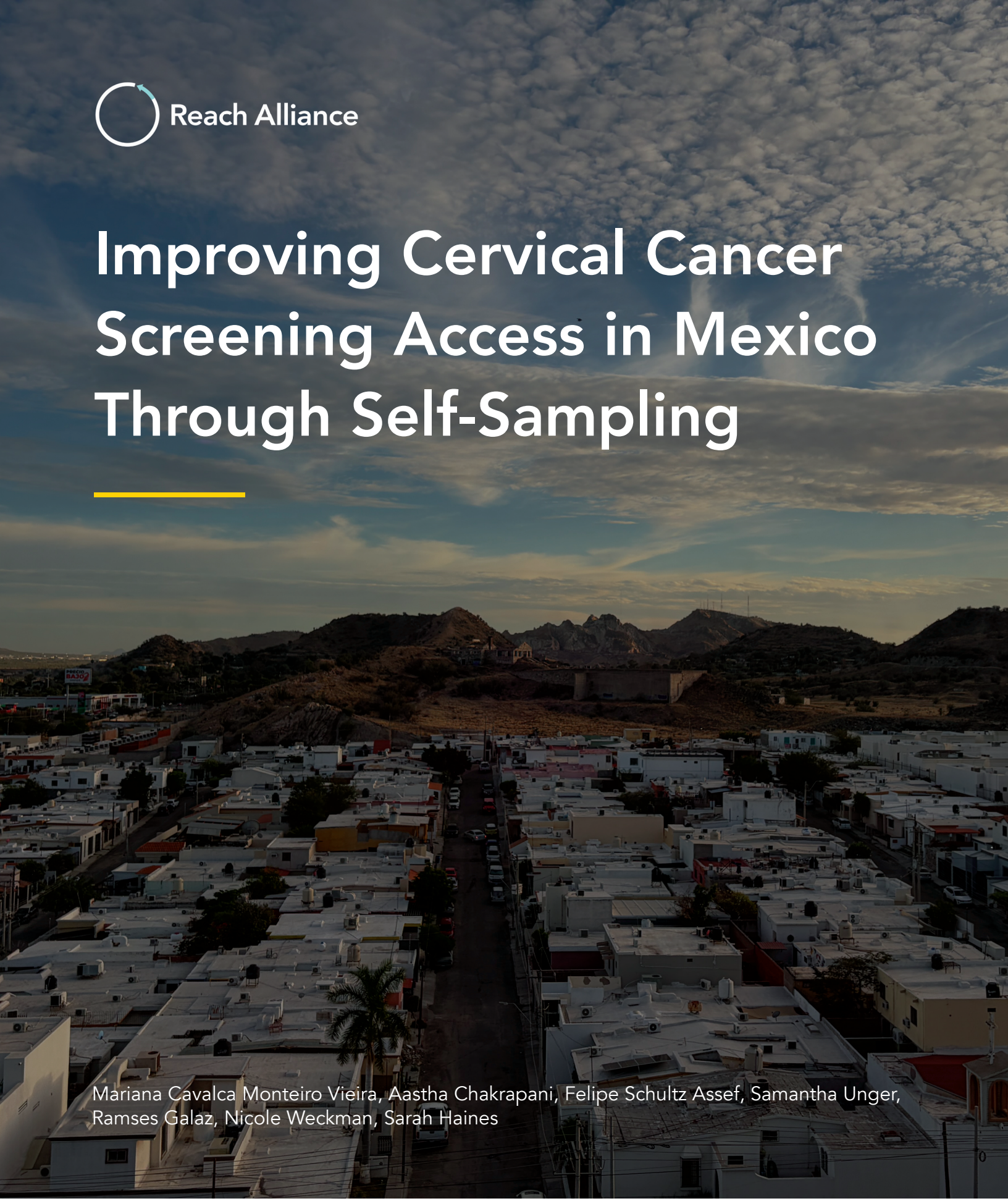
Reach Alliance

Improving Cervical Cancer Screening Access in Mexico Through Self-Sampling



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The Reach Alliance

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Note: Authors are listed alphabetically with the faculty mentors listed last.
Cover photo: View of Hermosillo, Sonora (photo by Samantha Unger)

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Photo of the research team: Sarah Haines, Samantha Unger, Felipe Schultz Assef, Mariana Cavalca Monteiro Vieira, Aastha Chakrapani

Contribution	Contributor (Initials)
Conception or design of the work	AC, FSA, MCMV, SU, RG, NW, SH
Data collection	AC, FSA, MCMV, SU, RG, SH
Data coding	AC, FSA, MCMV, SU
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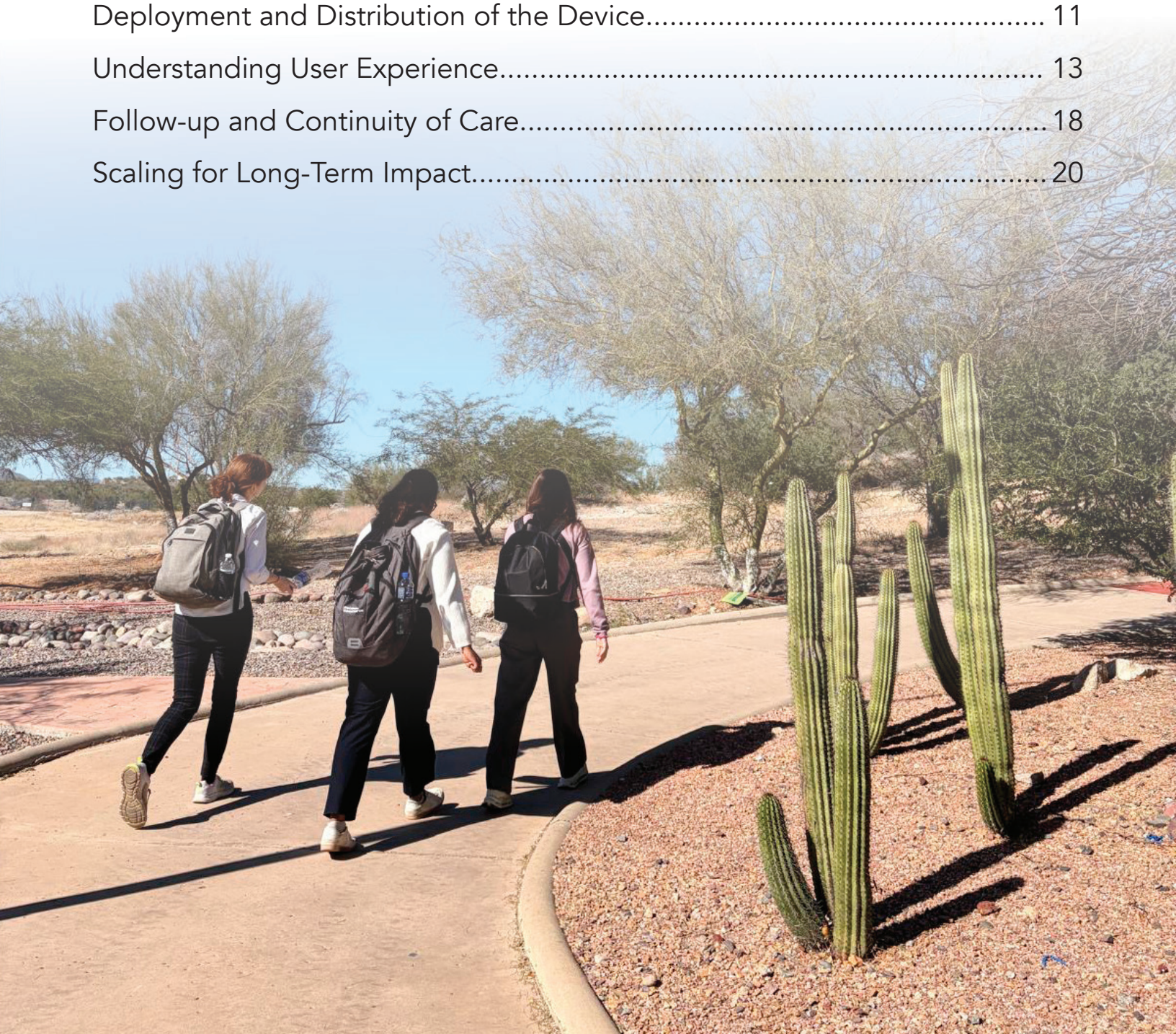

Executive Summary

In Mexico, cervical cancer (CC) remains a persistent public health challenge, disproportionately affecting women facing structural, geographic, and socio-cultural barriers to care. While national screening programs exist, gaps in access, late-stage diagnosis, and weak follow-up systems continue to limit their effectiveness. In this case study, we examine how self-sampling technologies could improve equitable access to CC screening by addressing barriers across the entire care pathway.

Self-sampling offers a shift from clinic-based screening toward more accessible, user-centred models. Allowing women to collect vaginal and cervical samples at home or in community settings reduces indirect costs, increases privacy, and improves autonomy, particularly for women deterred by stigma, distance, or institutional distrust. GSE Biomedical is a medical device company in Mexico working to develop one of these self-screening devices to increase CC screening access.

However, these technologies' effectiveness depends not only on their manufacturing but also on their integration into Mexico's fragmented health system where 48.8 per cent of patients seek care from private providers due to perceived differences in quality.[1] At the same time, nearly 70 million people lack consistent access to public healthcare, and only 12.3 per cent of insured women receive timely treatment following diagnosis.[2] These systemic gaps reinforce how access to screening alone is insufficient without coordinated follow-up care, reliable referral systems, and continuity across institutions.

Disparities are concentrated among hard-to-reach populations, including Indigenous women, rural communities, and migrant workers, whose exclusion is shaped by overlapping barriers including poverty, low health literacy, language differences, and restrictive gender norms. Across these contexts, distrust, stigma, and fear emerge as central determinants of whether women engage with screening, highlighting that user adoption depends as much on trust and cultural relevance as on availability.

Drawing on 28 stakeholder interviews from field research conducted in Mexico City and Hermosillo, Mexico, we identify four key conditions for successful implementation: (1) alignment with diverse health system entry points across public, private, and community channels; (2) accessible and culturally responsive distribution models that prioritize trust and local engagement; (3) user-centred design that addresses stigma, fear, and low health literacy; and (4) strong systems for follow-up, coordination, and long-term integration into existing care pathways. Together, our findings shift the focus from whether CC self-sampling can work in theory to what is required for it to work in practice, particularly for the populations most excluded from existing screening systems.

Figure 1. Reach Alliance team visiting the National Institute of Genomic Medicine, Mexico City

1 Octavio Gómez-Dantés, Edson Serván-Mori, Diego Cerecero, Laura Flamand, and Alejandro Mohar, "Mexico's Health System, 2023," *Salud Publica de Mexico* 67, no. 1 (2025): 91–105.

