_IA_responsable

[2] Se mencionan algunas soluciones analizadas: Jesús Francisco Pérez-Gómez, Juana Canul-Reich, Erick De-La-Cruz-Hernandez. Combinación de rankings como método para la identificación de biomarcadores de vaginosis bacteriana. Research in Computing Science. 2020;149(8):915-927. Lerma Sánchez ÁM, Mexicano Santoyo A, Villalobos Castaldi FM, Damián Reyes P. Clasificación automática de anastomosis mediante redes neuronales convolucionales en video fetoscópico. RIDE Revista Iberoamericana para la Investigación y el Desarrollo Educativo. 2021;11(22). doi:10.23913/ride.v11i22.856. Claudia C. Plataforma informática basada en inteligencia artificial para la caracterización e identificación del grado de adherencia al tratamiento para la población con VIH+. Published May 17, 2023. Accessed December 28, 2023. https://www.dii.uchile.cl/eventos/cierre-proyecto-fondef-plataforma-informatica-basada-en-inteligencia-artificial-para-la-caracterizacion-e-identificacion-del-grado-de-adherencia-al-tratamiento-para-la-poblacion-con-vih/ La Nación. Published July 9, 2018. Accessed December 28, 2023. https://www.lanacion.com.ar/sociedad/alumnos-de-un-secundario-porteno-disenaron-un-chatbot-para-responder-preguntas-sobre-sexualidad-nid2150976/ Montenegro JLZ, da Costa CA, Janssen LP. Evaluating the use of chatbot during pregnancy: A usability study. Healthcare Analytics. 2022;2:100072. Giordana S. Nuevo Embryoscope con inteligencia artificial para el

monitoring systems, and diagnostic algorithms. However, the report stresses that **strong technical performance alone does not guarantee positive outcomes in terms of quality, accessibility, or equity of services**. For example, early detection of a condition such as cancer, in the absence of a health system prepared to provide timely treatment, generates expectations without concrete solutions.

The current panorama in Latin America and the Caribbean shows an expanding field, with exploratory enthusiasm and a growing production of tools, but still with important thematic, population, and methodological gaps. **For AI-based solutions to be integrated effectively and responsibly into the public policies of SRMH, it is indispensable to advance the design of clear enabling conditions: adequate regulatory frameworks, inclusive research agendas, sustained public investment, and an ethical and people-centered approach.**

análisis de embriones. WeFIV. Published May 26, 2022. Accessed December 28, 2023. https://wefiv.com/blog/nuevo-embryoscope-inteligencia-artificial-analisis-embriones/ De Freitas MAF, Capecchi A. Inteligencia artificial en la detección del cáncer de mama por tomosíntesis, ¿hacia dónde vamos? Revisión Narrativa. Revista Científica CMDLT. 2021;15(2). doi:htdoi.org/10.55361/cmdlt.v15i2.66 Tejera E, Pérez-Castillo Y, Chamorro A, Cabrera-Andrade A, Sanchez ME. A Multi-Objective Approach for Drug Repurposing in Preeclampsia. Molecules. 2021;26(4). doi:10.3390/molecules26040777 Yacolca Huaman KL. Estudio de Atipia Celular Utilizando Redes Neuronales Convolucionales: Aplicación En Tejidos de Cáncer de Mama. Ingeniería Electrónica. Pontificia Universidad Católica del Perú ; 2020. https://tesis.pucp.edu.pe/repositorio/bitstream/handle/20.500.12404/18219/YACOLCA_HUAMAN_KARLA_LUCIA_ESTUDIO_ATIPIA_CELULAR.pdf?sequence=1CisAllowed=y

5. Selected Cases

5.1. Aya Contigo (Venezuela)

Aya Contigo[3], developed by the Vitala Global Foundation, is a mobile application designed to support the self-management of medication abortion and access to contraception, particularly in legally restrictive contexts such as Venezuela. Launched in 2022 and redesigned in March 2025, the app incorporates digital technologies with automation and personalization components, aligning with the criteria established for evaluation.

The application was developed using a user-centered design approach and is based on World Health Organization (WHO) guidelines on self-managed medication abortion.[4]

Aya Contigo[5] provides:

-Evidence-based information on how to safely perform a medication abortion in the early stages of pregnancy.

-Self-assessment of eligibility for medical abortion, step-by-step instructions on administering medication, and guidance on how to confirm whether the procedure was successful.

-Counseling on post-abortion contraception.

-Emotional support and virtual accompaniment, including WhatsApp notifications and chats, during and up to 30 days after the abortion.

-Offline access to key content, in recognition of frequent electricity and internet outages in the country.

-Referral to existing services when in-person medical care is required.

