



Connected Clinic Vision Statement

Non-functional medical equipment is a significant barrier to equitable healthcare in low- and middle-income countries (LMICs). Ministries of Health and donors have spent billions of dollars procuring NICU incubators, CPAP machines, ventilators, clinic solar panels, vaccine refrigerators, cold transport equipment, x-ray machines, and much more. However, because few resources have been designated for asset management, medical equipment is not consistently tracked, maintained, repaired, or responsively replaced.

As a result, up to 40% of medical equipment in LMIC health facilities is non-functional, directly impacting the ability of health care workers to provide critical care when and where it is needed.

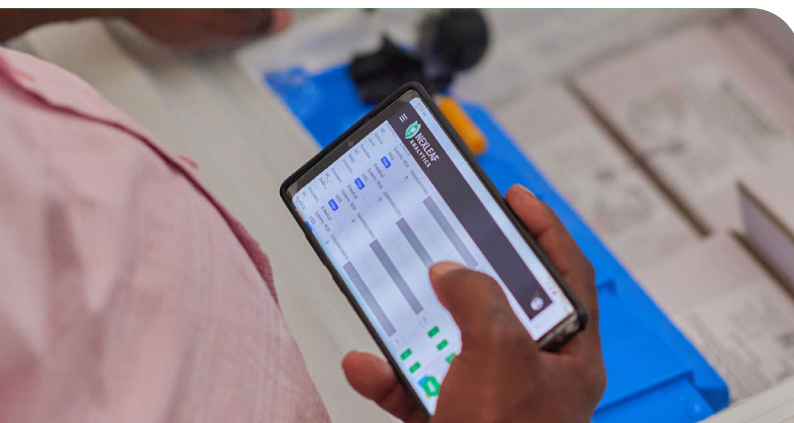
The human impact of medical equipment failure has yet to be quantified. However, a Nexleaf analysis of recent data on vaccine refrigeration failure estimates that across 57 LMICs,

99 million vaccine doses worth \$355,000,000 are lost due to faulty equipment each year. This loss translates to over 9 million children missing out on the most basic of health interventions – childhood immunization.

Vaccine refrigerators are just one type of equipment, but the example shows how medical equipment failure wastes resources and jeopardizes the lives of millions of people.

No person should die lying next to a broken ventilator that could be used to save their life. Sick infants shouldn't be doubled and tripled up in incubators. Widespread equipment failure harms patients and renders health workers bereft, frustrated, and demoralized.

Just as better data can tell us the magnitude of the problem, it also provides the road map to a sustainable solution.



Nexleaf Analytics has a plan for harnessing the power of automated data – along with health worker upskilling, data-centered process design, and the appropriate funding mechanisms – to drive the digital transformation of LMIC medical equipment management.



The **Connected Clinic** is an integrated system that equips **health workers** with the data, skills, processes, and resources they need to keep **life-saving** medical equipment **functioning**, supplies arriving, and electricity flowing so that every health facility stands **ready to save lives**.



By 2027, Nexleaf will partner with 15+ countries to realize the Connected Clinic vision and achieve the holistic digital transformation of their health systems.

The Problem

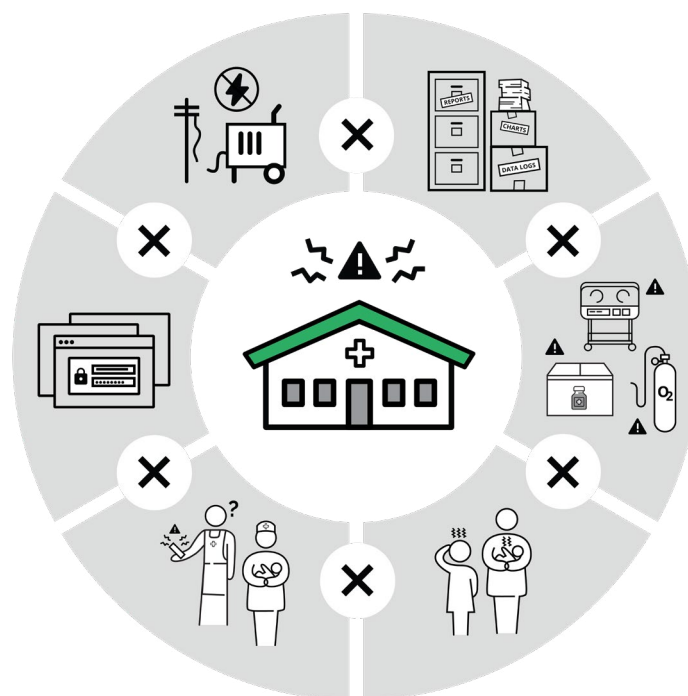
Undetected and Unaddressed Equipment Failures Weaken Patient Care

