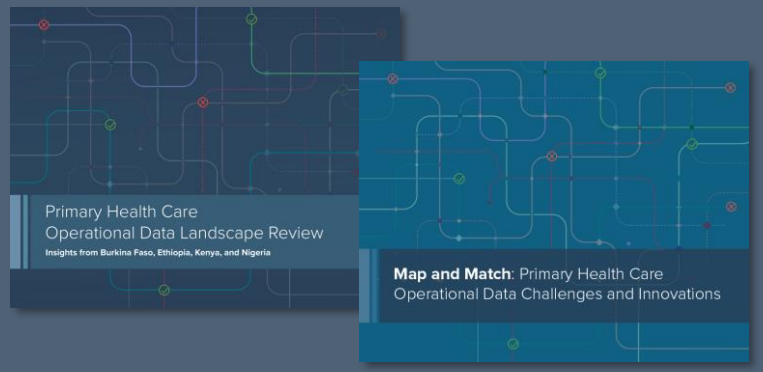
Innovations Brief

Primary Health Care Operational Data Extraction and Transmission

PATH/Enoch Kavindele Jr

This brief is part of the **PATH PHC Operational Data** suite of materials. The Landscape Report identified key PHC operational data gaps across four countries—Burkina Faso, Ethiopia, Kenya, and Nigeria—while this brief highlights promising technological and non-technological solutions to address them, showcased in the map and match visualization and the Final Summary Report. Together, these resources provide a cohesive framework for strengthening PHC dataflows and improving health system performance in low- and middle-income countries.



About

Challenge

Primary health care (PHC) systems in low- and middle-income countries face ongoing challenges in collecting and using operational data needed to manage resources, facilities, and service delivery.

Our approach

PATH conducted a global landscape review to identify practical and innovative solutions—both technological and non-technological—that can strengthen PHC data systems without requiring full system overhauls. The focus was on innovations to improve data extraction and data transmission, which primarily take place at the community and facility levels. Drawing insights from health and other sectors, we highlighted adaptable approaches suited for resource-limited settings.

The innovations

From more than 80 innovations reviewed, this brief presents 20 innovations that address common data challenges at community and facility levels, and represent a mix of digital, non-digital, and hybrid solutions. Each solution was analyzed to identify its key strengths, potential impact, and areas for improvement, helping to surface both ready-to-implement practices and transformative innovations with long-term potential.

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How to use this brief

This brief provides a one-page overview of each innovation. It includes a description of the innovation, metadata about the innovation and its applicability, and highlighted strengths and weaknesses.

Each innovation has been evaluated using a structured scoring rubric to assess key domains using a straightforward rating system:

- **High**
- **Moderate**
- **Low**
- **Not Applicable** (e.g., non-digital innovations were not scored for technical interoperability)

To support quick and intuitive interpretation, each score is **color-coded** according to the key provided. This visual approach allows you to easily see how each innovation performs across different domains, helping you compare options and identify those with the greatest potential to address the gaps or barriers identified.

More details on the innovation scoring rubric, including the metadata and scoring domains, are included on pages 31-35.

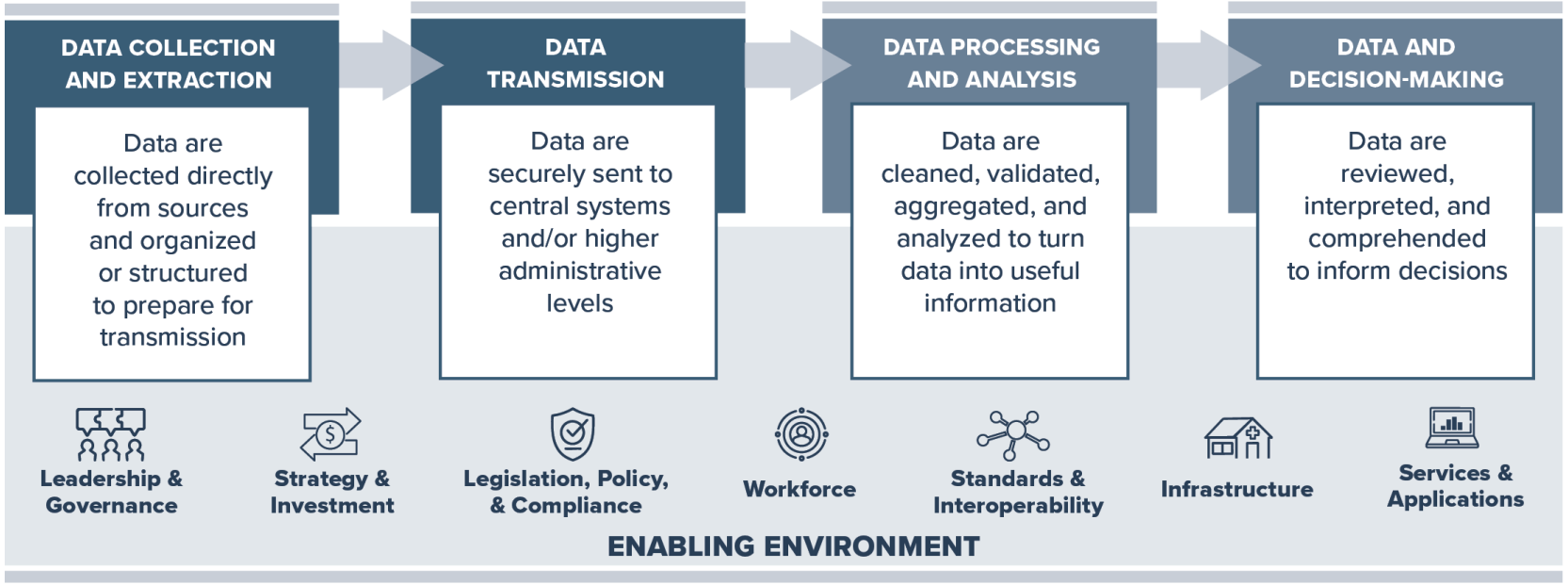
KEY	
High	
Moderate	
Low	
Not Applicable	

