

# Digital health systems to support pandemic response in Afghanistan

## Mapping digital health tools and matching deployment opportunities in response to COVID-19

April 2021

### IN THIS TECHNICAL BRIEF

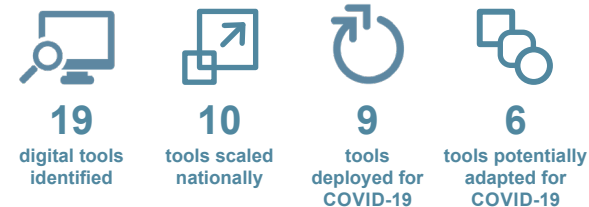
- 2 View a snapshot of the digital health tools mapped and matched to support Afghanistan's COVID-19 response
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## Introduction

The Islamic Republic of Afghanistan's Ministry of Public Health (MOPH) published the *National Health Strategy: 2016–2020* to frame its priorities, which include strengthening its health information systems (HIS) and building a national data warehouse to provide quality data for decision-making to support health programs and outcomes. The COVID-19 pandemic brought a new level of urgency to achieving these priorities. Leveraging digital health tools is a rapid, cost-effective strategy to accelerate Afghanistan's COVID-19 response while at the same time reinforcing its priorities.

## Background

Digital Square conducted a landscape analysis of Afghanistan's digital systems in the ten-year period from 2010–2020 with information validated by tool implementers and designers, digital health experts, and MOPH stakeholders as part of the USAID-funded Map and Match project. The purpose was to identify the existing digital tools utilized in Afghanistan, map the tools already deployed for COVID-19 response to relevant use cases, and highlight opportunities where existing tools can quickly be adapted and deployed to support COVID-19 response.



## Analysis overview

The Map and Match assessment found 19 digital health tools, with at least 9 already deployed for COVID-19 response. There may be many more tools deployed across the country that were not uncovered in this rapid analysis. This brief identifies opportunities for existing digital tools to be adapted to pandemic use case needs for the COVID-19 response and potential future epidemics. Mapping tools to the use cases revealed where there are strengths and gaps in Afghanistan's digital health systems response to COVID-19. For example, the analysis found additional tools ready for adaptation to support use cases like points of entry, supply chain, and vaccine delivery and planning. Strategic adaptation of existing digital health tools will accelerate the COVID-19 response, offering greater efficiency and more robust support to the government, health workers, clients, and other stakeholders.

## Key definitions

**Pandemic use case** refers to the specific type of information collected, stored, tracked, analyzed, or visualized as it relates to the functional response to an epidemiological event, specifically COVID-19.

**Digital health tool** refers to a website, application, or other computer or mobile technology that supports data collection, storage, tracking, analysis, or visualization. The tool must have an electronic interface. One digital tool can address multiple use cases.

**Application** refers to components of digital tools that are primarily designed for use by clients of the health system or by health workers. Applications can be reused to address more than one use case, or applications can be uniquely used for only one use case.

**Adaptation** refers to making improvements to existing digital tools to improve their applicability and impact in the context of COVID-19.

Figure 1. Current number of digital health tool deployments mapped to pandemic use cases in Afghanistan.

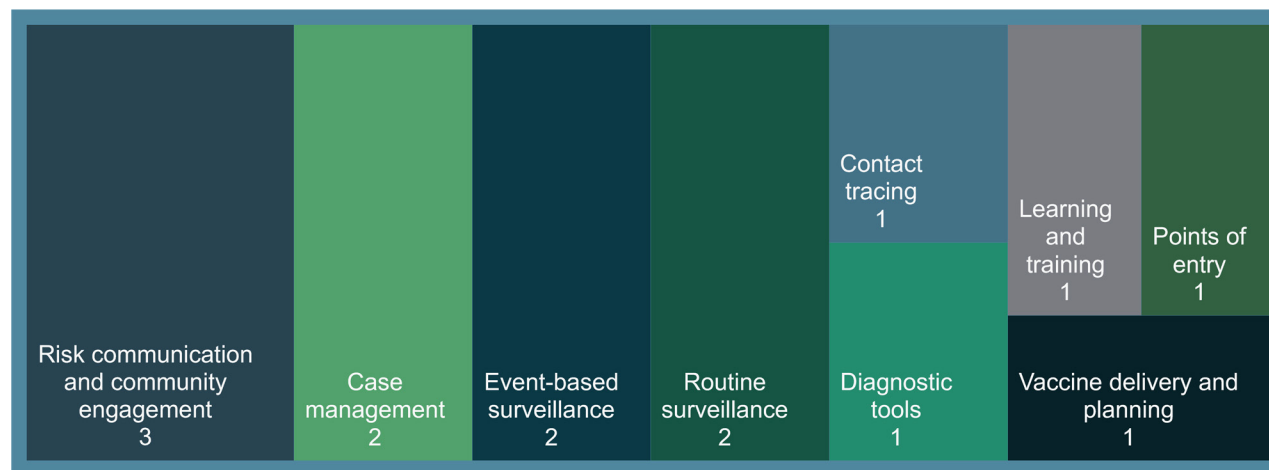


Figure 1 illustrates that many use cases are addressed using several tools in Afghanistan's COVID-19 response while other use cases are filled by only one tool.