Equipment comes to LMIC health facilities from many sources, including well-meaning donations. However, up to 40% of medical equipment in LMIC health facilities is non-functional¹. Donated and procured equipment often breaks permanently or sits idle for many reasons, including a lack of supply chains for necessary spare and consumable parts (such as disposable plastic tubes), a lack of equipment-specific training for technicians, and insufficient funds for repairs². Equipment lifespan is reduced by an estimated 30%-80% due to inexperienced operators and lack of repair.

All too often, equipment fails silently, and problems go undetected until a piece of equipment is urgently needed.

Electrification gaps exacerbate equipment-based care inequities. 50% of hospitals in sub-Saharan Africa don't have steady power³, and over 40% of hospitals that provide surgical care globally lack continuous electricity⁴. Remote clinics often lack consistent cellular service, which is required to summon an ambulance to drive a sick patient to a better-resourced hospital⁵.

Equipment and electricity failures are prevalent, but it's difficult to gauge the problem partly because equipment is not tracked systematically. Many Ministries of Health lack even simple digital inventories of their own medical equipment, generators, and solar panels. Due to analog management practices reliant upon tools like paper logbooks, equipment failures are not visible or communicated in a timely manner.





Some countries end up with more than 80 different types of the same device that health workers aren't trained to operate. When the equipment breaks, there are no spare parts or anyone to contact for repair, leaving health facilities no choice but to throw it away."

- Devex / PATH

When critical equipment and power resources break down, senior managers are not notified, responsive resources are not mobilized, and the coordinated human action required to fix problems is impossible. As a result, patients suffer.

Analog systems are a particularly pressing problem now, as modern medical equipment increasingly comes with built-in data collection and transmission features (via WiFi, Bluetooth, etc.).⁶ Countries already own smart vaccine refrigerators, smart infant monitors, traceability sensors for supply chain shipments, and vaccine monitoring solutions. However, as more IoT⁷-enabled equipment flows into countries, the number of separate dashboards, alert systems, and logins for each equipment make and model is ballooning. Sitting on siloed dashboards that health workers lack the training or incentive to use, valuable equipment and power data are orphaned and wasted. Innovations like AI and machine learning can only be applied when accurate and consistent data is aggregated and available, which means LMICs risk being left even further behind if all this equipment-generated data is not used to drive action.



The Opportunity

Solving the Equipment Access Crisis with Real-Time Data

Real-time, automated data—made accessible to health workers and operationalized effectively—is precisely what countries need to unlock coordinated equipment management at every level of a health system and ensure that equipment failure is no longer a barrier to positive patient outcomes.

Data-enabled equipment and sensor devices produce accurate data that people trust. Once operationalized, this type of data motivates responsive action without relying on error-prone human data entry or repetitive, rote survey completion. Responsive maintenance requires timely, accurate information on existing problems and emerging failures, delivered to the right health worker at the right time. Ministries of Health need a single platform, designed to serve users at every level of the health system, to make full use of this valuable resource.

Equipment-generated and sensor-based IoT data is also uniquely valuable for ensuring equitable access to the benefits of Artificial Intelligence⁸. Because sensors are already embedded or installed across a number of equipment types, LMICs are already generating valuable inputs for tomorrow's algorithms.

The most resource-constrained countries are poised to leapfrog siloed systems and achieve AI-ready, interoperable data systems even sooner than their wealthier counterparts.

