DIPC

DIPC Annual Report 2023

Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

digital. global

Published by:
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices:
Bonn and Eschborn
Friedrich-Ebert-Allee 32 + 36
53113 Bonn, Germany
E: info@giz.de
I: www.giz.de

Digital Innovation in Pandemic Control (DIPC):
Tessa Lennemann
Project lead
E: dipc@giz.de
I: https://www.bmz-digital.global/en/overview-of-initiatives/dipc/

Design and layout:
glow communication GmbH
https://glow-berlin.de

On behalf of:
German Federal Ministry for Economic Cooperation and Development (BMZ)
GIZ is responsible for the content of this publication.

Bonn, Germany
August 2024

CONTENT

ABBREVIATIONS

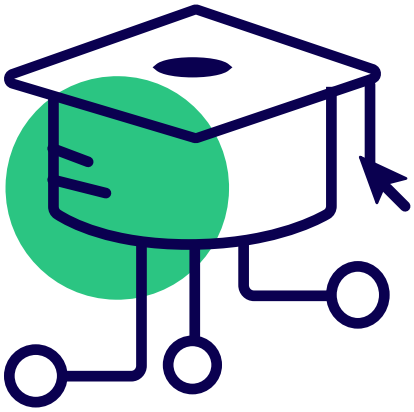
3Rs	Rights, Resources and Representation
Africa CDC	Africa Centres for Disease Control and Prevention
BMZ	German Ministry of Economic Development
D4P	Data4Policy
DAK	Digital Adaption Kit
DHD	Digital Health Division
DHIMS2	District Health Information Management System 2
DHIS2	District Health Information Software 2
DICE	Digital Health Centre of Excellence
DIPC	Digital Innovation in Pandemic Control Initiative
DPPA	Digital Pandemic Preparedness Assessment
DS/PATH	Digital Square/PATH

EIR	Electronic Immunization Registry
EPI	Expanded Programme on Immunization
EU – LAC	European Union – Latin American/Caribbean
FHIR	Fast Healthcare Interoperability Resources
GHS	Ghana Health Service
GIZ	Deutsche Gesellschaft für international Zusammenarbeit
GoT-HoMIS	Government of Tanzania Health Operation Management Information System
HIS	Hospital Information System
HISP	Health Information Systems Program
HL7	Health Level 7
HMIS	Health Management Information Systems
iCHIS	integrated Community Health Information System
ICT	Information and Communications Technology
IVD	Immunization and Vaccines Development
JSI	John Snow Inc.
LACPASS	Latin American and Caribbean Public Health Association for Standards and Solutions
LMICs	Low- and Middle-Income countries
M&E	Monitoring and Evaluation
MoH	Ministry of Health
ODI	Open Data Institute
OGTI	General Office of Information Technologies
OpenHIE	Open Health Information Exchange
OpenLMIS	Open-source logistics management information system
PAHO	Pan American Health Organization
PHC	Primary Health Care

PORALG	President's Office, Regional Administration and Local Governments
PPME	Policy Planning Monitoring and Evaluation
RENIEC	National Registry of Identification and Civil Status
RI	Regenstrief Institute
RKI	Robert Koch Institute
SDGs	Sustainable Development Goals
SIAF	Integrated System of Financial Administration
SIGA	Integral Warehouse Management System
SISMED	Integrated System of Public Supply of Pharmaceuticals, and Medical Devices
SMART	Standards-based, Machine-readable, Adaptive, Requirements-based, and Testable
SORMAS	Surveillance, Outbreak Response Management and Analysis System
SURD	System and User Requirements Documentation
TImR	Tanzania Immunization Registry
UNICEF	United Nations International Children's Emergency Fund
WFP	World Food Program
WHO	World Health Organization
WHO SG	WHO SMART Guidelines
WP	Work Package
WP1	Country Implementation
WP2	Global Product-Suite
WP3	Capacity Building
WP4	Operational and Strategic Research
ZIG 2	The Evidence-based Public Health Unit from RKI

1

EXECUTIVE SUMMARY



In response to the profound challenges posed by the COVID-19 pandemic, the Digital Innovation in Pandemic Control (DIPC) initiative, funded through the German Ministry of Economic Development (BMZ) Last Mile Fund, has emerged as a dynamic force in shaping resilient health systems globally. With collaborative efforts from implementing partners such as the United Nations International Children's Emergency Fund (UNICEF), Digital Square/PATH, the Pan American Health Organization (PAHO), Regenstrief Institute, and the Robert Koch Institute (RKI), DIPC strategically navigates the digital transformation to fortify health systems on a national, regional, and global scale. DIPC contributes to BMZ's strategies by strengthening health systems, promoting gender-equitable digital transformation, and enhancing women's participation in digital policies. DIPC is one of the first digital health project implementing the World Health Organisation's Standards-based, Machine-readable, Adaptive, Requirements-based, and Testable (WHO SMART) Guideline approach.

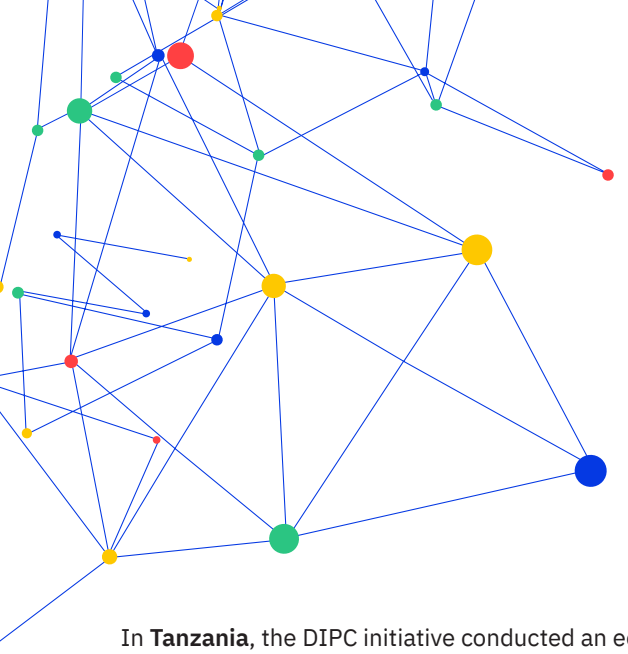
DIPC Aim and Vision:
DIPC envisions a demand-driven introduction of digital solutions for vaccine distribution, integral to resilient health systems. This is done by aiming to reduce the occurrence, spread, and consequences of infectious diseases, while leveraging human-centered digital transformation, while implementing the German development cooperation principles and leadership priorities.

Activities:
The DIPC initiative operates in two phases. Phase I, initiated in 2019, focuses on interconnected Work packages (WPs), including a Digital Pandemic Preparedness Assessment (DPPA) in 5 countries, a Digital Health Innovation Accelerator, and the establishment of the multilateral Digital Health Centre of Excellence (DICE). Building on this, Phase II comprises four WPs. These involve strengthening digital health systems in partner countries, integrating mature software aligned with the WHO SMART Guidelines, capacity building through an online training course, and conducting operational and strategic research. The interconnectedness of these WPs ensures coordination and knowledge sharing. DIPC emphasizes evidence-driven decision-making and positions itself as a catalyst for innovation, resilience building, and sustainable global health practices in addressing immediate pandemic challenges.

Setup and Cooperations:
DIPC, driven by extensive collaboration, engages key partners across WPs to implement activities. UNICEF contributes to Sierra Leone's National Digital Health Program, focusing on planning, oversight, and capacity building. Digital Square/PATH supports Ghana, Tanzania, and Malawi in improving immunization workflows and enhancing digital transformation capacities. PAHO collaborates in Peru through the development of a digital solution for the vaccine reigstration specially in rural areas with problem connectivities (offline). The Regenstrief Institute focuses on course development for the health sector in WP3. The RKI in WP4 evaluates the impact of the DIPC solutions in the digital health sector, providing essential research and insights. DIPC strategically integrates with other GIZ projects at both national and global levels. Additionally, DIPC engages global stakeholders, collaborating with organizations such as Africa Centres for Disease Control and Prevention (Africa CDC), Surveillance, Outbreak Response Management and Analysis System Foundation (SORMAS), Open Health Information Exchange (OpenHIE), and the WHO, to adopt a comprehensive approach to addressing global health challenges.

WP1 – Strengthening digital health systems on country level:
WP1 in a comprehensive approach, the existing digital ecosystem is mapped as a basis for strategic decision-making for its further development. Together with the minitries of health and decision makers, DIPC then supports needs-based ecosystem integration and software development and scale. The WHO SMART Guidelines approach is used as a guiding standard. DIPC supports the development of Digital Adaptation Kits (DAK) for routine immunizations to define the needs for vaccine and immunization services in the country. In 2023, the ecosystem mapping was concluded in all partner countries and DAKs were localized in Ghana, Sierra Leone, Malawi, and Tanzania. 2024 will see the development and scale of solutions supported by DIPC.

In **Peru**, the DIPC's ecosystem mapping executed in collaboration with the Data for Policy project (D4P) and the Open Data Institute (ODI) identified challenges such as interoperability issues and data fragmentation in vaccine logistics. Recommendations include information exchange mechanisms and private sector regulations. DIPC in collaboration with PAHO support the peruvian government to integrate digital health into national agendas, aligning initiatives with the government's priorities. Digital solution development aims to enhance immunization processes, collaborating with existing systems.

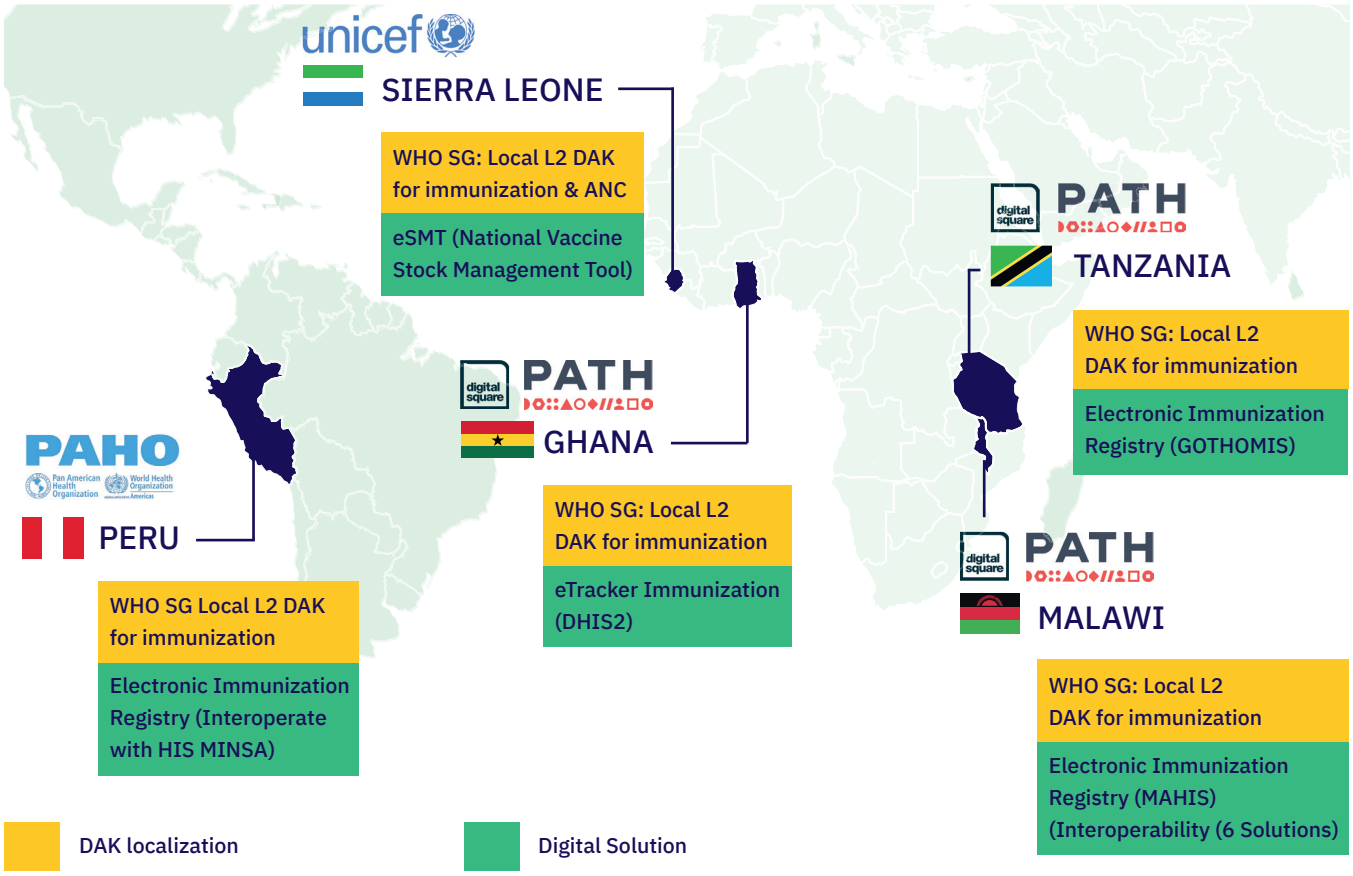


In **Tanzania**, the DIPC initiative conducted an ecosystem mapping, revealing strong governance mechanisms. Findings include priorities for immunization, such as updating the Tanzania Immunization Registry. Despite digital adoption, challenges persist, requiring capacity building. Plans involve deploying upgraded systems, comprehensive training, and collaboration with the Tanzanian government for digital health transformation. Tanzania actively embraces digitalization with roadmaps, and DIPC aligns with their goals.
Digital Square and the **Ghana** Health Service (GHS) conducted an ecosystem mapping initiative in Ghana, revealing challenges in infrastructure, functional gaps, interoperability concerns, and funding issues in the digital immunization landscape. The GHS actively collaborates with Digital Square, aligning with the national government's digitization plans and the GHS Policy and Strategy on Digital Health: 2023–2027. Digital solutions in Ghana follow the WHO DAK, implemented by PATH/Digital Square.
Digital Square, in partnership with **Malawi's** MoH, conducted a comprehensive ecosystem mapping of the country's digital immunization landscape. The initiative prioritized creating an Electronic Immunization Registry (EIR) within the Malawi Hospital Information System (MaHIS) to support immunization. The Immunization System and User Requirements Documentation (SURD) facilitated a common understanding, adhered to guidelines, and provided a framework for core data elements.
Sierra Leone's digital health landscape is assessed through an ecosystem report developed in collaboration with UNICEF. Key findings highlight the crucial role of leadership, governance, and infrastructure across seven digital health components. The government supports the DIPC initiative, evident in the development of a costed digital health investment roadmap. Sierra Leone is transitioning to the second phase of localizing WHO SMART Guidelines, focusing on operations and Digital Adaption Kits (DAK) for antenatal care and immunization. UNICEF, as implementing partner, collaborates with the directorate of science, technology, and innovation for DAK development.

WP2:
DIPC's WP2 adopts a software suite approach for seamless integration, emphasizing ease of use and compatibility. The suite, with a uniform interface and shared tools, excels in managing healthcare worker identities, ensuring secure data handling, and enabling efficient data collection and editing. Its strength lies in integration capabilities, providing comprehensive end-to-end functionality and data flow. DIPC defines standardized use cases, assigns software, and reinforces interoperability for a cohesive digital health ecosystem, enhancing adaptability with the implementation of the WHO SG DAK.

WP3:
DIPC's WP3, Training & Capacity Building, focuses on addressing capacity gaps in the digital health domain through a structured approach. It involves a standardized needs assessment, mapping existing trainings, designing tailored content, and systematic implementation at both global and local levels. The strategy aims for continuous learning, collaboration, and sustainable capacity building. In 2023, Regenstrief Institute conducted a comprehensive needs assessment for HIS training, integrating known capacity strengthening efforts. DIPC's local capacity-strengthening initiatives in partner countries, such as Malawi, Tanzania, Peru, Sierra Leone, and Ghana, tailor efforts to address specific workforce needs in digital health. These initiatives reflect a collective commitment to advancing digital health capabilities regionally and nationally. The global eLearning course, part of DIPC's transformative vision, launches in February 2024. Collaboratively designed with diverse contributors, the course addresses critical gaps in training for digital health professionals, featuring seven user personas and a Learning Community for peer-to-peer collaboration. DIPC's strategic and collaborative endeavors in WP3 highlight its commitment to addressing capacity gaps for sustained digital health investment globally.

WP4:
WP4 in the DIPC initiative, implemented by RKI, focuses on advancing evidence and innovation in digital health. It emphasizes harmonizing approaches, addressing evidence gaps, and promoting inclusive development. Thus, the initiative advocates for aligning technical standards, conducting research, and ongoing evaluation for sustained progress in digital health. Within this framework, the RKI furnishes critical evidence supporting the development, monitoring, and evaluation of the DIPC initiative. This is achieved by establishing research priorities, conducting comprehensive literature reviews to gather relevant evidence, and executing



operational research for program evaluation and strategic planning purposes. Finally, the RKI will leverage the experience gained from the DIPC initiative to provide donors with a roadmap for potential future investments, enhancing the impact and efficiency of their contributions.

Next steps in 2024:
2024 is a pivotal year for DIPC, marked by ongoing solution development, guideline refinement, global learning initiatives, impactful research, and active participation in key conferences, showcasing its commitment to leveraging digital innovation for global health:

WP1: Support of DIPC Partner Countries
Peru plans the introduction and implementation of WHO SMART Guidelines, the strengthening of local capacity, and offline registration with the interest of escalating the solution at a regional level.
Tanzania will focus on comprehensive training initiatives and tailor training programs to digital health needs.
Ghana aims to complete the e-Tracker's updated immunization component and to provide comprehensive training. Furthermore, the focus lies on the finalization of the interoperability layer. Additionally, a Women in Digital Health event will be hosted in Ghana. The DIPC Ghana Team will be taking part in the ICT4D Conference.
Sierra Leone focuses on promoting the eSMT and further digital health innovation, while developing infrastructure and building health workforce capacity.

Malawi will enhance the MaHIS with EIR module and develop a Software Roadmap. This will be done with a focus on safety and performance assurance. The release of an EIR module as open source is another key point planned for 2024.

WP2 DIPC will strengthen core functionality of the WHO SMART Guideline Reference Software, which will be tested in Peru.

WP3 (Global Learning Course Launch): Launch a global learning course on atingi, focus on training modules and peer-learning through a community of practice.

WP4 (Incubator of evidence): Identifying key research priorities, equipping the DIPC with evidence-based insights, and conducting operational research for program evaluation and informed strategic planning.

Events and Activities:
The DIPC Team will participate in different conferences, namely the ICT4D, re:publica24, the World Health Summit, and the Global Digital Health Forum.

2

INTRODUCTION

In the face of the global disruption caused by the COVID-19 pandemic, the critical role of data in guiding effective decision-making and shaping public health interventions has become indisputable. The Digital Innovation in Pandemic Control (DIPC) initiative is funded through the Last Mile Fund of the German Ministry of Economic Development (BMZ) and responds to this need.

Together with their implementing partners World Food Program (WFP), SORMAS Foundation, United Nations International Children's Emergency Fund (UNICEF), Digital Square/ PATH (DS/PATH), The Regenstrief Institute (RI), The Robert Koch Institute (RKI), the Pan American Health Organization (PAHO) and the national governments of its partner countries, GIZ harnesses digital transformation for resilient health systems on national and global levels.

The DIPC initiative envisions a demand-driven introduction, expansion, and integration of digital solutions for vaccine distribution processes (vaccine logistics) as an integral component of resilient health systems, which will strengthen pandemic prevention and response at national and global levels, while reducing the occurrence, future spread, and consequences of existing and emerging infectious diseases such as COVID-19.

Using a human-centred approach, the DIPC initiative strategically navigates digital transformation to mitigate global health crises. The initiative adheres to, promotes, and pilots standards, particularly WHO SMART Guidelines and FHIR/ HL7. In every WP of DIPC, something groundbreaking unfolds: WP1 and WP2 involve the implementation of the WHO SMART Guidelines Concept. WP3 pioneers training for a new target group not identified before, meaning a global course for IT experts managing and developing digital health ecosystems, coupled with tailored, needs-based local training programs for healthcare workers, community agents, and decision-makers. These courses strengthen digital health skills, which are needed to sustainably maintain, develop, and scale the digital health ecosystem DIPC develops.

In tandem with these efforts, the DIPC initiative is actively engaged in spearheading digital innovation and research in WP4. Conducting both operational and strategic research for program planning and evaluation, it bolsters the foundation upon which digital interventions are conceived. DIPC implements gender-inclusive development cooperation practices.

To navigate the complexities of a digital era, the DIPC initiative anchors its endeavors by focusing on digital coordination and collaboration. This is done by the establishment of the Digital Health Centre of Excellence (DICE) and active participation in entities such as the WHO SMART Guidelines Working Group, Africa CDC, and collaboration with GIZ health projects on bilateral, regional, and global fronts.

This report provides an overview of DIPC's work up until now, with a particular focus on the year 2023. During this period, DIPC implemented several significant steps to further support developments in digital health.

© GIZ / Dirk Ostermeier

3

IMPLEMENTING GERMAN DEVELOPMENT POLITICS AND CONTRIBUTING TO SUSTAINABLE DEVELOPMENT GOALS (SDGs)

The DIPC initiative implements the German Strategy on Global Health and Digitalisation Strategy, focusing on the BMZ Leadership Priorities on Pandemic Prevention, Poverty and Hunger and Feminist Development Cooperation. DIPC thus furthers the objectives of Sustainable Development Goal 3: Health and Wellbeing for all.

The potential impact of said strategies and leadership priorities becomes visible in the following table. It shows the huge potential initiatives such as DIPC can unfold if carried out to the end. Even though not all the described aspects are DIPC aims, the table generally provides an overview of the immense potential the intersection between health and digitization holds.