-A participatory design process involving local women and grassroots feminist organizations such as Faldas-R and Entre Nosotras, integrating community knowledge and lived needs.

-Strengthened capacity of local organizations to reach more women, including those in remote areas, while offering a safe and reliable alternative to the clandestine medication market, thereby reducing health and life risks for users.

[3] https://www.frontiersin.org/journals/global-womens-health/articles/10.3389/fgwh.2024.1401779/pdf

[4] La OMS reconoce que, durante el primer trimestre de gestación, las personas gestantes pueden autogestionar de manera segura un aborto con medicamentos si cuentan con información adecuada, acceso a fármacos de calidad y asistencia médica en caso de complicaciones.

[5] https://cdn.who.int/media/docs/default-source/reproductive-health/abortion/ibp-story-venezuela-es.pdf?sfvrsn=c72d9f27_15Cdownload=true

What kind of AI does Aya Contigo use?

The app does not employ complex AI or advanced machine learning models such as neural networks. Instead, it uses structured AI, based on fixed rules and predefined decision trees, to deliver personalized recommendations without adapting or modifying its behavior over time.

This means the application guides users step by step according to their responses, using carefully designed information flows developed by sexual and reproductive health specialists. The tool does not learn from or alter its logic through use; rather, it follows evidence-based clinical protocols, primarily WHO guidelines, ensuring consistency, safety, and reliability.

This approach makes Aya Contigo an accessible, safe, explainable, and controlled tool—well-suited for legally restrictive and fragile humanitarian contexts such as Venezuela[6], where access to formal health care is limited and clear, unambiguous guidance is essential for women choosing to self-manage an abortion.

Aya Contigo advanced without direct state support

The Venezuelan case demonstrates that even in the absence of formal government endorsement or enabling public policy frameworks, it is possible to design and implement effective technological solutions for SRMH. This experience underscores a set of favorable non-state conditions that enabled implementation[7]:

-Targeted international funding from organizations such as SAAF and IPPF/WHR, with experience in sexual and reproductive rights and restrictive contexts.

-Technical and methodological leadership by an international NGO (Vitala Global), capable of integrating clinical expertise, ethical perspectives, and user-centered design.

-Strategic collaboration with local feminist organizations (Faldas-R and Entre Nosotras), ensuring cultural and territorial relevance.

-Rigorous, independent evaluation conducted by YLabs, validating results and enabling evidence-based improvements.

-International recognition and dissemination through platforms such as IBP/WHO, enhancing replicability in other countries.

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[6] https://www.tandfonline.com/doi/full/10.1080/26410397.2022.2067104#d1e286

[7] https://cdn.who.int/media/docs/default-source/reproductive-health/abortion/ibp-story-venezuela-es.pdf?sfvrsn=c72d9f27_15Cdownload=true

Despite the absence of national public policies promoting or regulating such interventions, multistakeholder collaboration overcame structural barriers and ensured access to reliable information and safe digital support in a highly restrictive environment.

The progress of Aya Contigo highlights a key lesson: the conditions for implementing impactful technological solutions in SRMH are not solely dependent on the state but can be fostered through alliances among civil society, international cooperation, and organized communities. However, long-term sustainability and scalability will ultimately require some level of adoption or recognition by public health systems.

Is abortion a right in Venezuela?

The Venezuelan Penal Code[8] allows abortion only when it is necessary to "save the mother's life."[9] This legal restriction fosters a context in which abortion is largely clandestine, increasing the risks of unsafe procedures and perpetuating stigma against those seeking abortion. Legislation limits access to safe abortion services within the public health system, forcing individuals to rely on clandestine options or the informal medication market.

From an obstetric care perspective, the only available documentary reference identified was the Ministry of People's Power for Health's 2013 publication of Protocols for Care, Prenatal Care, and Emergency Obstetric Care[10]. Official epidemiological data remain scarce, as Venezuela continues to face a structural health and social emergency.

The challenge

AI alone cannot resolve inequities in access to sexual and reproductive health. In countries where abortion is criminalized and the health system is in crisis, pregnant individuals face insurmountable barriers: lack of services, stigma, and the absence of reliable data or safe care. Alternative pathways are urgently needed to deliver trustworthy information, safeguard reproductive autonomy, and reduce risks of maternal mortality.