2 Andrés Sánchez-Mercader, Andrea Cámara-Salazar, Valeria Traconis-Díaz, and Gabriel Sánchez-Buenfil, "Análisis de la mortalidad por cáncer cervicouterino en México y el estado de Yucatán," *Ginecología y Obstetricia de México* 89, no. 9 (2021): 671–77.

Figure 2. Clinical Simulation Center at Tecnológico de Monterrey, Mexico City Campus

Context: Burden of Cervical Cancer and Mexico's Health System

Cervical cancer (CC) is the second leading cause of cancer death among women in Mexico.[3] Each year, 9,439 women are diagnosed and 4,335 die from the disease.[4] Although Mexico's cancer mortality rate is lower than that of high-income nations and other countries in Latin America, CC remains a notable exception, with incidence and mortality rates often higher than those in countries like Canada or the United States.[5] The rate of CC death is exacerbated by late-stage diagnosis because 70 per cent of diagnoses in Mexico are for locally advanced disease with more limited treatment options.[6]

Geography plays a key role in who feels this burden most strongly. Women in southeastern states such as Quintana Roo, Yucatán, Campeche, Veracruz, and Oaxaca experience some of the highest CC mortality rates in the country, with Quintana Roo (17.7%) and Yucatán (15.6%) among the highest,[7] drastically outpacing the national rate of 6.58 per cent.[8] Regions with high CC rates tend to have high Indigenous populations, weak healthcare

3 We use the word *women* throughout this report. We are mindful of how this phrasing may exclude trans and queer people assigned female at birth. This usage aligns with the language used in publications from this local context; however these other populations do experience significant barriers to screening and care and are still at risk for cervical cancer.

4 Eder A. Arango-Bravo, Lucely del Carmen Cetina-Pérez, Tatiana Galicia-Carmona, et al., "The Health System and Access to Treatment in Patients with Cervical Cancer in Mexico," *Frontiers in Oncology* 12 (2022):1028291.

5 "Health at a Glance 2025: OECD Indicators," OECD 2025.

6 Arango-Bravo, Carmen Cetina-Pérez, Galicia-Carmona, et al., "The Health System and Access to Treatment."

7 Karla María Meléndez Dubóna, Sharon Nahomy Poblano Sandeza, and Iris Aurora Nava Jimeneza, "Epidemiological Overview of Cervical Cancer and Human Papillomavirus Vaccination in the Yucatán Peninsula, Mexico (2014-2024): Challenges and Perspectives," *Proceedings of Scientific Research Universidad Anáhuac* 5, no. 9 (2025): 16–26.

8 "Mexico: Human Papillomavirus and Related Cancers, Fact Sheet 2023," ICO/IARC Information Centre on HPV and Cancer, March 2023.

infrastructure, and low screening coverage, resulting in late detection and poor follow-up. While the burden of cervical cancer is a challenge across the entire country, those who are hard to reach geographically experience outsized impact.

Health System

In Mexico, healthcare is delivered through multiple programs aimed at universal access, as established in the country's constitution. The public system is split into two parallel streams: for those with formal employment (population with social security or PWSS) and for those without formal employment (population lacking social security or PLSS). The formally employed have this coverage:

- *Institute for Social Security and Services for State Workers* (ISSSTE) covers 13.7 million state workers and includes their family members.
- *Pemex* covers healthcare for 750,000 workers at the state-owned petroleum company, including their family members.
- *Social Security Institute for the Mexican Armed Forces* covers 870,000 workers of the Ministry of National Defense and the Secretariat of the Navy.
- *Mexican Social Security Institute* (IMSS) covers 68.7 million formal employees of the private sector and includes their family members.[9]

The programs covering those lacking social security fluctuate. Historically, some have included the Ministry of Health (MoH) and State Health Services (SHS), Seguro Popular, and the Institute of Health for Well-Being. A key development in the system serving the PLSS in 2022 was the establishment of *IMSS-Bienestar* ("well-being"). This program aims to be a universal, free healthcare system for people without social security, focusing on preventative care through a broad coverage of services. IMSS-Bienestar aims to address challenges introduced by decades of decentralized healthcare that focused on curative approaches rather than prevention, and it covers about 50 million people. Twenty-three of Mexico's 32 states opted out of this program and are instead covered by MoH and SHS, which together account for 15.6 million people. Across programs, the public system has historically faced challenges, including inadequate government spending and system fragmentation, which often lead to suboptimal resource use.

A private healthcare system operates in parallel to these public services, with many users accessing care through pharmacy networks. Private healthcare use is common across individuals covered by any of the insurance programs, with 48.8 per cent of the population accessing outpatient care in these facilities.[10] The perceived quality of care is a key driver of people's decision to seek private options. The proportions of people reporting fair or poor quality of care were 11.7 and 7.8 per cent among individuals using pharmacy-adjacent private doctors and stand-alone private healthcare providers, respectively, but 19.8 per cent for social security and 18.6 per cent for MoH providers.[11]

Cervical Cancer Screening Landscape

Screening programs for various health issues are an increasing focus in Mexico and around the world. In Mexico, Papanicolaou (Pap) and human papillomavirus (HPV) screenings, which involve removing a small sample of cells from the cervix, are recommended for women aged 25 to 64 years. The Pap test is recommended for patients 25 to 34 and looks for the presence of abnormal (precancerous) cells. Mexican standards advocate for the collection of Pap cervical samples every three years, after two consecutive negative annual tests. In older patients aged 35 to 64 years, HPV screening is used, which detects the virus most responsible (in 99.7% of cases)

9 Mariana Álvarez-Aceves, Lina Sofía Palacio-Mejía, Mauricio Hernández-Ávila, et al., "Twenty-three Years of Public Policy Towards Universal Health Coverage in Mexico: A Cross-Sectional Time-Series Analysis Using Routinely Collected Health Data, 2000–2022," *The Lancet Regional Health — Americas* 52 (2025): 101271.

10 Gómez-Dantés, Serván-Mori, Cerecero, et al., "Mexico's Health System, 2023."

11 Svetlana V. Doubova, Hannah H. Leslie, Ricardo Pérez-Cuevas, Margaret E. Kruk, and Catherine Arsenault, "Users' Perception of Quality as a Driver of Private Healthcare Use in Mexico: Insights from the People's Voice Survey," *PLoS ONE* 19, no. 6 (2024).

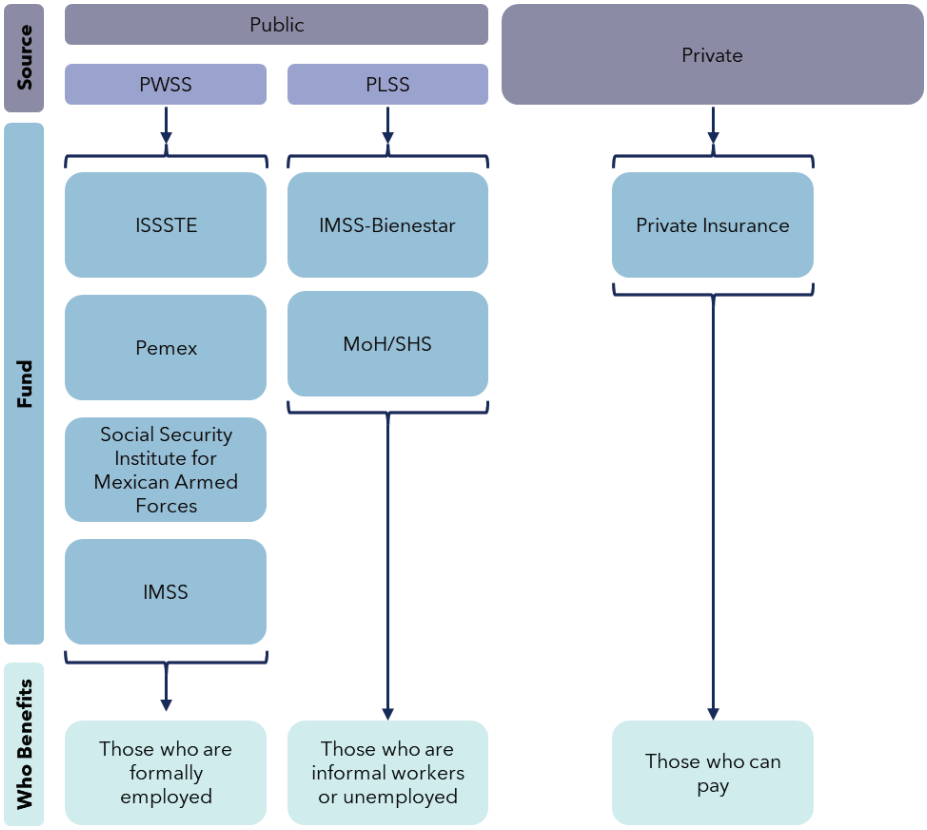

Figure 3. The healthcare system in Mexico[12]

for the presence of abnormal cervical cells.[13] This screening is conducted every five years. According to 2019 data, only 76 per cent of eligible patients in Mexico were screened by any test in the past five years, with around 12 per cent never being screened in their lifetime.[14] These rates, unfortunately, do not meet the WHO CC elimination targets, which aim for 70 per cent of women to be screened by 35 years of age and again by 45 years of age.[15] Increasing screening coverage is therefore essential for reducing mortality and improving the cost-effectiveness of care.

Outside of Mexico, combinations of vaccination and screening for CC have shown success, with Australia, another country with many remote communities, on track to eliminate CC by 2035.[16] Australia credits their reduction in cervical cancer to widespread HPV vaccine uptake, though inequity across uptake, particularly among Indigenous adolescents, remains an urgent challenge.

Besides CC, mammography screening for breast cancer has increased in Mexico, with coverage ranging from 49 to 92 per cent of women, depending on health insurance type.[17] These improvements reflect what can occur when preventative care is prioritized across stakeholders and backed by investment. Mexico substantially increased the number of mammography machines available and deployed a national action plan, with nongovernmental organizations further supporting promotion. Exploring other healthcare systems and disease-screening programs may provide models and approaches to support efforts to reduce CC in Mexico.

12 Adapted from Gómez-Dantés, Serván-Mori, Cerecero, et al., "Mexico's Health System, 2023."

13 Jan M.M. Walboomers, Marcel V. Jacobs, M. Michele Manos, et al., "Human Papillomavirus Is a Necessary Cause of Invasive Cervical Cancer Worldwide," *The Journal of Pathology* 189, no. 1 (1999): 12–19.