**Table 1. Mapping and matching digital health tools to strengthen Afghanistan’s COVID-19 response.**

Digital Square mapped the current state of tools’ functionality across the pandemic use cases in **blue** to illustrate how the digital health system is supporting Afghanistan’s COVID-19 response. Digital Square matched opportunities for tool adaptation across the pandemic use cases in **green** to reveal places where Afghanistan can reuse parts of its existing digital health systems to strengthen its COVID-19 response.

|                      |                                                                        | PANDEMIC USE CASES |                 |                             |                  |                                                                               |                                             |                                  |                    |                       |            |                 |                                             |                      |              |                               |
|----------------------|------------------------------------------------------------------------|--------------------|-----------------|-----------------------------|------------------|-------------------------------------------------------------------------------|---------------------------------------------|----------------------------------|--------------------|-----------------------|------------|-----------------|---------------------------------------------|----------------------|--------------|-------------------------------|
|                      |                                                                        | Case management    | Contact tracing | Coordination and operations | Diagnostic tools | Event-based surveillance (including rapid response teams, case investigation) | Health facility and provider administration | Infection prevention and control | Laboratory systems | Learning and training | One Health | Points of entry | Risk communication and community engagement | Routine surveillance | Supply chain | Vaccine delivery and planning |
| DIGITAL HEALTH TOOLS | 166 Call Center                                                        |                    |                 |                             |                  |                                                                               |                                             |                                  |                    |                       |            |                 |                                             |                      |              |                               |
|                      | Afghanistan HMIS (DHIS2)                                               | Blue               | Blue            | Green                       | Green            | Blue                                                                          | Green                                       | Green                            | Green              |                       | Green      | Green           | Green                                       | Blue                 | Green        | Green                         |
|                      | Case.io                                                                |                    |                 |                             | Blue             |                                                                               |                                             |                                  |                    |                       |            | Blue            |                                             |                      |              |                               |
|                      | COVID-19 Tracker in Afghanistan                                        |                    |                 |                             |                  | Blue                                                                          |                                             |                                  |                    |                       |            |                 |                                             |                      |              |                               |
|                      | form.expert                                                            | Blue               |                 |                             |                  |                                                                               |                                             |                                  |                    |                       |            |                 |                                             | Blue                 |              |                               |
|                      | Ministry of Public Health's official Facebook page                     |                    |                 |                             |                  |                                                                               |                                             |                                  |                    |                       |            |                 | Blue                                        |                      |              |                               |
|                      | SORMAS (Surveillance Outbreak Response Management and Analysis System) |                    |                 |                             |                  |                                                                               |                                             |                                  |                    |                       |            |                 |                                             |                      |              | Blue                          |
|                      | Viamo's 3-2-1 Service                                                  |                    |                 |                             |                  |                                                                               |                                             |                                  |                    |                       |            |                 | Blue                                        |                      |              |                               |
|                      | World Continuing Education Alliance                                    |                    |                 |                             |                  |                                                                               |                                             |                                  |                    | Blue                  |            |                 |                                             |                      |              |                               |
|                      | CommCare                                                               | Green              | Green           |                             | Green            | Green                                                                         | Green                                       | Green                            | Green              | Green                 |            | Green           | Green                                       |                      | Green        |                               |
|                      | Community Scorecard App                                                |                    |                 |                             |                  |                                                                               |                                             |                                  |                    |                       |            |                 | Green                                       |                      |              | Green                         |
|                      | GxAlert                                                                |                    |                 |                             | Green            | Green                                                                         |                                             |                                  | Green              |                       |            |                 |                                             |                      |              |                               |
|                      | Hayat (formerly Teeko+)                                                | Green              |                 |                             |                  | Green                                                                         |                                             |                                  |                    |                       |            |                 |                                             | Green                |              | Green                         |
|                      | iHRIS                                                                  |                    |                 |                             |                  |                                                                               | Green                                       |                                  |                    |                       |            |                 | Green                                       |                      |              | Green                         |
|                      | mSupply, mSupply ColdChain & mSupply mobile vaccines                   |                    |                 |                             |                  |                                                                               |                                             |                                  |                    |                       |            |                 |                                             |                      | Green        | Green                         |

Blue Digital tools deployed for COVID-19 response      Green Opportunities to adapt tools for pandemic response

## Matching digital health tools ready for adaptation to fill the pandemic use case gaps

The analysis identified existing digital tools that can be adapted to support COVID-19 response for several use case gaps below. Use case gaps are defined as use cases that have fewer than two tools addressing them. Contact tracing, diagnostic tools, health facility and provider administration, laboratory systems, learning and training, points of entry, and vaccine delivery and planning all have one tool that currently addresses these use cases so are considered response gaps. Coordination and operations, infection prevention and control, One Health, and supply chain are the use cases where no existing tools were identified making them complete gaps, yet the analysis matched existing tools that can be adapted to fulfill them as well.