Tackling the German Digital and Health Strategy, as well as the BMZ Leadership Priorities

BMZ Goal	Improved Vaccine Logistics	Digital Transformation
Leadership Priority: Pandemic Prevention	• Reduction and containment of outbreaks • Eradication of diseases (polio, measles) • Resilience for pandemics in the future	• Integration of GIS data • AI-based training and signal detection • Cross-border data sharing
Leadership Priority: Poverty and Hunger	• Increase in productivity and education standards	• Free cross-border movement of people • Strengthening the local ICT sector • Job creation through capacity strengthening
Leadership Priority: Feminist Development Cooperation	• Reduction of women-specific diseases and maternal mortality (HPV) • Reduction of differences with gender-specific vaccine rates	• Chatbots and digital education • Digital support of community workers e.g., home prenatal care
Global Health Strategy	"Germany is therefore pursuing the approach of simultaneously strengthening healthcare systems and integrating infrastructure, digital surveillance and management systems and outbreak prevention and response skills into healthcare systems."	
Digital Strategy	"We support the activities of international organisations to use digital technologies to tackle global challenges. This includes, for example, the efforts of the World Health Organisation (WHO) to prevent and combat pandemics."	

4

DIPC‘S AIM AND VISION

DIPC identifies, fosters, and promotes digital innovation to solve health and country-specific challenges by strengthening pandemic prevention, response, and vaccine delivery on a national and global scale. The initiative leverages human-centred digital transformation to mitigate global health crises.

DIPC is based on the hypothesis that the demand-driven introduction, expansion, and integration of digital solutions for vaccine distribution processes (vaccine logistics) as an **integral component of resilient health systems** will strengthen pandemic prevention and response at national and global levels. Thereby, the initiative aims to reduce the occurrence, spread and consequences of existing and emerging infectious diseases such as COVID-19. However, digital support to routine vaccine delivery in DIPC partner countries is expected to have impact beyond pandemic control: Increased vaccine coverage is associated with reducing disease burden and mortality. It is additionally connected to greater social benefits, including improved economic outcome, education levels and survival especially for disadvantaged groups such as women, children, and rural populations. All these processes can be supported by digital tools and linked through interoperability.

© GIZ / Waleska Ramirez

5

DIPC ACTIVITIES

PHASE I (2019 - 2022)

DIPC executes different activities to reach the established goals and make the vision a reality. Therefore, the initiative is divided into two phases.

DIPC Phase I started in 2019 and strengthens digital health systems in three interconnected Work Packages (WPs):

- **WP A:** The Digital Pandemic Preparedness Assessment (DPPA) captures and explores existing digital applications in 5 countries (Ghana, Nigeria, Togo, Sierra Leone, Ivory Coast) that can be used for vaccine distribution and pandemic control.
- **WP B:** DIPC, together with the World Food Programme, launched the Digital Health Innovation Accelerator, which has provided financial, technical, and methodological support for further development of promising digital solutions. Ventures that develop and strengthen digital solutions in the context of pandemic prevention and response have been supported in coordination with the respective government partners until the end of 2023.
- **WP C:** Established the multilateral DICE, led by WHO and UNICEF. DICE provides targeted advice on the use of digital solutions in the global south.

To further operationalize these goals and implement the WHO SMART Guidelines, which ensure a standardized and evidence-based foundation for its interventions.

PHASE II (2022 - 2024)

DIPC Phase II has structured its approach into four WPs.

- **WP1:** Together with national governments and implementing partners (Digital Square, Unicef and PAHO), works to strengthen digital health systems for vaccine logistics and pandemic prevention and response in Ghana, Sierra Leone, Tanzania, Malawi and Peru through the integration and scale of digital solutions and the adaptation of the WHO SMART Guidelines.

- **WP2:** Combines mature software into interoperable product suites, which meet the specifications of the WHO SMART Guidelines for routine vaccination and create a seamless end to end functionality and data flow.

- **WP3:** Strengthens capacity of digital health specialists responsible for developing, maintaining, and customizing digital health systems in partner countries through an online training course hosted on atingi.

- **WP4:** Conducts operational and strategic research for the program evaluation and strategic program planning.

The different WPs in their various phases are interconnected through the DIPC initiative, which ensures coordination and knowledge sharing with other partners in digital health. The importance of evidence-driven decision-making is realized, since DIPC aims to evaluate the generated knowledge and thereby provide a roadmap for cost efficiency in the digital health development sector. Through strategic WPs and the impact hypothesis, DIPC not only addresses the immediate challenges posed by pandemics but also positions itself as a catalyst for innovation, resilience building, and sustainable global health practices.

© GIZ / Dirk Ostermeier

DIPC Phase II

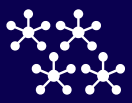
Implementation Period: 2022-2025 **Countries: Ghana, Sierra Leone, Tanzania, Malawi, Peru**

1 WP1 National Health Systems

- Digital health ecosystem mapping
- Decide on priority gaps in software landscape
- Develop a digital solution following the WHO SMART Guidelines
- Scale and integrate software

2 WP2 Global Product Suites

- Define standardized use cases
- Strengthen interoperability to create seamless E2E functionality and data flow
- WHO SG Digital Adaptation Kit implementation



3 WP3 Capacity Building

- Conduct needs assessment globally and in country
- **Nationally:** Needs-based trainings
- **Globally:** Create high-quality digital courses and
- Fem-Tech focus Adaptation Kit implementation

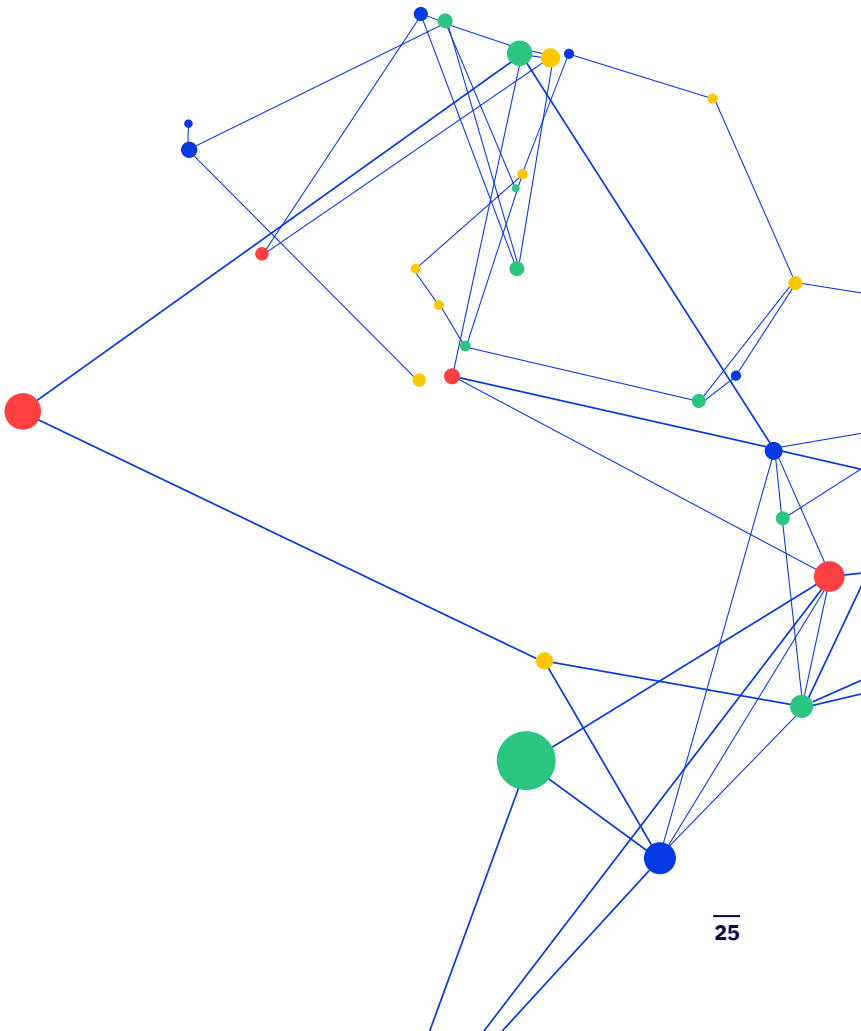
4 WP4 Incubator for Evidence

- Define research priorities for digital health
- Conduct literature reviews for relevant documents
- Conduct operational and strategic research for program evaluation and strategic program planning

© GIZ / Milagros Barbaggelata

6

DIPC SETUP AND COOPERATIONS



Collaboration is at the heart of DIPC. The initiative establishes a robust collaborative structure, functioning seamlessly at global, regional, and bilateral levels to integrate diverse approaches in development cooperation.

Implementing Partners:
The majority of DIPC is implemented through DIPC implementing partners, pooling their knowledge and technical competencies in the different WPs:

United Nations International Children's Emergency Fund (UNICEF):
https://www.unicef.org/sierraleone/
In Sierra Leone, DIPC partners with the United Nations International Children's Emergency Fund (UNICEF), which is committed to enhancing global healthcare through digital and data innovations, with a focus on children and vulnerable people.
In DIPC Phase I, UNICEF implemented DIPC WP C, setting up the DICE instrument to mediate digital health needs of developing countries during the height of the COVID-19 Pandemic. In DIPC Phase II, UNICEF supports DIPC implementation in Sierra Leone, where it has had presence for over 30 years. Thereby, a focus lies on the implementation of WP1, as well as local training needs, WP3.

Digital Square/PATH:
https://digitalsquare.org/
Digital Square through PATH act as implementing partners for the DIPC initiative in Ghana, Tanzania, and Malawi and for the implementation of WP2. From the onset of the COVID-19 pandemic, Digital Square has utilized its distinct position and capabilities to aid countries, donors, and collaborators incorporating digital tools for prevention and response measures. Leveraging their technical proficiency and well-established connections within the global digital health community, including the involvement in promoting digital global health solutions, Digital Square assists nations in choosing and customizing digital tools. This initiative aims to enhance digital systems for immunization, ensuring countries are well-prepared for potential future pandemics.
They support the DIPC initiative within WP1, 2 and 3 and plan to deliver improved and more sustainable pandemic prepared health systems with a focus on immunization workflows in Ghana, Malawi, and Tanzania.

The Pan American Health Organization (PAHO):
https://www.paho.org/es
The Pan American Health Organization (PAHO) is the international health agency for the Americas and the Regional Office of the World Health Organization. It provides technical cooperation and mobilizes partnerships throughout the region to improve health and quality of life in the countries of the Americas. PAHO acts as an implementing partner within WP1 for DIPC in Peru as well as in the region.

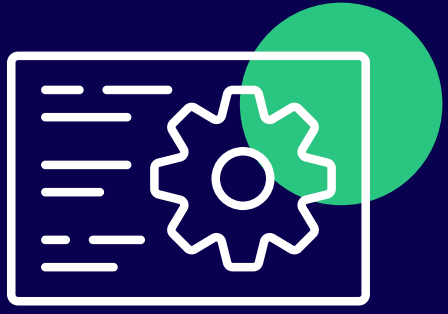
The Regenstrief Institute:
https://www.regenstrief.org/
The Regenstrief Institute acts as a valuable partner, creating an open-source course in collaboration with OpenHIE Community, that addresses the specific and currently unmet needs of those working in digital health.
The Regenstrief Institute is a dynamic, people-centred research organization driven by a mission to connect and innovate for better health. The vision of a world where better information empowers people to end disease and realize true health is what drives Regenstrief Institute. They pursue this vision through research and development guided by their core values, focusing on the creation of a global e-learning course, as well as localized offline learning material. With these contributions, they are a crucial part of WP3.

The Robert Koch Institute (RKI):
https://www.rki.de/EN/Home/homepage_node.html
The Robert Koch Institute is a significant public health institution in Germany. It operates under the German Federal Ministry of Health and plays a crucial role in disease control and prevention, both nationally and internationally. Within RKI, the Evidence-based Public Health Unit (known for its German acronym as ZIG 2), is dedicated to enhancing global public health by generating, evaluating, and applying strategic information. ZIG 2 provide a scientific foundation for prioritizing and effectively implementing international health policies and projects. ZIG 2 develop and apply scientific methods to evaluate health measures, policies, and initiatives. It aims to strengthen international health protection by conducting systematic reviews, developing human resources in research methods, creating guidelines, and prioritizing health projects to address critical needs and gaps. By joining the DIPC initiative, ZIG 2 seeks to rigorously assess the project against the five criteria established by the Organisation for Economic Co-operation and Development (OECD) for evaluations in international development cooperation. These criteria are relevance, effectiveness, efficiency, impact, and sustainability.

Countries:
DIPC Phase II is active in Peru, Tanzania, Malawi, Ghana, and Sierra Leone and implements country activities through close collaboration between the respective ministries of health, the implementing partner and the bilateral GIZ projects.

7

THEORETICAL BACKGROUND ON DIPC



The theoretical background of the DIPC project is rooted in a comprehensive definition of vaccine logistics, acknowledging the complexity of processes along the distribution chain. Encompassing side effect management, vaccination certificates, patient identification and scheduling, planning, implementation, and documentation of vaccine distribution, the project also extends its focus to improved processes for surveillance and outbreak management, as well as information management. Recognizing the interconnected nature of healthcare systems, DIPC further considers processes related to health financing, competence development, and human resources management at the interfaces of vaccination logistics with national and international digital systems.

Concisely, the DIPC initiative focusses on the following areas for intervention:

Digital Structures:

- **Strategy** – DIPC supports, develops, and aligns with national and regional digital health strategies and roadmaps.
- **Standards** – DIPC supports global goods, implements the WHO SMART Guidelines approach and advocates for FHIR/HL7 standard for interoperability.
- **Solutions** – DIPC supports the needs driven development of software & functionality, through i) the DIPC accelerator program, ii) through supporting WHO Reference Software and iii) By supporting countries to improve their local digital health ecosystem.

Digital Skills:
DIPC supports the development of Global courses for IT experts managing & developing digital health ecosystems and needs based **local training** for health care workers, community agents, decisionmakers.

Digital Innovation and Research, to generate evidence for future design of efficient solutions and digital health projects.

In alignment with the evidence provided by the RKI, the DIPC initiative adopts a holistic approach with the following key considerations:

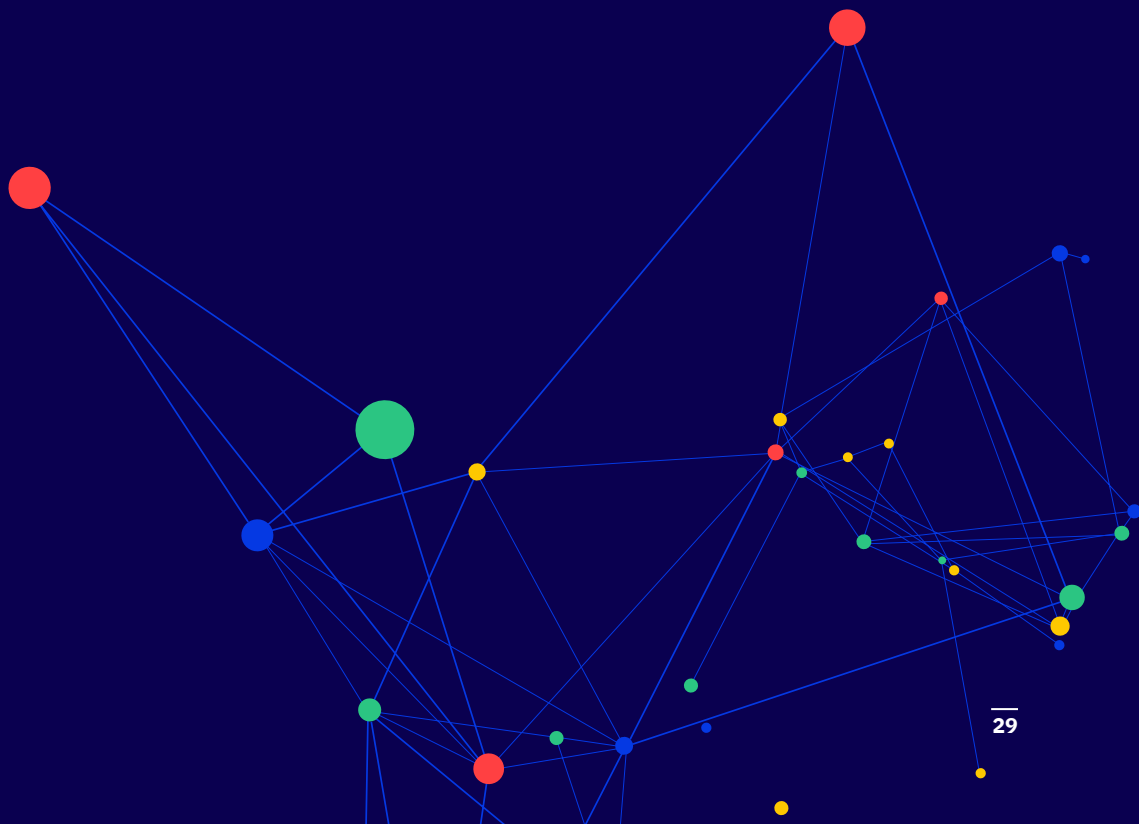
1. **Harmonized Approaches:** The initiative encourages the development of harmonized guidelines and frameworks to foster a unified approach to digitizing health systems globally. This approach aims to enhance interoperability and streamline digital processes across diverse contexts.
2. **Addressing Gaps:** Emphasizing evidence-sparse areas, DIPC focuses on research and development to create comprehensive guidelines for aspects of digital health development currently lacking resources. This targeted effort aims to address critical gaps and ensure a robust foundation for digital health interventions.
3. **Targeted Training Programs:** DIPC recognizes the importance of digital literacy and competency training, particularly in low- and middle-income countries (LMICs). The initiative aims to develop specific guidelines and frameworks to enhance healthcare staff's capacity in utilizing digital tools, contributing to improved healthcare outcomes.
4. **Global Standards Alignment**: Acknowledging the dynamic nature of technology, DIPC commits to working towards aligning technical standards across regions. The initiative aims to ensure these standards are adaptable to rapid technological changes, promoting a globally relevant and sustainable digital health infrastructure.
5. **Inclusive Development:** DIPC prioritizes the inclusion of diverse user groups and stakeholders in the development and implementation of digital health interventions. This commitment ensures that solutions are tailored to the needs of varied populations, fostering inclusivity and equitable access to healthcare resources.
6. **Ongoing Research and Evaluation:** Recognizing the importance of continuous improvement, DIPC emphasizes the need to monitor and evaluate the processes, effectiveness, and impact of digital health interventions. The initiative commits to sharing evidence widely and adapting guidelines and frameworks based on ongoing research and evaluation efforts, ensuring a responsive and evidence-based approach to digital health implementation.

The DIPC initiative is focused on four inputs, which shape the way DIPC works in the global sphere. By deploying funding for the program implementation, providing technical expertise, as well as the global DIPC initiative in the implementing countries, establishing partnerships with national and global stakeholders, and evaluating the program by providing advice on data and monitoring the project with the help of specialists, DIPC makes a meaningful package to further pandemic control available.

Thereby, the DIPC initiative follows a Logic Model, which provides guidance throughout the project, connecting initial thoughts with expected impact.

8

MAINSTREAMING



8.1 BMZ Leadership Priority: Pandemic Prevention and Preparedness

GIZ Global Initiatives and Bilateral Projects:
DIPC works with other GIZ initiatives both on global and national level. On the national level, DIPC aligns with bilateral projects, leveraging synergies with the bilateral digital health component. Collaboration might include full integration of global and bilateral project with a joined workplan (Malawi), roll-over of products developed by DIPC (Sierra Leone) or complementary strengthening of the vaccine sector (Ghana: support of vaccine production through bilateral project, vaccine distribution by DIPC).
On a global level, DIPC collaborates with Atingi as the learning platform for the global training course. Other global projects, particularly EU-LAC, Gov Stack, D4P, and Data economy align and develop synergies along a joint use case digital health.

EU-LAC:
The EU-LAC Digital Alliance was launched in March 2023 with the ambition to join forces for an inclusive and human-centred digital transformation in both regions and to develop bi-regional dialogue and cooperation across the full spectrum of digital issues. As part of this alliance, DIPC collaborates and works to achieve the EU-LAC aim.

GIZ Initiatives

Atingi:
The digital learning platform atingi.org offers people in the partner countries of German development cooperation knowledge modules, orientation offers and learning materials that are needed locally and fit the economic and cultural needs. Through digital learning with atingi, young people are given the opportunity to tap into their full potential, acquire new skills, and significantly improve their chances on the local job market. Atingi partners with the DIPC initiative within WP3 to make learning modules connected to digital health available.

Data4Policy (D4P):
The BMZ initiated “Data4Policy” in December 2021 to enhance data-driven policymaking post-Covid.

© GIZ / Jose Nario

BMZ Digital Transformation Centers focus on identifying government data gaps, creating collaborative formats for new data sources, and promoting data capacity building. Leveraging Atingi‘s digital learning platform, the initiative aims to make training on topics like data privacy widely accessible. Collaborating with DIPC, D4P shares synergies and approaches through the initiatives.

Governance with Open Source (GovStack):
The GovStack initiative aims to create a common framework and technical practice for developing reusable and interoperable digital components – so-called “digital building blocks” – needed for the digital transformation of government. GovStack invests in digital building blocks that help governments reduce the cost, time, and resources required to create or modify digital platforms, services, and applications. It has developed synergies and collaborated with the DIPC initiative to further digital health in an e-government context.

Data Economy:
The Data Economy initiative promotes the development of a fair and inclusive data-driven economy by advancing the implementation of data regulations, testing data sharing to drive local innovation, and supporting local value creation. It has collaborated and developed synergies with DIPC and will continue to do so.