14 Ginna Fernández-Deaza, Beatriz Serrano, Esther Roura, et al., "Cervical Cancer Screening Coverage in the Americas Region: A Synthetic Analysis," *The Lancet Regional Health — Americas* 30 (2024): 100689.

15 "Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem," World Health Organization, November 2020.

16 "Australia on Track to Eliminate Cervical Cancer by 2035," Media Release, November 2025, Australia Ministry of Health.

17 Sean P. McClellan, Karla Unger-Saldaña, John M. Neuhaus, et al., "Mammography Prevalence in Mexico from 2001-2018: Results from the Mexican Health and Aging Study," *Preventative Medicine Reports* 32 (2023): 102150.

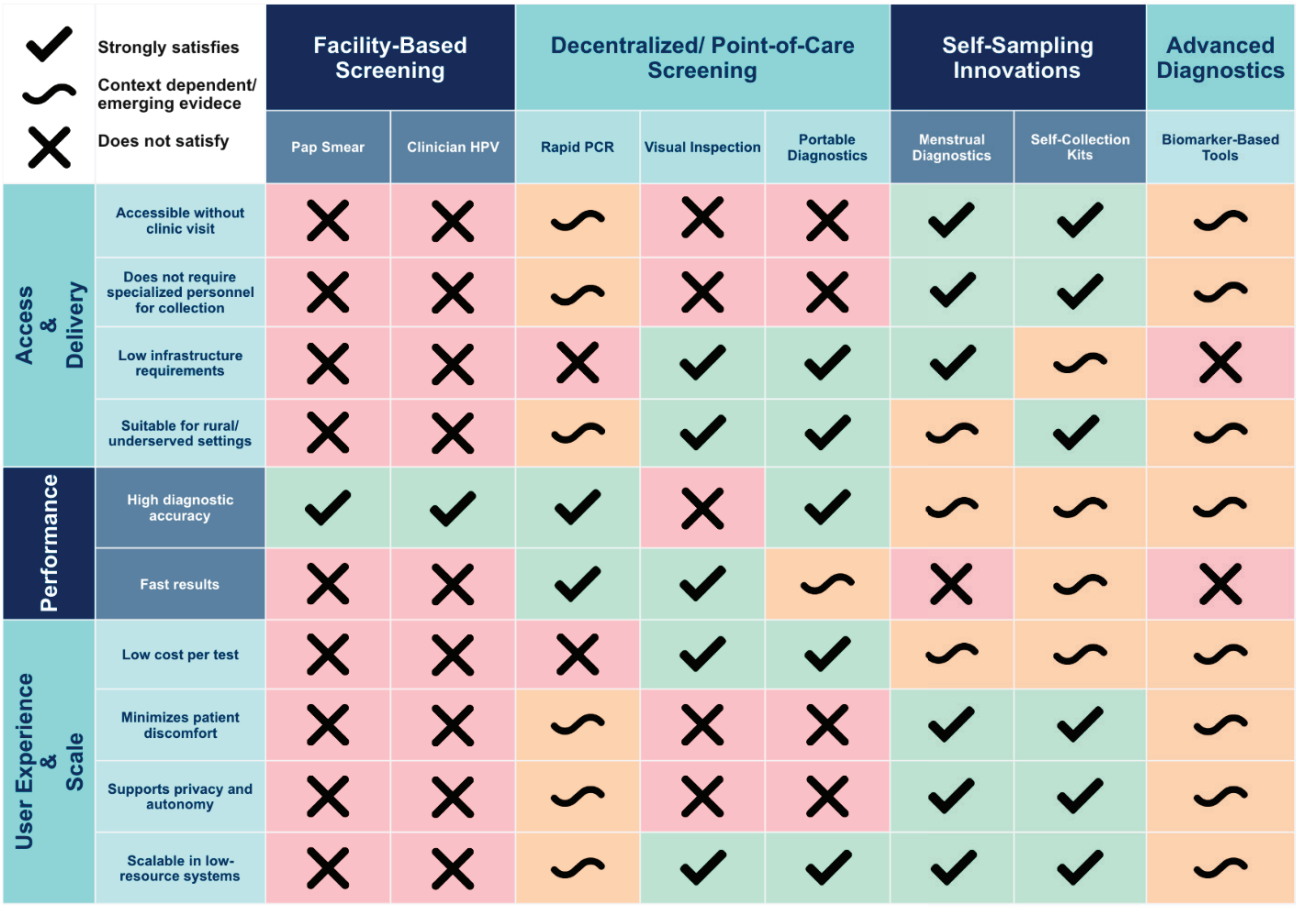

Figure 4. Comparing cervical cancer screening approaches by access, performance, and scalability

Emerging Role of Self-Tests

While testing for HPV relied on the collection of cervical cells similar to that of a traditional Pap exam, recent research has shown that self-collection of cells directly from the vagina without having to reach the cervix achieves sufficient sample quality. This approach is increasingly being positioned as a complementary strategy to address persistent gaps in CC screening in Mexico. It allows women to collect samples themselves, either at home or in community settings, and send the sample to a traditional lab, reducing reliance on clinic-based infrastructure. This reduces structural barriers to screening by lowering indirect costs, expanding access for women in underserved regions, and alleviating pressure on constrained health systems. By shifting part of the screening process outside traditional clinical settings, self-sampling has the potential to improve coverage among populations that clinic-based programs currently miss.

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Simultaneously, self-sampling addresses many socio-cultural barriers. Studies in Mexico and comparable settings show that women report greater comfort, privacy, and autonomy with self-collection compared to clinician-administered cervical screening tests.[18]

In terms of effectiveness, HPV self-sampling has comparable sensitivity to clinician-collected samples for detecting high-risk HPV infections, making it a reliable screening tool. It therefore represents a promising solution within broader efforts to expand equitable and timely cervical cancer screening in Mexico. As Figure 4 illustrates, while self-sampling reduces access barriers, its success remains dependent on downstream diagnostic infrastructure, such as transportation and processing of samples, as well as follow-up and care pathways. Taken together, these limitations highlight opportunities to create complementarities across the care pathway, where each modality addresses the other's limitations, thereby improving diagnostic accuracy, reducing attrition between stages, and increasing overall screening effectiveness.

Countries like Canada and Australia have recently shifted away from traditional pap smear tests toward primary HPV testing. In this scenario, self-sampling devices have gained attention as a way to expand coverage. However, critics argue that this shift requires caution because HPV testing identifies the presence of only high-risk viral infection, and only cytology can directly evaluate cervical cell abnormalities. Moreover, some studies have shown that 3 to 8 per cent of CC cases are not associated with HPV, so some model of cervical cell testing is still needed in the fight against CC.[19]

Aiming to fill this gap and provide a more comprehensive screening approach, GSE Biomedical, a medical device company based in Mexico, is developing a self-sampling device to collect cervical cell samples for both Pap and HPV testing (Figure 5). This device integrates multiple diagnostic approaches into a single collection pathway, rather than relying on one modality. It also enables a single self-collected sample to be used for multiple downstream analyses by providing the high yield of cervical cells needed for both tests. For example, an initial HPV-based screening result could be followed by cytological analysis without requiring another sample. This may be particularly important in contexts where follow-up is difficult: reducing the need for an additional collection step could help lower barriers, improve continuity, and make screening more efficient for women. Additionally, as a local company based in Hermosillo, Sonora, GSE Biomedical is well-positioned to adapt this solution to local realities which is especially important when considering implementation feasibility and long-term sustainability. Local manufacturing may provide a more viable pathway to lowering production costs, improving supply chain responsiveness, and supporting broader distribution, all of which are important for the equitable scale-up of CC screening innovations.

RELEVANCE TO SUSTAINABLE DEVELOPMENT GOALS

Expanding CC screening in Mexico, particularly through self-sampling, offers important contributions to several United Nations Sustainable Development Goals (SDGs), including:

SDG 3 – "[ensuring] healthy lives and [promoting] well-being for all at all ages" because self-sampling expands CC screening access, enabling early detection and treatment while reducing structural barriers and mortality among underserved populations.

SDG 5 – "[achieving] gender equality and [empowering] all women and girls" because self-sampling for CC enhances autonomy, privacy, and control over reproductive health decisions while reducing socio-cultural barriers to accessing care.

SDG 17 – "[strengthening] the means of implementation and revitalize the Global Partnership for Sustainable Development" because scaling effective screening solutions requires coordinated efforts across public, private, and non-profit actors to support funding, delivery, education, and follow-up care for equitable impact.

18 Lucybeth Nieves Arriba, Christine Enerson, Suzanne Belinson, et al., "Mexican Cervical Cancer Screening Study II: Acceptability of Human Papillomavirus Self-Sampler," *International Journal of Gynecological Cancer* 20, no. 8 (2010): 1415–23.

19 Jae-Eun Lee et al., "Untold Story of Human Cervical Cancers: HPV-Negative Cervical Cancer," *BMB Reports* 55, no. 9 (2022): 429–38.

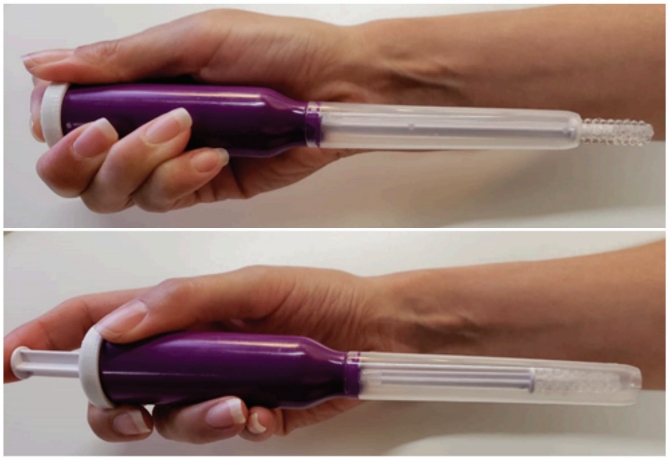


Figure 5. Prototype of GSE Biomedical's self-collection device for cervical cancer screening

Hardest to Reach

In Mexico, disparities in CC and HPV screening are concentrated among women facing overlapping geographic, socioeconomic, cultural, and institutional barriers:

- Indigenous women
- low-income women
- women with low education and health literacy
- women in southeastern states and rural areas
- adolescent and senior women
- women in extreme poverty.

While these categories identify who is most affected, the barriers themselves cut across groups and are best understood through specific patterns of exclusion. For example, migrant workers, particularly seasonal agricultural labourers, experience disrupted continuity of care as a result of constant movement between rural and coastal regions. Despite legal entitlements, access is constrained by documentation requirements and limited service availability. A 2025 report found that 29 per cent of migrant women who sought care could not resolve their health issues, while 38.6 per cent relied on self-medication due to lack of access.[20] Language barriers, stigma, and discrimination, especially among Indigenous and non-Spanish-speaking women, further restrict access to information and services.