Many of the matched tools below provide opportunities to streamline the COVID-19 response across a range of use cases. To learn more about the tools in the matrix below, please see Table 2 for more details to facilitate adaptations. To find out more about all the Digital Square approved global goods mapped across these pandemic use cases, please see [this Map and Match resource](#), which can provide decision-makers with targeted information to deploy and adapt global goods to fulfill gaps in the COVID-19 response.

| Use Case                                    | Tools                                                                                                                                               |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Contact tracing                             | Afghanistan HMIS (DHIS2), CommCare                                                                                                                  |
| Coordination and operations                 | Afghanistan HMIS (DHIS2)                                                                                                                            |
| Diagnostic tools                            | Case.io, Afghanistan HMIS (DHIS2), CommCare, GxAlert                                                                                                |
| Infection prevention and control            | CommCare                                                                                                                                            |
| Health facility and provider administration | Afghanistan HMIS (DHIS2), CommCare, iHRIS                                                                                                           |
| Laboratory systems                          | Afghanistan HMIS (DHIS2), CommCare, GxAlert                                                                                                         |
| Learning and training                       | World Continuing Education Alliance, GxAlert                                                                                                        |
| One Health                                  | Afghanistan HMIS (DHIS2)                                                                                                                            |
| Points of entry                             | Case.io, Afghanistan HMIS (DHIS2), CommCare                                                                                                         |
| Supply chain                                | Afghanistan HMIS (DHIS2), CommCare, mSupply, mSupply ColdChain, and mSupply mobile vaccines                                                         |
| Vaccine delivery and planning               | SORMAS, Afghanistan HMIS (DHIS2), Digital Community Scorecard App, Hayat (formerly Teeko+), mSupply, mSupply ColdChain, and mSupply mobile vaccines |

## Example of a global good ready for adaptation to support COVID-19 response in Afghanistan

### CommCare

CommCare is an offline-capable mobile data collection and service delivery platform used in more than 80 countries. CommCare is popular for its offline case management capabilities proven to be effective at scale. It is designed for everything from simple surveys to comprehensive longitudinal data tracking. It allows for easy digitization of surveys, has forms that are intuitive for end users, utilizes simple device deployment, and includes translation features.

Dimagi worked to rapidly design and deploy a set of free, templated CommCare applications and reporting options using mobile, web, and SMS. These applications have been applied to a wide variety for COVID-19 use cases, including community preparedness, contact tracing, facility readiness assessment, point of entry screening, and health worker education. More than 25,000 users from more than 70 organizations and governments have used CommCare for a variety of use cases in more than 30 countries.

**11**  
PANDEMIC  
USE CASES

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**0**  
USE CASES  
UTILIZED

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**11**  
ADAPTATION  
OPPORTUNITIES  
IDENTIFIED

- Case management
- Contact tracing
- Diagnostic tools
- Event-based surveillance
- Health facility and provider administration
- Infection prevention and control
- Laboratory systems
- Learning and training
- Points of entry
- Risk communication and community engagement
- Supply chain