The opportunity

Civil society has demonstrated that ethical, user-centered innovation can create new pathways. Applications such as Aya Contigo, which provide safe information, emotional

[8] https://www.oas.org/dil/esp/Codigo_Penal_Venezuela.pdf
[9] https://prosalud.org.ve/quienes-somos/404-Aborto
[10] https://www.unicef.org/venezuela/media/801/file/Protocolos%20de%20atenci%C3%B3n.%20Cuidados%20prenatales%20y%20atenci%C3%B3n%20obst%C3%A9trica%20de%20emergencia.pdf

support, and digital privacy, allow thousands of women to access essential services safely, even in emergency settings. This model, grounded in WHO guidelines, can be replicated or adapted in other countries with restrictive legal frameworks, provided that networks of legitimacy, accompaniment, and protection are built outside of state structures. The opportunity lies in recognizing, scaling, and safeguarding these solutions so that they reach those who need them most.

5.2 Development of the predictive platform for HIV treatment adherence (Chile)

The FONDEF project "AI-based information platform for the characterization and identification of treatment adherence levels among people living with HIV" [11] was developed by an interdisciplinary team at the Universidad de Chile, specifically from the Faculties of Medicine and Physical and Mathematical Sciences, in collaboration with the Arriarán Foundation, the main HIV care center in Chile.

The objective of this tool is to predict, at an early stage, the likelihood that a person will discontinue or demonstrate low adherence to antiretroviral treatment, using machine learning algorithms. This makes it possible to intervene in a timely manner, optimize health resources, and contribute to controlling HIV transmission in the country. To this end, a retrospective database of more than 5,000 patients from the national reference center, the Arriarán Foundation, was used. Data were collected up until 2019, excluding any changes related to the COVID-19 pandemic.

Initially, 450 variables were considered for analysis, which were subsequently reduced to 34 deemed most relevant. These variables were primarily obtained from questionnaires administered at patients' initial admission, complemented by additional questions on mental health, social support, and alcohol and drug use—factors that are fundamental to treatment behavior. The reasons why patients may discontinue or demonstrate low adherence were grouped into five broad categories: alcohol and drug use, mental health, use of other medications, patient ecology (including educational level, family environment, employment, and other personal factors), and a weighted aggregate of all these areas.

The predictive model developed is based on a Support Vector Machine (SVM) algorithm, which calculates a risk score for each patient and classifies their level of adherence, ranging from full adherence to non-adherence. This model was later applied to patients who enrolled between 2020 and 2021, classifying them by risk and enabling individualized interventions for those identified as likely to abandon treatment.

[11] https://uchile.cl/noticias/205427/plataforma-permite-predecir-adherencia-a-tratamientos-contra-el-vih

The personalized intervention was designed and developed jointly with a psychologist specializing in the management of chronic diseases and a research team from Universidad Diego Portales. It consists of three counseling sessions focused on addressing the specific causes that hinder each patient's adherence. In addition, staff at the Arriarán Foundation were trained to act as adherence counselors, providing targeted support. This training does not turn them into psychologists, but rather equips them with effective tools to support the patient and, when necessary, refer them to mental health specialists or social workers

The results obtained thus far indicate that the predictor has performed effectively, allowing for the identification of patients with adherence issues and the provision of appropriate interventions. Mental health has emerged as the most influential factor in adherence, encompassing conditions such as depression, anxiety, denial of diagnosis, and fear of disclosing the illness. Nevertheless, practical barriers that are easier to address were also identified, such as difficulties in accessing medications monthly due to work commitments. These have been addressed through proposals for longer-term deliveries or alternative methods.

This model represents a pivotal contribution to public HIV policy, as consistent treatment adherence not only enhances individual quality of life and decreases the need for more expensive interventions and hospitalizations but also significantly benefits public health by reducing community viral load. This reduction in population-level viral transmission effectively curbs sexual transmission of the virus and contributes to broader pandemic control efforts.

The tool integrates a preventive and personalized approach, with both individual and collective benefits, aligning with the international targets established by UNAIDS[12] to achieve goals for diagnosis, treatment, and viral suppression.

Currently, the project has reached an advanced stage that includes the development and validation of a functional prototype and the initial implementation of intervention models with positive results. The next steps include applying for a new FONDEF project[13], in partnership with the University of Magallanes[14], to adapt and validate the model in other regions of the country. The aim is to scale and adapt the platform for different populations and care centers, assessing whether there are specific determining variables according to regional contexts.

In addition, the 34 selected variables were designed so that any center could use them to build its own database and apply the predictor, even without prior historical records. This feature facilitates system portability for national and even international use. At the same time, continuous monitoring, adjustment, and improvement of interventions are underway, based on collected data and clinical feedback.

[12] https://www.unaids.org/es
[13] https://www.conicyt.cl/fondef/sobre-fondef/que-es-fondef/
[14] https://umag.cl/

Ongoing work also seeks to enhance the software, optimizing its technological infrastructure and user interfaces, as well as to facilitate remote access through web platforms. This will enable the scaling of the system to multiple healthcare centers across diverse regional contexts.

