

IMPROVING LINKAGES AND REFERRALS TO THE BROADER HEALTH SYSTEM... FOR QUALITY CARE AMIDST ABSOLUTE INFRASTRUCTURE AND RESOURCE CONSTRAINTS



THE CHALLENGE

In poorly resourced rural areas, most local health services are ill-prepared to manage severe complications or offer emergency surgical care. Saving lives in an emergency requires timely and appropriate referral to higher levels of care—but poor infrastructure, long distances, and underdeveloped emergency transport services can delay referral times, leading to preventable deaths and morbidity. Even for non-urgent care, a lack of tracking systems and limited human resources can create deficiencies in continuity of care, with high rates of pre-treatment loss-to-follow-up among individuals diagnosed with HIV or tuberculosis, among other diseases. Creative solutions are needed to ensure timely transport in an emergency and better patient tracking across care providers.

FRONTLINE FACILITIES HAVE LIMITED CAPABILITIES

Under ideal conditions, frontline services can treat simple presentations of common illnesses and provide skilled birth attendance—but in low-income rural areas, frontline facilities typically lack the skills, infrastructure, and supplies to manage maternal complications or health emergencies. Where frontline facilities are staffed only by a single health provider, they may be unable to provide 24-hour emergency services; lack of electricity (and light) can also create challenges for nighttime deliveries, with providers sometimes using flashlights, lamps, or even cellphones to illuminate the delivery site.ⁱ A 2008 national survey of Indian primary health facilities found that 38% of facilities lacked electricity; 38% lacked essential obstetric drugs; and just 31% of facilities had a staff member trained in skilled birth delivery or basic emergency obstetric care.ⁱⁱ

Long Distances, Underdeveloped Ambulance Systems, and Poor Infrastructure Delay Emergency Referrals

In low-income countries and far-flung rural areas, poor infrastructure, long distances to referral facilities, and deficient emergency transport systems can impede timely access to



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emergency referrals—a particularly large problem for obstetric complications.ⁱⁱⁱ Emergency transport services are largely underdeveloped. In one part of rural India, most intra-facility transport during obstetric emergencies takes place in private automobiles, with long delays;^{iv} in low-income countries more generally, access to prehospital emergency care within one hour is extremely low (typically 20% or less) and may take as long as one to two days in some rural areas of sub-Saharan Africa.^v Long delays to reach referral facilities in an emergency substantially increase the risk of severe complications and death. In Liberia, delays in obstetric referrals were associated with preventable maternal deaths;^{vi} in rural India, long distances to well-resourced district hospitals increases mortality from acute surgical emergencies.^{vii}

Patients Can Be Lost to Follow-Up

With few systems in place to manage referrals and track patient progress through health services—and hampered by limited electricity and telecommunications, fragmented delivery systems, and potentially long distances to health facilities—patients can be lost to follow-up even when they need lifesaving treatment.^{viii} In Africa and Asia, between 4% and 38% of patients diagnosed with tuberculosis are lost to follow-up before initiation of treatment. A systematic review finds rates of loss-to-follow-up prior to ART enrollment between 22% and 88% in Sub-Saharan Africa,^{ix} in Nigeria and rural areas of Mozambique, upwards of two-thirds of patients can be lost to follow up between HIV diagnosis and entry into care.^x In rural Sierra Leone, less than 1% of febrile patients completed referrals to health facilities after testing negative for malaria on a rapid diagnostic test.^{xi}

THE PATH FORWARD: STRENGTHENING CONNECTIONS

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Modified motorcycles have been widely adopted in Asia and sub-Saharan Africa as a low-cost alternative for emergency transport. In Malawi, motorcycle ambulances were found to decrease referral delays by between 35% to 76%, and cost much less than car-based services.
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Alternative Emergency Transport Models for Timely and Affordable Referrals

New approaches to emergency transport services can help to reduce transport time, improving the timeliness of referrals and related clinical outcomes. Motorcycle-based ambulance services—featuring modified motorcycles (two- or three-wheeled) with back- or side-cars for patient transport—offer a low-cost option for emergency transport in rural areas and have been widely adopted in Asia and sub-Saharan Africa. There is limited evidence for this innovation, but promising results in early trials. In Malawi, motorcycle ambulances were found to decrease referral delays by 2-4.5 hours (35-76%), at much lower cost than car-based services.^{xii} In rural Ghana, areas that introduced motorcycle ambulance services saw higher rates of delivery at district hospitals (with corresponding decreases at first-level health centers) and marginally significant decreases in maternal mortality at health facilities (see Spotlight).^{xiii} However, maintenance of motorcycle ambulances can be difficult, especially when they are used to traverse rough terrain. One study from the Democratic Republic of the Congo found that motorcycle ambulances typically remained in use for less than a year, after an average of 54 evacuations per vehicle.^{xiv} Where government services are lacking, social enterprise and private sector initiatives can potentially play a constructive role. In northern Ghana, for example, the Maza social enterprise subsidizes lease-to-own motorcycles in rural communities, which can be widely used for commercial purposes; however, drivers agree to