**Table 2. An in-depth look at digital health tools to support the COVID-19 response.**

| Digital health tool                                                    | Purpose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Use case(s)                                                                                                                                                                                                                                                                                                             | Funder(s)                             | Implementer(s)                         | Licensing     | Scale    |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------|---------------|----------|
| 166 Call Center                                                        | Afghans from anywhere in the country can dial 166 to consult with qualified female and male doctors for medical inquiries related to reproductive and maternal health, nutrition, polio, and COVID-19. Afghans can receive medical advice on what to do if experiencing symptoms of COVID-19 when they call 166.                                                                                                                                                                                                                                            | Risk communication and community engagement                                                                                                                                                                                                                                                                             |                                       | MOPH, Paywast                          | Public domain |          |
| Afghanistan HMIS (DHIS2)                                               | This is the MOPH's implementation of DHIS2, which is a software platform for integrated care and management. Afghanistan's HMIS acts as a central data warehouse for appropriate datasets to make browser-based analysis on demand possible by any internet-connected computer without the need for special distribution and installation of software on each computer.                                                                                                                                                                                     | Case management, contact tracing, coordination and operations, diagnostic tools, event-based surveillance, health facility and provider administration, laboratory systems, One Health, points of entry, risk communication and community engagement, routine surveillance, supply chain, vaccine delivery and planning | DHIS2, Gavi, Global Fund, MOHP, Norad | MOPH, DHIS2                            | Open source   | National |
| Case.io                                                                | Case.io is a web-based platform for sharing and exchanging medical cases quickly, easily, and securely. Sharing a patient case is possible with non-members of the platform via a unique link. All types of images, including Digital Imaging and Communications in Medicine (i.e., integrated viewer) and other file types (e.g., PDF, XLS) are transferred in seconds and are available for assessment and diagnosis.                                                                                                                                     | Diagnostic tools, points-of-entry                                                                                                                                                                                                                                                                                       | One World Medical Network e.V.        | One World Medical Network e.V.         | Proprietary   | National |
| COVID-19 Tracker in Afghanistan                                        | This tool is a dashboard showing the total number of confirmed cases, deaths, and recoveries in Afghanistan. It also shows the number of confirmed cases per province.                                                                                                                                                                                                                                                                                                                                                                                      | Event-based surveillance                                                                                                                                                                                                                                                                                                |                                       | Esri                                   | Proprietary   | National |
| form.expert                                                            | Form.expert converts customized PDFs into online fillable forms. Existing online forms can be expanded to include additional fillable fields such as a signature field. Each form has a unique link and can be shared with an unlimited number of people. Each person can fill out the form and sign it online. Each form is sent directly from the form.expert platform to a predefined email or to a callback URL. Forms can be filled out and sent on a smartphone, tablet, or computer. An internet connection is required. All browsers are supported. | Case management, routine surveillance                                                                                                                                                                                                                                                                                   | One World Medical Network e.V.        | One World Medical Network e.V.         | Proprietary   | National |
| Ministry of Public Health's official Facebook page                     | The MOPH's official Facebook page provides updates to the general public on important health topics, including COVID-19 (e.g., number of cases and vaccine availability).                                                                                                                                                                                                                                                                                                                                                                                   | Risk communication and community engagement                                                                                                                                                                                                                                                                             |                                       |                                        | Public domain |          |
| SORMAS (Surveillance Outbreak Response Management and Analysis System) | SORMAS is an open source software that processes disease control and outbreak management procedures. SORMAS also provides real-time digital surveillance of peripheral health care facilities and laboratories, which facilitates early detection of outbreaks. SORMAS adheres to international data standards to enhance technical and contextual interoperability with other systems.                                                                                                                                                                     | Event-based surveillance, vaccine delivery and planning                                                                                                                                                                                                                                                                 | CDC                                   |                                        | Open source   | National |
| Viamo's 3-2-1 Service                                                  | The 3-2-1 Service delivers free, trusted, life-enhancing information by local, regional, and international subject matter experts to people on mobile devices. Messages can reach previously inaccessible people with tailored health care information. Such information can overcome barriers to early detection of life threatening diseases, provide diagnostic advice, including self-diagnostic services, and treatment options through IVR.                                                                                                           | Risk communication and community engagement                                                                                                                                                                                                                                                                             |                                       | Viamo                                  | Proprietary   | National |
| World Continuing Education Alliance                                    | This learning management system is a multifield eLearning and mHealth system that supports virtual and blended learning linked to certifications for professional development and lifelong learning. Examples of content includes modules about nursing and midwifery and COVID-19 (both clinical and nonclinical). The platform generates reports on study habits and data of users (i.e., age, gender, location, qualification, role, employment status).                                                                                                 | Learning and training                                                                                                                                                                                                                                                                                                   |                                       | Regulatory & professional associations | Proprietary   | National |

 Digital tools deployed for COVID-19 response  Opportunities to adapt tools for pandemic response

**Table 2. An in-depth look at digital health tools to support the COVID-19 response, continued.**

| Digital health tool                                       | Purpose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Use case(s)                                                                                                                                                                                                                                      | Funder(s)                                           | Implementer(s)                       | Licensing   | Scale       |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------|-------------|-------------|
| CommCare                                                  | CommCare is an offline-capable mobile data collection and service delivery platform used in more than 80 countries. CommCare is popular for its offline case management capabilities proven to be effective at scale. It is designed for everything from simple surveys to comprehensive longitudinal data tracking. It allows for easy digitization of surveys, has forms that are intuitive for end users, utilizes simple device deployment, and includes translation features.                                                                                                                                                                                                                                                                                                                                 | Case management, contact tracing, diagnostic tools, event-based surveillance, health facility and provider administration, laboratory systems, learning and training, points of entry, risk communication and community engagement, supply chain |                                                     |                                      | Open source |             |
| Community Scorecard App                                   | Community scorecards are widely used to build a trusted and constructive relationship between communities and health facility staff. The Community Scorecard App helps staff or volunteers running community scorecards to digitize and analyze the data generated from this process. The app includes three related tools: a simplified data entry app that is designed to work offline, a program management app that includes real-time analysis tools, and a data hub to aggregate and visualize data.                                                                                                                                                                                                                                                                                                         | Risk communication and community engagement, vaccine delivery and planning                                                                                                                                                                       | Aga Khan Foundation, FCDO                           | Aga Khan Foundation, CARE            | Open source | Subnational |
| GxAlert                                                   | GxAlert is a digital platform that facilitates country-level surveillance of viral load laboratory by allowing data to flow across the health system. GxAlert can connect to other electronic tuberculosis (eTB) managers or M&E systems. GxAlert can also send targeted SMS alerts to facility managers, health officers and suppliers. GxAlert enabled a solution to address the following gaps: 1) device management, monitoring and reporting, 2) calibration, maintenance and procurement planning, 3) lab technologists' capacity, availability and training, 4) real-time results notifications to respective stakeholders including rapid case notifications for all positive results to all relevant healthcare officers, and 5) inventory management and notifications to reduce stockouts and expiries. | Diagnostic tools, laboratory systems, event-based surveillance                                                                                                                                                                                   |                                                     | SystemOne                            | Proprietary | National    |
| Hayat (formerly Teeko+)                                   | Hayat is a mobile Android application and web portal used by health providers and administrators to track immunization and MNCH service delivery. Hayat is comprehensive, capturing data across all points of contact with the health system and can be accessed by different cadres of health workers. The platform is expanding its ability to track inventory. As COVID-19 vaccines and therapeutics are developed, established systems like Hayat will be crucial to monitor deployment and immunization at decentralized levels.                                                                                                                                                                                                                                                                              | Case management, event-based surveillance, routine surveillance, vaccine delivery and planning                                                                                                                                                   | Aga Khan Foundation Canada, Grand Challenges Canada | Aga Khan Development Network, MOHP   | Open source | Subnational |
| iHRIS (internet-based human resources information system) | iHRIS is free, open-source software that helps countries around the world track and manage their health workforce data to improve access to services. Countries use it to capture and maintain high-quality information for health workforce planning, management, regulation, and training.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Health facility and provider administration, risk communication and community engagement, vaccine delivery and planning                                                                                                                          | USAID                                               | IntraHealth International, Palladium | Open source |             |
| mSupply, mSupply ColdChain, and mSupply mobile vaccines   | mSupply can be used for inventory management. The tool can display aggregated data on dashboards about vaccine dispensation numbers and rates. The tool can produce a list of people to send SMS reminders to receive their vaccine doses and record adverse drug reactions. mSupply uses Bluetooth sensors to monitor cold chain equipment monitoring.                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Supply chain, vaccine delivery and planning                                                                                                                                                                                                      | Primarily self-funded, UNDP, UNPFA, USAID           | UNDP                                 | Open source | National    |