Important note: The rubric scores are based solely on publicly available information. The scores have not been validated with the developers or stewards of the respective innovations.

Data value chain

PATH developed an analytical framework to guide this activity. The framework comprises the **data value chain** that describes the pathway from data collection to data use and the broader **enabling environment** that supports the data value chain.

The innovations are grouped according to where they fit in the data value chain—those that support data extraction, data transmission, both extraction and transmission, and cross-cutting enablers that strengthen the entire data value chain.



Summary of innovation scores

Innovations supporting data extraction

Collect only essential data elements for registers and reporting

Metadata

INNOVATION TYPE	Hybrid
PHC PILLARS	Service coverage, supplies, potentially cross-cutting
HEALTH SYSTEM LEVEL	All
WHO DHI TAG	Widely applicable to all types of data
SITE MATURITY	All

Gaps addressed

Parallel reporting for vertical programs, incomplete CHW/outreach reporting, donor-driven data silos, and non-standardized reporting.

Scorecard highlights

Description

Streamlined data collection using a reduced list of essential indicators to reduce the burden of data collection, collect once and reuse collected data where appropriate, minimize opportunities for errors, eliminate duplicate entry, and focus reporting on priority information that will be used for decision-making.

Strengths

Sustainability: Once implemented, the simplified essential data elements can continue to be used without additional costs.

Operational fit: Streamlines existing tasks by reducing the data collection burden.

Limitations

Startup investment: Depends on the scope of the changes that are being made. Even with a targeted effort, analysis is needed to review how data elements are used, weighing the value in continuing to collect the data and risks of no longer collecting it.

Color-coded kanban stock cards

Metadata

INNOVATION TYPE	Non-digital
PHC PILLARS	Supplies
HEALTH SYSTEM LEVEL	Primary, referral, district
WHO DHI TAG	N/A
SITE MATURITY	Nascent, emerging, established

Gaps addressed

Late stock reports, manual data entry errors, and lack of stock expiry visibility.

Scorecard highlights

Reference: https://e-journal.unair.ac.id/AJIM/article/download/47010/27256

Description

A simple, non-digital inventory management system using colored cards (typically green, yellow, and red) to visually indicate stock levels and reorder points. Kanban cards simplify inventory management by replacing complex tally sheets with a visual system. They require no power or connectivity and are resilient in low-resource settings. Staff can quickly assess stock status and reorder needs without calculations or digital tools.

Strengths

Cost startup & sustainability: Initial costs are limited to printing and laminating colored cards, which can be done locally. No devices, software, or infrastructure upgrades are needed. The intervention fits within routine operational budgets.
Change management fit: Training for kanban systems is minimal and can be completed in under an hour during routine supervision.
Inclusive design: The color-coded system is intuitive and requires no literacy or numeracy skills.

Limitations

Operational benefit: No published evidence of effectiveness or scaled use.
Data quality safeguards: While kanban cards improve visual tracking, they rely on manual updates and supervision for accuracy. Errors can occur if staff forget to move cards or misinterpret colors. Supervision logs and bin card reconciliation help mitigate this, but no automated safeguards exist.

Investing in data clerks

Metadata

INNOVATION TYPE	Non-digital
PHC PILLARS	Service coverage (potentially cross-cutting)
HEALTH SYSTEM LEVEL	All
WHO DHI TAG	2.2.1, 2.2.2, 2.2.3, 2.2.4
SITE MATURITY	Emerging, established, advanced

Gaps addressed

Poor quality and late facility reporting, including incomplete data, often due to overburdened health workers.

Scorecard highlights

Description

Bring on additional staff at facility or district levels that can focus on data entry, shifting tasks to them and reducing the burden on health workers. Implement a supportive supervision model at the district– and facility–level to encourage decision–making with register data.

Strengths

Operational fit: For existing staff, workload should be reduced after tasks are shifted, with some additional work to supervise or support the data clerks' work.