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An SMS-based pregnancy tracking platform in Rwanda substantially increased the number of births at health facilities. Biometric data has also been used to track tuberculosis treatment in Cambodia, India, and Uganda.
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India’s national identification program having now generated unique identification for 1.22 billion Indians, use of biometric data to track patients may now grow exponentially.
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Offering multiple services to a patient during a single visit may also limit loss to follow-up. Several programs offering same-day condition testing and treatment have yielded promising results.
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be “on-call” twice per week to provide transport during health emergencies, including women in labor.^{xv}

Top Interventions

Intervention	Evidence Strength	Research Findings
Motorcycle ambulances	Low	Positive
Mobile-based patient tracking	Low	Positive
Biometric-based patient tracking	Low	Positive
Same day test-and-treat	Low	Positive

Improving Patient Tracking Across the Health System

Implementation of improved patient tracking systems can be an important strategy to address low rates of referral completion and high loss-to-follow-up. Though trials are still limited in number and scope,^{xvi} a handful of countries and some small-scale studies are deploying mobile technology to improve patient health records and tracking across the health system. On one side, providers can use mobile technology to build and maintain health records, prompting patient contact and outreach at appropriate moments. In Rwanda, use of an SMS-based platform for pregnancy tracking substantially increased the number of births taking place in facilities,^{xvii} while national implementation of mobile- and cloud-based patient tracking system for HIV was associated with far faster delivery of HIV test results in infants.^{xviii} A mobile-based tracking platform in Bihar also led to higher rates of pregnancy and birth registration; higher rates of health facility deliveries; and better coverage of pre-natal and antenatal care.^{xix} On the other, mobile technologies can also be used to directly contact patients, reducing loss-to-follow-up between medical services; a study from Cambodia, for example, suggests mobile phone outreach is a feasible strategy to improve referral completion for tuberculosis treatment.^{xx}

At the cutting edge, biometric-based identification schemes may increasingly be applied to patient tracking with the health sector. Trials have used biometric identification to better track and improve adherence to tuberculosis treatment in India, Cambodia, and Uganda, with promising results.^{xxi} With the introduction of national biometric identification programs, such tracking systems may soon scale exponentially. As of August 2018, India’s Aadhaar program had generated unique identification for 1.22 billion Indians using demographic and biometric data,^{xxii} and discussions around the creation of a new national health insurance plan suggest the Aadhaar ID may soon be linked to health records. This offers a potentially powerful tool to track patients across health services, but also raises serious privacy and data protection concerns.^{xxiii}

Single-Day Services to Limit Attrition

When systemic barriers to care continuity cannot be immediately addressed, single-day services offer an alternative approach to limit loss to follow-up for some diagnostic and treatment services. Studies show potential applications of same-day services to eye care and diagnosis and treatment of sexually transmitted infections; however, the approach has not been systematically evaluated and may be difficult to finance and integrate within routine services. In India, outreach camps provided by the philanthropically-funded Aravind Eye Care System offer comprehensive eye exams and same-day provision of nonsurgical treatment (e.g., glasses or a medicine prescription); patients in need of cataract surgery or other

specialty services are counselled and transported to a nearby hospital for immediate admission.^{xxiv} In Cameroon, a pilot study for cervical cancer screening returned test results for the human papillomavirus (HPV) within one hour of sample submission, offering same-day coagulation treatment to eligible patients; loss to follow-up was only 1%.^{xxv} A similar approach in Tanzania yielded promising results for diagnosis and treatment of syphilis; testing for syphilis jumped more than 12-fold, treatment rates for diagnosed cases increased from 46% to 95%, and women reported savings as a result of averted transportation costs.^{xxvi}

SPOTLIGHT



Motorcycle Ambulances: Fleets in Pakistan and Ghana

- ▶ **Pakistan:** In fall 2017, the government of Punjab launched a free motorbike ambulance service. Following a short pilot, it quickly expanded to 900 motorbikes distributed across 9 divisional capitals. The two-wheeled motorbikes are driven by trained emergency medical technicians and equipped with essential medical supplies including oxygen cylinders, trauma kits, defibrillators, and vital monitors.^{xxvii} Government officials stress the benefits of the motorcycle ambulances in rural and urban areas alike (though in practice, early roll out has mostly focused on large urban centers). The motorbikes are better able to traverse rough roads to outlying villages, and can also wind through urban congestion and narrow alleyways.^{xxviii} *By mid-2018, its drivers had responded to 100,000 emergencies across Punjab, with a average response time of four minutes;^{xxix} 95% of users were highly satisfied with service quality.^{xxx}*
- ▶ **Ghana:** First piloted in 2012, Sustainable Emergency Referral Care (SERC) provides three-wheeled “Motorkings” for emergency medical transport in rural parts of Northern Ghana. The modified vehicles feature a large back-car equipped with privacy curtains, a mattress, seatbelt, extra space for an accompanying health worker, and a hook to support an intravenous drip. Volunteer drivers are selected by the community and trained in basic first aid, infection control, communication/referral protocols, and road safety. By 2013, Ghanaian health services had distributed 24 Motorkings across 12 sub-districts for an expanded pilot study, serving a catchment population of 184,000. *The evaluation found that the program increased completed referrals and may have reduced maternal mortality; however, the reliance on unpaid volunteer drivers sometimes reduced driver motivation and may have created tension within communities.^{xxxi}* As of 2016, the government of Ghana had endorsed and planned to scale the SERC approach as part of a larger primary and community care strengthening project in partnership with the Korea International Cooperation Agency.^{xxxii}





ENDNOTES

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