Another central issue is the lack of awareness and education among adolescents. Almost 80 percent of adolescent girls have low knowledge of cervical cancer, and 47 percent are unaware of the HPV vaccine,[21] even though sexual activity often begins during adolescence: 13.9 percent of women aged 12 to 19 report having had sexual intercourse, with 20.9 percent not using contraception during their first encounter.[22] This combination of early sexual exposure and low awareness means many young women do not develop the knowledge or preventive habits needed to seek screening once eligible, creating a life-course coverage gap in which early prevention is missed and diagnoses are more likely to occur at later stages.

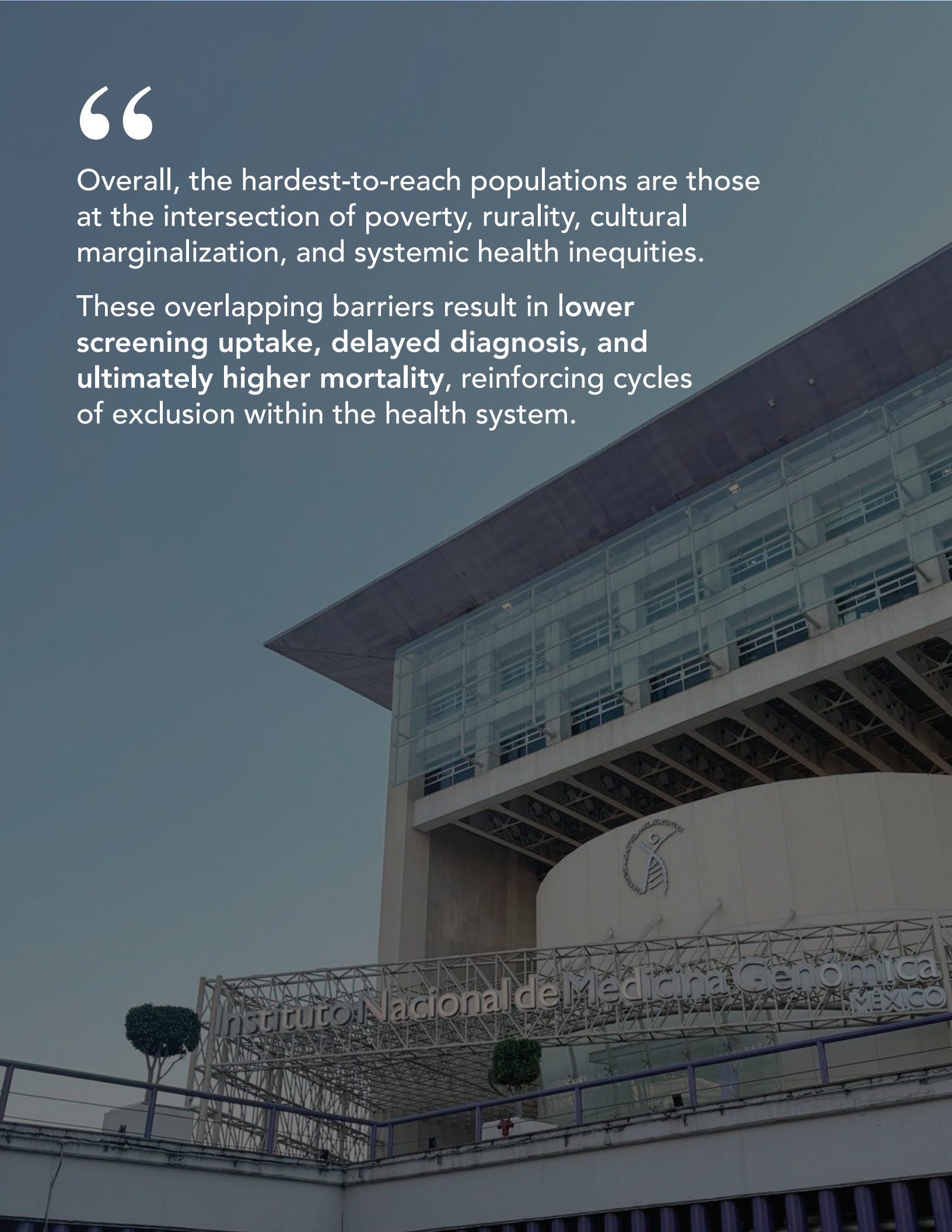
Economic constraints further exacerbate these vulnerabilities. Even when screening is nominally free, indirect costs such as transportation, lost wages, and follow-up care make preventive services inaccessible for women in poverty, leading to immediate survival needs being prioritized. These barriers are compounded by factors such as Indigenous identity, limited education, and restrictive gender norms, which can limit women's autonomy in seeking care. In some cases, screening becomes a negotiated or constrained decision shaped by partner approval and broader social expectations.

Overall, the hardest-to-reach populations are those at the intersection of poverty, rurality, cultural marginalization, and systemic health inequities. These overlapping barriers result in lower screening uptake, delayed diagnosis, and ultimately higher mortality, reinforcing cycles of exclusion within the health system.

20 Centro de Estudios en Cooperación Internacional y Gestión Pública (CECIG), Las Vanders, Instituto para las Mujeres en la Migración (IMUMI), and Red Mesoamericana Mujer, Salud y Migración (RMMSyM). 2025. *Informe Alternativo al Estado Mexicano Sobre la Situación de las Mujeres en Movilidad Humana, CEDAW 2025.*

21 Elda Carreón Moreno and Carmen Cerón Garnica, "Educación para la salud en adolescentes: Un estudio sobre el cáncer cervicouterino y su prevención," *Revista Científica De Salud Y Desarrollo Humano* 6, no. 4 (2025): 1028.

22 *Estudio sobre la Estrategia de Educación Integral en Sexualidad en Educación Básica en México*, CONEVAL, 2025; "Cerca de 20% de las personas de 12 a 19 años no usó algún anticonceptivo en su primera relación sexual," Secretaría de Salud, 2023.



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These overlapping barriers result in **lower screening uptake, delayed diagnosis, and ultimately higher mortality**, reinforcing cycles of exclusion within the health system.

Figure 6. Research team in discussions with different stakeholders at the National Institute of Cancerology (INCAN) (left) and at Tecnológico de Monterrey, Mexico City Campus

About Our Research

We used a qualitative approach to examine barriers to equitable CC screening in Mexico and to better understand the potential of self-sampling as an intervention to improve access. Our analysis focuses specifically on how structural, socio-cultural, and health system factors shape self-sampling approaches' acceptability and implementation.

Our team conducted one week of field research in Mexico City and Hermosillo, Mexico, consisting of semi-structured interviews with a range of stakeholders engaged in CC screening, women's health service delivery, research, policy, and implementation. We organized these stakeholders into one or more of five main groups according to their expertise: patient experience, policy and regulation, technology, industry and distribution, and financial and economic factors. This structure reflected our intention to understand the intervention from multiple angles. Our final sample included 28 interviewees, including public health authorities, oncologists, professors, and researchers (see Table 1).

We used a semi-structured interview guide with pre-developed questions and probes tailored to our stakeholder groups. This provided a consistent foundation across interviews while still allowing us to explore multiple perspectives on the same topics. The semi-structured nature of the interviews also let conversations evolve based on each participant's expertise, lived experience, and the discussion's direction. It aided participants in sharing detailed perspectives on the practical, social, and institutional factors that influence screening access and uptake. To maintain confidentiality, we de-identified the data before analyzing it using a structured coding approach to identify recurring themes and connect different pieces of knowledge. We aimed to move beyond the question of whether this intervention is promising in theory and instead examine what would be required for it to work in practice, especially for the populations most often left out of existing screening pathways.

Table 1. Types of interviewees included in research

Interviewee Type	Number
Public health officials	14
Health researchers	3
Applied science professors	7
Physicians	4
Total	**28**

Health System Entry Points

Introducing a self-collection device in Mexico requires navigating a segmented and unequal health system where entry points vary by population. Public institutions such as IMSS, ISSSTE, and IMSS-Bienestar serve distinct groups, resulting in differences in costs, quality, and services. Implementing a self-sampling device cannot follow the same pathway across the country; instead, it should be tailored to each subsystem. For example, IMSS and ISSSTE might integrate the device into existing screening programs for formally insured populations. Simultaneously, IMSS-Bienestar could be the primary entry point for reaching rural women, who are often the intended beneficiaries of self-collection technologies.

However, in practice, many insured and uninsured women access care outside formal public channels. The Programa Institucional IMSS-Bienestar 2025–2030 report identifies growing reliance on private providers, with clinics and pharmacy-based services often serving as first points of contact. This pattern reflects structural inequalities in both disease burden and access. As one physician notes, "In the morning at the public hospital, I have twenty cervical cancer patients in a day. In the private clinic, in the afternoon, I may have one patient with cervical cancer." This contrast underscores the concentration of cervical cancer among women reliant on the public system, while private-sector patients present less frequently.

For implementation, this points to a dual strategy: private providers can serve as accessible distribution points for women deterred from public facilities by long wait times, distance, or perceived low-quality care. However, because the burden of disease is concentrated in the public system, integrating the device into public-sector pathways remains essential to reach those at highest risk. Out-of-pocket payments remain common, reinforcing that affordability and pricing strategies will directly affect uptake in alternative entry points.

A major implementation barrier is the disconnect between federal and state systems. Decentralization has produced fragmentation, administrative inefficiencies, weak coordination, duplication, and insufficient infrastructure. These dynamics contribute to delays, weak referral systems, and high loss to follow-up. Screening quality further compounds these gaps: Pap tests may have a sensitivity as low as 40 per cent, with results taking three to six months, undermining retention and trust.[23]

> "In the morning at the public hospital, I have **twenty** cervical cancer patients in a day. In the private clinic, in the afternoon, I may have **one** patient with cervical cancer.

Implementation must therefore be adapted at the state level to reflect differences in health system contexts. Some states have stronger screening infrastructure and can integrate the device into existing programs, while others lack the administrative capacity, trained personnel, or laboratory networks required to process HPV samples, thereby limiting effective implementation.

Insurance coverage gaps further shape feasibility. In 2018, 69.6 million people lacked access to public health institutions, and even programs like Seguro Popular, which covered 57.1 million people, did not ensure effective service delivery.[24] Self-collection devices can address these gaps, but only

23 Ávila Ventura and Martha Soledad, "Iniciativa con proyecto de decreto por el que se reforman y adicionan diversas disposiciones a la Ley de Salud de la Ciudad de México en materia de prevención y detección del cáncer cervicouterino," Mexico City, 27 March 2025.