Limitations

Startup investment and sustainability: Requires investment in human resources and potentially physical resources (e.g., devices, a location to work, connectivity). Planning is required to determine how many staff are needed and where they will be located.

Marble jar for workload management

Metadata

INNOVATION TYPE	Non-digital
PHC PILLARS	Human resources for health
HEALTH SYSTEM LEVEL	Community, primary facility
WHO DHI TAG	N/A
SITE MATURITY	Nascent, emerging

Gaps addressed

Invisible/unmeasured staff workload distribution; lack of simple ongoing workload visibility.

Reference:
https://www.uhc2030.org/news-and-events/blog/article/ethiopias-community-based-social-accountability-groups-for-quality-health-services-555608/

Scorecard highlights

Description

A participatory visual monitoring method where staff or community members use marbles, beads, or tokens to represent and track work tasks, time allocation, or responsibilities, enabling teams to quickly identify workload imbalances and discuss solutions without requiring literacy or lengthy surveys.

Strengths

Cost startup & sustainability: Minimal upfront costs (tokens, jars, facilitation materials, short training) and modest ongoing expenses, making it far cheaper than digital monitoring systems.
Operational fit: Simple, adaptable method suitable for low-connectivity, low-literacy, and high staff turnover settings; can be implemented during staff meetings or community gatherings.

Limitations

Change management fit: Highlights issues and prompts discussion, but requires skilled facilitation, follow-up actions, and leadership support to achieve sustained change; otherwise, it may remain a one-off exercise.

Peer review / pair checking of data entry

Metadata

INNOVATION TYPE	Non-digital, hybrid
PHC PILLARS	Service coverage (potentially cross-cutting)
HEALTH SYSTEM LEVEL	Community, primary, referral, district
WHO DHI TAG	2.5.5 Peer group for healthcare providers
SITE MATURITY	Nascent, emerging, established

Gaps addressed

Poor quality of facility reporting.

Scorecard highlights

Description

Peer review is built into the data workflow, with colleagues checking each other's data before entry or submission, typically during group meetings or end-of-day reviews, to catch and correct errors early.

Strengths

Scalability: Workers can handle the approach unaided. No installation required or inputs required.
Operational benefit: Enhances health workers understanding of data quality issues and improves the use of data in decision-making processes at the PHC level.

Limitations

Operational fit: Adds time into the data workflow for conducting the review and any preparation involved.

Pictorial paper forms

Metadata

INNOVATION TYPE	Non-digital
PHC PILLARS	Cross-cutting
HEALTH SYSTEM LEVEL	Community, primary
WHO DHI TAG	Widely applicable
SITE MATURITY	Nascent, emerging

Gaps addressed

Low literacy / multilingual workplaces causing mis-entry or missed actions; visual control for fast operational decisions;

Scorecard highlights

Description

Low-tech paper tools using icons, pictograms, stamps or clear visuals (in place of or next to text) that enable staff with limited literacy to reliably perform operational tasks. Examples: shadow-boards and pictorial maintenance checklists for equipment inspection and maintenance, pictorial passbooks for community finance, and visual/kanban/bin cards for stock.

Strengths

Operational fit: Designed for conditions with limited electricity, varied languages, limited digital infrastructure, and high staff turnover.
Inclusive design & workload impact: Enables non-literate or multilingual users to carry out routine operational tasks (reorder, inspect, record savings). Typically speeds workflows (less time searching or clarifying), producing net workload reduction for many staff.

Limitations

Support/Governance: Requires MOH or program endorsement for consistent use and simple quality assurance processes (checklists, supervisory spot checks).
Data quality safeguards: Transcription errors (paper-to-digital) and physical loss/damage are real limitations.
Change management fit: Adoption requires co-design, local validation of icons (cultural testing) and user training; supervisors must enforce consistent use.

Supervision, Performance Assessment and Recognition Strategy (SPARS) program

Metadata

INNOVATION TYPE	Non-digital
PHC PILLARS	Supplies, potentially cross-cutting
HEALTH SYSTEM LEVEL	Primary, district, regional, national
WHO DHI TAG	N/A
SITE MATURITY	Nascent, emerging, established, advanced

Gaps addressed

Inaccurate or incomplete reporting of health commodity usage, poor supply chain management, stockouts of essential medicines and supplies.

Reference: *https://library.health.go.ug/medical-products-technologies/medicines/supervision-performance-assessment-and-recognition-strategy*

Scorecard highlights

Description

SPARS is a Uganda Ministry of Health program to strengthen medicines management through supportive supervision, standardized performance assessments, and recognition/incentives, implemented nationally since 2010 and adapted to other programs (laboratory, TB, HIV) and countries.

Strengths

Policy alignment: As an official Ministry of Health strategy, SPARS aligns with national medicines management and supply chain policies and is integrated into supervision frameworks.
Operational benefit: SPARS has significantly improved stock management, storage, ordering/reporting quality, and reduced stockouts, as confirmed by multiple peer-reviewed studies and national assessments (e.g., a 16% improvement in supply chain management measures).