Medical equipment and electrification resource management are at an ideal stage for an integrated information solution.

Ministries of Health have an unprecedented opportunity to fundamentally change how they track, repair, and finance lifesaving equipment and renewable energy resources for clinics.



The Connected Clinic

Holistic Digital Transformation for Health Systems

Technology alone will not solve this crisis. LMICs need more smart equipment and better data tools, but health worker engagement is also required to achieve the complete digital transformation of medical equipment and electrification management. To achieve a holistic solution, Nexleaf's Connected Clinic initiative comprises three separate but closely aligned components:



A Single Data Platform

that makes interoperable data from all equipment and electrification resources accessible to all health workers



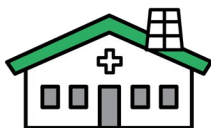
Data-Centered Processes

including redesigned health worker practices and responsive financing mechanisms to ensure detected problems are addressed promptly



Data-Use Skills & Training

to prepare an AI-ready health workforce



The Connected Clinic

The Connected Clinic will provide countries with everything required to bring together data from medical devices and health facility power sources to establish a health information infrastructure for equipment management that centers users and motivates responsive action.

Theory of Change

Countries can digitally transform medical equipment and clinic power management by equipping health workers with a single data platform, data utilization skills, and data-centered processes.

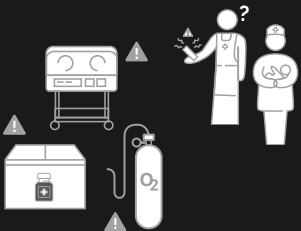
Digital transformation strengthens health systems' economic and operational viability, cultivates sustainability and resilience, and preserves the core values of compassionate care and community health. The Connected Clinic equips health workers at every level of a health system with the technology, skills, processes, and resources needed to engage with data from equipment, ensuring health systems attain measurable improvements across multiple dimensions.

When health workers have access to the data and resources they need to repair equipment responsively, keep equipment working longer, and provide equipment-based patient care—all at their fingertips—the quality of care will improve, along with patient outcomes.



LMIC Health Systems Face Persistent Problems

- Chronic equipment failures
- No digital inventories
- Wasted data
- No spare parts
- Unreliable power
- Data doesn't drive decisions
- Too many dashboards
- Poor communication
- Unreliable power



Compromising Patient Care.

- Patients don't get equipment-based care
- Shortened equipment lifespan
- Ad-hoc resource allocation
- Communication across the system is slow and burdensome
- Increased health worker stress
- Repair & replace resources are not mobilized
- Power outages disrupt care



The Connected Clinic Solves the Equipment Crisis

System-Level Change

- Scale smart equipment
- Build a Culture of Data
- Partner with multilaterals for scale

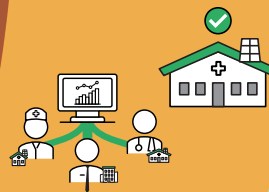
Country-Level Change

- Launch EqMIS as a Digital Public Good
- Redesign the processes around data
- Operationalize data to unlock resources on demand
- Upskill the health workforce to drive digital transformation



Through the Digital Transformation of Health Systems,

- Equipment availability and lifespan improves
- Data drives system-wide action
- Communication and collaboration are seamless
- Resources flow responsively
- Processes are optimized
- Equipment performance is visible in real-time
- Health worker data literacy improves
- Power consistency improves



Raising the Standard of Care

- Patients receive the standard of care without disruption
- No more equipment graveyards
- Connected Clinics stand ready to save lives
- Health Systems benefit from the AI Revolution



& Improving Health Outcomes



The Three Key Components of the Connected Clinic

EqMIS: An Interoperable Platform for All Equipment + Electrification Data

The Equipment Management Information System (EqMIS) platform is the central innovation of the Connected Clinic. Designed to be a Digital Public Good⁹, EqMIS is an interoperable, user-friendly platform for LMIC health systems that operationalizes automated data from all medical equipment, power resources, and supply chains. EqMIS integrates with countries' existing tools and software packages for health system management, ensuring comprehensive visibility into equipment performance.