This development represents a concrete advancement in the integration of AI and public health in Chile, with a direct impact on optimizing health policies for HIV control. The predictive approach and the personalization of interventions underscore the importance of mental health and early detection in achieving better adherence to treatment, positioning this model as a benchmark for future applications in the region and a significant contribution to the HIV response.

The challenge

The main challenge of this development lies in achieving precise and effective prediction of treatment adherence among people living with HIV, within a complex context where multiple individual, social, and health factors influence patient behavior. The platform seeks to identify, at an early stage, those at risk of discontinuing treatment, which requires not only rigorous collection and analysis of clinical and socioemotional data but also the integration of diverse variables such as mental health, substance use, family environment, and personal conditions, which are often difficult to quantify and model.

Another significant challenge is ensuring that the predictive model is adaptable and scalable to different regions and populations in the country, considering heterogeneous contexts and the potential absence of historical databases in some health centers. It is also necessary to ensure that the interventions derived from the system are effective, personalized, and clinically viable, which requires training healthcare personnel in specific counseling techniques and adequate follow-up.

From a technological perspective, the ongoing optimization of infrastructure, development of intuitive user interfaces, and enablement of remote access present persistent challenges—particularly in scaling adoption across remote centers or those with limited technical resources.

An equally important issue is that the development must balance model accuracy with respect for privacy and ethical management of sensitive data, promoting equity and ensuring that technological advances truly contribute to reducing the HIV burden at both individual and community levels. These aspects make the process of creating and validating this platform complex, demanding, and crucial for its long-term success.

The opportunity

The main opportunity presented by this development lies in the potential to transform HIV treatment management through the use of AI to anticipate and prevent treatment discontinuation. By providing a tool that identifies, at an early stage, patients at risk of abandoning treatment, it opens the door to precise and personalized interventions that not only improve individual health but also generate a positive population-level impact by reducing virus transmission.

This platform enables optimization of health resources by focusing efforts and support where they are most needed, avoiding high costs associated with rescue treatments and hospitalizations. Moreover, its comprehensive approach—which incorporates mental health, substance use, and social context—offers a holistic and realistic view of patients, a key element for designing effective interventions.

The adaptability of the model to different regions and contexts, as well as its potential implementation in centers without historical databases, creates opportunities to scale and replicate the innovation across the country and even internationally, broadening its reach and impact. It also represents progress in integrating AI into public health policies, potentially serving as a reference point for addressing other health challenges.

5.3. CITOBOT: cervical cancer screening in vulnerable contexts (Colombia)

CITOBOT is a portable medical device designed in Colombia[15] [16] as part of a translational research initiative aimed at improving access to cervical cancer screening in low-resource settings. Its development, led by an interdisciplinary team spanning public health, engineering, computer science, and design, was grounded in the principles of Human-Centered Design[17] and continuous validation with end-users, healthcare professionals, and technical experts[18].

[15] https://www.javeriana.edu.co/pesquisa/citobot-y-cancer-de-cuello-uterino/
https://consultorsalud.com/citobot-deteccion-cancer-de-cuello-uterino-ia/
https://www.sciencedirect.com/science/article/pii/S2001037024003891
https://invessoft.com/ponenciasSimposio2023/pdf/AO/2507.pdf
https://soloesciencia.com/2019/06/29/citobot-la-ia-contra-el-cancer/
https://pubmed.ncbi.nlm.nih.gov/39660014/
https://www.researchgate.net/publication/343842927_Innovative_prototypes_for_cervical_cancer_prevention_in_low-income_primary_care_settings_A_human-centered_design_approach/download?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6Il9kaXJlY3QiLCJwYWdlIjoiX2RpcmVjdCJ9fQ
[16] https://perfilesycapacidades.javeriana.edu.co/es/projects/citobot-desarrollo-y-validaci%C3%B3n-cl%C3%ADnica-de-un-sistema-portable-pa-2
[17] https://online.hbs.edu/blog/post/what-is-human-centered-design
https://www.iso.org/standard/77520.html
[18] https://www.researchgate.net/publication/343842927_Innovative_prototypes_for_cervical_cancer_prevention_in_low-income_primary_care_settings_A_human-centered_design_approach

The device seeks to address two major barriers faced by women in vulnerable contexts: the pain associated with the use of the traditional speculum and delays delivery of Pap test results.

CITOBOT replaces the speculum with a probe equipped with an endoscopic camera that captures real-time images of the cervix, processes them locally using AI, and provides an immediate risk estimate (high or low) during the same consultation. This functionality accelerates clinical decision-making and reduces loss to follow-up among women with precancerous lesions.