24 Programa Institucional IMSS-BIENESTAR 2025-2030.

if distribution explicitly targets uninsured populations beyond formal institutional channels.

Financial inequalities across the system also affect feasibility. Per capita spending is significantly lower for uninsured populations (6,351 pesos) than for insured groups (8,886 pesos), a difference of 28.53 per cent.[25] This limits the capacity of under-resourced systems such as IMSS-Bienestar to adopt new technologies. Successful implementation will likely require low-cost production, external funding, or partnerships with NGOs and international organizations.

Finally, effective implementation requires distinguishing regulatory approval from real-world acceptability. Even if a self-collection device is clinically validated and approved, it may not be used if women do not trust the technology, do not understand how to use it, or do not feel comfortable performing the test themselves. Health system reforms fail not because of a lack of coverage, but because of weak planning and implementation, and a lack of evaluation. This means that feasibility studies, pilot programs, and community engagement must accompany clinical validation. A successful introduction depends on aligning the device with multiple entry points, ensuring affordability, adapting to state-level variation, and building trust within a fragmented system where coverage does not guarantee use.

Deployment and Distribution of the Device

Access refers to how physically, financially, and socially easy it is for women to obtain and use the device. For the hardest to reach in Mexico, especially those living in rural areas and care deserts, the distance to healthcare facilities increases transportation costs.[26] It disrupts daily routines, further reducing access to care. These realities highlight that access to screening and care must account for the broader logistical conditions that shape women's ability to navigate the health system.

Public-Sector Models for Decentralized Screening

While conventional hospital-based screening may be effective for some populations, Mexico has already seen emerging models that bring screening closer to communities and reduce reliance on traditional healthcare facilities. In the public sector, mobile and decentralized approaches bring services closer to communities. For example, the Secretaría de Salud's Unidad Médica Estacional is a temporary mobile service model that uses a trailer to deliver breast cancer screening, increasing coverage and facilitating access for women living in more isolated regions. During one of the interviews, a public health official compared this model with current cervical cancer screening in isolated communities: "That is what is done in traditional Pap smears. A van comes. They gather everyone; they give the talks; there is no shame — they invite everyone to come in. The samples are taken and returned to a central lab so they can be interpreted — bringing the service close to them." Moreover, under IMSS-Bienestar, services for Indigenous and rural communities are delivered through rural medical units and brigades, reflecting a broader strategy of bringing care closer to communities with limited access to fixed health facilities. In the first half of 2025, IMSS reported providing more than 2 million consultations to Indigenous populations through these models.[27]

Importantly, this approach also focuses on culturally relevant care. Health information was translated into dozens of Indigenous languages, disseminated through the Indigenous Cultural Radio Network, and supported by healthcare workers, volunteers, traditional doctors, and community midwives. This example is especially relevant to the potential

25 Ibid.,15–18.

26 Care deserts are geographic areas with limited essential service access.

27 "IMSS Expands Healthcare Access in Indigenous Rural Areas," Mexico Business, 12 August 2025.

deployment of a self-sampling device because it shows that effective access in rural and underserved regions depends heavily on trust, local engagement, linguistic accessibility, and culturally sensitive delivery.

Private-Sector Alternatives

Private and nonprofit companies have also developed programs and initiatives to promote and deliver access. A good example is *Salud Digna*, a nonprofit provider of diagnostic services that has expanded access to low-cost preventive care across Mexico. Salud Digna offers laboratory and diagnostic tests, radiology screening, and optical exams, all through outpatient clinics. Specifically, in response to the need for broader coverage of CC screening, it partnered with the bank BBVA in 2023 to launch the six-month Aliados por la Salud campaign. This campaign provided more than 500,000 free CC screening tests using real-time PCR for HPV detection alongside Pap co-testing. Women from across the country were able to register on the website for an appointment at no cost. Salud Digna's large-scale reach at lower-to-no cost demonstrates the capacity of an established network to expand preventive services beyond conventional channels. While integrating the device into Salud Digna's clinics may strengthen connections to formal care, laboratory processing, and follow-up, this model still sometimes struggles to reach geographically isolated communities.

Other Distribution Channels: Pharmacies and Community Health Workers

A self-sampling device could be distributed through several other private channels. Pharmacies represent one possibility, particularly given their broad geographic reach. For example, in one model pharmacies could both distribute the device and collect samples, facilitating access and continuity by allowing women to complete multiple steps of the screening process in the same location. Trusted pharmacy chains might also offer an advantage through centralized data systems that can support standardized patient registration, sample tracking, and communication across sites. This infrastructure could streamline the experience for women moving through the screening process. However, while pharmacies offer convenience, they also provide less support for clinical counselling and continuity of care.

Community health workers may be particularly valuable in reaching women in remote or underserved communities, where trust and direct engagement are essential for successful uptake of any initiative. For example, *Compañeros En Salud*, the Mexico-based chapter of Partners in Health, has a mission grounded in a broader commitment to health equity for populations facing poverty and structural exclusion. In practice, this includes training community health workers from the same communities they serve, enabling them to provide not only screenings and health education, but also accompaniment, emotional support, and assistance navigating the health system. Since 2011, the organization has trained community health workers from rural communities in Chiapas to provide screenings, education, home visits, and health system navigation, demonstrating how locally embedded actors can strengthen both access and trust. Similarly, organizations such as the *Club de Leones* and the Mexican Red Cross could help raise awareness, support outreach efforts, and foster local engagement, especially in isolated communities. That said, while community-based approaches may be best positioned to reach underserved populations with higher trust, they often require training, staffing, and sustained investment to operate effectively.

This complex scenario highlights the need for partnerships across public, private, and community-based actors. Federal agencies and public institutions such as IMSS-Bienestar could play important roles in aligning the intervention with current agendas and integrating the device into existing programs. Private and nonprofit actors such as Salud Digna may offer valuable operational expertise and capacity through established networks and experience delivering preventive services at scale nationwide. Community-based organizations and trusted humanitarian actors might also help promote awareness and build trust and local engagement, especially in isolated communities. Overall, a successful implementation of self-sampling devices for CC in Mexico will likely depend on combining and adapting multiple delivery channels via cross-sector partnerships.

Figure 7. Public health institutions visited in Mexico City and Hermosillo. Research team at the National Institute of Cancerology (left) and the National Institute of Respiratory Diseases (middle) in Mexico City, and the Coordination of Strategic Health Services and Projects in Hermosillo (right).

Understanding User Experience

Before women might accept self-screening, they will likely go through four stages: awareness of cervical cancer, considering testing, deciding about testing, and then actually getting screened.

Stage 1: Awareness

Awareness of HPV, CC, and screening protocols remains low and uneven, especially in rural and underserved populations. One interviewee noted, "the majority of people don't have the idea. Who needs to do the test, when you need to do the test, and how to do the test." Some individuals are unaware of screening altogether or perceive it as unnecessary. Misconceptions about HPV and CC further reduce perceived risk and lower motivation to adopt new screening methods. For example, some women believe screening is unnecessary in the absence of symptoms or that lack of sexual activity eliminates risk. Additionally, the belief that vaccination eliminates the need for continued screening further suppresses uptake. Awareness is often limited to passive, clinic-based interactions, restricting reach to those already engaged with the healthcare system and excluding harder-to-reach populations.

Education is key for addressing these gaps, but existing efforts are fragmented and urban-centred. Although sexual education is included in schools, it remains inconsistent, and teachers often lack adequate training, leading to superficial information. Furthermore, many older adolescents are not enrolled in school which limits the reach of school-based interventions and highlights the need for broader community-based education. Mass media, particularly telenovelas, television, and widely consumed entertainment formats, may shape public understanding of health, functioning as informal but highly influential sources of information. Effective strategies therefore require aligning communication channels, including these media platforms, simplifying messaging, and adapting materials to different literacy and cultural contexts.

Low health literacy, language barriers, and a lack of culturally adapted materials, especially in Indigenous communities, compound these challenges. For instance, Indigenous, low-income women living in rural states such as Chiapas, Puebla, and Jalisco

often speak Indigenous languages like Nahuatl or Tutunakú, which reduces their ability to understand Spanish screening information. As a result, information is often available but not actionable, leading to missed screening. Screening rates remain extremely low with CC mortality being significantly higher in Indigenous-majority areas, reaching about 17 deaths per 100,000 vs. 9 nationally.[28]

Trust and cultural relevance are central to any program's success. People often view government messaging skeptically, whereas academic institutions, NGOs, and community-based actors are considered more credible, a perception that directly influences whether individuals believe and act on new information. As another interviewee noted, "You need to ally with local champions … someone who the community recognizes." Local leaders, midwives, or trained health promoters play a critical role in translating information, addressing misconceptions, and encouraging uptake, thereby driving adoption. Programs that leverage trusted intermediaries and tailor messaging to local norms are significantly more effective as they simultaneously reduce informational and psychological barriers. In Mexico, door-to-door initiatives such as *Salud Casa por Casa*, promotora programs pioneered by organizations like Federación Mexicana de Asociaciones Privadas, and the national HPV vaccination program successfully deliver culturally adapted education and subsequent health services through trusted local actors and institutions, improving uptake by addressing stigma, low awareness, and gender norms.

Stage 2: Consideration

Once women are aware of CC, they evaluate whether to engage with CC or HPV screening within contexts shaped by distrust, cultural norms, and psychological constraints. Interviewees repeatedly described distrust as a response to broader institutional failures. As one participant explained, "many people think that the information that comes from the government is not reliable." This distrust is reinforced by negative perceptions of providers, especially when patients fear unnecessary or poorly explained procedures: "here we have medical practicers … some of them are malicious … the doctor … says that you need to do this procedure, but then you do not really need that … It's both. I mean, it's financial [incentives], but it's also ignorance." At the system level, distrust is compounded by unequal access, cost, and long waiting times, with one interviewee noting that the public system is "saturated," while private care "costs," leaving those without resources to wait for care.

Cultural norms and stigma further shape decision making, but these are not uniform across the country. As one interviewee noted, "Mexico has many faces ... One is here in the city, but ... you can [also] find other kinds of people, other kinds of mentalities in little towns, little cities." Further, feelings of embarrassment and modesty, often described as "*pena*," are a dominant barrier, particularly in rural and smaller communities.[29] This reflects deeply rooted cultural norms around reproductive health, where exposing one's body, especially to male providers, is associated with shame.

Psychological barriers, especially fear, are among the most significant deterrents at this stage. Fear operates in multiple ways: fear of the procedure, fear of pain, and fear of the results. In one study, 75.4 per cent of women identified fear of results as a major barrier to screening.[30] Additional concerns specific to self-screening include fear of self-harm during testing (reported by 54.1 per cent of women) and discomfort with touching one's genital area (16.2 per cent).[31] These fears create hesitation even when services are available.