Component	Mainstreaming Approach
Sierra Leone	DIPC's implementation partner UNICEF is developing a national training approach for the Sierra Leone MoH to **strengthen the digital skills of health personnel, which will be rolled out nationwide** as part of the national Digital Health Roadmap. Roadmap, course development and scaling are supported by DIPC. The bilateral GIZ follow-up project in Sierra Leone was reviewed and commissioned at the beginning of 2023, with DIPC approaches incorporated into the offer. **The initiative is now scaling up the national training approach in the supported districts.**
Malawi	**DIPC and the bilateral healthcare program follow a joint work plan.** They are working together to expand the e-registry platform, which in turn will be linked to the nationwide hospital information system.
Ghana	The promotion of the further development of **the SORMAS core software in DIPC I is being investigated for integration in DIPC II in Ghana with the bilateral health program "Vaccination Production"**. For this purpose, SORMAS is developing a functionality (AEFI module) through DIPC that registers the side effects of vaccinations and enters them into the national immunization system. This solution will in turn be linked to the national "OpenHIM" system. Scaling via the bilateral health program is currently being examined.
Tanzania	The WHO reference software supported by the reprogramming of the assigned funds for Tanzania is being used in Tanzania by US AID at regional level, so there is connectivity here. DIPC also supported the development of national software standards for vaccine development through the WHO SMART Guideline approach. The process could be replicated for the focus of the bilateral health project - mother and child health. However, these opportunities are currently not being pursued further.
Peru	As Latin America is not a health priority of the BMZ, the mainstreaming of **digitalization in the health sector takes place via digital projects.** DIPC supports the implementation of the PAHO-led Pan-American Highway for Digital Health Initiative at the regional level. The collaboration led to DIPC's **invitation to participate in the planned PAHO strategy documents.**

Table 1 outlines integration of DIPC in different GIZ bilateral projects on a local level.

Global Stakeholders

DIPC engages with global stakeholders such as Africa CDC, SORMAS, OpenHIE, and the WHO.

Africa CDC strengthens the capacity and capability of Africa's public health institutions as well as partnerships to detect and respond quickly and effectively to disease threats and outbreaks, based on data-driven interventions and programs. They partner with DIPC on a global level to leverage effective pandemic control approaches throughout the African partner countries.

SORMAS (Surveillance, Outbreak Response Management and Analysis System) is a cutting-edge solution designed to improve prevention and control of communicable diseases, particularly in resource-poor settings. Developed by experts in public health surveillance and disease control, SORMAS is a free-of-charge system that adheres to the highest data protection standards, good scientific practice, and open access policy. With SORMAS, public health authorities can monitor and respond to outbreaks in real-time, enabling timely and effective intervention. As a valued DIPC partner, there are various areas in which SORMAS is collaborating with the initiative.

The OpenHIE community is a community of people building an open framework to support nations as they develop health information exchanges (HIEs) to improve patient care, public health, and the management of health resources. They are collaborating with DIPC as a community of practice within WP3.

This extensive network allows DIPC to bring together a wealth of expertise, resources, and perspectives, comprehensively addressing global health challenges and is mainstreamed through the following approaches.

Global Component	Mainstreaming Approach
DIPC Academy	The course development will not be completed until December 2024. A trainer-led offline version is being developed, but the application of this version in partner countries is not part of DIPC. The possibility of making the course available through other national and regional platforms is currently being explored, and PAHO has indicated interest in translating the course into Spanish for the regional PAHO Academy.
RKI	The WHO is interested in a research cooperation regarding the introduction of the WHO SMART Guidelines. A project-specific memorandum of understanding is currently being drawn up.
Gender	DIPC pursues a gender mainstreaming approach. Opportunities and risks were defined in a gender analysis. This was comprehensively recorded in a gender logic model and the individual gender activities for the various project strands were defined. A DIPC "gender event" was developed as an individual measure.

Implementation of DIPC

8.2 BMZ Leadership Priority: Feminist Development Policy

The DIPC initiative is aligned with BMZ's leadership priorities and feminist development policy. As such, DIPC seeks gender-responsive and transformative change within its WPs, by ensuring to implement global and country-specific gender activities, emphasizing the importance of regional context and historical factors. This section shows the complexities of digital health post-COVID, cautioning against overly celebratory narratives and emphasizing the need for a feminist lens. It outlines a feminist theoretical base, highlighting intersectionality and inclusive gender perspectives. The intersectional feminist framework explores social systems such as colonialism, capitalism, and globalization, shaping individual advantages or disadvantages. The lens extends beyond individuals to question discursive constructions, knowledge framing, and underlying assumptions, shedding light on embedded patriarchy, domination, and violence in the context of digital health.
DIPC aligns with BMZ's feminist development strategy, focusing on equal rights, resources, and representation (3Rs) as guiding principles for gender transformative change. The BMZ strategy emphasizes strengthening health systems for women and marginalized groups, improving access to resources through gender-equitable digital transformation, and promoting the full and meaningful participation of women in shaping digital policies and technologies. DIPC prioritizes reorienting activities towards gender-transformative change and quality in line with BMZ's feminist development policy through the 3Rs approach and includes this strategy in every part of their logic model.

Rights:
DIPC takes a proactive stance in generating crucial evidence around digital health, enriching the program's implementation on global and country-specific scales. Prioritizing accessibility and resilience in national systems, DIPC leads the development and integration of software and Health Information System (HIS) functionalities. This concerted effort emphasizes crucial aspects such as interoperability, sex-disaggregated data, and robust privacy and security measures.

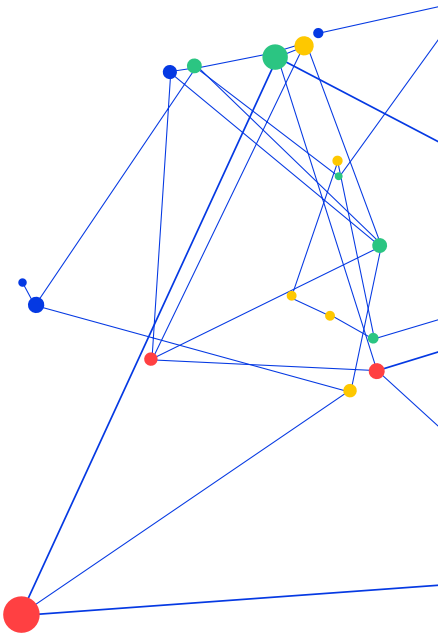
Representation:
Anchored in principles of equality and diversity, DIPC consciously supports and targets women in its capacity-strengthening initiatives. This approach ensures a diverse workforce and, particularly, elevates women to influential roles within the program. Emphasizing equal representation, DIPC extends its commitment to include not only its internal team but also its implementing partners and the developers involved in software creation. The program extends its support to partner countries, aiding them in formulating context-specific gender mainstreaming activities and efforts.

Resources:
DIPC contributes significantly to digital health literacy by developing and offering an open e-Learning course, placing a special emphasis on accessibility and inclusivity. Furthermore, the program actively hosts the Gender and Equity in Digital Health event, scheduled for 2024 in Ghana. This event serves as a pivotal platform for training and connecting women within the digital health space, with the ultimate goal of fostering diversity and representation in the field. These initiatives underscore DIPC's commitment to shaping resources that are not only accessible but also equitable, ensuring that the benefits of digital health extend comprehensively across diverse demographics.

© GIZ / Waleska Ramirez

© GIZ / Jose Nario

9



WORK PACKAGE 1

9.1 The DIPC Approach on Country Implementation

In the execution of Work Package 1, DIPC adopts a multi-faceted approach to drive impactful outcomes. The first key component involves comprehensive ecosystem mapping through the implementing partner on the digital health landscape. This mapping is the basis for discussions with governmental entities to facilitate a deeper understanding of their specific needs and challenges. These discussions extend beyond MoH, involving various stakeholders to ensure a holistic perspective.

The second step highlights the localization of the WHO Digital Adaptation Kit (DAK). This means that standard functionalities, required by routine immunization software, are defined according to WHO requirements and national guidelines.

Third, a strategic decision on ecosystem development is taken, in which the government decides between option A, adopting existing software to meet the localized DAK, or option B, translating localized DAK into machine readable code and integrating it into a software that can read said code.

The fourth step consists of a software development adaptation which is a solution development through a subcontracted vendor.

Lastly, the chosen solution is scaled for vaccine and immunization services in the country through the adaption of a tool set with trained users. The process is visualized in the graphic.

WP1

Country Implementation – DIPC Approach

Ecosystem Mapping

Output

- **Mapping** of existing ecosystem
- **Alignment** with government and relevant policies
- **Integration** into existing local technical networks

Localization of WHO DAK

Output

- **Specification of standard functionalities** required by software in relation to routine immunization are defined according to WHO requirements and national guidelines

Strategic Decsion on Ecosystem Development

Output

- **Decision of Government** - Tools/Usecase for refinement and scale in country:

  Option A: Adopt existing software to meet the localized DAK (WHO SG L2)

  Option B: Translate localized DAK into machine readable code (WHO SG L3) and integrate into a software that can read this code (WHO SG L4)

Software Development/ Adaptation

Output

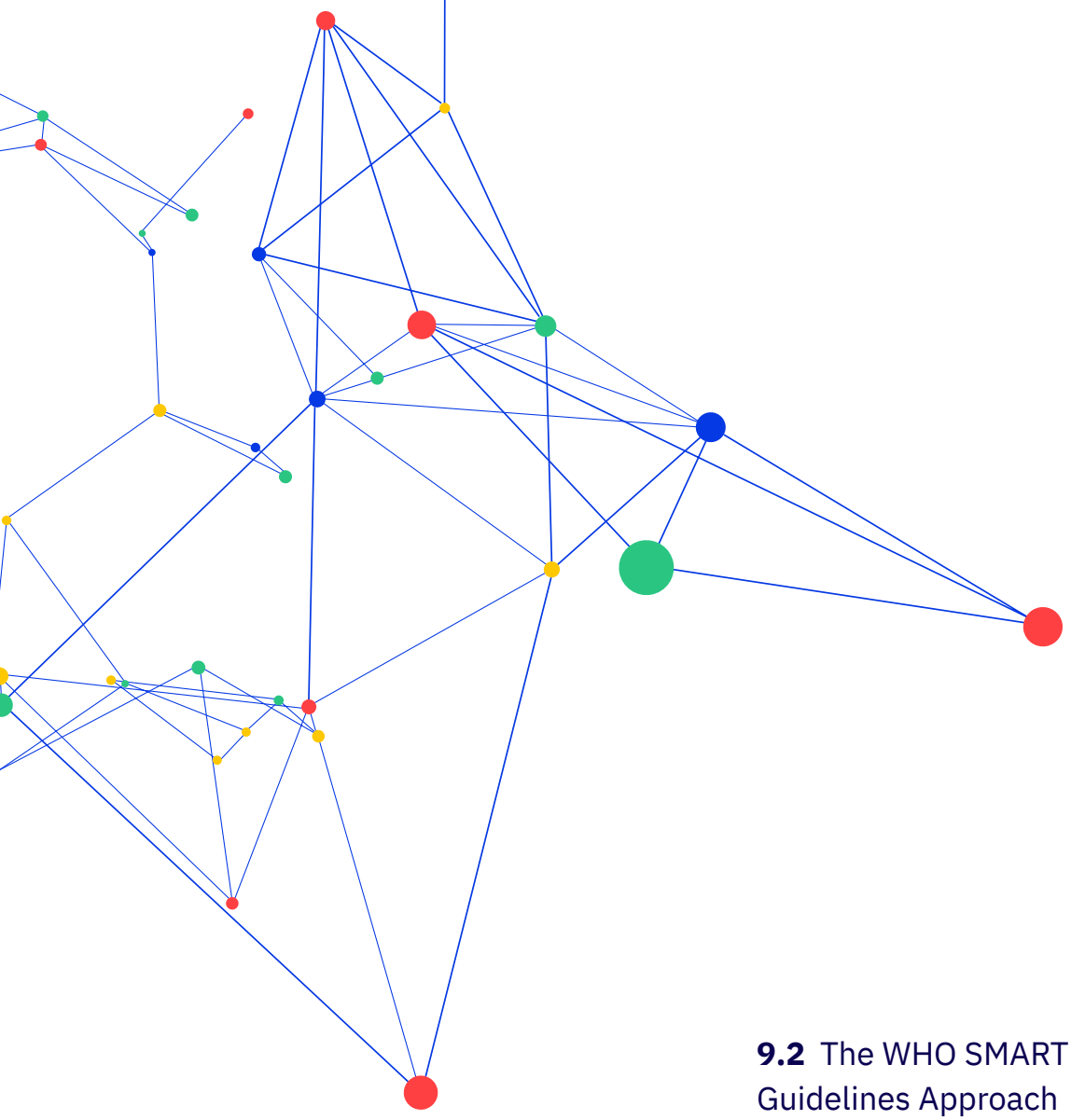
- **Solution developed** through subcontracted vendor

Scale of Solutions

Output

- Adaptation of set of tools with users trained to scale for vaccine and immunization services in country.

2023 | **2024** | **2025**



9.2 The WHO SMART Guidelines Approach

The localization of the World Health Organization (WHO) SMART Guidelines (SG) represents a pivotal dimension in WP1. DIPC localizes the immunization guidelines into a DAK and then adapts the software to the specifications outlined in the DAK, emphasizing a tailored approach to meet the unique requirements of the local context. This involves a comprehensive process encompassing software adaptation, proof of concept development, and scaling efforts. The intricacies of software adaptation to the DAK are addressed with precision, ensuring alignment with the specificities of the digital health ecosystem. DIPC navigates the complex landscape of proof-of-concept development and interoperability, seeking to establish scalable solutions that resonate with the overarching goals of the initiative. The exploration of hackathons introduces an innovative element, fostering collaborative problem-solving and ideation within the digital health domain. Through these strategic interventions, WP1 unfolds as a dynamic and comprehensive initiative, poised to make substantial contributions to the enhancement of digital health systems. The way in which this is supposed to be achieved is visualized in the graph, showing four different layers which are essential to the WHO SMART Guidelines approach.

WHO SMART Guidelines – From Treatment Standard to Software

L1

Traditional guidelines

Anaemia

B.1.1: Full blood count testing is the recommended method for diagnosing anaemia in pregnancy. In settings where full blood count testing is not **available, on-site haemoglobin testing with a haemoglobinometer is recommended over the use of the haemoglobin colour scale** as the method for diagnosing anaemia in pregnancy.

L2

Digital Adaptation Kit = Standard

INPUTS	OUTPUTS	ACTION
"Blood haemoglobin test result" <110g/L	*Anaemia diagnosis – *Positive for anaemia	Conduct REQUIRED anaemia counselling
"Gestional age" < 12 weeks		"Amount of iron prescribed" – 120 mg

L3

Machine readable code

```
/* codesystem "LOINC": 'http://loinc.org'
code "Hb": '718-7' from "LOINC" display 'Haemoglobin measured from haemoglobinometer (g/dl)' */
code "Hb": '165395AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA' from Common.OpenMRSEntity display 'Haemoglobin
measured from haemoglobinometer (g/dl)'
```

L4

FHIR native software
WHO SG compliant software

← Decision support:
"Conduct anaemia counseling"
"Prescribe Iron 120mg"

← Collect **standardized data** to the health satck

Both strategies have advantages and disadvantages

	Option A: Adopt Existing Software **Ghana, Sierra Leone, Malawi**	**Option B: Introduce "true L4"** **(Tanzania), Peru**
+	• Software solutions are already rolled out • Potentially less investment in staff training • Local IT technical capacity available • Countries can keep their in-house systems	**Country specific requirements 70% coded in L3:** • Increased ownership and control for Gov. • Time for local adaption of L4 substantially reduced • Reduced vendor lock-in • Quality assurance of L3 on central level **"true L4"** • WHO Reference Software as global solution allows joint investment from different partners • Potential for local market to build solutions using software developing kits (google SDK)

−	• **Substantial hardcoding** of all solutions
	• **Implications for sustainability** when guidelines change:
	  • Prolonged time of discrepancy between Guidelines and software due to new hardcoding in all solutions
	  • Higher investment in quality assurance
		• Introduction of new software requires increased change management on the user side
		• L3 capacity has to be built in country
		• Interest of governments to strengthen local market versus global L4

WHO SMART Guidelines Approach @ DIPC – Lessons Learned

L1 **Traditional Guidelines**	+	COVID 19 has prepared ground → National Guidelines are relatively current	–	The localization process could be utilized more to review existing national guidelines
L2 **Digital Adaptation Kit**	+ +	Transparent process increases ownership of MOH L2 as national standard may harmonise software beyond DIPC support	– –	Need for more local capacity **→ WP3** Quality Assurance if software aligns to Standard still under development (WHO Clearing house) **→ TIE PHI**
L3 **Machine Readable Code**	+ +	L3 allows for rapid updates when guidelines change L3 increases ownership of MOH	–	Need for more local capacity in CQL **→ DIPC WP3 Academy**
L4 **Software**	+ + +	DIPC supports in-country dialogue about strategic development of DH Ecosystem Roadmaps and strategies support donor Harmonisation and joint action	– –	Change management to transition needs to be moderated Strategic decision: fund development of existing systems for short term improvement versus long-term benefits from new WHO SG L4

© GIZ / Milagros Barbaggelata

9.3 Peru

9.3.1 Ecosystem Mapping

Methodological Approach:
To address vaccination logistics in Peru, the MoH and BMZ's DIPC and Data4Policy (D4P) initiatives organized a data ecosystem mapping workshop in which different institutions participated: government, international organizations, the private and public sector, the academy, and civil society, totaling 43 participants. The event was facilitated by the Open Data Institute (ODI). This institution proposes a methodology to assist organizations in identifying and mapping their data environment, including assets, data producers, users, as well as functions and interactions within it. This exercise is particularly useful when there are data gaps, and the location of pertinent data is unknown.

During the workshop, the following questions were addressed:
- Who are the relevant actors in the vaccine logistics process?
- What are the "formal values" generated as a result of data exchange?
- What are the "informal values" generated as a result of data exchange?
- What are potential opportunities within the system?

Key Findings:
Key findings from the analysis of Peru's digital immunization ecosystem highlight critical challenges that hinder effective vaccine logistics. There is a notable lack of interoperability and barriers to data exchange, both within sectors and across sectors, impeding decision-making and policy implementation. Even within organizations, obstacles to data exchange exist due to data fragmentation and diversity in data standards. The fragmentation in health sector information systems, both public and private, is a significant obstacle to informed decision-making, complicating the attainment of a complete and accurate view of national vaccination coverage. The consequences extend to health decision-making, where the lack of integrated and up-to-date data complicates gap identification, strategy evaluation, and resource planning. Challenges also arise from the lack of timely information, manual processes, and information loss in remote regions, impacting vaccine planning and distribution efficiency. The data gaps and inefficiencies in the vaccine purchase and distribution process further affect nationwide vaccination coverage. Recommendations include establishing information exchange mechanisms, binding regulations for the private sector, and strengthening data management with digital technologies. Collaboration between government, private, and academic entities is deemed essential to integrate digital technologies, ensuring equitable vaccine coverage nationwide. Limitations include the inability to fully capture the entire digital health ecosystem due to restricted access to some systems and potential biases introduced by voluntary participation in workshops and interviews. Coordination between entities is suggested to improve research and data generation in the future.

9.3.2 Putting Digital Health on the Agenda – Communication with the Government

The implementing partner PAHO, and the DIPC initiative are actively engaged in fostering communication with the Peruvian government to ensure the seamless integration of digital health solutions into national guidelines and roadmaps. PAHO has initiated crucial discussions, including a significant meeting with the Vice-Minister to discuss how to support the agenda for the digital transformation developed by the MoH. This transformative agenda involves the migration to an offline mode for many modules, with a focus on, for example, immunization.
In March 2023, the first mission visit took place in Peru. During this mission, the official presentation of the DIPC initiative was conducted, and a visit to the Loreto region was carried out. During this trip, in coordination with the local regional governor, the need for the initiative not to be confined to the Amazonian borders but to be considered for deployment nationwide was explained.
Throughout the year, and through strategic contacts, meetings were held with the General Office of Information Technologies (OGTI) of the MoH to understand the needs and assess the possibility of implementing the WHO SMART guidelines on the platform that will be developed within the project. Additionally, meetings were held with the MoH's immunization department.
Currently, in collaboration with PAHO, the MoH, and the DIPC team regular meetings are still being held with the goal of monitoring the planned activities for 2024.

9.3.3 Digital Solutions and DAK Localization

In Peru, government participation plays a crucial role in the development of digital solutions, ensuring alignment with national priorities and guidelines, as well as with existing digital systems such as immunization tools or software. In this context, the planning for the adaptation and localization of the DAK begins under the guidance of the Technical Norm for Immunization 2022 (NTS number 196 – MINSA/DGIESP 2022), whose main objective is to improve and streamline immunization processes. Within the project, emphasis is placed on the importance of digital data recording, focusing on enabling remote areas to access the application without requiring a connection. This allows the efficient capture of information that can be quickly transmitted to central systems. This approach not only simplifies data-driven decision-making but also contributes to reducing errors in the review of written data. Thus, special attention is given to immunization tools used in the Peruvian territory, including:

- SIHCE (Electronic Health Record Information System)
- HIS (Health Information System)
- SISMED (Integrated System of Public Supply of Pharmaceuticals, Medical Devices and Health Products)
- Excel
- Institution specific software

9.3.4 Regional Collaboration for Interoperability

As part of the vaccination data exchange platform component, the DIPC project supported the second edition of the Connectathon LACPASS, held from November 12 to 14, 2023, in São Paulo, Brazil. The event brought together national representatives from member countries, health authorities, IT and telecommunications experts, international organizations, and technical teams for collaboration and innovation. Sixteen countries participated, including Brazil, Colombia, Ecuador, and Peru.