The integrated AI is based on the Inception V3 neural network[19], trained with transfer learning and finely tuned to classify cervical images. The device operates without an internet connection, making it suitable for regions with limited or unstable connectivity[20].

Beyond the device itself, CITOBOT's design process stands out for its participatory approach, which prioritized the experience of its female users, respect for their autonomy, and adaptation to institutional settings with limited resources. This approach made it possible to identify needs unmet by traditional public health strategies and to build a solution that is technologically robust, culturally acceptable, and potentially scalable within fragmented healthcare systems.

This case highlights a set of enabling conditions that were crucial for its development and could be replicated in other contexts across Latin America and the Caribbean. Particularly critical was the foundational support from institutional, academic, and strategic partners, which guaranteed the project's technical feasibility, initial operational sustainability, and its strategic alignment with the overarching needs of the healthcare system.

First, the development was led by an interdisciplinary team from Pontificia Universidad Javeriana Cali, an academic institution with recognized expertise in applied research and a strong commitment to social innovation. This provided a favorable environment for user-centered design, the ethical integration of emerging technologies, and rigorous validation through functional prototypes in both simulated and clinical settings.

Another notable aspect is that the device was developed with a focus on integration into the Colombian public healthcare system. It was designed to streamline the work of frontline healthcare professionals, operate without connectivity, and adapt to the actual capabilities of primary care centers. The development process was guided by experts in gynecology, nursing, public health, software, and engineering, enhancing its potential for adoption within national reproductive health strategies.

[19] https://www.sciencedirect.com/science/article/pii/S2001037024003891

[20] https://www.researchgate.net/publication/343842927_Innovative_prototypes_for_cervical_cancer_prevention_in_low-income_primary_care_settings_A_human-centered_design_approach

In terms of regional replicability, the CITOBOT case suggests that the presence of public or private universities with technical capacities and a public service mission, together with mechanisms for state funding and legal recognition of the strategic value of technological innovation, are key elements for scaling such solutions and incorporating them into public policy.

The challenge

The main challenge presented by the CITOBOT case lies in ensuring that a technological innovation developed with participation, inclusion, and technical quality criteria can move beyond the academic sphere and become an integrated, sustainable tool within public sexual and reproductive health policies. The existence of a functional and validated solution does not, in itself, guarantee widespread adoption or incorporation into public systems, particularly in institutionally fragile contexts or under constrained budgets.

The opportunity

The development and validation of CITOBOT offer a concrete opportunity to advance the construction of public policies that integrate AI-based solutions aimed at improving sexual, reproductive, and maternal health (SRMH) in highly vulnerable contexts. CITOBOT combines user-centered design, institutional support, and operational feasibility, positioning it as a viable and adaptable solution.

5.4. TeleNanu (Peru)

TeleNanu[21] is an innovative project developed in Peru by the Universidad de San Martín de Porres, aimed at improving access to sexual and reproductive health among adolescents and young people, particularly in vulnerable communities such as Ayacucho[22]. Through the use of AI, the team created a tele-counseling service based on a chatbot that employs natural language processing technology to respond to frequently asked questions and provide personalized support. The chatbot was built on the Azure Health Bot platform, allowing it to be hosted in the cloud and connected to social media and other digital channels, thereby facilitating access for users from their own devices and daily environments.

The core objective of the project is to reduce gaps in access to clear, timely, and culturally relevant sexual and reproductive health information. This is particularly critical in a context where many young people face barriers such as poverty, distance to healthcare facilities, lack of intercultural services, and the absence of content in their native language. To address these challenges, the research team is currently working to

[21] https://dialnet.unirioja.es/servlet/articulo?codigo=8675408
[22] https://usmp.edu.pe/telenanu-la-revolucion-en-teleconsejeria-en-salud-sexual-y-reproductiva-para-adolescentes-y-jovenes-peruanos/

incorporate translation into Quechua[23] and an intercultural approach that adapts the content to the specific realities of Indigenous populations, thereby promoting equity in access to information.

The TeleNanu chatbot was designed following a virtual counseling model structured in five steps: establishing a cordial relationship, identifying user needs, providing appropriate responses, verifying comprehension, and maintaining open and empathetic communication. Although responses are based on preprogrammed logic, the system allows for continuous adjustment and improvement of this logic through iterative scenario design. This means user behavior patterns are analyzed, and new responses or adaptations are progressively incorporated to make the experience more effective and personalized.

TeleNanu employs AI as the functional core of its service, enabling much of the interaction to be automated without compromising quality, warmth, or cultural appropriateness. Due to its tangible contributions to health equity and its adaptability to local settings, it was recognized as a standout case in the category of service access and resource management by our Centro de Inteligencia Artificial y Salud para América Latina y el Caribe (CLIAS), as part of its regional call for innovative solutions.