Limitations

Sustainability: Ongoing costs for supervision, medicine management supervisor salaries, refresher training, and monitoring are manageable and cost-effectiveness studies that indicates SPARS delivers good value, though long-term sustainability depends on MOH or donor budget support.

Innovations supporting data extraction and transmission

Biometric attendance systems for workforce management

Metadata

INNOVATION TYPE	Digital
PHC PILLARS	Human resources for health
HEALTH SYSTEM LEVEL	All
WHO DHI TAG	3.1.2 Monitor performance of healthcare provider(s)
SITE MATURITY	Established/advanced

Gaps addressed

Unknown staffing levels, mismatched service coverage, chronic absenteeism and late arrivals, and increased patient wait times.

Scorecard highlights

Description

A digital approach to identifying capture of “who’s here” via fingerprint or biometric scan for operations and workforce management. While there are many ways biometrics may be used, this innovation is specifically about using Simprints biometric scanners to log arrivals of workers and show attendance trends in a cloud dashboard.

Strengths

Interoperability: Usually vendor-specific but can integrate via API or ETL; performs best when linked with HWR or HRIS systems.
Operational benefit: Biometric systems provide a reliable way to verify health worker attendance, reducing errors, fraud, and buddy punching when paired with reconciliation processes. They enhance accountability, enable performance-based management, and automate tracking to reduce supervisory and administrative workloads.

Limitations

Operational fit: Most effective when supervisors actively use outputs; without managerial engagement, hardware risks going unused.
Cost – startup & sustainability: Requires significant investment in hardware, maintenance, and procurement, with ongoing costs for devices, technical support, and secure hosting.

Internet of Things (IoT) cold chain sensors

Metadata

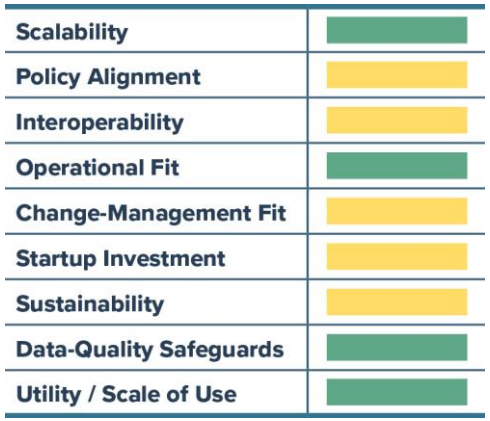
INNOVATION TYPE	Digital
PHC PILLARS	Supplies, equipment
HEALTH SYSTEM LEVEL	Primary, referral
WHO DHI TAG	3.2.3 Monitor cold-chain sensitive commodities
SITE MATURITY	Emerging, established, advanced

Gaps addressed

Cold chain equipment issues leading to spoilage, stock losses, and delayed maintenance responses. Limited visibility for managers.

Nexleaf ColdTrace (https://nexleaf.org)

Scorecard highlights



Description

Solar-powered IoT cold-chain sensors, such as those integrated with Nexleaf ColdTrace, continuously monitor temperatures in vaccine refrigerators, cold rooms and transport. In off-grid settings the sensors and gateways are powered (or supported) by solar-charged systems and include battery buffering/store-and-forward to survive intermittent connectivity and power outages.

Strengths

Operational fit: Solar-powered with offline capability, ensuring reliable data capture in low-connectivity, low-power settings.
Scalability: Deployed in thousands of facilities across multiple countries, proving readiness for national scale-up.
Operational benefit: Reduces vaccine spoilage and improves outage response and logistics decisions.
Workload impact: Automated alerts cut manual checks, lowering workload and speeding response.

Limitations

Operational fit: Most effective when supervisors actively use outputs; without managerial engagement, hardware risks going unused.
Cost – startup & sustainability: Requires significant investment in hardware, maintenance, and procurement, with ongoing costs for devices, technical support, and secure hosting.

Smart Paper Technology

Metadata

INNOVATION TYPE	Hybrid
PHC PILLARS	Supplies, service coverage (potentially cross-cutting)
HEALTH SYSTEM LEVEL	All
WHO DHI TAG	2.2: 2.3; 3.2
SITE MATURITY	Nascent, emerging, established

Gaps addressed

Lack of reliable, timely, and complete data constrained by limited electricity and internet connectivity, heavy workload from filling in multiple forms, and risk of data capture errors.

References: https://www.shifo.org/

Scorecard highlights

Description

Smart Paper Technology, developed by the Shifo Foundation, is a hybrid paper-to-digital system where redesigned paper forms completed at the point of care are later digitized for high-quality data. The digitized forms are synchronized with backend systems using the Resilio Platform, which is designed to interoperate with existing HIMS like DHIS2. It has been applied across immunization, maternal and child health, and supply chain management, with potential use across all PHC areas where forms can be adapted.

Strengths

Operational benefit: External evaluations indicate that SPT reduces health worker workload, improves reporting timeliness, and maintains service delivery even in low-power or low-connectivity areas, with qualitative confirmation from staff and managers.
Data quality safeguards: Ensures high-quality data through structured forms, automatic error detection during scanning, integration checks, and continuous monitoring with feedback to staff and supervisors.