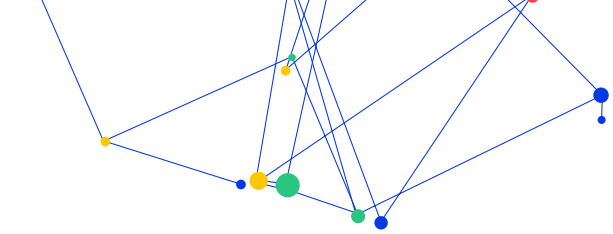
During the event, the DIPC team focused on the second track, which is considered essential for the LAC region. The objective of the vaccination certificate track was for each participant to generate and interoperate a vaccination certificate based on the WHO DDCC profile. This track required the use of the FHIR standard, WHO DDCC, and the LACPASS Docker. DIPC actively supported the development of this track.

© GIZ / Dirk Ostermeier

9.4 Tanzania

9.4.1 Ecosystem Mapping

Methodological Approach:
The ecosystem mapping in Tanzania has yielded crucial insights into the country's digital health landscape, revealing robust governance mechanisms, including the National Digital Health Steering Committee. This was done by the implementing partner Digital Square, who employed the following methods to collect the data included in the report:
They conducted a desk review of Tanzania's health and digital governance documents (e.g., Digital Health Strategy: July 2019–June 2024) and existing resources on established digital tools (e.g., Digital Pandemic Preparedness Assessment and the Map and Match project).
Furthermore, they held consultative sessions with country leaders to validate the current state immunization ecosystem assessment and propose ways to strengthen relevant components of the digital health immunization ecosystem, as needed. Additional stakeholders consulted include the Health Information Systems Program (HISP) Tanzania, John Snow Inc. (JSI), and the President's Office – Regional Administration and Local Government.



Key Findings:
The created report outlined three priority digital solutions for immunization, along with six other integral digital system solutions.

1. Update the Tanzania Immunization Registry, the country's current electronic immunization registry, so that:
   a. It is locally owned/managed.
   b. Its necessary functionalities are incorporated into the upgraded system.
   c. It is aligned with the localized Digital Adaptation Kit.
   d. It is standards-based (e.g., Fast Healthcare Interoperability Resources (FHIR) compliant).
   e. It is interoperable via OpenHIM.
   f. It can exchange information securely across the interoperability layer.
2. Deploy the upgraded electronic immunization registry in select facilities.
3. Create a training package for national use to strengthen health workers' capacity to use the new and improved system and conduct training of health care workers in selected facilities.

While Tanzania demonstrates rapid growth in adopting mobile and web-based digital health solutions, integration and interoperability challenges persist. Despite technical proficiency, there's a need for capacity building, and addressing internet connectivity issues in low-resource settings is identified as urgent. Interoperability gaps in systems supporting immunization components are highlighted, with specific recommendations from end users for enhancements. Tanzania's clear vision for a national digital health strategy informs plans to strengthen existing in-country digital immunization solutions in collaboration with the DIPC initiative. This involves updating the Tanzania Immunization Registry for local ownership, functionality alignment, and standards compliance. The upgraded system will be deployed in select facilities, accompanied by a comprehensive training package to enhance health workers' capacity in utilizing the improved system.

9.4.2 Putting Digital Health on the Agenda – Communication with the Government

Digital Square worked with various departments within the MoH, including Immunization and Vaccines Development (IVD), Information and Communications Technology (ICT), and Monitoring and Evaluation (M&E), to review existing assessments and workflows to better understand the landscape of systems currently used in the country's immunization health domain. The MoH and Digital Square produced this country profile to share with all project stakeholders (e.g., government stakeholders, funders, and implementing partners) so that the information is widely available. The country profile helps define the priority needs so that Tanzania— directed by the MoH and existing governance mechanisms—can use it as a resource on its journey to developing and operationalizing an interoperable digital system that supports the full end-to-end immunization use case. Furthermore, there is a Tanzania Digital Health Investment Roadmap 2017- 2023 and National primary health care (PHC) rolling digital transformation roadmap (2023 - 2027). Tanzania is actively embracing the global shift towards digitalization in healthcare, particularly in its PHC sector. The Health Sector Strategic Plan V and the National Digital Health Strategy underline the importance of adopting digital systems to enhance the quality of healthcare services. The newly proposed Tanzania Primary Health Care Rolling Digital Transformation Roadmap outlines a strategic direction for leveraging digital health technology to improve and make healthcare services more accessible. With an emphasis on real-time access to patient information, streamlined coordination among healthcare providers, and the centralization of patient data, this roadmap seeks to revolutionize healthcare delivery. The call to partners to align their interventions with this roadmap, under the leadership of the President's Office, Regional Administration and Local Governments (PORALG), underscores the collaborative effort needed for a successful and unified digital transformation in Tanzania's healthcare landscape. DIPC follows this effort by closely collaborating with the MoH and supporting Tanzania in reaching their ambitious efforts outlined in their roadmap.

9.4.3 Digital Solutions and DAK Localization

In the pursuit of enhancing the immunization system in Tanzania, the MoH, in collaboration with the IVD program, ICT, M&E departments, DS/PATH, and GIZ, conducted a thorough analysis of system requirements. This initiative aimed at localizing the District Health Information Software (DAK) to align with the Tanzanian context. Despite initial plans to redevelop the TImR system for improved efficiency, the project did not materialize as expected. Nevertheless, Tanzania already boasts several concrete digital health solutions, such as TImR, currently utilized by the MoH, and government hospital management systems like GoT-HoMIS for primary healthcare facilities and eHMS for regional and national hospitals. These digital solutions represent the country's commitment to leveraging technology for more effective healthcare management.

© PATH Ghana / Patience Dapaah

9.5 Ghana

9.5.1 Ecosystem Mapping

Methodological Approach:
In a collaborative effort, Digital Square, and the GHS undertook a comprehensive assessment of Ghana's digital immunization landscape through an ecosystem mapping initiative. The objective was to delve into the existing systems supporting the country's immunization health domain, with a keen focus on generating insights for the development of an interoperable digital solution. The mapping aimed to equip Ghana, under the guidance of GHS and existing governance mechanisms, with a resourceful profile for effective decision-making. Digital Square employed a multi-faceted approach to gather insights:

- A thorough desk review of Ghana's health and digital governance documents, including the Ghana Health Service Policy and Strategy on Digital Health: 2023–2027, and previous landscaping reports.
- Consultative sessions with country leaders to validate the assessment of the immunization ecosystem and propose enhancements to the digital health domain.
- Distribution of an online survey to all sixteen regional IT managers, complemented by interviews with regional Expanded Programme on Immunization (EPI) managers and Disease Control Officers.

Key Findings:
Building upon the research provided in the ecosystem report, the following points can be categorized as main findings:

1. **Infrastructure Challenges:** Notable issues include unreliable internet connectivity and funding gaps for data purchase, hindering efficient system utilization.
2. **Functional Gaps:** Identified gaps in functional components critical for the end-to-end immunization workflow, highlighting challenges in the production of digital immunization certificates, microplanning, and the absence of a national product catalog.
3. **Interoperability Concerns:** Lack of interoperability among existing systems emerged as a significant challenge, leading to data silos and inefficiencies. Specific recommendations from end users emphasized the importance of data exchange across systems.
4. **Funding Issues:** Sustainability challenges were identified concerning GHS DHIMS2 servers, revealing a financial gap for the annual server costs, raising concerns about long-term viability.

The collaboration between Digital Square and GHS uncovered crucial insights into Ghana's digital immunization landscape. The ecosystem mapping delineated five digital systems, providing a nuanced understanding of their features, challenges, and recommended interventions. The persistent issues of integration, interoperability, and training were underscored, with targeted efforts at the community and facility levels. GHS envisions adapting existing tools and, as part of the DIPC initiative in Ghana (2023-2024), implementing enhancements to DHIS2 e-Tracker, updating health workers' training content, and ensuring interoperability using the HL7/FHIR standard.

9.5.2 Putting Digital Health on the Agenda – Communication with the Government

Governmental involvement in Ghana's digital health initiatives is closely intertwined with the GHS, reflecting a collaborative approach aligned with the national government's digitization plans for health. The Ghana Health Service has worked closely with the implementing partner, Digital Square, and has demonstrated its commitment through active participation of various departments in the process. These departments include the Policy Planning Monitoring and Evaluation Division (PPME), the Public Health Division focusing on the EPI, health program managers within the Ghana Health Service, and the Center for Health Information Management (CHIM). This close collaboration ensures that the digital health initiatives, such as DIPC, align with national strategies, fostering a comprehensive and integrated approach to health digitization in Ghana. Through the concerted efforts of these government entities, Ghana aims to leverage digital solutions effectively for improved health outcomes and enhanced healthcare delivery. In close communication with these entities, the DIPC initiative through Digital Square, could identify aspects within the scope of the **Ghana Health Service Policy and Strategy on Digital Health: 2023–2027**, in which the initiatives support is focused.

9.5.3 Digital Solutions and DAK Localization

In Ghana, the strategic implementation of digital solutions for routine immunization needs has been guided by the WHO DAK, encompassing eight interconnected components. This DAK, functioning as a Layer 2 (L2) component of the WHO's SMART Guidelines initiative, was instrumental in creating the System and User Requirements Documentation (SURD). The objectives of the DAK developed for Ghana were threefold: ensuring adherence to Ghana-specific public health and data use guidelines, fostering consistency in health content for the development of a human-centered digital tracking and decision-support (DTDS) system; facilitating a transparent review mechanism for health content validity; and providing a starting point for core data elements and decision-support logic within DTDS systems for Immunization. Additionally, the DAK aimed to ensure communication of vaccination data, create an electronic registry, and reflect workflow processes, data, and decision-support algorithms derived from the DIPC initiative. The primary audience for this DAK includes the Policy Planning Monitoring and Evaluation Division, Public Health Division (EPI), and health program managers within the GHS.

The implementation process of the DAK was carried out by the implementing partner PATH/ Digital Square. Notably, the Ghana Health Service played a pivotal role in the process, with active involvement from departments such as Policy Planning Monitoring and Evaluation Division (PPME), EPI, health program managers within GHS, and the Center for Health Information Management (CHIM). The overarching aim of the DAK process was to determine the requirements needed to implement a digital solution for routine immunization needs in Ghana. Following this process, it was decided that the digital solution would enhance DHIS2 e-Tracker to serve as Ghana's immunization information system for both COVID-19 and routine immunization. The decision was based on a defined and validated set of requirements prioritized by the GHS within the designated time and budget. The vendor selected for software development was the Health Information Systems Program (HISP) Ghana, chosen for its longstanding relationship with the Ghana Health Service and intricate knowledge of DHIS2 e-Tracker. Notably, this process was supported by a workshop organized by GIZ and PATH/ Digital Square, adhering to a 50% women's quota, mapped as part of DIPCs gender approach. This workshop, under the topic of "User-Centered Business Requirements Validation" Workshop, was connected to WP1 of the DIPC initiative and had specific content and objectives. These included creating a high-level understanding of the collaborative requirements development methodology (CRDM) approach and its significance, establishing an understanding of the SURD/DAK key components and their importance in digitalization, and validating SURD components to create a localized DAK for immunization, by closely working with the GHS and therefore including a regional approach to the DAK localization.

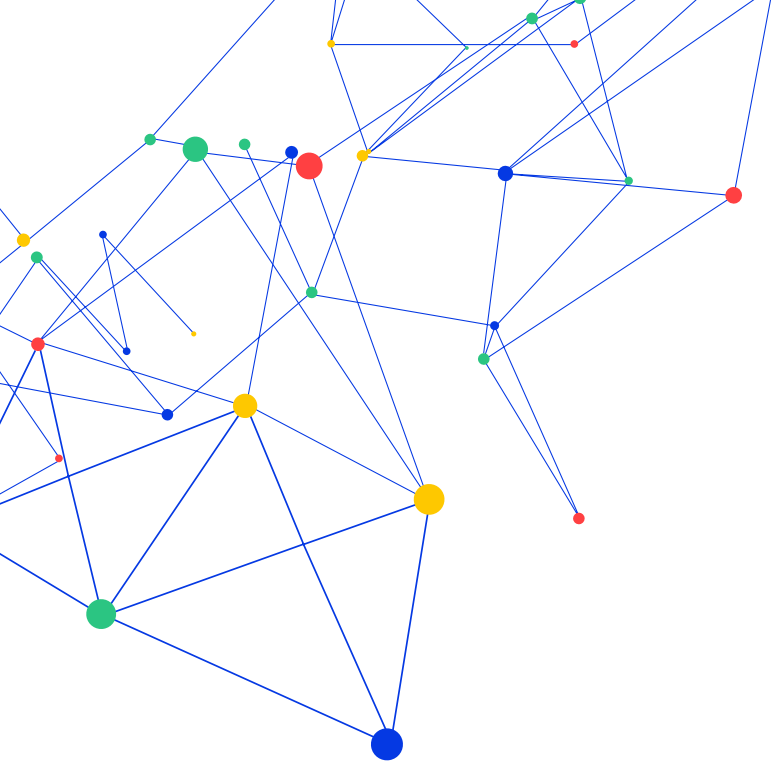
© GIZ

9.6 Sierra Leone

9.6.1 Ecosystem Mapping

Methodological Approach:
Sierra Leone's digital health landscape is mapped through an ecosystem report, shedding light on critical gaps, and proposing solutions for improved digital healthcare strategies in the country. The report employed a mixed-methods approach encompassing quantitative and qualitative data from 246 health facilities across 16 districts, along with desk reviews and key informant interviews. Furthermore, the Ministry of Health and Sanitation employed tools like the Health Facility Landscape assessment tool and KoboCollect for quantitative data collection. Analysis, including SWOT and problem tree analysis, was conducted using Microsoft Excel, Power BI, Slidequest, and other software.

Key Findings:
The report underscores deficiencies in digital health leadership, governance, and infrastructure, hindering coordinated and integrated services. Specific findings span seven digital health components, revealing needs for enhanced coordination, a national architecture for data exchange, and improved tools and workforce training.
Additionally, Sierra Leone's National Digital Health Strategy, initiated in 2018, underwent a current state assessment due to the intensified demand for digital health interventions during the global COVID-19 pandemic. The assessment identified key gaps such as inadequate leadership, the absence



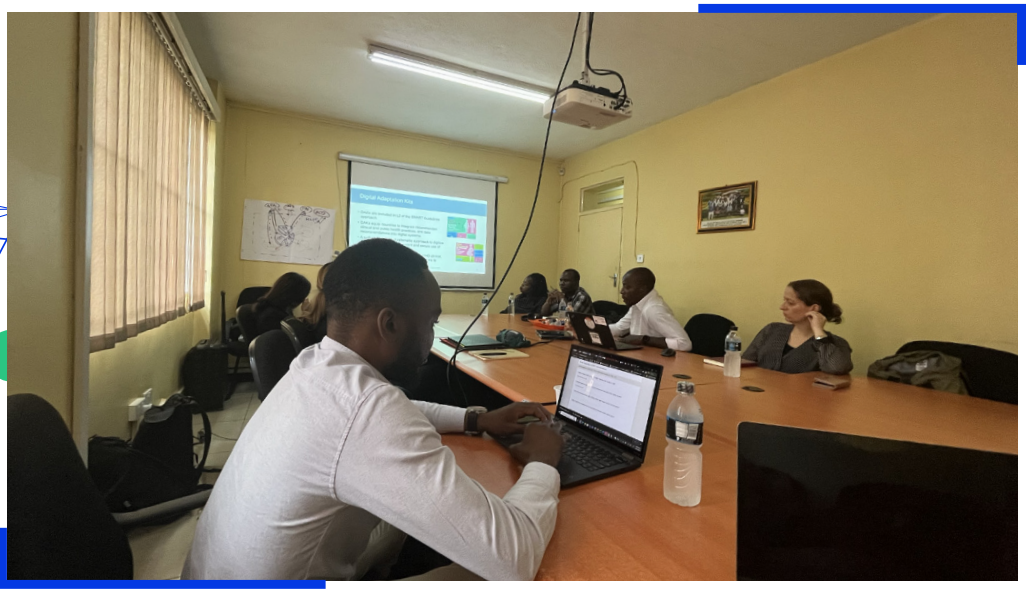
of a national enterprise architecture, lack of standardization, funding challenges, and insufficient workforce capacity and infrastructure.
The report offers detailed recommendations, based on the key findings, categorized as high, medium, and low priorities. High-priority areas include leadership and governance enhancement, strategic planning, service optimization, infrastructure development, and standards definition. Medium priorities focus on digital health funding systems, resource mobilization, meaningful use of solutions, infrastructure leveraging, and standards frameworks. Low priorities involve implementing a standard-based digital health enterprise architecture and ensuring compliance and accreditation.
Workshops are planned to develop a National Digital Health Roadmap, serving as an investment plan to enhance coordination, synergy, and funding mobilization for realizing the National Digital Health vision. These reports collectively lay the foundation for transformative change in Sierra Leone‘s digital health landscape.

9.6.2 Putting Digital Health on the Agenda – Communication with the Government

The government of Sierra Leone through the ministry of health and other directorates including directorate of policy planning and information (DPPI), is strategically supporting the implementation of DIPC initiative activities. This is visible when revising the activities supported by DIPC in Sierra Leone. UNICEF and DPPI have developed a costed digital health investment roadmap, by building on the Sierra Leone Digital Health Roadmap (2024-2026). This is a strategic document outlining the country‘s approach to implementing digital health initiatives. It assesses the current state of digital health, highlighting strengths such as political support and existing digital health interventions, while also noting challenges like inadequate digital skills in the health workforce and fragmented digital health interventions. The roadmap sets out strategic objectives and interventions across seven digital health enablers, aiming to improve health outcomes and move closer to achieving universal health coverage through effective and efficient ICT-enabled systems.

9.6.3 Digital Solution and DAK Localization

Sierra Leone is transitioning from the first phase (L1) to the second phase (L2) of the localization of the WHO SMART (standards-based, machine-readable, adaptive, requirements-based, and testable) guidelines. The initial phase L1 focused on integrating health informaticians and aligning Sierra Leone‘s national policies with WHO guidelines for antenatal care. Currently, Sierra Leone through DIPC initiative is preparing for the second phase, which involves operations and DAKs for antenatal care and immunization.
UNICEF, the implementation partner will effectively be collaborating with the directorate of science, technology, and innovation (DSTI) and the UNICEF innovation team to serve the role of vendors to develop the DAK. This phase includes the collaboration between various stakeholders, including GIZ-UNICEF, Ministry of Health program managers (ANC & Immunization) and software developers from the DSTI for the development of DAKs in conformity with WHO standards.



© GIZ

9.7 Malawi

9.7.1 Ecosystem Mapping

Methodological Approach:
Digital Square, as part of its inaugural activities under Workstream 1, mapped Malawi's digital immunization ecosystem. Collaborating closely with the MoH-DHD, this initiative employed a thorough approach, conducting a desk review of the nation's health and digital governance documents, including key resources like the Map and Match Malawi Country brief and the President's Malaria Initiative (PMI) Digital Community Health Initiative (DCHI) Malawi country profile. The comprehensive process continued with an ecosystem mapping workshop, involving country leaders and external stakeholders, where digital tools supporting immunization were identified and validated. Subsequent consultative sessions and telephone interviews with MoH-DHD leaders provided further insights, leading to the realization that the mapped digital systems were supplementary. Consequently, Digital Square and the MoH decided to concentrate efforts on creating an Electronic Immunization Registry (EIR) embedded within the MaHIS, aligning with the primary goal of supporting immunization in the country.

Key Findings:
The DIPC initiative strategically utilized WHO's Classification of Digital Health Interventions to conduct an insightful ecosystem mapping of digital health systems in Malawi. By scrutinizing users, challenges, and recommendations for each system, the analysis provided a nuanced understanding of their roles in supporting the immunization health domain. The evaluation prioritized functional features, addressing programmatic requirements essential for meeting users' needs, and executing tasks within business processes. Examples include capabilities like registering new clients in the immunization registry. Nonfunctional requirements were also considered, covering general attributes, usability, and solutions for technical constraints, with a special emphasis on security, privacy features, offline functionality, and multilingual support.
Moreover, the initiative underscored the importance of interoperability and standards, assessing the efficiency of digital systems in exchanging information with the priority system and ensuring adherence to data standards in system architecture. This standards-based approach was highlighted as pivotal for achieving uniform and efficient data exchange across systems. Users were classified into four overarching groupings based on WHO's Classification of Digital Health Interventions, encompassing interventions for clients, health care providers, health system or resource managers, and data services. This classification provided a comprehensive understanding of the primary users and their roles within the digital health interventions.
In summary, the ecosystem mapping report delves into the details of Malawi's digital health landscape, identifying key systems, outlining their features, challenges, and recommendations. This approach ensures a comprehensive understanding of digital health interventions, emphasizing the need for improvements and strategic enhancements in the realm of immunization.