 Digital tools deployed for COVID-19 response  Opportunities to adapt tools for pandemic response

*“We are using aggregated data for DHIS2 for COVID-19 response, but we would like to focus on collecting individual data moving forward too. We want to focus on patient management in digital health reform.”*

—Dr. Lutfullah Shifaa, MOPH

## At a glance

Figure 2 shows that Afghanistan's digital health tools rely on different software licensing types for sustainability with open source being the most common. Figure 3 demonstrates that Afghanistan has 10 digital health tools deployed on a national scale while 5 operate on a subnational scale. These figures are not specific to COVID-19 response, but provide an overall picture of Afghanistan's digital health infrastructure.

Figure 2. Software licensing types of Afghanistan's digital health tools.

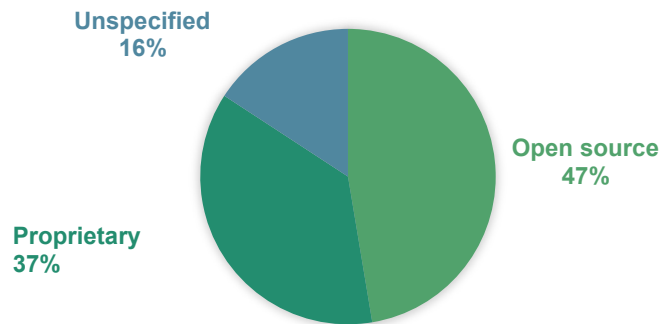
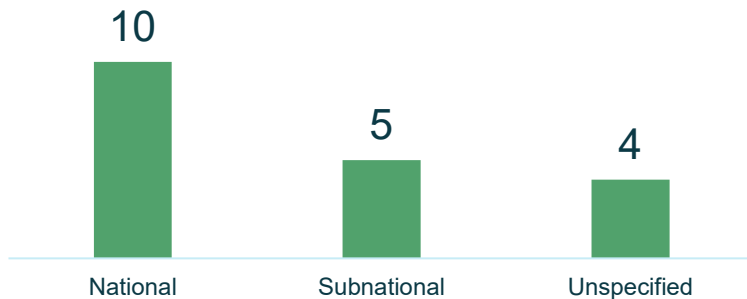






Figure 3. Number of digital tools deployed at scale in Afghanistan.



## Conclusion

Digital Square identified 19 existing, adaptable digital health tools in Afghanistan. The analysis found gaps in use cases and several opportunities where existing tools can meet these gaps to support the country's COVID-19 response and simultaneously strengthen its health system. This brief underpins how critical it is to align funding to Afghanistan's existing digital health infrastructure to bolster its capacity to mitigate the effects of the current pandemic and prepare the country to respond to future outbreaks.

## Take action

- 
**Coordinate with all digital systems stakeholders** to create a unified, robust digital health system that can strategically and rapidly be part of the ongoing COVID-19 response. It is paramount to support the government's lead and support its national digital health strategies and the tools it approves. Visit the [Digital Health Atlas](#) to see a complete, regularly updated snapshot of Afghanistan's digital health system. If you know of a digital system that is not identified in this brief, please add it to the [Digital Health Atlas](#).
- 
**Reuse existing tools when possible.** Do not invest in new systems if there are existing systems the government endorses that can effectively approach each of the pandemic use cases.
- 
**Learn more about Afghanistan's digital health systems** and their role in the COVID-19 response by reviewing Afghanistan's full Map and Match dataset.
- 
**Apply GIZ's Assessment Tool for Digital Pandemic Preparedness** to better understand the strengths and gaps in the country's COVID-19 response and to be well prepared for future disease outbreaks.

- 
**Connect with additional relevant resources, including:**

**Digital Square** continues to update its [wiki](#) with adaptations of Digital Square Global Goods and has a [COVID-19 resource page](#) that features hosted webinars that provide demos of tool adaptations.