Limitations

Scalability: Relies on regional scanning centers and reliable printing/distribution of Smart Paper Forms, posing logistical and infrastructure challenges.
Cost – startup & sustainability: Initial costs include scanning equipment and ongoing operations; moderate annual costs are offset by improved data quality and reduced staff reporting time, though slightly higher than some traditional HMIS solutions.

Innovations supporting data transmission

Photo to digital – Open Data Kit (ODK) Scan

Metadata

INNOVATION TYPE	Hybrid
PHC PILLARS	Cross-cutting
HEALTH SYSTEM LEVEL	All
WHO DHI TAG	4.1.1 Form creation for data acquisition
SITE MATURITY	Emerging, established

Gaps addressed

Gaps in HRH data, ghost workers and absenteeism, weak supervision, and quality assurance reporting.

Reference:
https://www.villagereach.org/project/odk-scan/

Scorecard highlights

Description

Photo-to-digital solutions capture images of paper registers, wall charts, tally sheets, or supervision checklists using smartphones or cameras and convert them into digital data through optical character recognition (OCR), computer vision, form-recognition (e.g., ODK Scan), or manual transcription. This approach preserves familiar paper workflows while making the data usable in digital systems.

Strengths

Workload impact: Designed to streamline data capture. Reduces manual entry, speeds reporting, frees staff time, and supports low-connectivity fieldwork.
Interoperability: The ODK-X Suite integrates with health information systems such as DHIS2, OpenHIE, and OpenMRS via a REST API.

Limitations

Data quality safeguards: Poor photo quality, lighting, or angles can reduce OCR accuracy, often requiring manual validation in hybrid workflows.
Support/governance & process robustness: The ODK-Scan codebase is no longer actively maintained, limiting long-term support and updates.

Physical courier with scheduled data pickup as last resort

Metadata

INNOVATION TYPE	Non-digital
PHC PILLARS	Service coverage (potentially cross-cutting)
HEALTH SYSTEM LEVEL	Community, primary, referral, district
WHO DHI TAG	Update
SITE MATURITY	Nascent, emerging

Gaps addressed

Infrastructure/connectivity gaps that prevent digital reporting of facility status and overburdened health care workers.

Scorecard highlights

Description

District staff collect paper registers on schedule and enter centrally; maintain chain-of-custody to reduce loss.

Strengths

Operational fit: Does not rely on power or connectivity to transmit data to the next level.
Workload impact: Reduces workload by eliminating the need for health workers to enter data for reporting purposes.
Change Management Fit: Requires minimal change management at the facility level.

Limitations

Data sensitivity: Even with small or aggregate datasets, measures must be in place to protect personal data. Design should also account for physical security.
Impact: Evidence is limited and largely anecdotal, based on the Burkina Faso landscape analysis.

Remote photo-based reporting and mapping

Metadata

INNOVATION TYPE	Digital
PHC PILLARS	Equipment, facilities & infrastructure
HEALTH SYSTEM LEVEL	Primary, referral, district
WHO DHI TAG	3.6.1, 3.72
SITE MATURITY	Nascent, emerging, established

Gaps addressed

Poor transmission of data on equipment and facility infrastructure condition.

Scorecard highlights

Reference:
http://chatmap.hotosm.org/

Description

Facilities or staff send photos or SMS reports of equipment damage via WhatsApp to a central triage team that maps the locations of repairs and prioritizes and schedules repairs, enabling rapid response to maintenance needs.

Strengths

Change-management fit: Users can submit data through an application they are likely already familiar with.
Data quality safeguards: Data quality largely depends on user submissions. Geographic data is reliable if sourced directly from the site, requiring no user input.
Startup investment: The tool is open source and free to use.

Limitations

Sustainability: Requires ensuring that the data will be used to respond to repair requests for it to be fully effective.
Startup investment and sustainability: Requires users have a charged device with the application loaded, a working camera, and data to submit the photos.

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Signalytic

Metadata

INNOVATION TYPE	Digital
PHC PILLARS	Supplies, potentially cross-cutting
HEALTH SYSTEM LEVEL	All except community level
WHO DHI TAG	3.2.1
SITE MATURITY	Nascent / emerging

Gaps addressed

Lack of stable power and internet connectivity to enable digital systems,

Scorecard highlights

Reference:
https://www.signalytic.ca/

Description

A solar-powered system that can operate with intermittent network connectivity by generating its own Wi-Fi network and uses distributed ledger technology rather than a central server model. Whilst the platform currently supports a stock management system, the hardware platform is designed to host multiple systems and is designed to enable interoperability with health data management systems.

Strengths

Operational Benefit: Provides reliable power and connectivity, with 100% uptime reported across all facilities during the project period in Uganda.
Cost – startup & sustainability: Independent report suggests Signalytic is significantly more cost-effective for data digitization and transmission alone than similar alternative solutions, even when excluding added benefits like zero-downtime, strong data security, enhanced stock management, EMR interoperability, and Distributed Ledger Technology (DLT) integration.
Interoperability: Supports standards-based integration with National Medical Stores and other EMRs.