This development demonstrates how AI can be harnessed to serve inclusion, equity, and public health. Its implementation not only improves access to vital information for young people who are often beyond the reach of the formal health system, but also does so in a safe, confidential, and culturally respectful manner, setting a valuable precedent for future digital health innovations in Latin America.

The challenge

The case of TeleNanu reveals a common paradox in digital health initiatives within highly vulnerable contexts: despite their transformative potential and their ethical, user-centered design, such solutions face structural barriers that hinder their sustainability, scalability, and state adoption.

One of the main challenges lies in the disconnect between technological innovation and public policy. TeleNanu has demonstrated that AI can be used in a culturally appropriate, safe, and empathetic way to support young people on sensitive issues of sexual and reproductive health. However, its development has relied on isolated institutional efforts rather than on a digital ecosystem supported by regulatory frameworks, public financing, or national strategies for adolescent health or digital health.

Another key challenge is the country's uneven digital infrastructure. Although the chatbot is cloud-hosted and designed to operate on personal devices, many rural areas lack

[23] https://usmp.edu.pe/telenanu-incluira-informacion-en-quechua-2/

stable connectivity or mobile internet access, significantly limiting its reach among those who need it most. This structural digital divide cannot be resolved by technological initiatives alone; it requires decisive public policies focused on connectivity, digital literacy, and territorial inclusion.

The opportunity

TeleNanu represents a concrete opportunity to demonstrate that AI-based technologies can be ethically designed, implemented, and sustained in a contextually and culturally relevant way within the field of adolescent and youth sexual and reproductive health. Its people-centered approach, integration of empathetic counseling elements, and adaptability to Indigenous languages such as Quechua make it a viable model for technological inclusion with an intercultural perspective.

Another dimension of the opportunity lies in the fact that TeleNanu already possesses social legitimacy and regional visibility, having been recognized by CLIAS[24] for its contribution to health equity. This endorsement can serve as a valuable starting point for driving integration processes with health and education systems, promoting its inclusion in public telehealth platforms, and facilitating institutional adoption—all while maintaining the community-focused approach that was central to its origins.

[24] https://clias.iecs.org.ar/

6. Enabling Conditions

The effective implementation of artificial intelligence (AI)-based solutions in the field of sexual, reproductive, and maternal health (SRMH) in Latin America and the Caribbean does not depend exclusively on technological development. It requires an enabling environment that combines digital infrastructure, data governance, specific regulatory frameworks, institutional capacities, and sociopolitical conditions that guarantee both the sustainability and equity of such innovations.

First, **the availability and quality of data** are critical conditions. AI solutions require large volumes of representative, interoperable, and standardized data to function properly. However, the region faces serious limitations in terms of electronic health records, integration of public databases, and the systematic production of information on sexual and reproductive health. In many cases, even basic records disaggregated by age, gender identity, or socioeconomic status are lacking, preventing the training of models with a rights-based, equitable, and diversity-sensitive approach.

Second, **the existence of appropriate regulatory and ethical frameworks** is essential. AI technologies applied to SRMH must operate under principles of transparency, explainability, personal data protection, informed consent, and non-discrimination. Yet, most countries in the region lack specific regulations on AI or digital health, and existing data protection frameworks often fail to account for the sensitive particularities of data linked to SRMH. The absence of specialized agencies to oversee these technologies, and the lack of ethical guidelines for their development and implementation, creates a vacuum that exposes users to risks of surveillance, discrimination, or misuse of their information.

Moreover, **strengthening institutional capacities** is essential for adopting, adapting, and scaling AI solutions within public health systems. This includes trained human resources in data management, analytics, and digital ethics; technological infrastructure that ensures connectivity and cybersecurity; and sustainable financing mechanisms. In a regional context characterized by strong territorial inequalities and budgetary constraints, these capacities are uneven and, in many cases, incipient.

Equally, **political commitment and institutional willingness to incorporate technologies in sensitive fields** such as SRMH are fundamental enabling conditions. In environments where abortion remains criminalized in most countries, where barriers to comprehensive sexuality education persist, and where rights related to sexual and gender diversity remain invisible, any technological solution must be accompanied by public policies that recognize and guarantee these rights. Without the willingness to address these issues comprehensively, technological advances risk reinforcing structural biases rather than correcting them.

It will be critically important **to promote participatory and multi-stakeholder governance frameworks** that integrate user communities, health professionals, technology developers, regulatory agencies, academia, and social organizations. Only through the inclusion of diverse voices will it be possible to design AI solutions that address real needs, adapt to local contexts, and guarantee respect for individual autonomy and rights.