The recently released [Global Goods Guidebook](#), Version 2 includes additional information about global goods deployment for COVID-19.

Map and Match has many resources on its [project landing page](#) including the Digital Applications and Tools Across an Epidemiological Curve, Global Goods Adaptations Across Use Cases, and other country briefs.

[Digital Solutions for COVID-19 Response](#), published by Johns Hopkins University, features digital platforms that have been adapted for COVID-19 case management and contact tracing needs. The assessment includes a review of nine tools that were selected based on their existing deployment, flexibility, and adaptability for COVID-19 use cases; their ability to support multiple languages; and stakeholder interest in how these applications can be leveraged in response to COVID-19.



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# Annex 1. Abbreviations

| Acronym        | Definition                                         |
|----------------|----------------------------------------------------|
| <b>CARE</b>    | Cooperative for Assistance and Relief Everywhere   |
| <b>CDC</b>     | US Centers for Disease Control and Prevention      |
| <b>DHIS2</b>   | District Health Information Software 2             |
| <b>EIRs</b>    | Electronic immunization registries                 |
| <b>EMRs</b>    | Electronic medical records                         |
| <b>FCDO</b>    | UK Foreign, Commonwealth and Development Office    |
| <b>IVR</b>     | interactive voice response                         |
| <b>M&amp;E</b> | monitoring and evaluation                          |
| <b>MNCH</b>    | maternal, newborn, and child health                |
| <b>MOPH</b>    | Ministry of Public Health                          |
| <b>PDF</b>     | portable document format                           |
| <b>SMS</b>     | short message service                              |
| <b>TB</b>      | tuberculosis                                       |
| <b>UNDP</b>    | United Nations Development Programme               |
| <b>UNICEF</b>  | United Nations Children's Fund                     |
| <b>UNFPA</b>   | United Nations Population Fund                     |
| <b>URL</b>     | uniform resource locator                           |
| <b>WHO</b>     | World Health Organization                          |
| <b>USAID</b>   | United States Agency for International Development |
| <b>XLS</b>     | Excel spreadsheet                                  |

## Annex 2. Use case definitions

| Category                                                                              | Objective                                                                                                                                                                    | Functional description                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Case management</b>                                                                | Systematic processing of suspected infected persons                                                                                                                          | Systems for documenting patient details and clinical interactions                                                                                                                                                                                  |
| <b>Contact tracing</b>                                                                | Reduction of epidemic reproduction rate                                                                                                                                      | Identification and follow-up with people who have had high-risk interactions with infected persons                                                                                                                                                 |
| <b>Coordination and operations (including emergency operations centers)</b>           | Preparedness and response plans, support for multisectoral responses                                                                                                         | Systems to support cross-coordination for multisectoral response, emergency operations centers, and executing response plans                                                                                                                       |
| <b>Data analytics, visualizations, and use</b>                                        | Efficient and effective response to validated outbreaks                                                                                                                      | Systems for enabling data-driven decision-making and communications to field teams                                                                                                                                                                 |
| <b>Diagnostic tools</b>                                                               | Improve efficiency in clinical diagnosis and collection of data from diagnostic tools                                                                                        | Diagnostic tools with digital connectivity to support monitoring, documentation, and reporting of diagnoses                                                                                                                                        |
| <b>Event-based surveillance (including rapid response teams, case investigations)</b> | Early detection of outbreaks and epidemics, case detection and investigation, national and subnational emergency operations to ensure rapid management of infectious disease | Systems with functionality or ability to monitor patterns indicative of infectious disease epidemic outbreak; systems to detect and document cases of emerging disease threats, investigate those threats, identify cases, and manage the response |
| <b>Health facility and provider administration</b>                                    | Robust organizational underpinning for response                                                                                                                              | Systems for managing facility accounting and HR                                                                                                                                                                                                    |
| <b>Infection prevention and control</b>                                               | Prevent infection among patients and health workers                                                                                                                          | Systems that support triage, isolation, WASH, waste management to prevent transmission to staff, other patients, and the community                                                                                                                 |
| <b>Interoperability</b>                                                               | Improve effectiveness of tools                                                                                                                                               | Provision of standardized interfaces to other software modules                                                                                                                                                                                     |
| <b>Laboratory systems</b>                                                             | Validation of infectious disease incidence                                                                                                                                   | Systems with functionality to order lab tests, follow progress of patient sample, receive test results (confirm suspected case)                                                                                                                    |
| <b>Learning and training</b>                                                          | Support health worker readiness, including improve patient data collection and sample testing                                                                                | Localized E-learning solutions for health workers and others                                                                                                                                                                                       |
| <b>One Health</b>                                                                     | Prevent zoonotic disease outbreaks                                                                                                                                           | Monitoring of potential vectors to humans by tracking infectious diseases in local wildlife and livestock                                                                                                                                          |
| <b>Points of entry</b>                                                                | Detect and manage international spread of disease by identifying suspected infected persons at border entry points                                                           | Systems to strengthen border health security, screen, and follow-up with suspected infected persons at ports of entry and other border entry points                                                                                                |
| <b>Risk communication and community engagement</b>                                    | Improved public awareness of facts and best practices for disease prevention                                                                                                 | Systems for channeling messaging and communication to public to promote public awareness, counter misinformation, encourage treatment seeking behaviors, and encourage citizens to take appropriate actions to promote health                      |
| <b>Routine surveillance</b>                                                           | Routine health data monitoring to identify trends                                                                                                                            | Systems to manage health data and track trends on an ongoing basis, regardless of whether there is an outbreak or epidemic; systems usually include aggregate data                                                                                 |
| <b>Supply chain</b>                                                                   | Support allocation of resources to aid in response                                                                                                                           | Systems for monitoring facility readiness and stock levels                                                                                                                                                                                         |
| <b>Vaccine delivery and planning</b>                                                  | Systematic monitoring of vaccinations in the population                                                                                                                      | Systems for documenting vaccinations for patients                                                                                                                                                                                                  |