Limitations

Scale of use: Piloted in over 75 facilities across multiple districts in Uganda, though there is no evidence of broader adoption across countries.
Policy alignment: Deployment requires formal approvals.

SnapForm AI-OCR of paper forms and registers

Metadata

INNOVATION TYPE	Hybrid
PHC PILLARS	Service coverage (potentially cross-cutting)
HEALTH SYSTEM LEVEL	Community, primary
WHO DHI TAG	2.2.4 Routine health indicator data collection and management
SITE MATURITY	Emerging, established

Gaps addressed

Poor quality of facility reporting. Time consuming manual data aggregation. Transport issues for paper forms.

Reference:
https://www.path.org/our-impact/articles/streamlining-health-data-reporting-with-snapform

Scorecard highlights

Description

A mobile device is used to take a photo of a paper form with data entered. Artificial intelligence (AI) to read the numbers and text on the form. The system sends the photo to an external AI service that "reads" the data entered and loads it into DHIS2 after the user approves the submission.

Strengths

Operational benefit: Demonstrated improved efficiency through substantially reducing time needed to report data, with reduced transcription errors, and significant improvements data completeness.
Data quality safeguards: Includes an approval step to review values before submission to DHIS2.
Interoperability: Integrates with DHIS2 and may be set up for other uses.

Limitations

Operational fit: Currently requires user be connected for use, though, an offline version is in development that will allow for taking photos that are stored and submitted once connected.

WhatsApp for coordination

Metadata

INNOVATION TYPE	Digital
PHC PILLARS	Service coverage, supplies, HRH, finance, potentially cross-cutting
HEALTH SYSTEM LEVEL	Community, primary facility, referral facility, district / sub-county management
WHO DHI TAG	2.5.1 Communication from healthcare provider to supervisor(s)
SITE MATURITY	Nascent, emerging, established

Gaps addressed

Lack of responsive and reliable HIS for real-time administration and coordination.

Reference:
https://www.researchgate.net/publication/388964150_WhatsApp_as_an_improvisation_of_health_information_systems_in_Southern_African_public_hospitals_A_socio-technical_perspective

Scorecard highlights

Description

Providers and managers use WhatsApp informally to fill gaps in data sharing for immediate coordination where there are not digital systems, or where systems are slow, inaccessible, or not interoperable. Examples include communicating in order to: speed up referrals, share bed availability, coordinate logistics, and manage routine administration.

Strengths

Operational fit: Meets urgent operational needs (referrals, bed tracking, logistics) when other systems are slow, inaccessible, or are not used. Highly adaptive.
Startup investment: Where staff already have devices, WhatsApp is free with generally low data usage. No infrastructure investments required.
Impact: e.g. Enhanced supervision of CHWs in Kenya.

Limitations

Interoperability: No interoperability with other systems. Data is siloed, informal, and cannot be integrated directly into official systems.
Policy alignment: WhatsApp use is largely informal and not sanctioned in policies with risk that with more formal policies it will no longer be allowed.

Wi-Fi Direct

Metadata

INNOVATION TYPE	Digital
PHC PILLARS	HRH, service coverage, supplies, potentially cross-cutting
HEALTH SYSTEM LEVEL	Community, primary
WHO DHI TAG	2.6; 2.7
SITE MATURITY	Nascent, emerging

Gaps addressed

Connectivity challenges that delay synchronization of mobile tools.

Reference:
https://dimagi.atlassian.net/wiki/spaces/commcarepublic/pages/2143973390/CommCare+with+Wi-Fi+Direct

Scorecard highlights

Description

CommCare's Wi-Fi Direct feature enables offline data collection in areas without internet by allowing field workers to transfer forms from their devices to a host tablet, which is later synced to the server when connectivity is available.

Strengths

Workload impact: Empowers field workers with offline data collection and peer-to-peer form sharing, reducing travel, enhancing safety, supporting flexible schedules, and fostering collaboration and leadership, particularly for women.
Operational fit: Designed to function in low-resource settings, addressing unreliable power and internet connectivity.

Limitations

Data quality safeguards: Wi-Fi Direct may pose risks to data ownership, integrity, and confidentiality.
Operational benefit: CommCare is widely adopted, with 90+ peer-reviewed studies showing positive effects on data quality, service delivery, and client outcomes, though the impact of Wi-Fi Direct specifically is not documented.

Innovations that are enablers of data extraction and transmission

Clear role definition and accountability

Metadata

INNOVATION TYPE	Non-digital
PHC PILLARS	Service coverage, potentially cross-cutting
HEALTH SYSTEM LEVEL	Primary, referral
WHO DHI TAG	N/A
SITE MATURITY	Nascent, emerging

Gaps addressed

Lack of clarity of roles and accountability, inconsistent service delivery, data errors, lower staff motivation, weak supervision, and poor team coordination.