The reality is that enabling conditions for implementing AI solutions in SRMH in Latin America and the Caribbean are not merely technical: they are structural, regulatory, institutional, and political. Without progress on these fronts, any innovation risks remaining confined to pilot projects, without achieving significant transformation in access, quality, and equity in sexual, reproductive, and maternal health care.

The positive aspect is that it is possible to identify certain conditions that have facilitated the implementation of AI solutions in SRMH in Latin America and the Caribbean. Based on the cases analyzed, this report highlights that when some key elements are combined—even if not always in a planned or perfect manner—initiatives are able to develop, sustain themselves, and even generate impact. Among these elements, the availability of **adequate data to feed the systems stands out, not necessarily massive, but relevant, secure, and contextualized**. Also noteworthy is the **participation of interdisciplinary teams capable of integrating technical expertise with ethical sensitivity and an understanding of the social environment**.

In several examples, the **support of universities, community organizations, or committed health centers served as a foundation that provided legitimacy, continuity, and adaptive capacity**. Financial support, often provided by **international cooperation**, played a key role, as did the possibility of **building culturally relevant solutions in collaboration with local actors**. Although specific regulatory frameworks were not always in place, the presence of regulatory environments that did not obstruct development allowed progress, particularly when there was a clear orientation toward the protection of rights.

In this sense, rather than referring to enabling conditions as a rigid set of prerequisites, the report suggests that they can be progressively built, through possible combinations of technical capacities, ethical commitment, adequate financing, and situated knowledge. When these factors align, even in adverse contexts, real opportunities emerge for AI to contribute to health equity in a safe and respectful way.

Recommendations

1. **Integrate social justice and territorial approaches into digital health strategies:** Public policies should prioritize the development and implementation of AI solutions

in historically excluded territories, such as rural areas, Indigenous communities, or regions with low connectivity. These solutions must be designed in accessible languages, respect diverse cultural practices, and avoid homogeneous approaches centered on urban or technocratic models.

2. Establish clear, ethical, and adaptable regulatory frameworks: Regulatory frameworks are needed for the use of AI in health that consider the protection of sensitive data, algorithmic transparency, digital informed consent, and ethical mechanisms of governance. The creation of controlled testing environments (sandboxes) can facilitate safe innovations without compromising fundamental rights. These regulations should be aligned with national agendas for inclusive digital transformation and promote the development of responsible, ethics-by-design AI systems, ensuring that the principles of equity, care, transparency, and respect for human rights are embedded from the early stages of conception, development, and implementation.

3. Recognize and scale local solutions with evidence of impact: Recognition of technologies developed in the region must be based on proven evidence of effectiveness, safety, and acceptability. This includes documented results from clinical validations, community evaluations, or implementation studies that demonstrate tangible improvements in access, quality of care, or risk reduction. Only with this empirical backing can such solutions be integrated into public policies, avoiding the diversion of resources to initiatives with little or no evaluation that fail to generate real benefits. To facilitate scaling, governments can implement innovative public procurement mechanisms, competitive funds, or inter-institutional agreements that prioritize technologies proven effective in real-world conditions. This approach not only promotes the sustainability and legitimacy of interventions, but also strengthens the region's technological sovereignty and reduces dependence on external solutions that often fail to address local needs. This process must be complemented by the systematization and dissemination of successful experiences (see recommendation 8), so that recognized and scaled solutions also generate replicable learnings across the region.

4. Strengthen institutional capacities and anticipatory governance: In Latin America and the Caribbean, many health institutions and regulatory agencies lack specialized teams in AI and digital technologies, limiting their capacity for oversight and responsible adoption. It is therefore a priority to invest in the training of human resources capable of practically evaluating the ethics of AI applications, identifying potential biases, assessing their social impact, and conducting periodic audits, even with simple tools adapted to available resources. More than complex structures, the goal is to create minimal but effective capacities within ministries of health, regulatory agencies, and subnational governments, enabling them to monitor these technologies in their real-world implementation.

At the same time, progress should be made toward mechanisms of anticipatory governance—permanent bodies capable of monitoring technological development and responding swiftly to emerging risks. These bodies do not necessarily require large new structures, but rather the strengthening of existing ones (ethics committees, data protection agencies, digital health directorates), equipping them with clear protocols to review the social impact of solutions before deployment. The combination of trained teams and strengthened institutional spaces will allow the region to advance toward more realistic and sustainable oversight, preventing AI from being implemented without control or evaluation in fields as sensitive as SRMH.

5. Ensure meaningful participation of user communities: Participatory approaches and human-centered design must be applied throughout the AI life cycle. This involves co-creating solutions with adolescents, women, Indigenous peoples, or other marginalized groups; establishing feedback channels; providing accessible complaint mechanisms; and developing review processes that incorporate lived experiences.