## Annex 3. Digital tools supporting vaccine deployment

Digital technologies can act as accelerators for the introduction, deployment, and scale-up of vaccines in countries to assist health workers, communities, and other stakeholders. The use of digital tools and the data they enable facilitate rapid, iterative, and scalable approaches to ensure vaccines are safely delivered to health facilities, that health workers are equipped to administer them, and that communities are informed and confident in their efficacy.

Through the Map and Match project, Digital Square mapped the existing functionality of approved global goods to COVID-19 use cases, including those supporting planning, delivery, administration, and monitoring of COVID-19 vaccines. These adaptations and supporting resources are listed on Digital Square’s [wiki](#).

Table 3 illustrates how digital tools can support activities aligned to five use cases focused on vaccines. Digital Square has information about its approved global goods and how they align to these use cases currently as well as potential adaptations on its [website](#). This list does not include all digital public goods in the digital health ecosystem. Other tools like RapidPro and WelTel, which are not supported through Digital Square, can be included in these use cases.

**Table 3. Global goods tools to support vaccine deployment use cases.**

| Description of vaccine deployment use cases                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Digital Square approved global goods use cases                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Plan for vaccine introduction in country</b></p> <p>Digital tools can be used for planning and “microplanning” to inform how many vaccines are needed, where vaccines can be stored and monitored, who the most vulnerable populations are and where they are located, and other information essential to planning. Assessing the tools and data available throughout the health system, including patient data and health worker data, will inform this planning.</p> <p>As part of a vaccine introduction, governments need to build awareness of the vaccine and its benefits, and combat misinformation. Digital tools can be used for planning purposes to send messages to both health workers and communities about the vaccine.</p> <p>Training health workers is essential before introducing a new vaccine. Governments need to provide information to health workers on vaccine administration, possible side effects, and how to treat patients showing adverse reactions. Digital tools can be leveraged to rapidly share this information and offer virtual training.</p>                                                                                                                                                                        | <p> <b>Messaging</b></p> <p> <b>Microplanning</b></p> <p> <b>Training</b></p>                         |
| <p><b>Support vaccine introduction</b></p> <p>Digital tools can enhance the launching of a vaccination campaign. Communication tools like SMS and social media can support rapid information sharing with communities as the vaccine is made available.</p> <p>Pharmacies, hospitals, clinics, and other facilities use robust digital systems to ensure vaccines are stocked at facilities by tracking inventory and shelf life and ordering additional supplies when needed. Digital tools can manage the transactional movements of vaccines within multilevel supply chains. Supply chain systems can also ensure that syringes, diluents, and other materials needed for vaccine delivery are stocked.</p> <p>Digital tools can support temperature monitoring during transport and where vaccines are stored. Remote temperature monitoring can improve cold chain performance, giving health workers assurance that vaccines are safe and effective.</p> <p>Digital tools can track when clients receive vaccines as well as other data fields (e.g., vaccine type, immediate negative reactions, and longer-term potential adverse events). Countries can adapt existing electronic immunization registries (EIRs) for vaccine monitoring and follow-up.</p> | <p> <b>Patient monitoring</b></p> <p> <b>Supply chain</b></p> <p> <b>Vaccine management</b></p> |

### Digital Square approved global goods use cases



#### Electronic immunization registries

DHIS2 Tracker, OpenSRP, OpenMRS, Tamanu



#### Messaging

CommCare, Community Health Toolkit, mHero, OpenSRP



#### Microplanning

Healthsites, OpenSRP, Reveal



#### Patient monitoring

CommCare, DHIS2 Tracker, OpenSRP, SORMAS



#### Supply chain

DHIS2, OpenLMIS, Logistimo, OpenBoxes, Product Catalogue Management Tool



#### Training












CommCare, Community Health Toolkit, mHero, OpenSRP, SORMAS



#### Vaccine management

CommCare, Community Health Toolkit, DHIS2, DHIS2 Tracker, Logistimo, OpenBoxes, OpenLMIS, OpenSRP, Tamanu