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28 Betania Allen-Leigh et al., "Barriers to HPV Self-Sampling and Cytology among Low-Income Indigenous Women in Rural Areas of a Middle-Income Setting: A Qualitative Study," *BMC Cancer* 17, no. 1 (2017).

29 M.M. Watkins, C. Gabali, M. Winkleby, E. Gaona, and S. Lebaron, "Barriers to Cervical Cancer Screening in Rural Mexico," *International Journal of Gynecological Cancer: Official Journal of the International Gynecological Cancer Society* 12, no. 5 (2002): 475–79.

30 Lucybeth Nieves Arriba, Christine L. Enerson, Suzanne Belinson, Loyd Novick, and Jerome Belinson, "Mexican Cervical Cancer Screening Study II Acceptability of Human Papillomavirus Self-Sampler", *International Journal of Gynecological Cancer* 20 (2010): 1415–1423.

31 Ibid.

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Mexico has many faces ... One is here in the city, but ... you can [also] find other kinds of people, other kinds of mentalities in little towns, little cities.

Finally, questions of autonomy and privacy shape whether women move forward with screening. Concerns about bodily exposure, lack of female providers, and limited control over healthcare decisions all reduce willingness to engage. Privacy-related anxiety alone accounts for a substantial portion of nonparticipation and is compounded by broader concerns about trust and gender norms.

Overall, these findings show that self-collection technologies cannot be treated as purely clinical tools; they must be designed and framed to respond directly to distrust, stigma, fear, and misconceptions in the user experience. This means prioritizing privacy-first design, such as discreet packaging and a simple, non-invasive shape, while using clear instructions and culturally sensitive communication to reduce fear, normalize use, and explain why screening matters even without symptoms. Given people's distrust in institutions, the device should be introduced through trusted intermediaries, such as community health workers or female providers, while emphasizing user control and autonomy throughout the process.

Stage 3: Decision Making

Decision making about whether women receive cervical screening is influenced heavily by their household dynamics, with conflicting perspectives on how they impact women seeking care. In some contexts, women may lack autonomy over their own healthcare decisions, with male partners or family members deciding on their behalf. The father may decide whether his daughter receives an HPV vaccine; later, the husband may decide whether his wife receives CC screening.

The role of the male partner is especially pronounced. From an epidemiological standpoint, men are carriers who can transmit HPV to their partners, with increasing risk based on their sexual contacts. In rural areas, especially, men may discourage their female partners from seeking pelvic exams from male healthcare providers. Given the man's impact on household finances, they often have final decision-making power over health. Consequently, women with CC were six times more likely than women without cervical cancer to report low spousal acceptance of screening.[32] A lack of overall awareness and the impact of *machismo* culture were identified during our interviews as drivers for men's views on CC screening. For example, one interviewee commented, "So you have a woman there who wants to get it done, who hasn't had a checkup in a long time. And here's where the issue of machismo comes in ... They even must get their husbands'permission." This is a challenge when 66.3 per cent of husbands prevent their wives from being tested.[33]

Conversely, women play a key role in healthcare within the household, often focusing on other family members' health to the point of neglecting their own. Some women view healthcare as their sole responsibility, seeing themselves as responsible for their own health and avoiding partner involvement, according to a 2007 study by Pelcastre-Villafuerte.[34] Men accompanying their wives to screening reported that their daughters typically suggested their mothers undergo screening, highlighting the need to see the entire household as influential to decision making.[35]

Consequently, strategies for deploying CC self-screening should consider how to include other household members, such as fathers, male partners, and daughters, in education and as targets for advocacy. With successful deployment, CC self-screening can empower women to be more involved in their own proactive healthcare and encourage male partners and families to support, together prompting women to decide to undergo screening.

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32 Kristin M. Wall, Georgina Mayela Nuñez Rocha, Ana María Salinas-Martínez, Sarah Baraniuk, and R. Sue Day, "Modifiable Barriers to Cervical Cancer Screening Adherence Among Working Women in Mexico," *Journal of Women's Health* 19, no. 7 (2010): 1263–70.

33 Arriba et al., "Mexican Cervical Cancer Screening Study II Acceptability."

34 Blanca E. Pelcastre-Villafuerte, Laura L. Tirado-Gómez, Alejandro Mohar-Betancourt, and Malaquías López-Cervantes, "Cervical Cancer: A Qualitative Study on Subjectivity, Family, Gender and Health Services," *Reproductive Health* 4, no. 2 (2007).

35 Ibid.

Stage 4: Usage

Given that stigma, fear, pain, and embarrassment are closely associated with why women avoid conventional Pap smear screening, the design and implementation of a self-sampling device must take these factors into account. The value of a self-sampling device lies in its ability to address the emotional, cultural, and practical barriers that shape women's screening experiences in the first place.

For many women, screening at home would offer greater privacy, convenience, and autonomy than conventional clinic-based screening. Home-based self-sampling may therefore reduce both practical and emotional barriers by allowing women to engage with screening in a setting that feels more private and controllable. This represents an important shift in healthcare dynamics, empowering women to take a more active role in their own health and well-being while promoting greater autonomy in screening decisions, transforming the user journey as Figure 8 illustrates.

However, greater autonomy does not automatically translate into ease of use and acceptability. The success of self-sampling devices for cervical cancer depends in part on whether users understand the process, trust that they are using the device correctly, and feel comfortable collecting the sample independently. Interview themes point to factors such as clarity of instructions, physical comfort, language accessibility, and confidence in the reliability of self-collection are likely to shape user experience.

To fully deliver the autonomy that self-sampling intends, the device must be accompanied by carefully designed instructional materials. Factors such as the wording and format of instructions, the language in which materials are provided, the use of visuals, and the overall simplicity of the process can strongly influence whether women feel confident engaging with self-sampling. Support materials must be developed with cultural sensitivity and accessibility in mind, particularly for women with limited familiarity with reproductive health

Note: Red text indicates barriers and remaining system requirements, while blue text indicates potential benefits and opportunities associated with self-sampling.

Figure 8. Current Pap smear pathway versus an envisioned self-sampling pathway for cervical cancer screening

terminology. Visuals can make instructions more intuitive and accessible, ensuring that women with different literacy levels understand how to use the device correctly. As one interviewee explained, "If it's a drawing, that's better, because we also have people who can't read. So, the drawing gives them an image of what they have to do even without knowing how to read." In this sense, usability is not only a matter of technical design, but also of communication, trust, and the extent to which the device feels understandable and approachable in real-world settings.

Besides direct delivery and complete autonomous use of the device, self-sampling technologies also offer another pathway of use that can be especially important for building the foundations of trust in a new technology — clinic-supported use, or use guided by a trusted healthcare worker. Some women may prefer to self-sample in a clinic setting, with support from trained staff to explain the process and ensure adequate collection. This approach may be particularly valuable for reaching communities where trust building is essential for the uptake of any new initiative or technology. Self-sampling devices could be delivered through programs supported by trained community healthcare workers and trusted champions, who can provide educational materials on cervical cancer, HPV, and the importance of screening, and explain the device's purpose and how to use it. As one interviewee suggested, "You instruct a midwife of the community. She instructs the women on how to take it, and 'I will bring it today, and I come in two or three days to collect the samples and take them.' ... We would have better results." This highlights the potential role of trusted community-based providers in making self-sampling feel more supported and complete.

When considering a healthcare worker or community-supported pathway, training is important. Clinicians, outreach staff, and community health workers would need to be trained not only in the device's technical use, but also in how to communicate about it in clear, nonjudgmental, and culturally sensitive ways. Training should therefore prepare them to address concerns related to stigma, fear, and misconceptions regarding CC screening, while helping women feel respected and supported throughout the process.

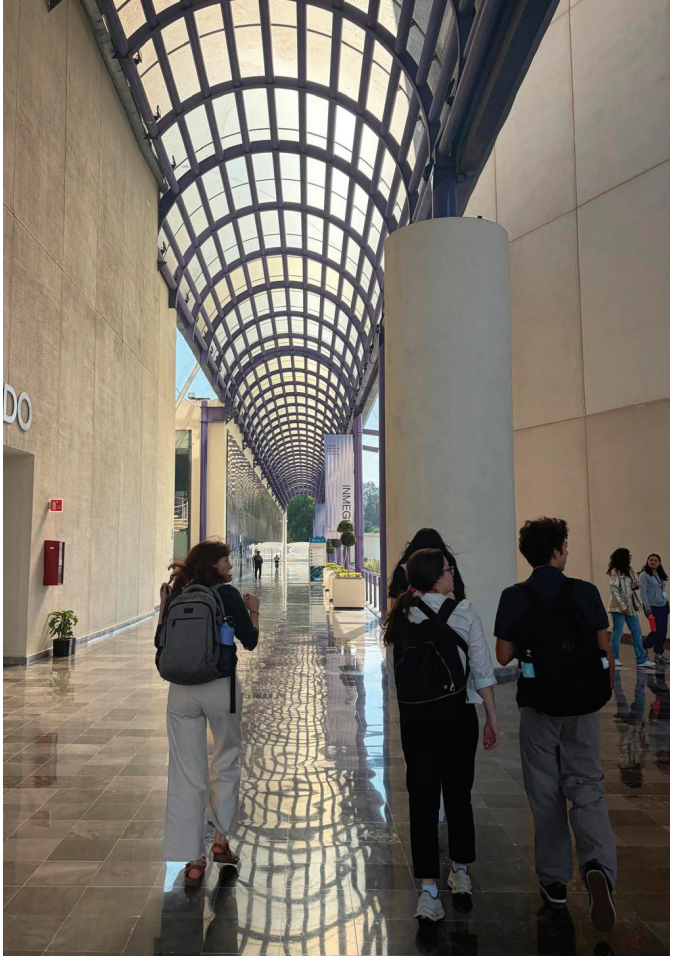

Figure 9. Reach Alliance team visiting the National Institute of Genomic Medicine, Mexico City (photo by Mariana Cavalca Monteiro Vieira)

Follow-up and Continuity of Care

For CC self-screening devices to increase access to screening, they need to be deployed within a functional system with continuity of care. After collecting and processing cervical samples, there must be pathways to return the results to the woman undergoing screening. Given the stigmatization surrounding HPV and CC, this process needs to deliver positive test results sensitively. For example, interviewees suggested that digital tools like WhatsApp or a custom mobile app might be used, but only if complemented by clinician involvement. As one interviewee shared, "[when] you don't have a favourable outlook, that result shouldn't be given to a patient like that, because she needs a support network."