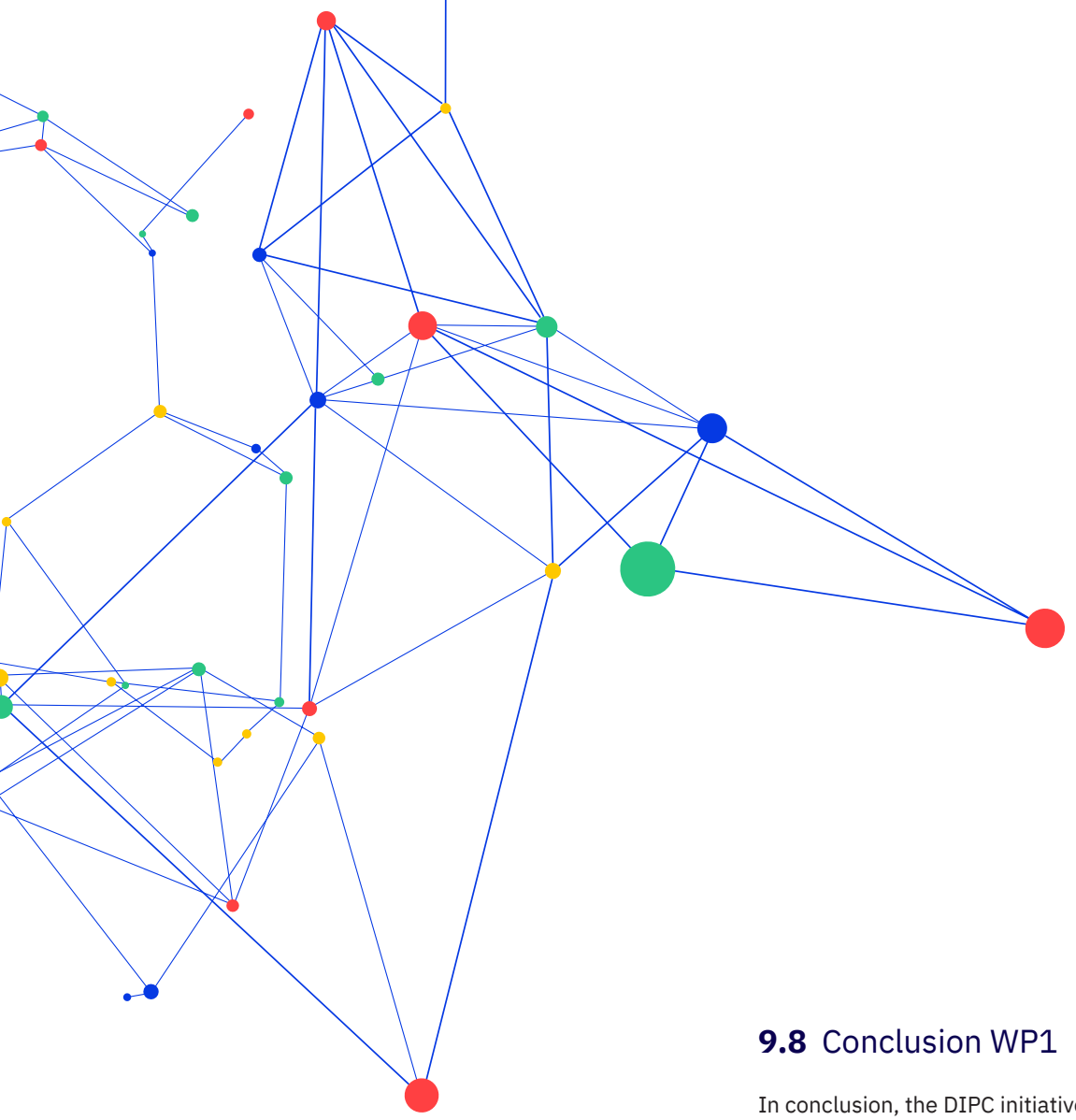
9.7.2 Putting Digital Health on the Agenda – Communication with the Government

Through close communication with the Malawian government and their MoH, it was possible to carve out a meaningful spot for DIPC, in which the proposed solutions could be localized and discussed with various stakeholders. By choosing this path, the implementing partner, as well as DIPC itself, made sure to actively engage in national health policy and furthering the immunization health domain in harmony with the MoH.

© PATH

9.7.3 Digital Solution and DAK Localization

In pursuit of enhancing the immunization health program in Malawi, the Immunization SURD was developed with a focus on fostering a shared understanding among diverse stakeholders. This comprehensive document aimed to establish a common language for program managers, software developers, and digital system implementers, ensuring consistency in health information content. The Immunization SURD not only sought adherence to public health and data use guidelines but also facilitated transparency in reviewing and validating the health content within the proposed digital tracking and decision-support (DTDS) system. Additionally, it provided a foundational framework for core data elements and decision-support logic essential for effective immunization systems.
To validate the information gathered during the workshop and ensure its accuracy and consistency, the Immunization SURD played a pivotal role in confirming that the statements, opinions, and requirements expressed by participants were accurately represented. This process aimed to resolve discrepancies and contradictions, fostering a reliable foundation for subsequent actions.
Digital Square, in alignment with these goals, sought applications from qualified vendors/consortiums for the configuration and/or development of a national immunization registry. Derived from the Better Immunization Data (BID) project and informed by WHO's Immunization DAK, this initiative aimed to select a vendor capable of addressing the organization's needs outlined in the SURD. The evaluation process focused on determining the proposal that best aligned with the specified requirements and verified the selected vendor's qualifications, expertise, and capabilities. The overarching aim was to ensure that the chosen vendor could successfully execute the project and contribute to the advancement of immunization programs in Malawi.

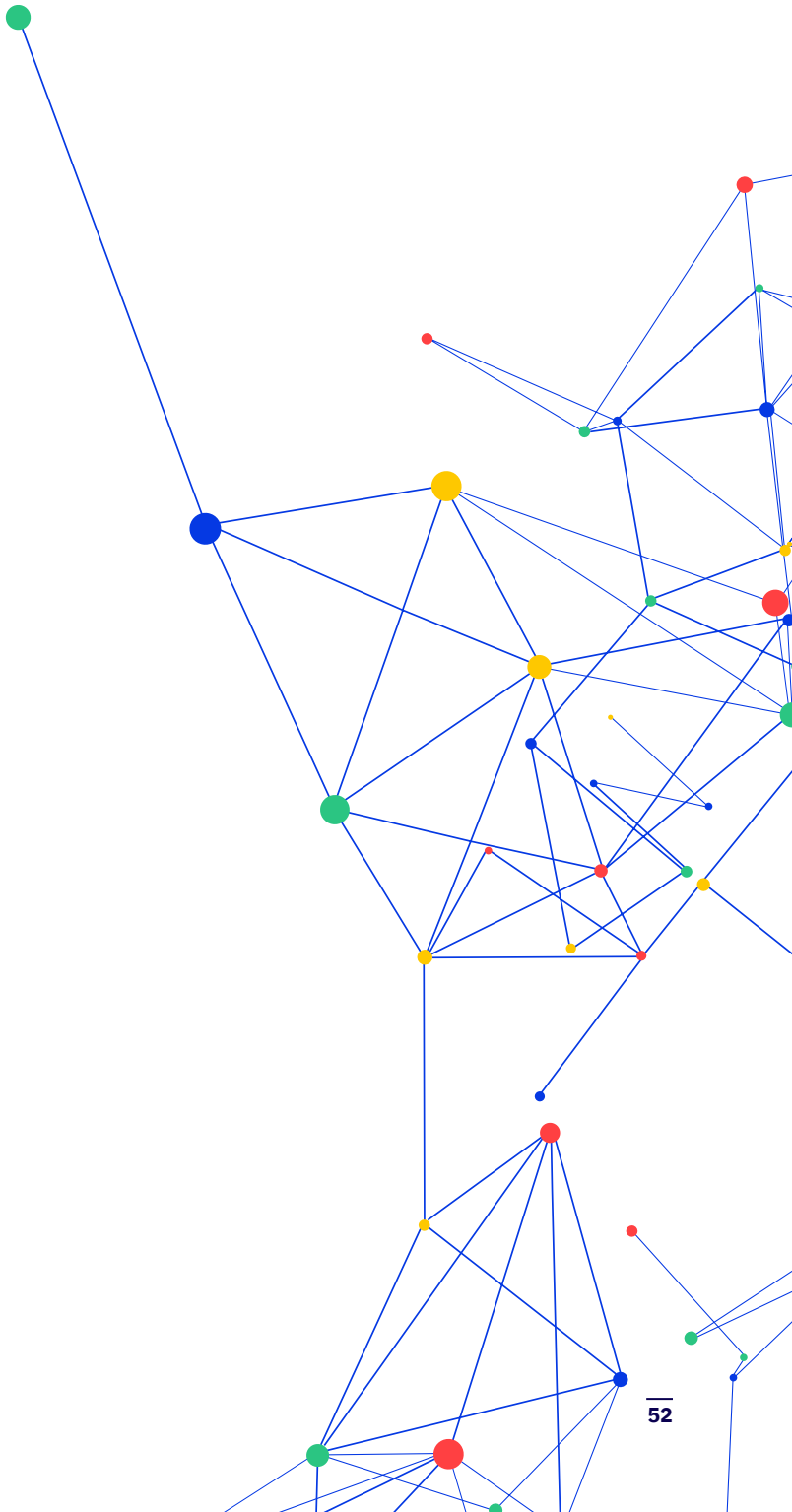


9.8 Conclusion WP1

In conclusion, the DIPC initiative has undertaken a comprehensive and multi-faceted approach in Work Package 1 to drive impactful outcomes in Peru, Malawi, Tanzania, Ghana, and Sierra Leone. The initiative has employed ecosystem mapping as a key component, providing detailed insights into each country‘s digital immunization system. Extensive discussions with governmental entities, stakeholders, and a gender-inclusive approach have further enriched the understanding of specific needs and challenges.

The localization of the World Health Organization SMART Guidelines has been a pivotal dimension in Work Package 1, with a focus on adapting the guidelines into a DAK. This involves tailoring the software to meet the unique requirements of each country, addressing interoperability, and fostering innovation through hackathons.

Key findings from Peru highlight challenges such as interoperability barriers, data exchange issues, and the need for common standards. In Tanzania, priorities include updating the immunization registry, deploying improved systems, and providing training packages for health workers. Ghana‘s ecosystem mapping reveals infrastructure challenges, functional gaps, and interoperability concerns, with plans to enhance the DHIS2 e-Tracker. Sierra Leone faces leadership and infrastructure challenges, while the country is transitioning from the first to the second phase of DAK localization. In Malawi, the ecosystem mapping emphasizes the importance of interoperability, standards, and user-focused digital health interventions.

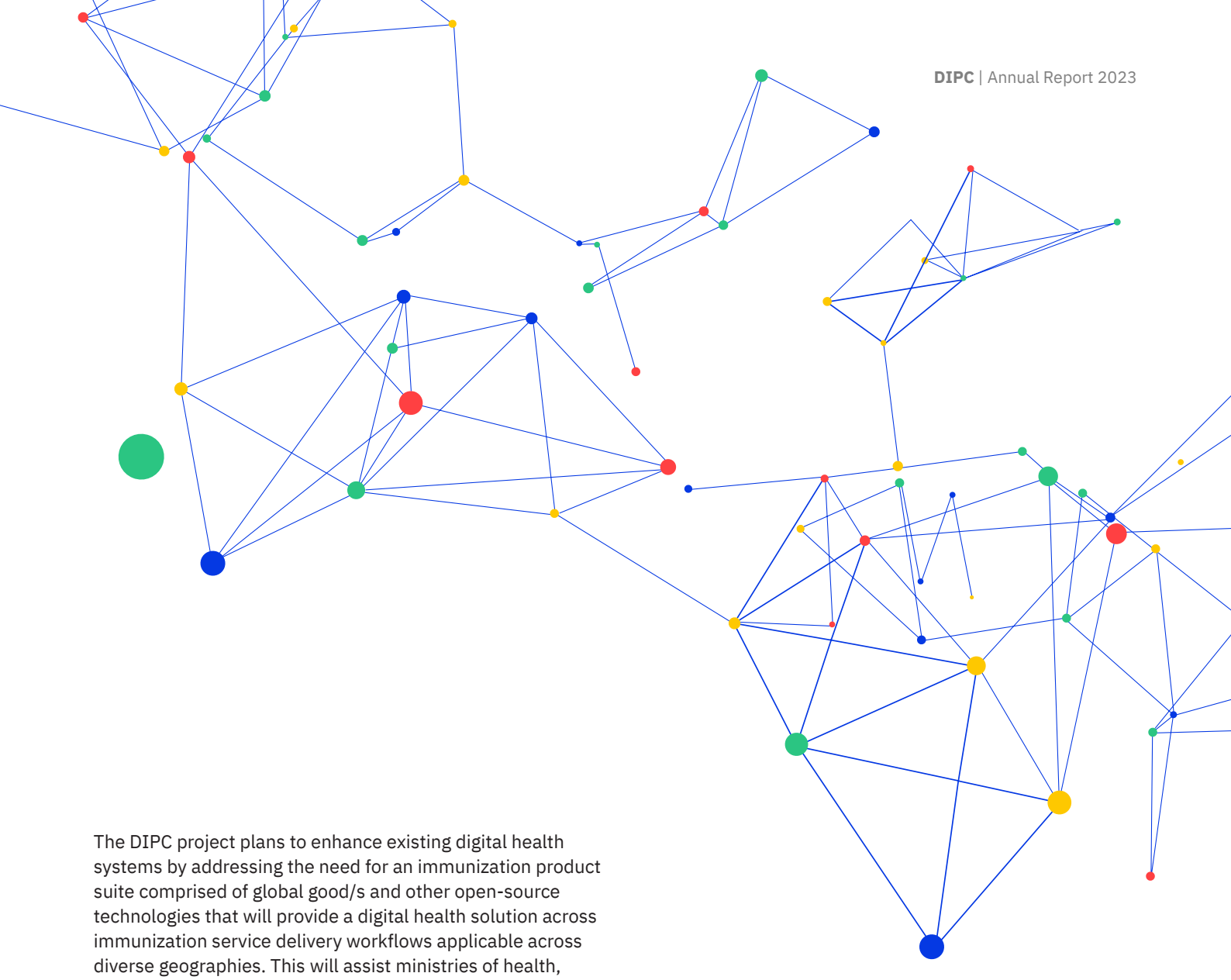


Throughout the process, close communication with governments and collaboration with various stakeholders have been instrumental. The engagement with ministries of health, technology and innovation directorates, and other relevant entities ensures alignment with national guidelines and roadmaps. The DIPC initiative has actively contributed to digital health strategies, addressing gaps, and proposing solutions to enhance health outcomes.

In summary, Work Package 1 of the DIPC initiative unfolds as a dynamic and comprehensive effort, leveraging ecosystem mapping, WHO SMART Guidelines, and localized Digital Adaptation Kits to address specific challenges and drive impactful improvements in digital immunization systems across the participating countries. The findings and recommendations serve as valuable resources for future developments, fostering collaboration, innovation, and effective healthcare delivery.

10

WP2 – DIPC‘S APPROACH ON THE GLOBAL PRODUCT SUITE



The DIPC project plans to enhance existing digital health systems by addressing the need for an immunization product suite comprised of global good/s and other open-source technologies that will provide a digital health solution across immunization service delivery workflows applicable across diverse geographies. This will assist ministries of health, especially in low- and middle-income countries (LMICs), to more rapidly utilize digital technologies to provide a fully integrated solution that supports effective immunization service delivery, ultimately strengthening data-driven health systems and future pandemic preparedness.

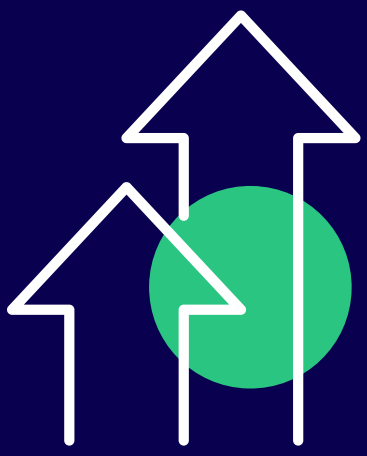
Although there are many digital health solutions that cater to specific functional areas within the workflow—such as electronic immunization registries (EIRs), community-based tools, reporting systems, etc.—these still require significant work to achieve an interoperable solution that supports the full end-to-end immunization use case. Many countries have digital systems in place that already support key functions of the workflow and/or have the capacity to support technologies and may be looking for additional components that can be added to existing systems to provide an integrated immunization solution that aligns with their national digital health strategies and health enterprise architecture. A product suite provides that flexibility and should be designed to incorporate existing systems rather than replace them.

Product suites are aligned with the World Health Organization's (WHO) Standards-based, Machine-readable, Adaptive, Requirements-based, and Testable (SMART) Guidelines. Product suites should use the level two (L2) (operational) and L3 (machine-readable) components to produce L4 (executable) reference software.

11

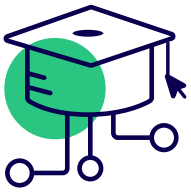
WP3 – DIPC‘S APPROACH ON TRAINING AND CAPACITY BUILDING

DIPC‘s comprehensive approach to Work Package 3, Training & Capacity Building, aligns with the objective of understanding and addressing capacity gaps for sustained digital health investment. The process is strategically structured to empower both technical workers and end-users across various levels of the digital health domain.



WP3

Capacity Building



In Countries

- Country needs assessment
- Needs based training:
  - SL: Digital Literacy
  - PE: HCW & Community Agents
  - ML: IT Tec training
  - TZ : IT Tec training
  - GH: IT Tec training

Global Level

- Needs assessment for technical staff maintaining digital health systems
- Mapping of existing training content
- Needs based online training course
- Trainer led offline training material
- Community of Practice

Training as a Global Good

- Integrate in national/regional
- training platforms
- Africa CDC workforce development flagship
- WHO SG training & scale-up working group

At both local and global levels, partners collaborate actively, ensuring that the training approach is well-informed and region-specific. This holistic strategy aims to cultivate a culture of continuous learning and collaboration, empowering individuals throughout the digital health ecosystem. By addressing identified needs through a structured approach, DIPC fosters sustainable capacity building for the long-term success of digital health initiatives globally.
The pyramid in the graph shows in detail the target audience groups and their specific training needs, as well as the way the DIPC initiative addresses said needs. As visible in the pyramid, practitioners, and providers, as well as planners and developers are assessed for local training needs in consultation with experts while conducting an assessment of existing training courses. This is then translated into in-presence courses which are supposed to fill possible gaps. Planners and developers as a group are furthermore looked at through the perspective of a global course and assessed for different learning personas and training needs. Based on this a prioritized training map is designed. As a next step, to address possible needs, a global online course on atingi is made available, and a community of practice is established.

WP3

Training

Vision
- One place access to a collection of the training global good resources
- Peer-to-peer based sustained learning
- Co-creation of training content with different stakeholders
- Integration into national training platforms & local in-presence training

Policy Makers, Decision Makers

Planners, Developers

Practitioners and Providers

Population, People and Patients

WHO Digital Literate Health Workforce

Global Courses

Learning personas and training needs

Learning personas and training needs

Existing training courses

Local Training

Consultative Process

Community of Practice

Online Course

In-presence Course

11.1 Needs Assessment for Training

In 2023, the DIPC partner Regenstrief Institute, focused on conducting a comprehensive needs assessment for training in HIS. The team aimed to understand the broader community's desires and requirements for training, including an exploration of existing HIS professional training in the global health space. The capacity needs assessment involved identifying individuals and organizations supporting tooling in various environments, understanding needs from multiple perspectives, and synthesizing findings into potential learning personas. A landscape review identified key contacts and forums related to Digital Health and HIS, leading to outreach, material evaluation, and a report on existing materials relevant to learning needs. Designing learning pathways involved synthesizing needs, existing courses, and personas into a proposal, seeking feedback from the community. The Regenstrief team employed various methods, including surveys, interviews, and workshops, to gather qualitative information on training needs from leadership, implementers, and global good creators.

11.2 Mapping of Existing Training Courses

Known capacity strengthening efforts were integrated into the project, leveraging global health networks to compile existing training materials. These materials were organized based on the emerging Digital Health Competency Framework (DHCF). The analysis incorporated identified competencies and courses, aligning with the DHCF in 2023, and considered diverse competency areas beyond Health Systems and Digital Health Solutions. These can be found in the Annex.

11.3 Local Needs Assessment and Capacity-Strengthening for Digital Health

To assess the local training needs, surveys as well as an assessment of existing training courses for capacity strengthening have been and are being conducted. The local approach is geared towards the specific needs of each country's national digital health landscape and is implemented by DIPCs partners in the respective countries.
Through collaborative efforts with implementing partners UNICEF, Digital Square, and PAHO, local capacity-strengthening initiatives are making a tangible impact in partner countries. The focus is on tailoring capacity-building measures according to each country's specific needs across various levels of the digital health workforce, from frontline staff to ministerial roles. While each country pursues its independent efforts, the goal is to leverage best practices and adaptable material through a DIPC-led Local Capacity Strengthening Working Group. In Malawi, efforts are directed at empowering Ministry of Health partners to manage and adapt the electronic immunization register for sustainable local use. Tanzania is developing a comprehensive training package to enhance the capacity of health workers in utilizing the new and improved system. Peru's initiatives involve creating digital skills programs for health personnel in the cross-border Amazon regions and professionals in the epidemiology branch. Sierra Leone is actively involved in crafting core competency courses on digital health for healthcare workers, and Ghana is concentrating on strengthening the capacity of health workers by updating content for the GHS eLearning platform, enabling them to effectively navigate digital immunization systems. Together, these endeavors reflect a collective commitment to advancing digital health capabilities on both regional and national fronts.

11.3.1 Peru

DIPC is actively engaging with the Peruvian MoH to comprehensively address local training needs within the Peruvian context. The collaborative efforts have led the organization to host some events and activities under WP3 aimed at mapping and assessing these needs. Notable initiatives include the Subregional Workshop, focusing on identifying requirements for enhancing Digital Skills among Information Technology and Statistical Personnel within the Public Health Sector. Additionally, the participation in Connectathon, centered around Information Systems and Digital Health in the Americas, further contributes to a nuanced understanding of the digital health landscape in Peru.
A detailed summary of available training courses, including their structure and content, is documented in the Annex, providing a valuable resource for the personalized approach of DIPC in addressing identified gaps. The information repository serves as a foundation to align DIPC initiatives with existing courses developed by various institutions, with a notable emphasis on Peru's National School of Public Health (ENSAP). ENSAP offers courses in digital literacy, telemedicine, information systems, among others, aimed at training healthcare personnel and individuals interested in gaining knowledge about digital health. This alignment ensures a coherent and effective strategy that complements ongoing efforts in the Peruvian digital health ecosystem.
As part of our commitment to collaboration, DIPC is actively exploring partnerships with key organizations and stakeholders involved in the Peruvian health sector. This collaborative

approach ensures that DIPC's interventions not only meet the identified needs but also integrate seamlessly into the existing government strategy and initiatives.
The existence, usage, and ownership of digital training platforms in Peru are critical aspects that DIPC is actively investigating. This inquiry includes an assessment of how these platforms are currently utilized, who owns them, and their overall impact on the digital health training landscape. By gaining a comprehensive understanding of the digital infrastructure, DIPC aims to optimize its interventions and contribute meaningfully to the enhancement of digital health capabilities in Peru.