**Table 3. Global goods tools to support vaccine deployment use cases, continued.**

| Description of vaccine deployment use cases                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Digital Square approved global goods use cases                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Enhance roll-out of vaccine, support ongoing vaccine monitoring</b></p> <p>In this phase, scaling to vaccinate large portions of the population is a priority. Vaccine roll-outs can be enhanced by adapting digital tools to add workflows and functionality as vaccine coverage expands. Governments need to consider additional information communications technology (ICT) needs like larger cloud-hosting services and use of tools that are operational offline for areas that have limited mobile network coverage.</p> <p>Supply chain is critical as vaccines are transported to more sites across the country. Digital supply chain tools, especially when paired with vaccine delivery data (e.g., from electronic medical records/EIRs), can help forecast supply needs and include decision support to prompt vaccine orders when supply falls below a defined threshold.</p> <p>EIRs and other tools can help prevent overcrowding in clinics by scheduling specific clinic times for vaccines. This ensures more equitable distribution of health services.</p>                                                                                                  | <ul style="list-style-type: none"> <li> <b>EIRs</b></li> <li> <b>Supply chain</b></li> <li> <b>Patient monitoring</b></li> <li> <b>Vaccine management</b></li> </ul>         |
| <p><b>Enhance communication to sustain vaccine demand</b></p> <p>Many COVID-19 vaccines are multi-dose shots. To ensure clients receive boosters, now and in the future, enhancing communication to sustain demand for the vaccine is important. Digital tools can be used to send messages to both health workers and communities about the vaccine. Communication tools can be linked with patient monitoring tools to automatically trigger direct communication to clients. Digital tools can continue to be used to increase vaccine demand and address misinformation, dispelling rumors and misinformation that cause vaccine hesitancy.</p> <p>Many EIRs include contact information and messaging features for patients' caregivers, allowing for direct communication to caregivers. These messaging features have historically been used to notify caregivers about upcoming immunization sessions or overdue vaccines. As the global community develops a greater understanding of COVID-19—including its transmission patterns, full range of symptoms, and treatment options—health workers also have the ability to share health promotion messages with patients.</p> | <ul style="list-style-type: none"> <li> <b>EIRs</b></li> <li> <b>Messaging</b></li> <li> <b>Patient monitoring</b></li> </ul>                                                                                                                                   |
| <p><b>Use data to inform vaccine-related decisions</b></p> <p>Patient monitoring and tracking tools as well as EIRs can help generate meaningful insights for future vaccination efforts and encourage data-driven decisions when countries are able to plan for catch-up campaigns. For example, some EIRs can quantify the number of missed vaccines and determine which areas have been under-vaccinated. This individual-level data will enable decision-makers to target immunization services and allocate funding to those areas most in need. For more information, <a href="#">this publication</a> explains how Gavi and UNICEF are working to scale up use of digital tools for vaccination campaign performance monitoring.</p> <p>Interoperability is critical. As governments review the portfolio of tools and systems that are in place to support vaccine management, it is crucial that there is strong consideration given to the movement of data between systems to ensure a harmonized set of records for the population. This ensures that no individual is missed or counted twice.</p>                                                                       | <ul style="list-style-type: none"> <li> <b>EIRs</b></li> <li> <b>Patient monitoring</b></li> <li> <b>Supply chain</b></li> <li> <b>Vaccine management</b></li> </ul> |

**Digital Health Center of Excellence (DICE) to support the COVID-19 pandemic response**

As countries operationalize their COVID-19 vaccine rollout plans, there is an opportunity to identify areas where digital health interventions can amplify these efforts, while improving service delivery and strengthening health systems more broadly.

The success of digital health solutions often correlates with the strength of the enabling environment for these technologies, such as ICT infrastructure readiness, workforce capacity, data standards, interoperability, and the policy and regulatory environment. Poorly designed or inappropriate digital interventions, as well as vertical approaches geared only toward COVID-19, risk undermining and ultimately weakening national systems.

To more effectively organize support to countries for COVID-19 response, a multiagency COVID-19 DICE, with a UNICEF-WHO cohosted secretariat, will launch in April 2021. The DICE will provide coordinated technical assistance to low- and middle-income countries to support sustainable and scalable deployment of carefully chosen digital health solutions that support COVID-19 pandemic response plans.

Areas the COVID-19 DICE covers include:

- Support countries to conduct a structural readiness assessment of their enabling environment, define business requirements, conduct platform analysis, and map partnerships, existing tools, and gaps. Along with support to countries, this will require standardizing approaches and tools across development partners.
- Coordinate surge support to countries to assist in their development of a rapid strategic approach to meet the imminent needs of the vaccine delivery and transition to a sustainable strengthened and digitally enabled health system.
- Foster capacity and partnership with regional and national digital health experts toward the development of capacity that can provide long-term technical support to the region.
- Strategically support developers and product owners to modify and optimize software products relevant for pandemic response and vaccine delivery toward interoperability, standardization, and vaccine-specific functionalities.
- Complement and operationalize WHO and UNICEF guidelines developed in the context of the Access to COVID-19 Tools Accelerator (ACT-A) to further clarify and identify mature options open to countries building health infrastructure.
- Support the transition, alignment, and integration of COVID-19-related digital health investments through a systems strengthening lens.
- Pilot and assess transformative approaches to digital health deployments, monitor global developments and opportunities for standardized approaches, increase south-south knowledge transfer, and compile lessons learned.