AI-Ready Health Workforce: Data Skills Development & Training

Training health workers to use data and integrate real-time information is key to sustained systems change. By ensuring: 1) the right people have access to the data, 2) staff have the skills to use and draw conclusions from the data, and 3) the value of the data is understood and utilized for decision making. Ministry staff and stakeholders at all levels are empowered and motivated to use data to drive action.

Data-Centered Processes: Rapid Response & Repair Playbooks & Financing

Rapid Response & Repair (R3) is an innovative approach developed alongside Ministries of Health and in partnership with Gavi, the Vaccine Alliance. It re-imagines administrative processes by placing real-time data at the forefront, enabling swift access to funding and empowering timely, effective responses.



Measuring Impact

2027

By the end of 2027, 90% of clinics in four core countries and 50% of clinics in 11 additional countries will be equipped with the Connected Clinic data, tools, and resources health workers need to ensure critical equipment works and the lights stay on.

2028

By 2028, Nexleaf and our partners will scale the Connected Clinic to protect the vaccine supply for over 80 million babies, directly improving access to potent vaccines for 9.6 million babies born every year.



Nexleaf’s experience deploying technology, skills development, and process redesign in LMICs recommends a ground-up approach to the digital transformation of equipment management. Outputs, outcomes, and indicators along an impact continuum will track the success of the Connected Clinic.

Foundational KPI: Reach



How many Connected Clinics?

Level 1 KPI: Effectiveness



How much data is flowing?

Level 2 KPI: Engagement



How many users routinely access data? (This reflects both trained users and process redesign.)

Level 3 KPI: Responsive Funding



Are financial and technical resources flowing to address the problems?

Impact KPI: Readiness to Provide Optimal Patient Care



Is equipment ready to provide optimal care?
 Is sufficient equipment available?
 Is power flowing?

Why Nexleaf

Proven Impact + Work Already Underway

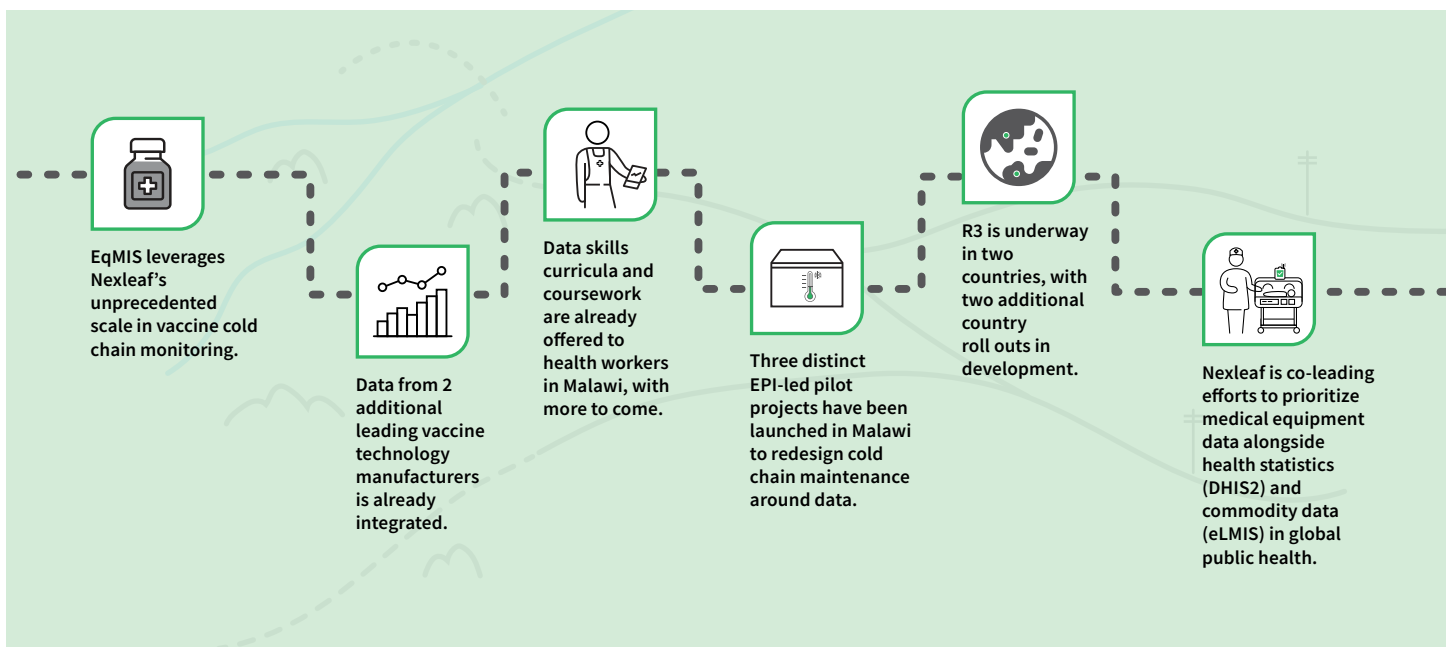
Nexleaf Analytics is a non-profit technology company headquartered in the United States; over half of our small team (27 out of 46 employees) is based in Africa and Asia.