11.3.2 Tanzania

Tanzania follows its own digital health strategy 2019-2023, supported by the DIPC initiative. In this context various e-Learning platforms have been created, providing a learning landscape for capacity strengthening and training.

National eLearning platform for health:
Tanzania MoH supports the development of a national consolidated Continuing Professional Development (CPD) Framework for all health care providers in Tanzania, both those licensed and those currently not licensed. The National eLearning for healthcare platform in Tanzania gives a useful platform for healthcare providers access CPD to improve healthcare system by enhancing the provision of quality care to the population of Tanzania.

© GIZ / Dirk Ostermeier

Immunization and Vaccine Development (IVD) e-Learning Platform:
In 2015, the Tanzanian government, with support from CHAI, initiated a digital initiative known as the IVD e-Learning Platform. This online tool was developed to provide training for immunization officers across the country. It provides a complement to current face-to-face training, but with a comparative advantage: immunization officers can do the training from anywhere, providing cost-savings in terms of travel to workshops and other related expenses. The platform also ensures uniformity of materials, meaning that all officers receive the same quality of training, as well as continuous access to training – a benefit to officers who previously could only attend training updates every one or two years.

HISP Tanzania launches a new Academy course digitally:
Since 2011, HISP Tanzania has worked with other regional HISP groups in East Africa to host regional DHIS2 Level 1 Academies and had responsibility for maintaining and updating course material for the Design and Customization course that was delivered by other HISP groups worldwide. HISP Tanzania had proposed an update to this course in late 2019, based on feedback from students, to bring together concepts of DHIS2 design with their related analytics outputs. A pilot version of a newly redesigned course, Design for Analytics, was planned for mid-2020. When the HISP network met in March 2020 to decide how to deliver training during the pandemic, it was decided that HISP Tanzania should go forward with the pilot course in an online format. It was also agreed that registration in the course — and all other DHIS2 Academies — would be offered at no cost to participants, to make it easier for Ministries of Health to meet their critical needs for DHIS2 capacity building.

11.3.3 Ghana

The DIPC initiative is strategically aligning with the GHS to enhance local training initiatives in digital health. The focus is on assessing how DIPC-developed courses can seamlessly integrate into the curriculum identified by GHS for various training levels outlined in the draft digital health training manual. Collaboration with GHS involves exploring avenues for these courses to be accessible through the GHS e-learning platform, ensuring widespread availability, and potentially utilizing other platforms like atingi.
The Ghana Health Service, in partnership with WHO, has conducted a comprehensive needs assessment of local digital health training, providing valuable insights that will inform the approach. The upcoming sharing of the Needs Assessment report will further guide DIPC's efforts in tailoring

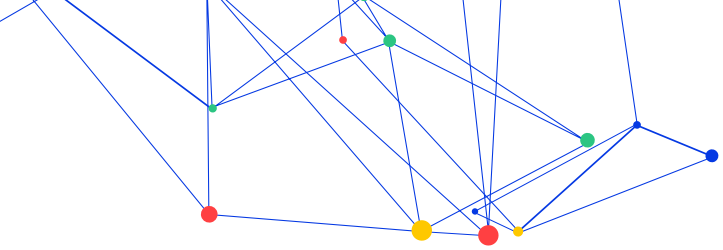
courses to meet the identified needs and contribute effectively to the local training landscape.
The draft digital health training manual, encompassing Foundation, Intermediate, and Advanced skills courses, is poised for implementation through strategic partnerships with Blue Crest University and Kwame Nkrumah University of Science and Technology (KNUST). Additionally, collaborative efforts with these universities are underway to develop a digital health certificate program, reinforcing the commitment to robust and structured training.
To enhance our understanding of the existing digital health training landscape, an inventory of current courses available on e-learning platforms and any in-person training has been compiled. This valuable compilation provides a comprehensive overview, enabling the alignment of the offerings with existing resources and optimizing the impact of DIPCs training programs.

11.3.4 Sierra Leone

DIPC is a leading initiative under WP3, aimed at meticulously mapping and assessing the training needs within the health sector. These initiatives include specialized workshops and forums designed to uplift the digital competencies of healthcare workers, emphasizing the critical role of digital literacy in pandemic prevention and management. These efforts are aimed at bridging the digital skills gap, ensuring that health professionals are well-equipped to utilize digital tools and platforms effectively in their response to health crises.
To ensure a cohesive and comprehensive approach, DIPC is leveraging the expertise and resources of a wide range of partners and organizations involved in Sierra Leone‘s digital health landscape. This includes collaboration with governmental bodies such as the DPPI, Directorate of Health Security and Emergency (DHSC), educational institutions like the College of Medicine and Allied Health Sciences (COMAS), Najala University and international partners such as the German Agency for International Cooperation (GIZ) and the United States Agency for International Development (USAID). These partnerships are instrumental in pooling resources, knowledge, and expertise to drive forward the digital health agenda in Sierra Leone.
A key component of DIPC‘s strategy is the focus on digital training platforms. The roadmap underscores the establishment of digital learning centers within health facilities as a cornerstone for improving digital literacy among health workers. These centers are envisioned to offer hands-on training, making critical contributions to the upskilling of healthcare professionals in digital health applications. DIPC is actively involved in assessing the current landscape of these training platforms, including their usage, ownership, and impact on the health sector‘s digital capabilities. This assessment is geared towards identifying opportunities for enhancing these platforms, ensuring they are optimally utilized to meet the training needs of health workers, particularly in areas relevant to pandemic prevention and response.
Addressing these gaps and leveraging partnerships and digital training platforms, DIPC aims to fortify Sierra Leone‘s health system, making it more agile, informed, and prepared to tackle future pandemics. This strategic approach is designed to ensure that digital health interventions are seamlessly integrated into Sierra Leone’s national health strategy, contributing to the overall improvement of health outcomes in the country.

11.3.5 Malawi

Through the digital health strategy, DHD has been providing digital health governance, coordination, and leadership in the country. During the period, digital health infrastructure substantially expanded, including the extension of the Government Wide Area Network (GWAN) from District Council offices to District Health offices and some other selected health facilities, as well as solar power backup systems to more than 100 facilities to support the use of digital health solutions. This will increase internet access to health facilities. A milestone was the development and deployment of an Interoperability Architecture to support the interoperability of digital health systems. So far, software components under the interoperability architecture include Interoperability Layer, Master Health Facility Registry, the Master Patient Index and Terminology Registry. The Interoperability Architecture is already currently facilitating the sharing of data between HMIS DHIS 2 and OpenLMIS (Drugs and Essential Medicines data platform), HMIS DHIS2 and DHA MIS, HMIS DHIS 2 and Integrated Supportive Supervision System, among other systems.
As a response to local needs in the training and capacity building sector in Malawi, certain actions have been taken. The MoH, through support of various implementing partners and the Department of Computer Science at the University of Malawi has developed the integrated Community Health Information System (iCHIS), a digital system that combines software, hardware, people, and processes to support informed decision making and action taken by community health workers. Even though it has been scaled down to a few districts in the country, this game-changing digital health intervention will demonstrate the potential that exist when funder invest in it locally conceived and executed solutions in addressing local needs sustainably and cost-effectively.
Another milestone is the establishment of the Central Data Repository (CDR) for patient level data. The CDR working



together with the Master Patient Index is a starting point for the Shared Health Record where a patient can move with their electronic health record from one health facility to another. On customization and deployment of electronic learning (eLearning) for Continuous Professional Development (CPD), the Ministry has made Reproductive Health and Digital Health modules available for online learning by healthcare workers.

The main challenges include:

- Weak coordination of digital health investments in the health system.
- Lack of reliable ICT infrastructure to enable utilization of digital health systems.
- Lack of capacity among communities and health workers to utilize digital health investments.
- Lack of continuity of care through shared health records; with ineffective alignment between monitoring and evaluation needs of health sector strategies and digital health solutions currently being deployed.
- Weak security of information and ICT systems
- Lack of interoperability among the country's digital health systems

A detailed description of existing training courses can be found in the Annex.

11.4 Global Training Course

The DIPC initiative is championing a transformative vision with its eLearning course, addressing critical gaps in resources and training for digital health professionals. Grounded in insights from diverse contributors, ranging from business analysts to care providers, the course acknowledges the fundamental need for baseline capacity and technical know-how to navigate health information systems effectively. Collaborating with the Regenstrief Institute, DIPC conducted surveys, interviews, and workshops, crafting a comprehensive eLearning course on atingi. The global learning course will furthermore be connected and available on local e-learning platforms, ensuring accessibility. The course, designed with seven distinct user personas, ensures relevance to various digital health roles. Beyond traditional training, DIPC introduces a learning community, fostering peer-to-peer learning and collaboration. This dynamic space invites digital health enthusiasts to join and collectively drive positive change in the global digital health landscape. DIPC's initiative isn't just a course; it's a catalyst for transformation, launched in February 2024, inviting professionals to be part of this groundbreaking movement.

- **Step 1 - Needs Assessment:** The initiative kicks off with a standardized needs assessment, focusing on technical professionals. User personas are crafted to tailor training content, ensuring specificity and effectiveness in addressing identified gaps.

- **Step 2 - Mapping of Existing Trainings:** An in-depth analysis of existing training content is conducted, pinpointing gaps, overlaps, and improvement opportunities. This step maximizes the utilization of available knowledge, building upon existing resources.

- **Step 3 - Design Training:** Informed by insights gathered, a meticulous design phase follows. The training content is carefully curated, integrating user feedback, WHO SMART Guidelines, and global health standards. Special emphasis is given to local adaptations and contextual relevance.

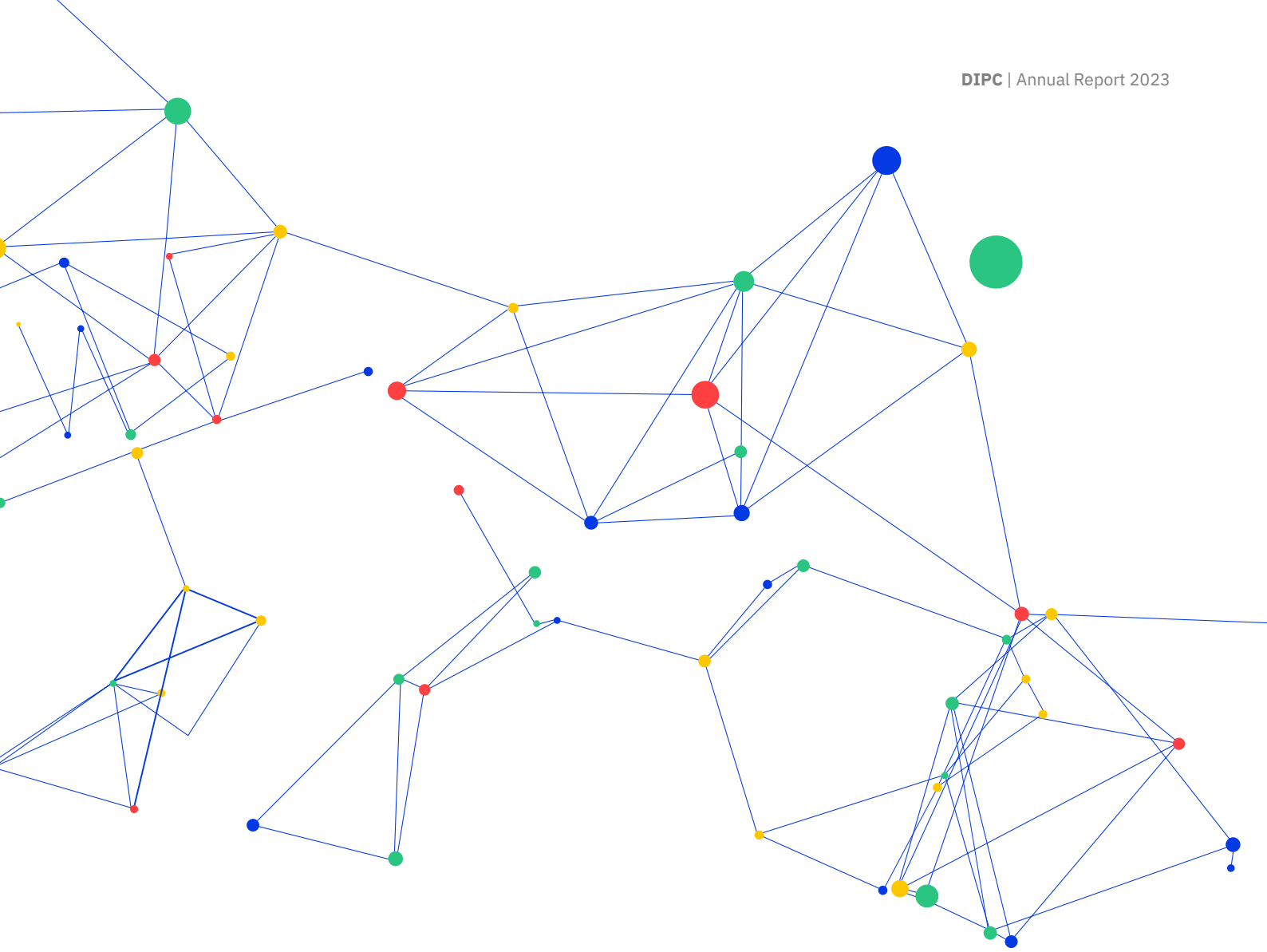
- **Step 4 - Implement Training:** With the training program finalized, a systematic implementation plan unfolds, facilitating knowledge transfer at the local level. Partners actively engage in delivering tailored training sessions that align with specific regional requirements.

11.5 Conclusion WP3

In conclusion, WP3 of the DIPC initiative demonstrates a comprehensive and strategic approach to training and capacity building in the digital health domain. The four-step process, starting with a meticulous **Needs Assessment** and progressing through **Mapping of Existing Trainings, Designing Training, and Implementation**, aligns with the goal of addressing capacity gaps for sustained digital health investment. The detailed overview of activities in different partner countries, such as Peru, Tanzania, Ghana, Sierra Leone, and Malawi, highlights tailored efforts to meet local needs. The mapping of existing training courses and local needs assessments, along with the focus on digital training platforms and local capacity strengthening, underscores DIPC's commitment to context-specific interventions. The global eLearning course, designed collaboratively with diverse contributors and introducing a Learning Community, serves as a transformative initiative addressing critical gaps in resources and training for digital health professionals worldwide. DIPC's strategic and collaborative endeavors position it as a catalyst for positive change, actively contributing to the enhancement of digital health capabilities at both local and global levels.

12

WP4 – INCUBATOR FOR EVIDENCE



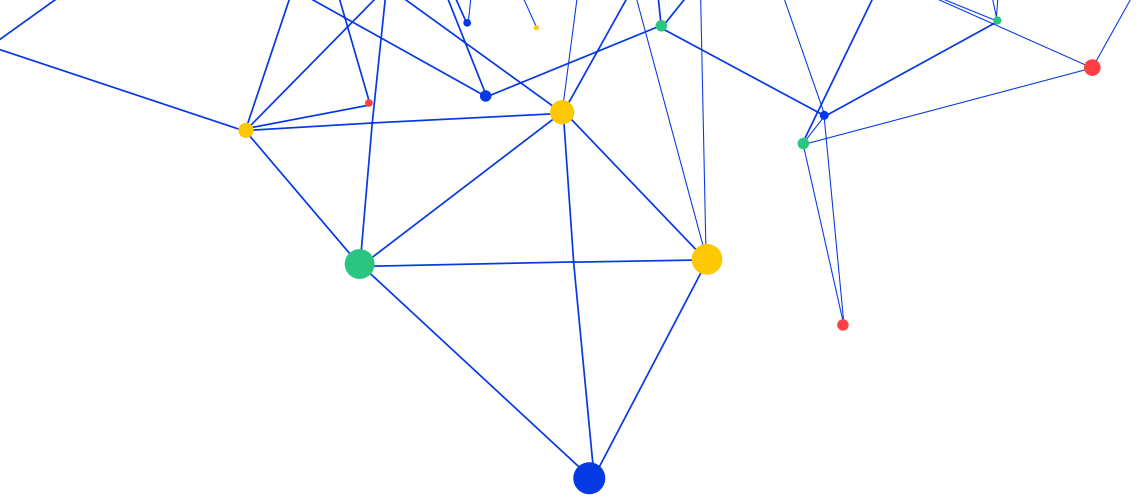
WP4 is a crucial component of the global DIPC initiative, aimed at reviewing, synthesizing, and generating evidence around digital health, and DIPC itself. This goal is pursued through collaborative partnerships and a steadfast dedication to academic rigor and innovative methodologies. Led by the Evidence-based Public Health Unit (ZIG 2) (RKI), WP4 emphasizes continuous enhancement of implementation strategies to stay abreast of the latest developments in the field. The RKI's central role involves evaluating the DIPC initiative, including the work of its collaborative partners, through comprehensive literature reviews, and primary data collection through several social sciences methods addressing the implementation of DIPC.

The DIPC process evaluation aligns with the OECD's five criteria: relevance, effectiveness, efficiency, impact, and sustainability. In its 2023 preparatory phase, ZIG 2 focused on conducting desk reviews to support implementation partners. Furthermore, this phase included activities such as analyzing project documents, hosting a workshop in April 2023 for stakeholder engagement, and participating in the HELINA conference in Cape Town to connect with African partners. ZIG 2 also supported the refinement of the DIPC Logic Model and secured Data Protection clearance in August 2023 for data collection across the five DIPC countries, ensuring adherence to data protection standard. ZIG 2 also provided evidence concerning the impact of Information Communication Technology (ICT) on immunization and immunization programs, the use of gamified digital health tools by healthcare workers in their daily tasks, and standard indicators to monitor and evaluate digital health initiatives. Furthermore, ZIG 2 drafted a concise review of guidelines, frameworks, and tools relevant to digital health programs, offering an overview of resources to support the digitization of health systems worldwide. This review aims to encourage the adoption of these resources, highlight gaps and challenges, and motivate research and development of evidence-based guidelines for underrepresented areas in digital health. Its goal is to create a solid conceptual basis for the DIPC project's design and implementation.

13

NEXT STEPS 2024

© GIZ / Jose Nario



13.1 WP1 Country-Specific Action in 2024

Peru:
In 2024, Peru is set to embark on a series of pivotal activities aimed at advancing its healthcare system through digital innovations. The year kicks off with a workshop where different experts will will present the implementation of the SMART Guidelines (SG) to key stakeholders, including the Ministry of Health, the National School of Public Health of Peru (ENSAP), and GIZ. Training programms dedicated to strengthening local capacities will empower healthcare professionals with essential digital skills. The pilot of the digital solution will be executed through vaccination campaigns, coordinated with the Regional Health Directorates (DIRESA), to test its effectiveness. The adaptation and implementation of the SMART Guidelines, offline registration capabilities and the possible deployment of the digital solution at a regional level, marks a significant technological leap. Finally, the transference phase ensures the seamless integration and sustainability of these innovations, underlining Peru‘s commitment to a digitally advanced and resilient healthcare landscape.

Tanzania:
In 2024, Tanzania is poised for a significant leap forward in digital health capabilities, with a dedicated focus on advancing and implementing comprehensive training initiatives. The outlook for the year emphasizes a strategic approach to addressing the evolving needs of the healthcare sector by fostering a culture of continuous learning and skill development. The primary objective is to further enhance the proficiency of health professionals in utilizing digital health systems effectively. The collaborative efforts of the DIPC in Tanzania will play a pivotal role in tailoring training programs to align with the specific requirements of the country‘s digital health landscape.

Ghana:
Ghana‘s ambitious plans within the DIPC initiative for 2024 outline several key milestones. The focus is on completing the software development and implementation of the updated immunization component of the e-Tracker system. Active participation in update calls, reviewing software development deliverables, engaging in system integration, and testing, and ensuring comprehensive training for Digital Health staff are integral components of this initiative. Additionally, Ghana aims to finalize the requirements document for the interoperability layer, emphasizing collaboration through regular update calls and document reviews. Another crucial aspect is the completion of the immunization training module for the e-learning platform, with a thorough review of the instructional design documentation. Furthermore, Ghana is set to host a Women in Digital Health event in September 2024, demonstrating its commitment to fostering gender inclusivity in the local digital health ecosystem. Active participation in the planning committee and contributions to the Women in Digital Health/Digital Health Equity Workshop will play a pivotal role. Lastly, Ghana plans to showcase its achievements on the international stage by having a representative as a speaker at the ICT4D Conference in Accra, Ghana, on March 19-20, 2024. The session will focus on Ghana‘s use of WHO‘s SMART Guidelines and the HL7 FHIR standard in creating localized and interoperable immunization systems, featuring insights from panelists experienced in building integrated digital innovation systems. These comprehensive plans underscore Ghana‘s dedication to advancing digital health and fostering innovation on various fronts.