Scorecard highlights

Description

Formal roles and responsibilities for data management staff are publicly displayed on facility information boards, which also include catchment area demographics that enable cross-checking of extracted data. These boards also often include demographic data of the catchment area, which helps in cross-checking extracted information.

Strengths

Scalability: Simple, role-specific design requires no specialized equipment or training, enabling easy scaling across facilities.
Operational fit: Functions without power or connectivity, resilient in low-resource settings, and easily adaptable to changing needs.
Cost – startup & sustainability: Minimal initial costs (optional print/laminate), negligible ongoing expenses, fits within routine budgets, and can be scaled affordably without donor dependency.

Limitations

Operational benefit: Implemented in Burkina Faso and observed during site visits and noted in data collection, though no evidence of impact is available

Solarization of PHC facilities for reliable power

Metadata

INNOVATION TYPE	Digital
PHC PILLARS	Cross-cutting
HEALTH SYSTEM LEVEL	Primary, referral
WHO DHI TAG	3.2
SITE MATURITY	Established, advanced

Gaps addressed

Unreliable electricity at PHC facilities hampers critical equipment operation, including vaccine storage and digital health tools, and causes delays in data reporting.

Reference: SEforALL Powering Healthcare Malawi Case Study: https://www.seforall.org/news/malawi-case-study-powering-healthcare

Scorecard highlights

Description

Installation of solar systems with battery storage at PHC facilities for improved cold chain reliability and reporting timeliness by ensuring routers, computers, and information systems remain powered during outages. This has been used to enable continuity in data entry, reduce delays in service coverage reporting, and improve availability of commodities.

Strengths

Workload impact: Reduces staff effort by eliminating manual outage workarounds.
Operational fit: Well-suited to LMIC facility constraints.
Operational benefit: Ensures continuity of health services and reporting during power outages.

Limitations

Scalability: Scalability is dependent on capital investment and donor or government support.
Cost – startup & sustainability: High upfront costs and ongoing maintenance funding needed, but more cost-effective than diesel generators.

WhatsApp groups for peer learning and mentorship

Metadata

INNOVATION TYPE	Digital
PHC PILLARS	Service coverage (potentially cross-cutting)
HEALTH SYSTEM LEVEL	Community, primary, referral, district
WHO DHI TAG	2.5.5 Peer group for healthcare providers
SITE MATURITY	Nascent, emerging, established

Gaps addressed

Incomplete CHW /outreach reporting, poor quality of facility reporting, and weak feedback loops to facilities.

Reference:
https://media.path.org/documents/HSID_BID_LessonsLearned_PeerLearning_br.pdf

Scorecard highlights

Description

WhatsApp groups connecting facility or community staff enable peer-to-peer knowledge sharing, real-time troubleshooting of data issues, and collaborative problem-solving across facilities or districts.

Strengths

Scalability: Leverages an existing, widely used application that requires minimal infrastructure, allows large and geographically dispersed groups to connect, and supports text, audio, and media sharing.
Impact: Demonstrates positive changes in mentees knowledge, skills and practices.

Limitations

Startup investment & sustainability: Requires health workers that have devices that can be used for this purpose and a data package.
Policy alignment: Requires that policy allows for use of the app.
Data sensitivity: Requires workers be trained to protect data privacy when using the app.

Innovation scoring rubric

Metadata (1)

Innovation type	Innovations are categorized as digital, non-digital, or hybrid to alert reviewers to the practical implementation constraints. • **Digital.** Solutions in this category rely on power, connectivity, cybersecurity controls, and adherence to data-privacy legislation. Typical examples include DHIS2 modules, barcode scanners linked to OpenLMIS, and mobile decision-support applications. • **Non-digital.** These interventions depend on physical media such as paper registers, laminated wall charts, or mechanical devices. Continuous consumable supply and routine supervisory checks become the primary operational considerations. • **Hybrid.** Many contemporary approaches blend analogue data collection with periodic digital capture—for instance, paper tally sheets photographed by smartphones for batch upload. Hybrid solutions inherit both the infrastructure sensitivities of digital tools and the consumable demands of non-digital ones.
PHC pillars	This field identifies which operational domain(s) of the PHC system an innovation targets. • **Finances.** This pillar covers budget ceilings, expenditure ledgers, revenue streams, and payment flows that keep facilities running. Data originate in facility cashbooks or electronic financial-management systems and travel upward to district treasuries and national health-accounts teams. • **Human resources for health.** Staffing lists, absenteeism logs, licensure status, and in-service training records define workforce capacity. Most countries manage these data through paper files at facility level and an electronic HR information system such as iHRIS at district or national level. • **Supplies.** Stock balances, order quantities, and consumption rates form the backbone of supply-chain visibility. Registers or electronic systems such as OpenLMIS capture these figures; timely entry prevents commodity shortages. • **Equipment.** Asset inventories, functionality status, and maintenance histories ensure that diagnostic and treatment devices remain operational. Data often resides in spreadsheets or bespoke biomedical-engineering databases and are seldom linked to routine reporting platforms. • **Facilities and infrastructure.** Indicators include water, sanitation, power availability, and the physical integrity of buildings. Data are commonly collected through periodic surveys and therefore lag behind real-time service data. • **Service coverage.** Counts of consultations, immunizations, chronic-disease reviews, and preventive services measure whether populations receive essential care. Facilities submit monthly tallies, often through DHIS2, to form the national service-coverage dataset.