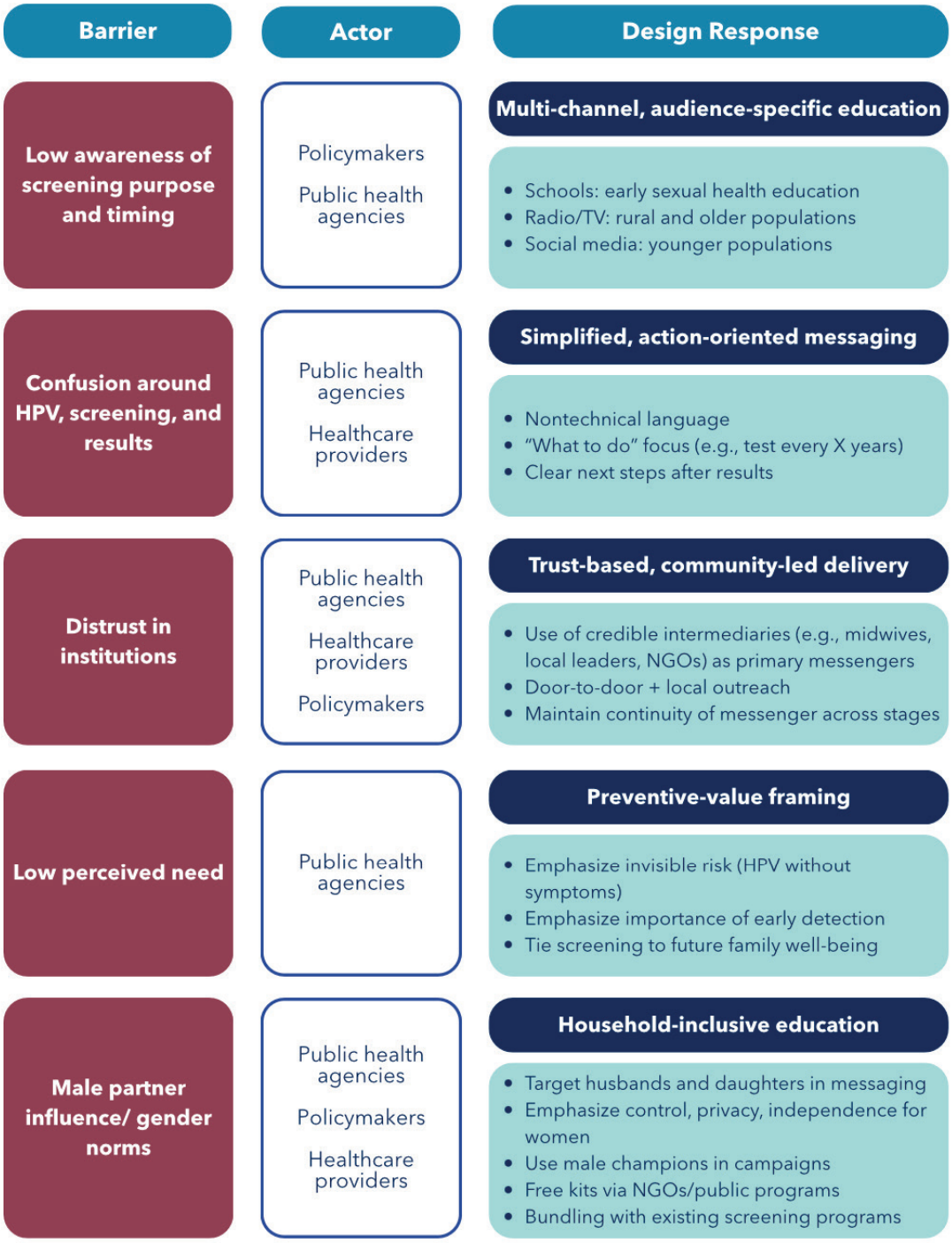

Figure 10. Patient-level barriers to screening and policy design response ideas

Once results are delivered, attendance at follow-up procedures, such as colposcopy, remains a significant challenge. Patients may avoid these procedures due to fear of receiving an unfavourable diagnosis or inconvenience similar to the initial screening. Weak referral pathways and poor coordination of care may also make it difficult for patients to understand how to obtain follow-up screening, even when they feel empowered to seek it. At the same time, access to diagnostic and treatment centres needs to match increased access to screening. Positive follow-up experiences are required to reinforce trust in the healthcare system. One strategy to help achieve this is to keep patients connected to the same healthcare institution, which can help build relationships and provide reassurance as they seek additional care. Together, these strategies treat CC self-screening devices as tools that need to be situated within systems of follow-up care.

Figure 11. Research laboratory at the National Institute of Cancerology (INCAN), Mexico City

Scaling for Long-Term Impact

The true impact of self-collection devices depends on whether they can be embedded in the broader health system in a way that is financially, politically, and operationally sustainable.

Scaling any health intervention requires moving from localized success to system-wide feasibility. For self-collection devices, this hinges on generating strong evidence not only about clinical effectiveness but also real-world performance. Policymakers must be convinced that the device improves screening uptake, maintains diagnostic reliability, and leads to higher rates of follow-up care in early stages of the disease.

One form of evidence is a cost-effectiveness or a cost-benefit analysis. In a resource-constrained system, interventions must justify their inclusion relative to competing priorities and alternatives. Demonstrating that self-collection reduces downstream costs such as late-stage cancer treatment by promoting early detection can strengthen the case for adoption, especially within underfunded public systems. However, this argument must be supported by economic modelling and pilot data that reflect local conditions. Later, studying and presenting the impact of self-screening on mortality and health system spending can motivate sustained investment.

Operational feasibility is another critical consideration. Scaling self-collection requires adequate laboratory capacity, reliable transport systems, trained personnel, and data infrastructure to manage patient records and results. Without these complementary investments at a national level, increased screening uptake might overwhelm existing systems, undermining both effectiveness and trust.

> “Scaling self-collection requires adequate laboratory capacity, reliable transport systems, trained personnel, and data infrastructure to manage patient records and results. Without these complementary investments at a national level, **increased screening uptake might overwhelm existing systems**, undermining both effectiveness and trust.

Even when strong evidence is presented, adoption is not guaranteed because of the additional complexity introduced by Mexico’s fragmented health system — federal and state actors may differ in priorities, resources, and implementation capacity. Preventive interventions, in particular, face structural disadvantages in Mexico’s policy environment, which tends to prioritize immediate, visible outcomes over long-term gains.

Figure 12. The team discussing the feasibility of the device's implementation with public health officials and researchers at the National Institutes of Health and High Specialty Hospitals, Mexico City (left) and at the Centre for Research in Policy, Population, and Health at the Universidad Nacional Autónoma de México (UNAM) (right).

Funding constraints further limit the ability to scale new technologies, particularly within under-resourced public systems. Introducing a self-collection device requires not only initial procurement but also sustained financing for distribution, processing, follow-up care, and program management. In this context, external partnerships with NGOs, international organizations, or private actors can play a significant role in early-stage scale-up. Still, long-term sustainability ultimately depends on government buy-in.

Positioning self-collection as a preventive care investment, rather than a stand-alone innovation, can help align it with broader public health goals. Emphasizing its role in improving outcomes while reducing long-term system costs strengthens its relevance within constrained budgets and competing policy agendas.

> "The fact that there is a device **doesn't translate into better access**, unless you include the device in a wider strategy for screening.

Lessons Learned for Actors Integrating Self-Screening into the Health Ecosystem

For self-screening devices to have a lasting impact, various actors play key roles in embedding them within health system pathways. As one interviewee noted, "The fact that there is a device doesn't translate into better access, unless you include the device in a wider strategy for screening." Policymakers and governments must treat CC as a priority in their agenda. This means investing financially to make the device affordable or free, and incorporating it into existing programs. Packaging services (e.g., with existing HPV vaccination or breast-cancer-screening programs) and coordinating these interventions to create a more comprehensive and coherent prevention strategy can improve both efficiency and outcomes. Treating CC as a priority also means investing in education, particularly by developing awareness programs for schools and rural communities that leverage the approaches we described earlier. Finally, tracking implementation and system change, such as through a national CC registry, enables a better understanding of whether continuity of care has been achieved. Throughout policy development, hard-to-reach populations need to be explicitly considered.

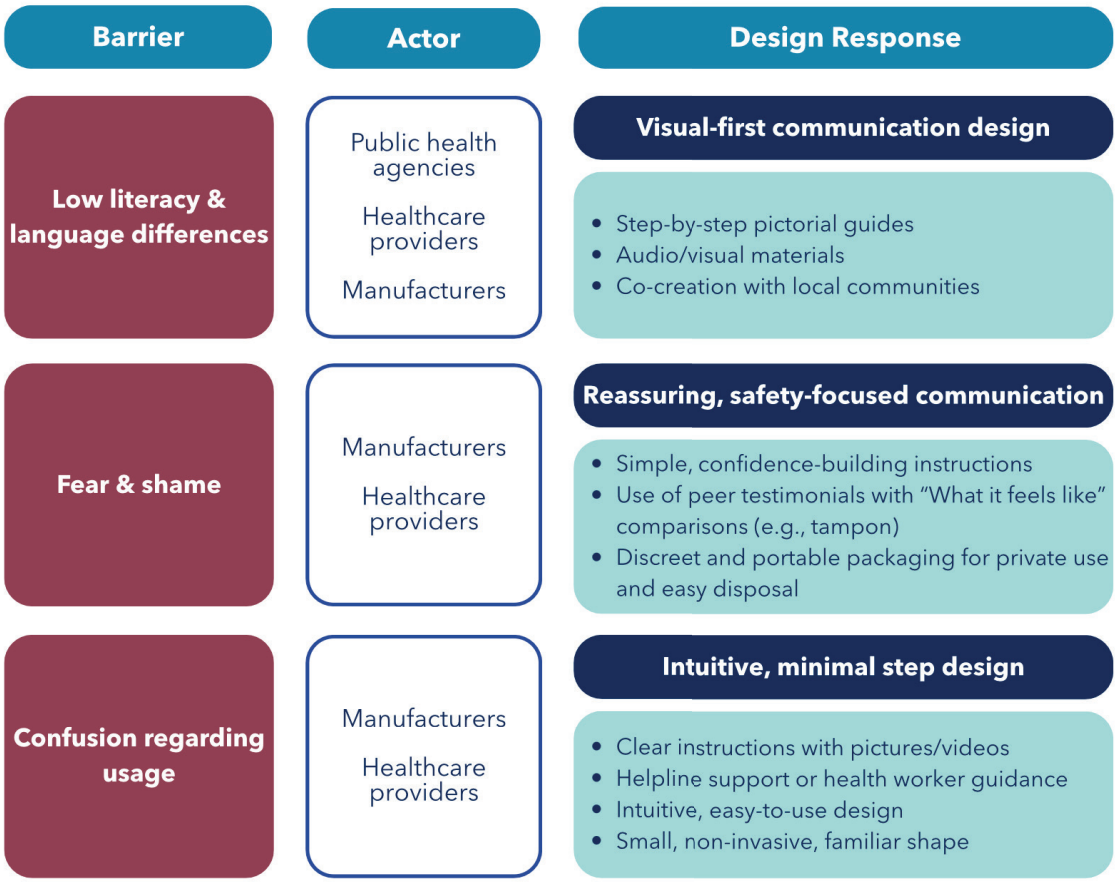

Figure 13. Device-related barriers to screening and product design response ideas

The private sector needs to ensure device production and delivery are affordable to enable access. Private provider models like Salud Digna highlight how programs can remain low cost and economically accessible. Partnerships are key for expanding reach and achieving operational efficiency, including those between medical device producers, pharmacies, clinics, and community programs.