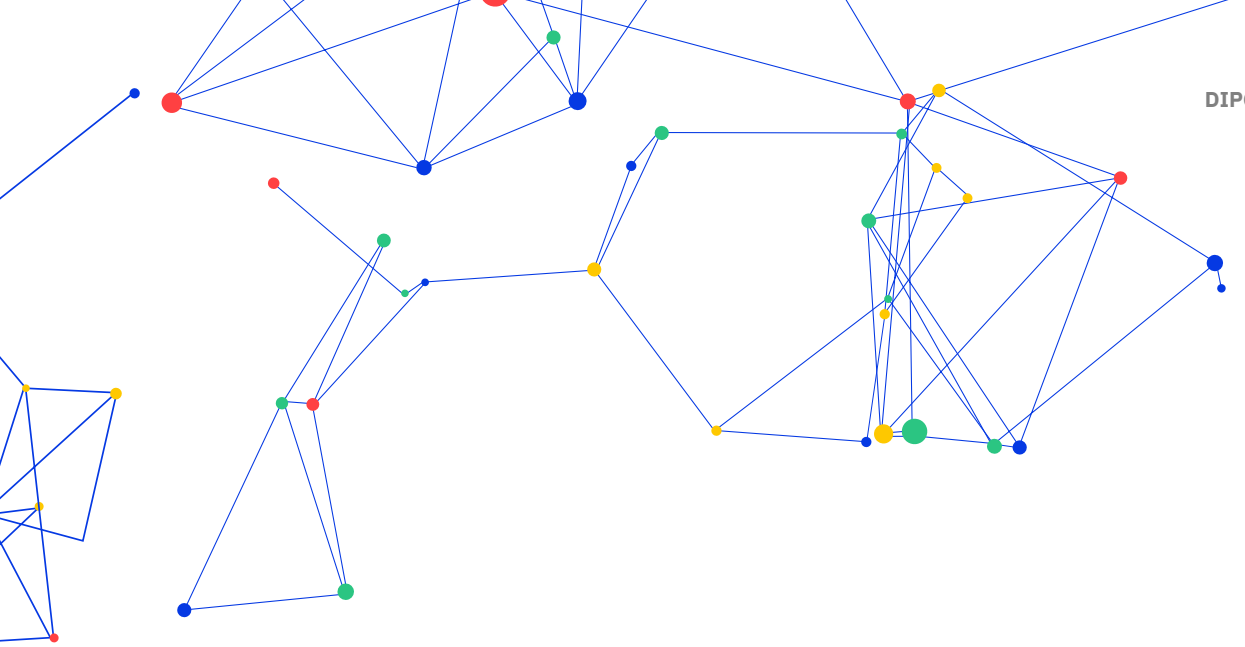
Sierra Leone:
In 2024, Sierra Leone is poised for transformative advancements in its healthcare infrastructure, with a strategic focus on services and applications, infrastructure, and health workforce development.
Under services and applications, the country aims to sensitize relevant stakeholders on the advantages of the electronic stock management system (eSMT). A refresher training program is planned to equip personnel with skills in eSMT utilization, WhatsApp platforms, data management, cold chain management, and stock management. Additionally, efforts will be directed towards enhancing vaccination data management mechanisms, including the localization of WHO SMART guidelines for improved health content. Collaborating with Innovation SL, Sierra Leone plans to organize hackathons/conectathons to foster innovation in digital health solutions.
Infrastructure development is a key component, encompassing the procurement of ICT hardware, provision of internet connectivity, and acquisition of backup power equipment to

ensure the reliability and continuity of digital health systems. The health workforce will undergo significant capacity-building initiatives. Sierra Leone aims to develop training modules for core digital health competencies and identified priority health skills. Offsite training will be conducted to enhance these competencies, complemented by onsite training reinforcements and coaching/mentoring support. Furthermore, collaboration with academia for a research fellowship at the eHealth coordination hub demonstrates Sierra Leone‘s commitment to nurturing a skilled and research-oriented health workforce.
In summary, Sierra Leone‘s 2024 outlook reflects a comprehensive and strategic approach to leverage digital health solutions, foster innovation, and empower its healthcare workforce for a more resilient and digitally advanced healthcare system.

Malawi:
In 2024, Malawi is embarking on a comprehensive plan to enhance its health information system, MaHIS, with a particular focus on the EIR module. The following key initiatives are outlined for the upcoming year:
The first step involves the collaborative development of a Software Roadmap, prioritizing enhancements to the EIR module in coordination with the Malawi MoH. This roadmap will be made accessible to key stakeholders, including MoH, Digital Square, and GIZ. A detailed Software Requirements Document is on the agenda, specifying enhancements to the EIR module. This includes updates to the data model and user interface screen mockups, providing a clear guideline for the development process. Ensuring the safety and performance of the system is a top priority. To achieve this, the plan includes the production of a Quality Assurance Framework and Test Plan, which will set the standards for testing throughout the development phase. To demonstrate compliance with functional requirements, a set of detailed test cases will be produced. These cases, written in Behavioral Driven Development (BDD) syntax, aim to support operational qualification and User Acceptance Testing (UAT). The tests will provide documented evidence, assuring that the software functions as expected and yields consistent results. Importantly, all tests will be meticulously mapped back to the requirements for traceability. Virtual feedback sessions during the development phase will be thoroughly documented. Transcripts, recordings, and meeting notes will be compiled, ensuring that feedback from designated MoH and DIPC team members, whether physical or virtual, is well-documented and accounted for. Reports summarizing the results of each of the three testing cycles for MoH will be generated, offering insights into the performance and functionality of the EIR module. The final EIR module of MaHIS will align with the prioritized requirements outlined above. Integrations with other systems will be ensured to be interoperable via standards-compliant interfaces, supporting an end-to-end immunization workflow. The module will be made available on a test or staging server for further evaluation. Emphasizing transparency and collaboration, the final EIR module will be released under an OSI-approved open-source license, accessible to the wider community. A User Acceptance Testing (UAT) report, including detailed test results and a pass rate in line with the Quality Assurance Framework, will be provided. Additionally, a plan for addressing any failed tests will be outlined. Comprehensive technical documentation is planned, covering the technical architecture of the solution. This will include a context diagram to explain system interactions, ensuring clarity for developers and stakeholders. Detailed technical documentation on deploying, configuring, and validating the solution will be produced, providing a comprehensive guide for future implementations. The plan also includes the development of training materials and end-user guides for the EIR module in MaHIS, facilitating seamless adoption and use. Lastly, an Installation Qualification will be conducted, showcasing evidence of the new EIR module‘s transition from the test to the production environment during the initial implementation phase. This will ensure the successful integration and deployment of the enhanced system in the healthcare infrastructure of Malawi.

13.2 2024 – Work Packages

In 2024, the DIPC initiative is poised for a dynamic and impactful year, driven by its commitment to advancing digital health solutions globally. Across its four key Work Packages, DIPC envisions significant progress and contributions.



WP1: Solution Development
The relentless pursuit of innovative digital health solutions continues under WP1. DIPC is dedicated to developing and refining cutting-edge products that address critical challenges in pandemic control, which has been showcased in the country-specific actions for 2024.

WP2: WHO SMART Guidelines Level 4 Development
WP2 is focused on the meticulous development of Level 4 of the WHO SMART Guidelines. This comprehensive approach involves scaling, documenting, and reporting, ensuring that the guidelines are not only developed but effectively disseminated for maximum impact.

WP3: Global Learning Course and Community of Practice Launch
A major highlight for DIPC in 2024 is the launch of a global learning course on atingi, scheduled for later this year. The Regenstrief Institute has furthermore identified a strategy and topics to help the global learning community in moving forward. Therefore, in 2024, the Regenstrief Team plans to collaborate with community experts and GIZ DIPC partners to develop learning modules focusing on crucial aspects of implementing and maintaining health applications. The modules will cover topics such as End-User Support and Training, Software Development Life Cycle, Change Management, Global goods and communities, and Business Analysis. Additionally, the team has established a peer-learning community, or, in other words a Community of Practice, fostering peer-to-peer learning among individuals supporting health applications. This initiative will involve identifying community participants, articulating the value proposition, conducting initial outreach, forming the community, and creating an engagement plan. Key topics for discussion within the community are anticipated to include business analysis, the systems development lifecycle, change management, and testing.

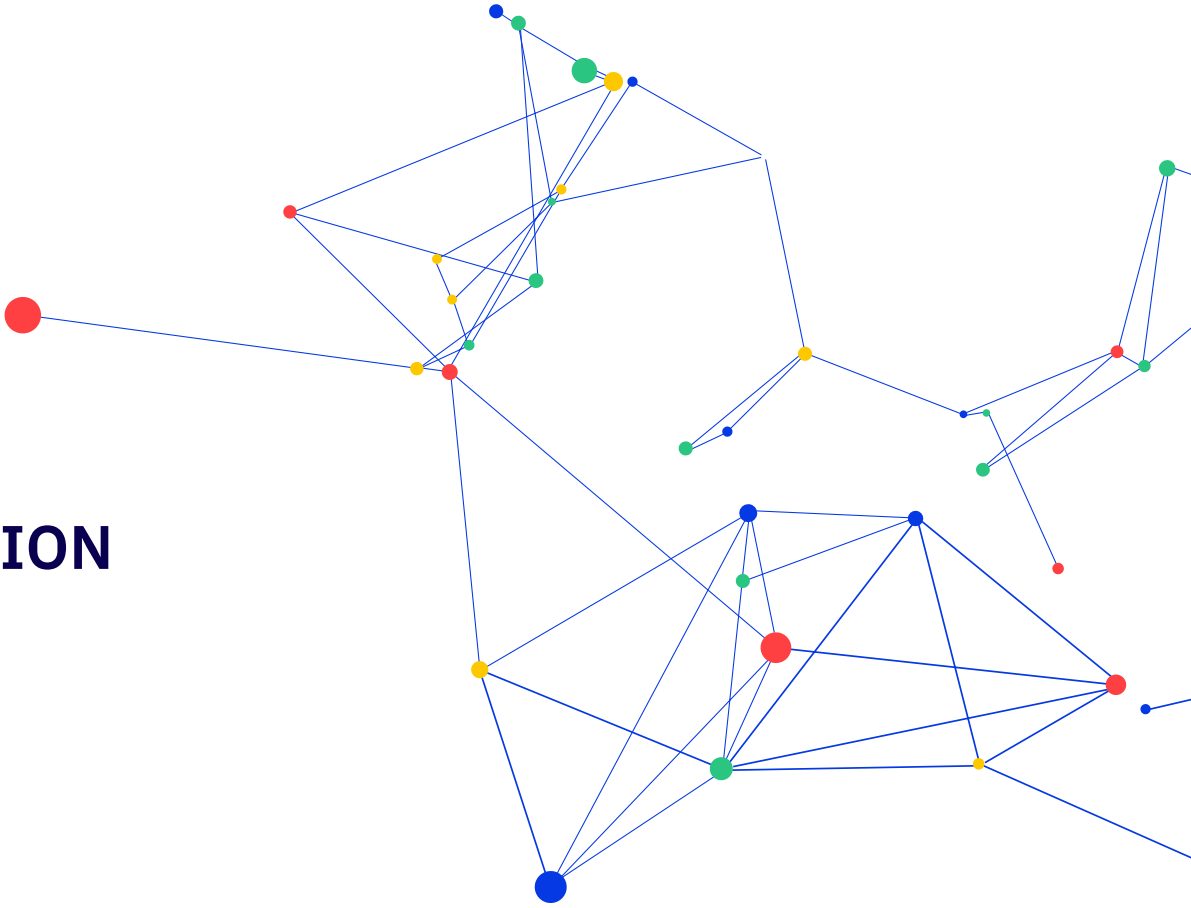
This course, a culmination of collaborative efforts, will be complemented by the creation of local training materials in Sierra Leone and Peru. The subsequent implementation of these trainings in participating countries underscores DIPC‘s commitment to fostering digital health expertise at the grassroots level.

WP4: Products and Operational Research
WP4 is a hub of innovation, where DIPC is actively creating and publishing products and operational research outcomes. In 2024, the RKI team will finalize and diseminate the reviews started in 2023 and it will undertake applied research to evaluate the DIPC‘s implementation, primarily through key informant interviews and document review. These efforts aim to assess the digital intervention and its usage across health system levels, focusing on acceptability and identifying improvement areas to enhance sustainability and effectiveness. The desk review will analyze reports from partners, health ministries and the main stakeholders. The assessment timeline involves preparing protocols and materials from May to June, with data collection starting in September, post-training of local researchers and ethical approvals. Additionally, a cluster randomized trial in Peru to test a gamified digital intervention is considered for 2025, pending funding.

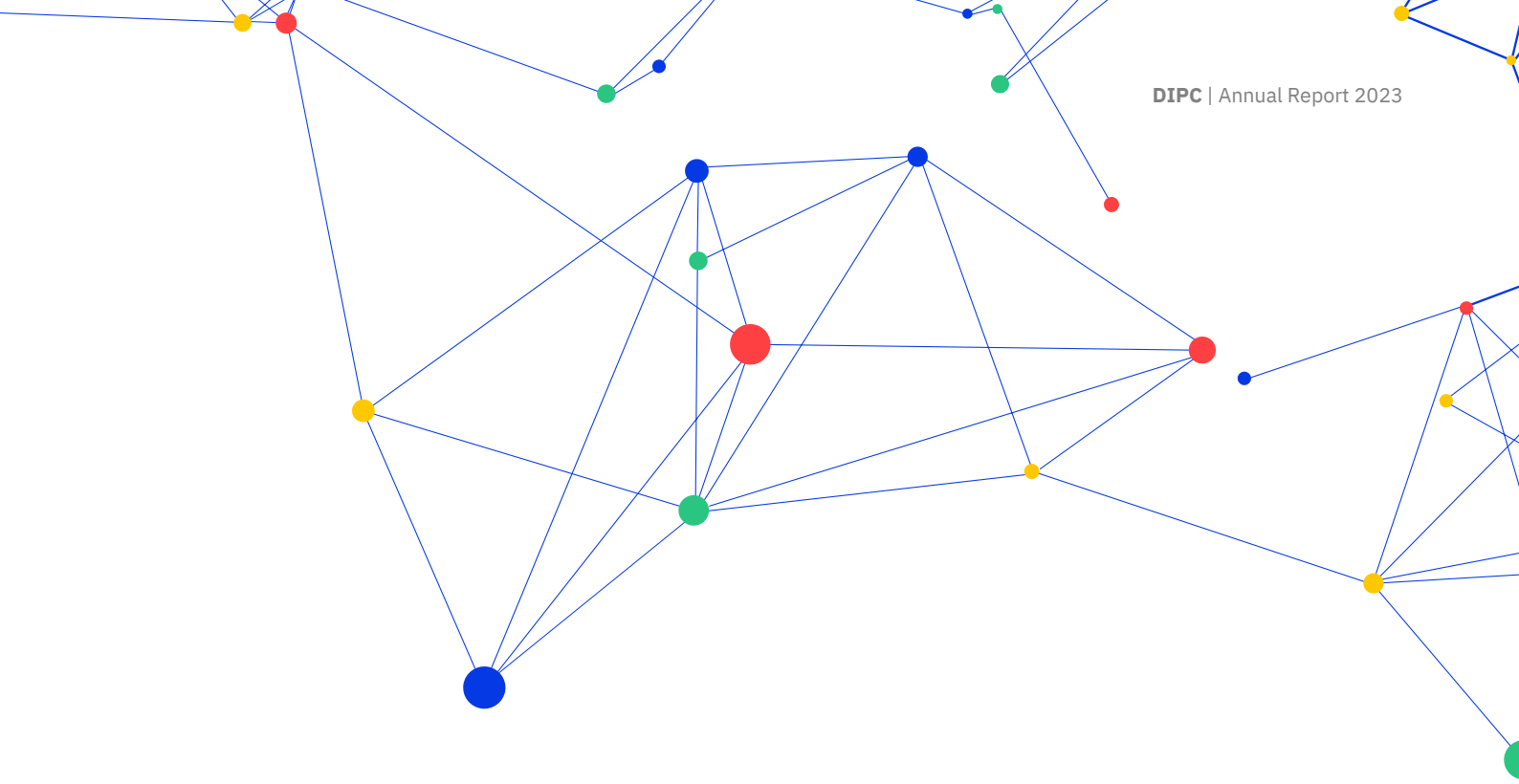
13.3 DIPC: Events and Activities

Beyond the individual WPs, and the country-specific activities, DIPC is set to participate in various conferences, solidifying its presence in the global digital health landscape. Events such as the ICT4D Conference, republica24, World Health Summit, and the Global Digital Health Forum provide platforms for DIPC to share its advancements, exchange ideas, and collaborate with stakeholders worldwide.

14



CONCLUSION



After looking at 2023 in detail one can summarize that the DIPC initiative has taken significant steps to further their vision and aim through country-specific activities, as well as on a global scale. To structure and build on the activities in 2023, the team has formulated annual key results to achieve and further these aims.

SMART Guidelines (WP1/2): Within SMART Guidelines, the primary objective is to consolidate proof of concept, positioning DIPC as experts in the field. This is done by actively gathering experiences with partners in workshops focused on Essential Medicines (EM), WHO SG, and Supply Forecasting (SF). Additionally, all DAKs are made publicly available and the implementation of the product suite as Level 4 in Peru is piloted. Lessons learned from these initiatives are meticulously documented, providing a valuable resource for future endeavors.

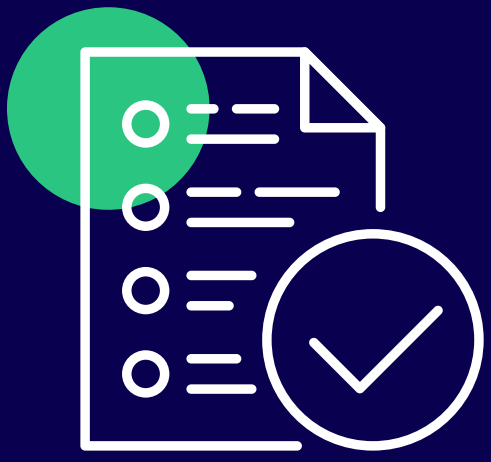
Training (WP3): For Training initiatives, the aim to make the DIPC courses accessible to targeted stakeholders, emphasizing support for partners to create a minimum set of five trainings. The content is hosted on relevant platforms, with an integration strategy for the community of practice and joint marketing efforts. To ensure sustained success, DIPC elaborates on the next steps for implementation, marketing, and improvement within a comprehensive strategy. This strategy also includes the incorporation of relevant content from partner institutions on Atingi, including the Sierra Leone course.

Impact (WP4): In the realm of Impact, the focus lies on ensuring that lessons learned, and project outcomes are not only relevant but actively utilized. This involves documenting learning logic models and impacts, developing and initiating a fundraising strategy, and establishing a robust Monitoring and Evaluation (M&E) system for data collection for the 2024 reporting. Partners are committed to implementing their work packages as outlined in their proposals, and DIPC actively seeks synergies with the GIZ Project on national, regional, and global levels to amplify our collective impact.

Communication & Public Relations: In the realm of Communication & PR, the primary focus is on enhancing the visibility and reputation of both DIPC and GIZ within the Digital Health Innovations sector. This involves utilizing effective communication tools and channels to facilitate knowledge transfer, ultimately raising awareness about the WHO SG. The strategic communication efforts extend to promoting training courses through targeted communication materials, ensuring alignment with the objective to increase visibility in the dynamic field of Digital Health Innovations.
In summary, 2024 marks a pivotal year for DIPC, characterized by continued solution development, guideline refinement, global learning initiatives, impactful research, and active participation in key conferences. DIPC‘s unwavering commitment to leveraging digital innovation for pandemic control positions it as a key player in shaping the future of global health.