6. Guarantee technical and semantic interoperability with health systems: In the region, many countries have fragmented systems with varying levels of digitalization. AI solutions must be able to integrate easily with what already exists, such as electronic health records, telehealth platforms, or epidemiological surveillance systems. The goal is not to create new and costly infrastructures, but to ensure that these technologies can adapt to available resources. For this, the use of open and flexible standards is key, along with modular architectures that allow each country or institution to make local adjustments without compromising security or functionality.

7. Promote sustainable financing schemes and intersectoral collaboration: To ensure continuity, strategies for sustainability must combine public financing, international cooperation, public–community partnerships, and social economy models. Coordination among governments, universities, research centers, civil society, and ethically committed private sector actors should be encouraged.

8. Foster documentation and dissemination of replicable experiences: It is essential to systematize successful experiences, which entails collecting, organizing, and analyzing information on how AI solutions in SRMH were designed, implemented, and evaluated. This includes describing achievements, challenges, lessons learned, and the conditions that made implementation possible. With clear and accessible information, other institutions or countries can adapt these experiences to their own contexts. Equally important is promoting regional exchange platforms to share these lessons openly, with a rights-based, gender-sensitive, and linguistically and culturally accessible approach, ensuring that information reaches diverse audiences and local realities. In this way, documentation and dissemination of experiences are linked to the recognition and scaling of proven solutions (see recommendation 3), forming an integral cycle that moves from evidence to public policy, and from policy to the generation of new knowledge.

9. Acknowledge and integrate community and traditional knowledge: The implementation of AI should not replace pre-existing practices but rather seek respectful synergies with them. It is recommended to integrate intercultural mediators, midwives, popular educators, and other local actors into SRMH technological ecosystems.

10. Promote regional development of common standards for AI in health: Regulatory advances on AI and digitalization of health systems in the region are uneven, which may hinder the sharing of experiences or joint scaling of solutions. It is therefore essential for regional organizations, such as PAHO (Pan American Health Organization) and ECLAC (Economic Commission for Latin America and the Caribbean), to promote practical, gradual agreements on a minimum set of common standards—for example, on sensitive data protection, algorithm quality and validation, and basic criteria for safety and ethics. These guidelines need not be complex or uniform, but should establish a common baseline that enables countries to collaborate, exchange lessons, and avoid importing external models unsuited to local realities. Such cooperation would make it easier for solutions developed within the region to be used across diverse contexts in a fairer, more sustainable, and resource-adapted manner.

Concluding reflections

Artificial intelligence is not, in itself, a magical solution to the structural challenges affecting sexual, reproductive, and maternal health in Latin America and the Caribbean. However, it can become a powerful tool to reduce historical inequities and strengthen the autonomy of those who have been systematically excluded from the full exercise of their rights. By facilitating access to reliable information, timely support, and informed decision-making, AI can help broaden horizons of freedom and care where previously there was only silence, stigmatization, or neglect.

What this work demonstrates is not only that successful experiences exist, but also that it is possible to build real enabling conditions even in the most adverse contexts, provided that ethics, care, and attentive engagement with communities are prioritized.

This document does more than gather best practices. It reflects an expanding movement in which technology is placed at the service of rights, equity, and care. The experiences analyzed show that it is possible to design AI tools that guide, support, and protect, while respecting people's autonomy and adapting to their life contexts. The goal is not to impose innovation, but to co-create solutions with meaning, legitimacy, and humanity.

Enabling conditions already exist. They are not a distant ideal but a set of elements that can be built: alliances among universities, community organizations, and international cooperation; public policies open to ethical innovation; and regulatory frameworks that are dynamic, adaptable, and rights-based. What has been possible today in Venezuela, Chile, Colombia, or Peru can tomorrow become a reality across the entire region if these conditions are strengthened, lessons are shared, and collaboration is embraced.

This is a call to believe in what is already taking place: in the teams developing solutions with limited resources but great commitment; in the communities that adopt these tools and imbue them with meaning; in the young people who use a chatbot to access, for the first time, reliable information about their health; in the women who find support where once there was only isolation; and in the states that, by recognizing these innovations, can become protagonists of a genuine, sustained, and just transformation.

With political will, ethical commitment, and regional cooperation, Latin America and the Caribbean have the opportunity to incorporate technologies such as AI in a progressive and responsible manner, generating tangible changes in the lives of those facing the greatest barriers to accessing sexual, reproductive, and maternal health. The foundations are already in place: valuable experiences, emerging capacities, and committed networks. The task now is to nurture them, sustain them, and allow them, step by step, to contribute to transforming realities where they are most urgently needed.

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