Metadata (2)

Health system level	This field specifies the health-system tier(s) where an intervention is intended to have its primary impact. Typically, health systems in low- and middle-income settings are structured into six operational tiers: 1. **Community level.** This tier encompasses volunteer health promoters, community health workers (CHWs), and village health committees. Data generated here are typically paper-based registers or mobile forms documenting household visits, basic services, and commodity use. 2. **Primary-facility level.** Health posts, dispensaries, and health centers deliver first-contact care. They aggregate CHW data, maintain basic logistics records, and submit monthly service reports, commonly via DHIS2 or paper summaries. 3. **Referral-facility level.** District or sub-county hospitals provide higher-acuity services and generate more complex stock, finance, and HR records. They also serve as supervisory hubs for primary facilities. 4. **District or sub-county management level.** Administrative teams compile facility reports, validate data quality, allocate resources, and provide feedback. Information systems at this tier often include DHIS2 instances, HR information systems, and supply-chain dashboards. 5. **Regional or provincial level.** In larger countries, an intermediate tier collates district data, supports cross-district analytics, and oversees specialized services such as blood banks or regional warehouses. 6. **National level.** Central ministries of health and partner agencies maintain the policy framework, national data warehouse, financial management systems, and supply-chain oversight platforms. They also negotiate donor funding envelopes and set reporting standards.
WHO DHI tag	For digital or hybrid innovations, the innovation is mapped to the WHO Digital Health Intervention (DHI) v2.0 classification that best describes its principal function. The tag provides a common language for describing digital functionality and facilitates alignment with global registries. For non-digital innovations, this field is marked “N/A” to indicate that the classification does not apply.

Abbreviations: DHI: digital health intervention; WHO: World Health Organization

Metadata (3)

Site maturity	This field captures the site maturity required to support the innovation, categorized in four levels that reflect step-wise gains in governance, infrastructure, and routine data use. By documenting which maturity level an intervention assumes, reviewers avoid recommending solutions whose demands exceed what the setting can realistically support and, conversely, highlight low-tech options that can deliver quick wins in maturity sites. 1. **Nascent.** The site operates in a severely constrained environment. Physical infrastructure is rudimentary, with unreliable or absent access to electricity and water. There is no reliable internet connectivity. Staffing is minimal, roles are unclear, and there is limited or no oversight or management structure. Record-keeping and operations are ad hoc, and the site struggles to consistently deliver even basic services. 2. **Emerging.** The site has made initial investments in essential infrastructure. Electricity and water supply are present but intermittent. Internet may be available occasionally, but it is unreliable. Governance and management structures are beginning to form, though inconsistently applied. Staff roles are somewhat defined, and there is growing awareness of standard procedures and service expectations, though gaps remain. 3. **Established.** The site has functional and consistent access to electricity, clean water, and a stable physical environment. Internet connectivity is available and used for basic administrative or health functions. Governance structures are formalized, with regular staff supervision, defined responsibilities, and adherence to protocols. The site operates with predictable processes, enabling consistent service delivery and data use for management. 4. **Advanced.** The site benefits from a highly enabling environment. Infrastructure is reliable, with uninterrupted power, water, and high-quality internet connectivity that supports routine operations and coordination. Governance is strong, with transparent leadership, routine performance management, and proactive oversight. The environment supports continuous learning, adaptive planning, and innovation to improve quality of care and community trust.

Abbreviations: DHI: digital health intervention; WHO: World Health Organization

Scorecard Domains

The following domains were assessed to identify strengths and limitations of each innovation. Scores are presented for a subset of these domains with reliable and complete data across innovations.

Scalability	The intervention's capacity to scale and endure—it probes the conditions that foster, or obstruct, wide rollout and long-term affordability.
Gender and equity responsiveness	The extent to which the intervention reduces barriers for female health workers, low-literacy users, or marginalized communities.
Risk and compliance	How well the health-information system complies with a country's policy framework and respects rules on sensitive data.
Interoperability	This domain tests two things: How smoothly the tool exchanges data with existing platforms (interoperability) and whether it simplifies, rather than clutters, everyday work (complementarity).
Operational fit and change-management fit	How readily an intervention integrates into existing workflows and the level of ongoing support it demands.
Cost – startup and sustainability	The extent to which an intervention's financial profile—both the initial outlay and the ongoing expense—fits the means of the health system that aims to adopt it.
Impact potential and data-quality safeguards	Measures both the operational gains an intervention delivers and the rigor with which it protects data integrity.
Maturity / readiness	How far an intervention—digital or non-digital—has progressed from concept to dependable routine use.

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