Nexleaf is currently operationalizing real-time data from over 31,000 health facilities in 30+ countries. Our automated data tools provide countries with an up-to-the-minute snapshot of clinics and transport routes

across the entire health system, every ten minutes, every day. We have deployed nearly 45,000 sensors, and our sensor technology safeguards the vaccine supply for 1 in 7 babies born on Earth each year.

Nexleaf's innovative vaccine equipment monitoring platform sends real-time alerts and mobilizes data, leading to a 4X reduction in catastrophic freezing and improved equipment performance by 9%.

Nexleaf's work toward key milestones of the Connected Clinic initiative is already underway:



Why is Nexleaf a tech nonprofit?

Nexleaf has a powerful track record of designing and deploying innovative technology with impact rather than profit as our primary objective. This orientation means listening to and partnering with countries and a fundamental commitment to country data rights. Nexleaf views data as a powerful resource – not to extract for profit, but to mobilize and propagate for the greater good. We don't stop at the shiny object of new technology. We work to infuse health systems with the tools, resources, and knowledge they need to integrate technology into daily operations and improve health outcomes successfully.

Partnerships

Nexleaf Analytics is dedicated to driving digital transformation by addressing core issues within health systems globally. Achieving meaningful and lasting impact is a complex endeavor that requires

a realistic, iterative, and partnership-based approach. Nexleaf's partnership strategy, like our engagement with individual health workers, is built on trust and shared values, not merely one-off transactions.

The Connected Clinic will build on Nexleaf's well-established partnerships with:



Multilaterals

Gavi, the Vaccine Alliance, Africa CDC, and UNICEF



Ministries of Health

Malawi, Tanzania, Pakistan, Rwanda, Uganda, and Kenya



Funders

Patrick J McGovern Foundation, ELMA Foundation, Google.org, Qualcomm



Digital Health +Tech for Good

Global Health Labs, inSupply, OpenLMIS, Digital Square, PATH



Manufacturers

Berlinger, with more relationships in development

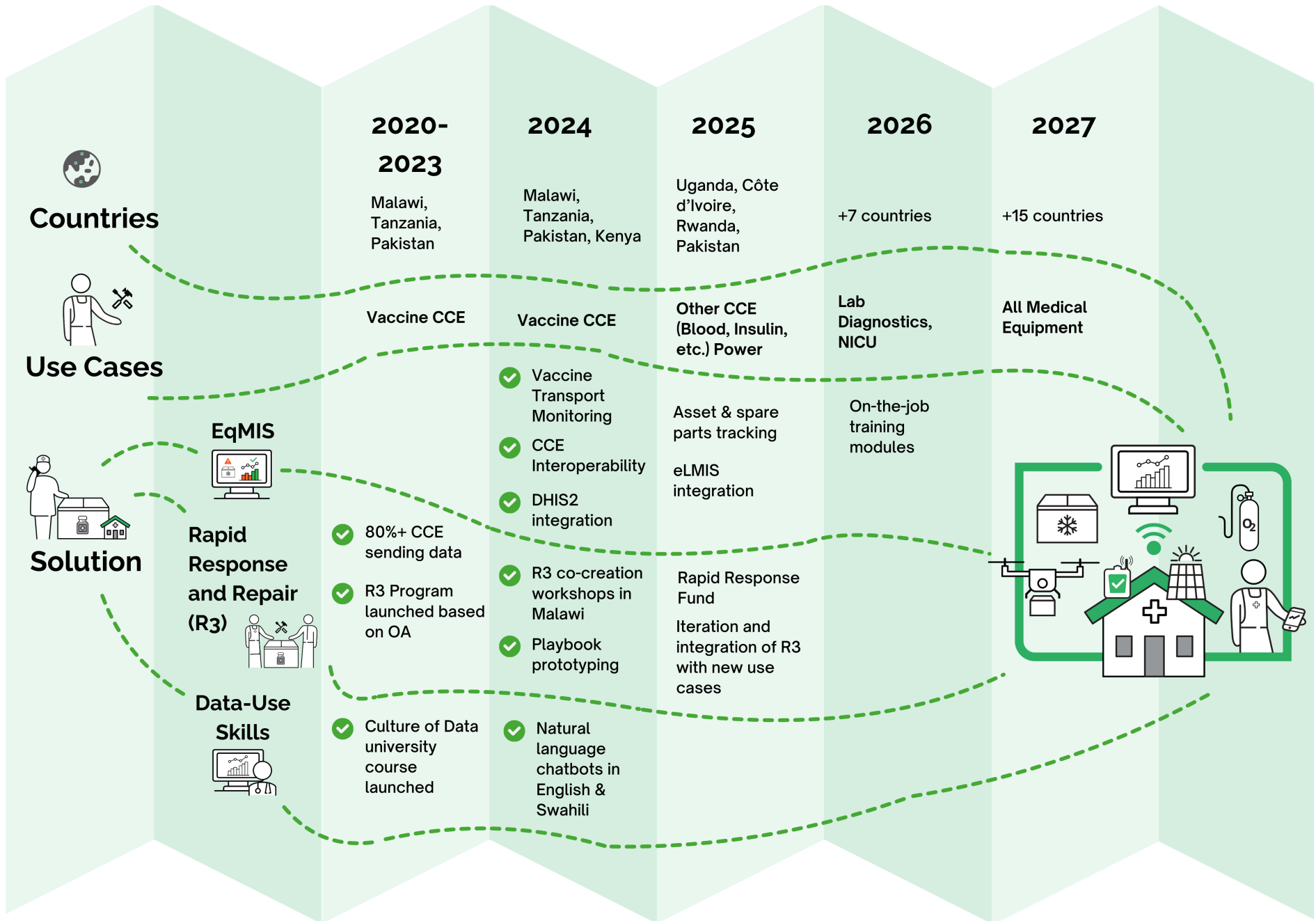


Nexleaf is currently undertaking the process to ensure the Connected Clinic / EqMIS is designated a Digital Public Good. We are building relationships with entities across the global health equipment and energization landscape to ensure equipment data flows interoperably and that software tools remain updated and available to support LMIC health system goals over the long term.

The Connected Clinic builds on Nexleaf's extensive track record of deploying tech in the field, engaging health workers as core users and tech advisors, and empowering Ministries of Health with data.

Our dedication to empowering health workers, collaborating closely with Ministries of Health, and leveraging real-world insights positions us to drive sustainable, tech-enabled health solutions for communities worldwide.

Roadmap to the Connected Clinic



Endnotes

- 1 [BMJ Global Health](#)
- 2 [BMJ Global Health](#)
- 3 [WHO](#)
- 4 [BMJ Global Health](#)
- 5 [Partners in Health blog \(archive\)](#)
- 6 See [Neopenda](#), [Masimo](#)
- 7 Internet of Things (IoT): IoT refers to a network of devices, vehicles, appliances and other physical objects that are embedded with sensors, software and network connectivity.
- 8 [AT&T Business](#)
- 9 [Digital Public Goods](#) (DPGs) are open-source software, data, artificial intelligence models, standards, and content that anyone can benefit from.

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