The logistics of moving samples from patients to labs need to be explored, with labs prepared to scale their infrastructure to handle higher sample volumes. This would ensure that lab processing is not a bottleneck in screening programs, supporting timely delivery of results to enable quick intervention and continued trust building among women. Private-public collaboration will enable healthcare interventions to come together amid fragmentation and create continuity in the patient experience.

Healthcare professionals can also support awareness building and education. They can propose self-sampling as an alternative for patients hesitant about screening, and partner with device companies on pilots and clinical studies. Discussions with patients can also shift the discussion around HPV to encourage screening and engagement in follow-up care by making these experiences seem less scary. This trust can be further reinforced through timely, accessible, and thoughtful communication of test results. To better prepare for the introduction of self-screening devices, healthcare professionals also require training that is culturally sensitive and nonjudgmental. Overall, by leveraging healthcare professionals to normalize self-sampling, reframe HPV discussions, and build patient trust through clear communication and better training, this approach directly addresses fear, misinformation, and low engagement — ultimately increasing early screening uptake and reducing late-stage cervical cancer diagnoses.

With their grounding in local contexts, community champions are crucial leaders for building CC screening's acceptability. By leveraging existing relationships, they are well-positioned to support education around CC, HPV, and sexual health

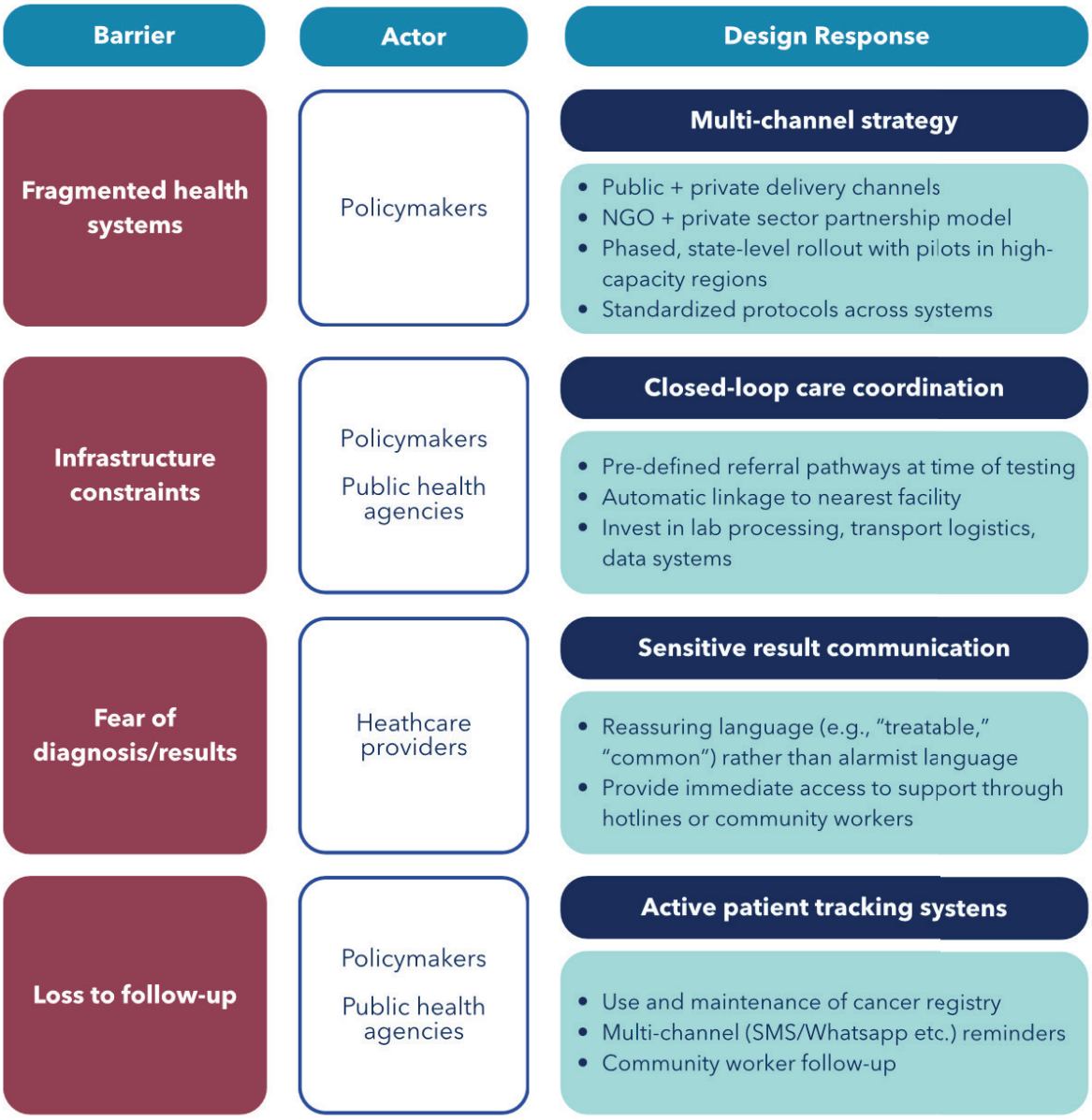

Figure 14. System-level barriers to screening and policy response ideas

education broadly. Their unique personal experiences enable them to translate health and technical information into accessible, culturally appropriate messaging. Community champions can also meet women where they are, engaging in door-to-door outreach and following women as they navigate screening processes. Overall, community leaders' involvement can help to target hard-to-reach groups and close coverage gaps.

Because a self-collection device is not a stand-alone solution to system inequities, these actor groups are essential for situating the device. Without broader system strengthening and addressing structural barriers like low health literacy, persistent distrust in institutions, and social stigma with sexual health, the device's benefits may be unevenly distributed. It is only a single component in a larger ecosystem of interventions and a network of collaborators, rather than a comprehensive solution. For self-sampling to improve access to CC screening and subsequently CC outcomes, a comprehensive solution would position the device as one part of a well-designed system.

Research Team

Mariana Cavalca Monteiro Vieira is a fourth-year undergraduate student at the University of Toronto, double majoring in political science and sociology. Her interests include sustainability, social impact, and global governance. Mariana brings experience as a compliance analyst at the G20 Research Group, alongside project management work at Ontario's Ministry of Public and Business Service Delivery, and consulting internships with Consultec in Mozambique and Synergia Social-Environmental Consulting in Brazil.

Aastha Chakrapani is a fourth-year undergraduate student at the University of Toronto specializing in finance and economics. Her interests lie in applying analytical and economic thinking to solve complex business and societal challenges. She has worked in finance and forecasting internships at AstraZeneca, and with nonprofit organizations such as Project Access. She has also worked as a design researcher at University of Toronto's Innovation Hub and as a consultant for multiple student-led organizations.

Felipe Schultz Assef is a fourth-year undergraduate student at the University of Toronto specializing in human biology and physiology. His research interests lie at the intersection of epidemiology, oncology, and women's health. With extensive research experience in breast and ovarian cancer risk and prevention at Women's College Hospital, he has developed a strong interest in translational research and data-driven approaches to improving patient care.

Samantha Unger is a PhD candidate at the University of Toronto, within the Institute of Biomedical Engineering. She is interested in the development of medical devices that expand the scope of what we are able to measure and help improve access to care. Samantha brings experience from her academic research in wearable devices for cardiovascular monitoring, and her previous internships at BCG, Google DeepMind, and CAMH: The Centre for Addiction and Mental Health.

Ramses Galaz is a medical device designer and inventor with expertise in mechanical design, biomedical engineering, manufacturing, and ISO 13485 quality management systems. He is the founder and CEO of GSE Biomedical, a Mexico-based design engineering firm specializing in the development, prototyping, and manufacturing of medical devices. His work focuses on translating innovative concepts into practical, scalable solutions that can be effectively implemented in real-world healthcare settings. Ramses is also as a professor at multiple Tec de Monterrey campuses in Mexico.

Nicole Weckman (ISTEP, ChemE) is the Paul Cadario Chair in Global Engineering at the University of Toronto. Her research focuses on developing the next generation of point-of-care technologies for diagnosing diseases and monitoring outbreaks of drug-resistant infections. She is interested in developing low-cost and sustainable diagnostics that can help to improve health equity. She joined U of T after completing postdoctoral research at the Wyss Institute for Biologically Inspired Engineering, Harvard University, and the Cavendish Physics Department, University of Cambridge. Before her postdoctoral work, she obtained her PhD in engineering from the University of Cambridge, her MEng in chemical engineering from McGill University, and her BASc in nanotechnology engineering from the University of Waterloo. Beyond her academic work, Weckman is co-founder of the start-up 52 North Health, where she works in the medical diagnostic space to develop low-cost digitally linked technologies that help improve health outcomes and health equity for people receiving chemotherapy.

Sarah Haines is an assistant professor in civil and mineral engineering at the University of Toronto. She received her BSc in environmental engineering and her MASc and PhD in environmental science from The Ohio State University. She is currently leading multiple interdisciplinary research projects working with communities in Canada. Haines has previous experience managing sensitive individual housing information for over 20 residential homes. She has also worked with First Nations communities to establish pathways for housing self-sufficiency and indoor environmental quality as well as their implications for occupant health. She has previously mentored two other Reach Alliance projects, focused on health education in Uganda and housing resilience in the Philippines.

GSE Biomedical is a medical technology product development firm dedicated to enabling physicians, researchers, and engineers to improve lives through innovation. Founded in 2008, the company brings together a multidisciplinary team of biomedical and mechanical engineers with extensive experience in medical device design, development, prototyping, regulatory strategy, manufacturing, and commercialization. GSE Biomedical partners closely with clients at every stage of development, providing creative, practical solutions that help transform ideas into commercially ready products for global markets. The company is ISO 13485 certified and operates as an FDA-registered manufacturing facility.
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Reach Alliance

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