



Last-mile triage under a tarp: smartphone-based auscultation on a medical mission in Ecuador

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In the dense green of the Amazon and the scattered villages of Ecuador, the gap between city medicine and “last-mile” care becomes impossible to ignore. In the urban “concrete jungle,” a hospital is nearby, an exam room is quiet, and diagnostic routines are familiar. In remote communities, care more often looks like a mobile team, a temporary clinic under a tarp, and a long line of patients; and reaching a specialist, or even basic testing, can take hours, sometimes days.

This field report highlights a simple point: in last-mile settings, where time and limited diagnostics make subtle findings easy to miss, practical smartphone-based tools can strengthen first-pass triage and help clinicians decide who most needs follow-up. If a technology cannot travel beyond the city into humidity, noise, and makeshift clinics—it will miss the people it could benefit most.

That was the reality of a medical mission in Ecuador in 2025, organized by *Fundación Hombro a Hombro* together with local partners, including Sumak Kawsay Wasi and the provincial health authority in Napo, and supported by over 60 healthcare professionals and volunteers. As the host organization in-country, *Fundación Hombro a Hombro* coordinates outreach brigades in Ecuador (typically eight per year, around one week each) with local partners and health authorities to reach communities where routine access to diagnostics and specialists is limited. As with many outreach efforts, follow-up remains constrained by distance, infrastructure, and patients' ability to travel for

further assessment once the brigade moves on. The route ran from remote communities in the Amazon basin around Tena; hot, humid, and roadless, where clinics were built from scratch in jungle villages like Ushpayacu, Pukachickta, and Pano, to Santo Domingo de los Tsáchilas in the Chocó biogeographic corridor, a wetter, cooler region closer to the Pacific and part of the Darién system.^{1,2} Over the course of two weeks, more than 2,500 patients were assessed and treated. The teams worked in areas where many communities lack even basic infrastructure, clean drinking water and reliable sanitation, let alone specialized equipment. When there is no cardiologist nearby, no ultrasound, and no lab, what matters most is fast, practical screening and solid triage: who needs attention now, and who needs a referral for further evaluation.

Picture it: you are a clinician in a makeshift clinic under a tarp in rural Ecuador. The humidity is crushing, children are crying, and you have 250 patients to see before dark. A traditional stethoscope loses the battle against the background noise: the constant din of generators, conversations, and tropical rain. Miss a suspicious murmur, and a child may not be referred while timely referral is still possible.

This time, however, clinicians had a tool built for field realities: Stethophone,³ software that can be downloaded to a standard smartphone, placed on a patient's chest, and used to record and analyze chest sounds with using AI-based signal processing. Its workflow helps clinicians quickly surface recordings that warrant a closer listen, supporting first-pass screening and triage

in settings where subtle findings are easy to miss. In the chaos of a mobile clinic, noise reduction and replay made a practical difference. Instead of relying on a single, fleeting listen, clinicians capture a recording, replay it, and discuss what they were hearing with colleagues, especially when the initial impression was subtle or uncertain. Visual displays also helped teams compare recordings over time and communicate findings more clearly during a fast-moving day. In several cases, recordings prompted closer assessment and strengthened the team's decision to recommend follow-up evaluation for suspected cardiac or respiratory concerns. Just as importantly, the workflow supported efficiency: recording could be captured quickly and reviewed later while patients were receiving care, helping teams manage high volume without losing track of concerning findings; when connectivity allowed, de-identified recordings could be shared securely for remote input.⁴ And in a purely "field" sense, the tool held up: punishing humidity, work under a tarp, and frequent disinfection between patients.

Yet these missions were not just about technology; they were also about meeting cultures whose medicine is rooted in centuries of plant knowledge. The team was welcomed by the Tsáchila, an Indigenous people known for their achiote-dyed red hair and for healing practices that remain part of cultural identity.^{5,6} When Stethophone was demonstrated in their community, it became a meeting of approaches: not an attempt to replace tradition, but a tool that could support a more confident first assessment.

Across the wider Amazon and Chocó regions, this also echoed the legacies of neighbouring peoples such as the Kichwas del Oriente, who maintain extensive ethnobotanical knowledge. One moment made this especially tangible. A respected community member agreed to a first cardiovascular check: blood pressure was measured, auscultation was performed, and findings were heard that warranted attention. It was not a finished diagnosis, but it was an important outcome of initial screening, enough to plan a follow-up

assessment with specialists, clarify the concern, and discuss next steps. In that moment, the technology did not function as a replacement for local knowledge. It functioned as a bridge: a careful way to connect lived experience and intuition with what modern medicine can offer.

The impact of this work did not end on the last day of the brigade. *Hombro a Hombro*, the local NGO that supports a permanent medical center and serves the community year-round, was able to continue caring for those who needed it most. Over eighteen years, the clinic has delivered more than 118,000 medical consultations, and its temporary health brigades have seen thousands more. Yet field brigades have often lacked the one element that matters most after the tents come down: a practical way to identify, with enough confidence, who must not slip through the cracks. During the mission, the team noted patients for follow-up: children with concerning findings on auscultation, adults with symptoms suggestive of respiratory problems, and patients with elevated blood pressure and warning signs that could not be ignored. In a typical field setting, these cases can disappear into the crowd, someone returns home, and everything depends on whether they can reach a city, navigate the system, and find specialized care.

Here, follow-up became more realistic for some patients because the first assessment left behind something durable: a clear recording of heart and lung sounds that could be revisited, replayed, and discussed, supporting a more deliberate decision about next steps. For many who serve on these missions, the motivation is simple: love of neighbour expressed in practical work. The medicine may be basic, the setting improvised, but the intent is clear—to show up for those who have few options. In that sense, triage is not only a clinical decision; it is careful attention so that the most vulnerable are not overlooked, not grand promises, but the simple ability not to lose a "complex" patient in the rush; this is what shows why technology matters on the last mile.⁷



Recommendation:

1. Use targeted first-pass triage to prioritize follow-up. In high-volume brigades, simple triage steps help clinicians decide who most needs referral and further evaluation.
2. Prioritize field-fit workflows. In humidity, noise, and makeshift clinics, replay and review of recordings can strengthen first-pass assessment when subtle findings are easy to miss.
3. Support continuity when feasible. Leaving behind a durable recording that can be replayed and discussed can help avoid losing complex cases once the brigade moves on.
4. Practice culturally respectful care. In communities with long-standing healing traditions, trust depends on clear communication, respect for local practices, and technology that supports, rather than displaces, the clinician–patient relationship.

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