15

LIST OF IMPORTANT DOCUMENTS CONNECTED TO THE DIPC INITIATIVE



Ecosystem Mappings
Ghana
Nigeria
Ivory Coast
Togo
Sierra Leone
Peru
Tanzania
Malawi

Factsheets
DIPC Factsheets

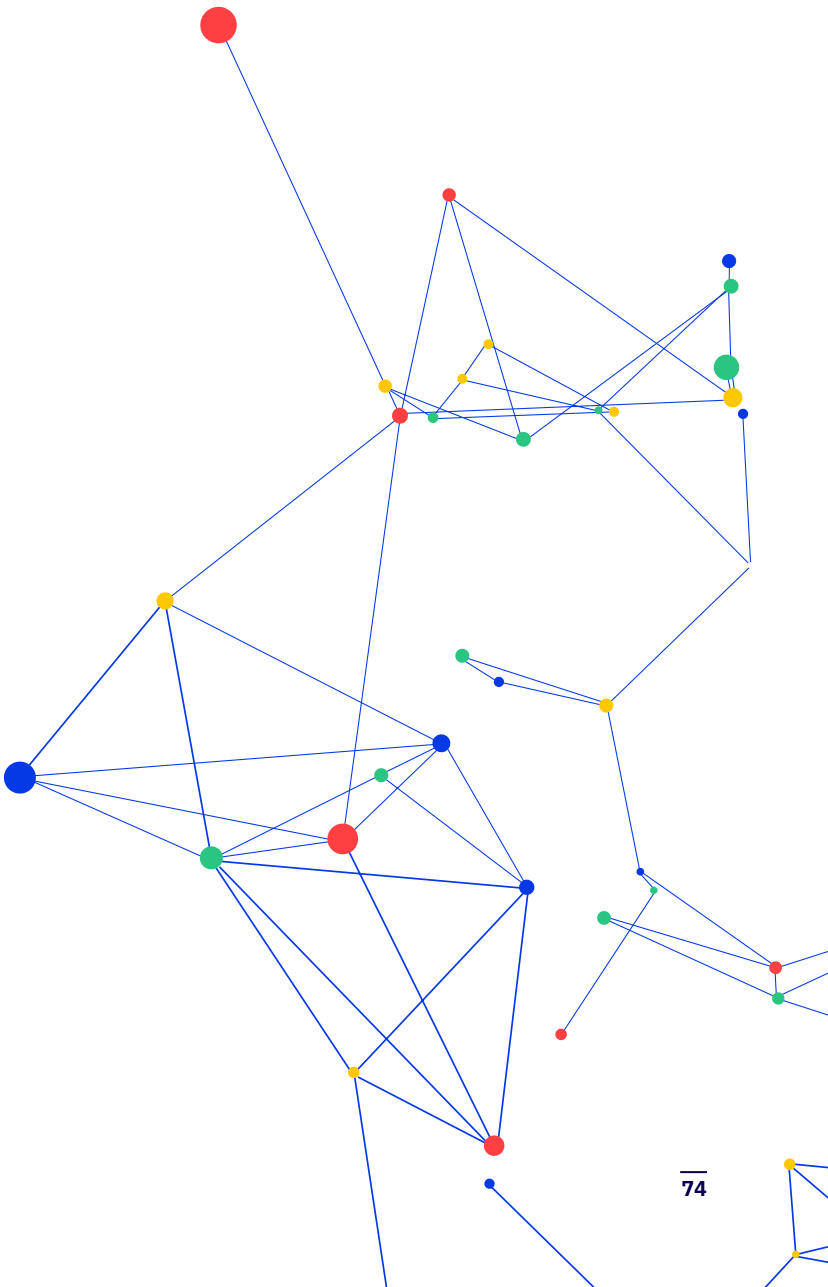
Logic models, Guidelines and Work Aids
General Logic Model
Gender Logic Model

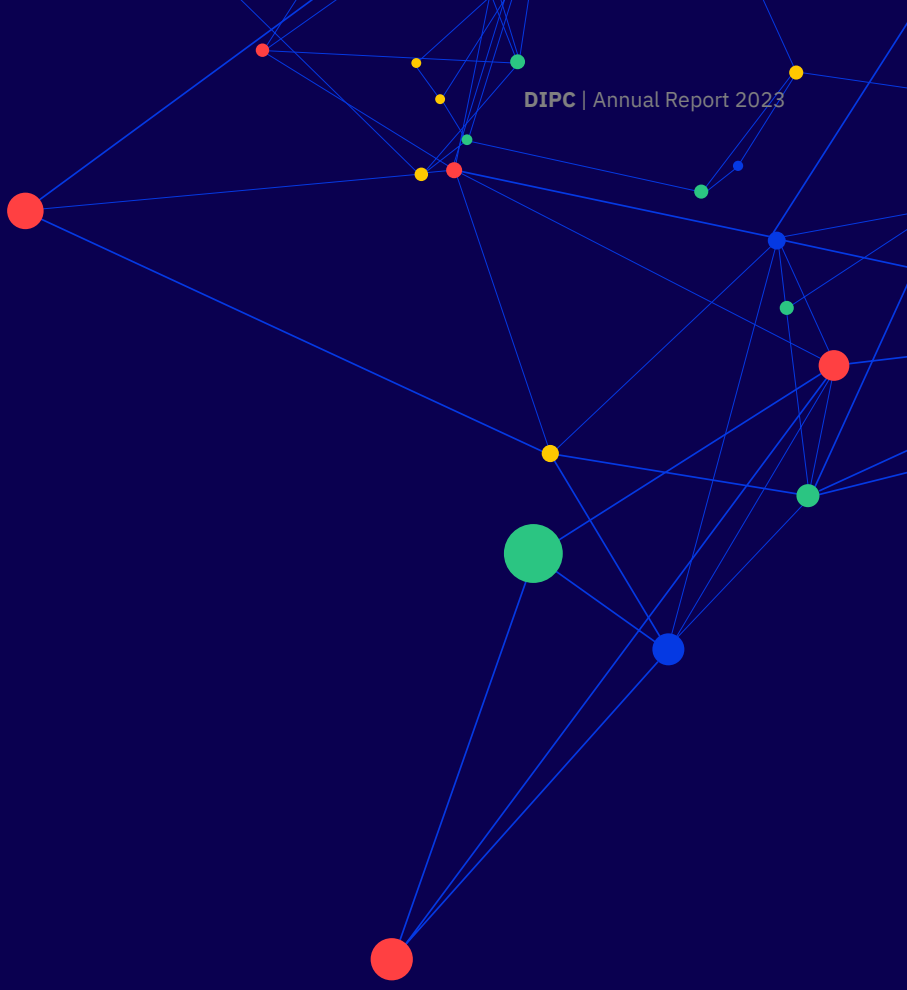
Gender Mainstreaming
Gender Publication

Scan the QR code to visit the DIPC website.

16

ANNEX





15.1 Most Important Events within Work Packages

Peru
Tanzania
Ghana
Sierra Leone
Malawi

Peru

Event & Workpackage assigned	Summary of Content / Topic	Organized by / Institutional Approach	Date	Participating Partners / Institutions	Women %
Mapping the Health Data Ecosystem **WP1**	**Answers to questions:** • Who are the relevant actors in the vaccine logistics process? • What are the "formal values" generated because of data exchange? • What are the "informal values" generated because of data exchange? • What are potential opportunities within the system?	GIZ Peru and Peruvian MoH	17th March 2023	Government, international organizations, private and public sector, and civil society	34.8% (16/46)
Digital Transformation Regional Forum: Open debate on robust and resilient digital health systems in Latin America and the Caribbean **WP2**	1. Post COVID-19 digital challenges in the health sector in Latin American and the Caribbean 2. Needs in the development of digital capabilities, challenges for providers – institutions and professionals, social agents and users in the health sector 3. **Agenda Setting:** Action Plan for the Implementation of the WHO SMART Guidelines in LATAM and the Caribbean 4. **Shared data and interoperability in the health sector:** Crossing Physical Borders 5. **Closing:** Conclusions and learnings from previous sessions	GIZ Mexico and Mexican Secretariat Economy	May 24 – 26, 2023 1. 24th May 2023 2. 24th May 2023 3. 25th May 2023 4. 25th May 2023 5. 26th May 2023	Government, international organizations, private and public sector and civil society.	51.02% (75/147)
Subregional Workshop **WP3**	Identification of needs to strengthen Digital Skills in the Information Technology and Statistical Personnel of the Public Health Sector.	GIZ Peru	28th June 2023	Ministry of Health, Hospitals, national and international institutions	48% (12/25)
Connectathon **WP 1**	Information Systems and Digital Health in the Americas	PAHO and IDB	November 12 – 15, 2023	-	-

Tanzania

Event & Work-package assigned	Summary of Content / Topic	Organized by / Institutional Approach	Date	Participating Partners / Institutions	Women %
Ecosystem mapping of all digital immunization systems **WP1**	Describes the digital solutions Tanzania uses to support the immunization health domains. For each digital system, the results provide a system overview and details about its major features, users, challenges, and recommendations	Digital Square worked with various departments within the MoH, including Immunization and Vaccines Development (IVD), Information and Communications Technology (ICT), and Monitoring and Evaluation (M&E), to review existing assessments and workflows to better understand the landscape of systems currently used in the country's immunization health domain. The MoH and Digital Square produced this country profile to share with all project stakeholders (e.g., government stakeholders, funders, and implementing partners) so that the information is widely available. This country profile helps define the priority needs so that Tanzania – directed by the MoH and existing governance mechanisms – can use it as a resource on its journey to developing and operationalizing an interoperable digital system that supports the full end-to-end immunization use case. **Digital Square employed the following methods to collect the data included in this report:** • Conducted a desk review of Tanzania's health and digital governance documents (e.g., Digital Health Strategy: July 2019–June 2024[3]) and existing resources on established digital tools (e.g., Digital Pandemic Preparedness Assessment[4] and the Map & Match project[5]). • Held consultative sessions with country leaders to validate the current state immunization ecosystem assessment and propose ways to strengthen relevant components of the digital health immunization ecosystem, as needed. Additional stakeholders consulted include the Health Information Systems Program (HISP) Tanzania, John Snow Inc. (JSI), and the President's Office – Regional Administration and Local Government	November 2023	GIZ, DS/PATH, MoH (ICT, IVD and M&E)	+ 40%
Requirement gathering to localize Immunization DAK. **WP1**	Identify and review system requirements for the immunization system for Tanzania	The Ministry of Health (MoH), through the IVD program, ICT, M&E in collaboration with DS/PATH and GIZ made it possible	-	-	-
Capacity building **WP3**	Training for the MoH technical team on the WHO SMART Guideline and FHIR Standards	-	-	-	-

Ghana

Event & Workpackage assigned	Summary of Content / Topic	Organized by / Institutional Approach	Date	Participating Partners / Institutions	Women %
User-Centered Business Requirements Validation Workshop **WP1**	**Objectives:** 1. Create a high-level understanding of the collaborative requirements development methodology (CRDM) approach and why it is important to document requirements. 2. Create an understanding of the system and user requirements documentation (SURD)/ digital adaptation kit (DAK) key components and why they are important to digitalization. 3. Validate SURD components to create a localized DAK for immunization.	PATH / DS	12th – 14th June 2023 PATH/DS	GIZ, PATH / DS, Ghana Health Service	50%
Validation of Ecosystem Mapping Process **WP1**	Ecosystem mapping process	PATH / Digital Square and GIZ Ghana	17th June 2023	Government, international organizations, private and public sector and civil society.	51.02% (75/147) 51.02% (75/147)

Sierra Leone

Event & Work-package assigned	Summary of Content / Topic	Organized by / Institutional Approach	Date	Participating Partners / Institutions	Women %
WP1	**Developed the ecosystem mapping report.** The ecosystem mapping report evaluates the implementation of digital health strategies in the country. The assessment identifies key bottlenecks across seven digital health and ICT environments, highlighting issues like inadequate leadership, lack of standardization, and insufficient infrastructure. It emphasizes the need for improved coordination, funding, and capacity building in the health sector. The report concludes with a set of prioritized recommendations, including strengthening leadership, optimizing services, and improving infrastructure, to enhance digital health implementation.	Directorate of policy, planning and information (DPPI) / UNICEF	January 2023	US Centre for Disease Control (CDC), GIZ, Digital Square, eHealth Africa, MCGL-JHPIEGO, College of Medicine and Health Science (COMAHS), Njala University, Pharmacy Board, World Vision, Medtronic Labs, Last Mile Health, Project Last mile, PSI-Impact Malaria, Community Health Access Finance (CHAF), International Federation of Red Cross and Red Crescent Societies (IFRC), Partners In Health (PIH), National HIV/AIDS Control Programme (NACP), National Monitoring and Evaluation Directorate (NaMED), Food and Agriculture Organization (FAO),	-
	Develop a costed digital health investment roadmap and the production and printing of the document. The Sierra Leone National Digital Health Roadmap (2024-2026) is a strategic document outlining the country's approach to implementing digital health initiatives. It assesses the current state of digital health, highlighting strengths such as political support and existing digital health interventions, while also noting challenges like inadequate digital skills in the health workforce and fragmented digital health interventions. The roadmap sets out strategic objectives and interventions across seven digital health enablers, aiming to improve health outcomes and move closer to achieving universal health coverage through effective and efficient ICT-enabled systems.	Directorate of policy, planning and information (DPPI)/ UNICEF	December 2023		-
	UNICEF has provided the necessary ICT infrastructure identified from baseline assessments in the 44 CHC facilities in Bonthe, Kailahun, Koinadugu and Karene Districts and selected DHMTs. Procurement has been completed in order to leverage the minimum technical specifications defined by the MoH. The DIPC Project team has commenced sensitization of the facility OIC and District Logistics Officers at the DHMT.	UNICEF	December 2023	-	-

Event & Work-package assigned	Summary of Content / Topic	Organized by / Institutional Approach	Date	Participating Partners / Institutions	Women %
WP2	**WHO SMART Guideline** Sierra Leone is transitioning from the first phase (L1) to the second phase (L2) of the localization of the WHO SMART (standards-based, machine-readable, adaptive, requirements-based, and testable) guidelines. The initial phase L1 focused on integrating health informaticians and aligning Sierra Leone national policies with WHO guidelines for antenatal care. Currently, the Sierra Leone thru DIPC project is preparing for the second phase, which involves operations and digital adaptation kits (DAKs) for antenatal care and immunization. This phase includes the collaboration between various stakeholders including GIZ-UNICEF, Ministry of Health program managers (ANC & Immunization) and software developers from the directorate of science, technology and innovation (DSTI) for the development of DAKs in conformity with WHO standards. Sierra Leone, in collaboration with UNICEF, has completed the planning of a hackathon and engaged their innovation team to kickstart the innovation process. The term of reference for the hackathon has been completed and the hackathon will commence anytime soon.	UNICEF	December 2023	-	-

Malawi

Event & Work-package assigned	Summary of Content / Topic	Organized by / Institutional Approach	Date	Participating Partners / Institutions	Women %
Ecosystem Mapping **WP1**	To better understand the digital systems currently used to support immunization by conducting a desk review, holding consultative sessions, and convening a workshop to identify and validate digital systems. This country profile summarizes findings from those activities, outlining ten key digital systems currently supporting aspects of immunization and their major functional features, existing challenges, and recommendations to strengthen each one based on the World Health Organization's (WHO) Classification of Digital Health Interventions. The systems profiled in include the Integrated Community Health Information System (iCHIS), One Health Surveillance Platform (OHSP), District Health Information Software 2 (DHIS2), OpenLMIS, Electronic Health Information Network (eHIN), Master Health Facility Registry (MHFR), Demographics Data Exchange (DDE), Product Catalog Master Tool (PCMT), and national identity systems. Findings also highlight that although the MoH is experiencing rapid growth in the development and adoption of these mobile and web-based digital tools, a number of the existing systems are non-integrated and/or interoperable, leading to inefficiencies and a lack of accurate data.	Digital Square, DHD, EPI, GIZ	July 2023	Digital Health Division (DHD) Expanded Programme on Immunization (EPI) Quality Monitoring Department (QMD) Central Monitoring and Evaluation Division (CMED) Information Technology (IT) Directors of Health Support Services Ntcheu district Mchinji district Reproductive Health Department (RHD) Malawi Red Cross Compelling Works GIZ Village Reach Digital Square at PATH	-
Immunization System and User Requirements Documentation (SURD) **WP2**	This Immunization SURD aimed to provide a common language across various audiences – program managers, software developers, and implementers of digital systems to ensure a common understanding of the appropriate health information content within the immunization health program area in Malawi, as a mechanism to catalyze the effective use of these digital systems. The key objectives of this Immunization SURD included: • to ensure adherence to public health and data use guidelines and facilitate consistency of the health content that is used to inform the development of a person-centered digital tracking and decision-support (DTDS) system. • to enable health program leads and digital health teams (including software developers) to have a joint understanding of the health content within the digital system, through a transparent mechanism to review the validity and accuracy of the health content; and • to provide a starting point of the core data elements and decision-support logic that should be included within DTDS systems for Immunization.	Digital Square, DHD, EPI, GIZ	July 2023	Digital Health Division (DHD) Expanded Programme on Immunization (EPI) Quality Monitoring Department (QMD) Central Monitoring and Evaluation Division (CMED) Information Technology (IT) Directors of Health Support Services Ntcheu district Mchinji district Reproductive Health Department (RHD) Malawi Red Cross Compelling Works GIZ Village Reach Digital Square at PATH	-

Event & Work-package assigned	Summary of Content / Topic	Organized by / Institutional Approach	Date	Participating Partners / Institutions	Women %
Validation of SURD **WP2**	It was aimed at confirming that the information collected during the workshop accurately represents the statements, opinions, and requirements expressed by the participants and also to ensure consistency in the information gathered, both within individual responses and across different stakeholders as well as to resolve any discrepancies or contradictions.	Digital Square and EPI	October 2023	Mchinji District Hospital perssonel (EPI coordinator, Cold Chain Technician) as well as Health Surveillance Assistants from various health facilities	Digital Square
Request for Proposals (RFP's) for Development of a National Electronic Immunization Registry for Malawi **WP2**	Digital Square was soliciting applications of qualified vendors/consortiums to configure and/or develop a national immunization registry that would meet the requirements as defined in the Immunization Product Suite System and User Requirements Document (SURD). This document was derived from the Better Immunization Data (BID) project conducted by PATH and is informed by WHO's Immunization Digital Adaptation Kit (DAK), a resource of WHO's SMART Guidelines initiative	Digital Square at PATH	18th August 2023	DHD, EPI and GIZ	-
Screening, reviewing, evaluating, selection and awarding winners from the RFP's proposals. **WP4**	The main aim was to determine which proposal offers the best solution to address the organization's needs or requirements and to verify that the selected vendor possesses the necessary qualifications, expertise, and capabilities to successfully execute the project. It was also aimed at ensuring that the selected vendor's proposal aligns with the specified requirements outlined in the RFP.	Digital Square, DHD, GIZ	September – December	Digital Square, DHD and GIZ	-

15.2 Landscape of Digital Health Training Courses

Peru
Tanzania
Ghana
Sierra Leone
Malawi

Peru

Platform	Name of the Course	Content	Duration and Modality	Target Audience	Link
National School of Public Health (ENSAP)	Digital Health Literacy	**Modules:** • Introduction to Health Digitization • Basic Digital Tools for Work and Online Health Information • Health Communication in Digital Health	40h Online, Free	1. Healthcare professionals and nursing staff. 2. Health services administrators and managers. 3. Health sciences students. 4. Public health officials. 5. Health policy decision-makers. 6. Anyone interested in acquiring specific digital skills in the context of health.	http://pees.minsa.gob.pe/course/view.php?id=1041
	Diploma: Telemedicine Management	Develop competencies to manage the implementation of remote medical services based on information and communication technologies in accordance with current regulations. **Modules:** • International and Peruvian Telemedicine • Regulatory Framework of Telemedicine in Peru • Management for the Implementation of Telemedicine • Governance of Digital Health: ICT and Health, Information Security, and Personal Data Protection	Online		http://pees.minsa.gob.pe/course/view.php?id=757
	Information System for Electronic Health Records of the SIHCE of the MoH for	**Modules:** • **Unit 1:** Enabling Frameworks for the Implementation of the Electronic Health Record Information System (SIHCE) of the Ministry of Health for the First Level of Care • **Unit 2:** Identity and Digital Signature in the SIHCE of the Ministry of Health • **Unit 3:** Digital Package with emphasis on the SIHCE of the Ministry of Health	32h (04/12/23 – 18/12/23) Hybrid	End users of the components/modules of the MoH's SIHCE for the First Level of Care in the DIRIS of Metropolitan Lima.	http://pees.minsa.gob.pe/course/view.php?id=1121
PAHO Virtual Public Health Campus	Introduction to Health Information Systems	Overview of the complexity of Health Information Systems (HIS), considering the functioning of its components through the analysis of their constitutive dimensions. **Modules:** 1. eHealth and Digital Transformation 2. Health Information Systems 3. Interoperability and Key Challenges 4. Electronic Health Records 5. Change Management and IT Projects in Health 6. Health Informatics	30h Online, Free	• Officials involved in health decision-making. • Professionals and technical staff in the healthcare team.	https://www.campusvirtualsp.org/es/curso/sistemas-informacion-salu

Platform	Name of the Course	Content	Duration and Modality	Target Audience	Link
PAHO Virtual Public Health Campus	Change management for telehealth services	Develop change management capabilities in healthcare teams to adopt ICTs, particularly in initiating or enhancing telehealth services, focusing on the prevention and treatment of non-communicable diseases, including mental health. **Modules:** 1. Opening and welcome. 1. Leveling prior knowledge 2. Approach and analysis of applied models 3. Use and analysis of functional and documentary tools 4. Adoption of change planning guidelines 5. Identify roles and competencies in the change team 6. Handle notions of evaluation, readjustment, and corrective actions 7. Final evaluations	20h Asynchronous and self-paced Online, Free	Implementers and project managers of telehealth projects. Other members of healthcare teams who serve as change agents or require change management tools.	https://www.campusvirtualsp.org/es/curso/gestion-cambio-telesalud
	Introduction and application of the 8 Guiding Principles of the digital transformation of the health sector	Increase knowledge and provide tools for informed decision-making in the development of policies, programs, and interventions that contribute to the digital transformation of the health sector in the Americas region. This involves applying the 8 guiding principles for the digital transformation of the health sector. **Modules: Introductory Module** **1: Principle** 1. Universal Connectivity. **2: Principle** 2. Digital Public Goods. **3: Principle** 3. Inclusive Digital Health. **4: Principle** 4. Interoperability. **5: Principle** 5. Human Rights. **6: Principle** 6. Artificial Intelligence. **7: Principle** 7. Information Security. **8: Principle** 8. Public Health Architecture.	25h Asynchronous and self-paced Online, Free	• Decision-makers related to health digitization. • Responsible for policies, programs, and processes associated with health digitization. • Members of the PAHO and WHO departments.	https://www.campusvirtualsp.org/es/curso/salud-digital-8-principios
PAHO Virtual Public Health Campus	Virtual course for the integration of telehealth in the primary level of care with the application of simulation models.	The Telehealth Training Center aims for participants to be capable of integrating telehealth into the primary level of care by the end of the program. This integration is intended to facilitate actions related to the prevention, promotion, diagnosis, monitoring, and treatment of non-communicable diseases. **Modules:** 1. Telehealth Training 2. Teleconsultation Training 3. Regulatory Training 4. Simulator 5. Graduation	40h Online, Free	Healthcare workers in the Americas region without prior knowledge of telehealth who are interested in gaining insights into its potential.	https://www.campusvirtualsp.org/es/curso/curso-virtual-para-la-integracion-de-la-telesalud-en-el-primer-nivel-de-atencion-con-la

Platform	Name of the Course	Content	Duration and Modality	Target Audience	Link
CENS	Introduction to Health Information Systems (HIS) and Interoperability Course.	Provide a comprehensive overview of health information systems, enabling students to recognize the significance of using these technologies. This encompasses support for clinical needs and their impact on improving health management. **Modules:** 1. Introduction to Interoperability, Health Information Systems 2. Interoperability 3. Health Information Systems 4. Secondary Use of Health Data	54h (12/10/23 – 24/11/23) B-Learning, Paid Course	Clinicians and decision-makers who wish to gain foundational knowledge in Digital Health or incorporate technology into health projects.	https://cens.cl/introduccion-a-los-sistemas-de-informacion-en-salud-version-4-2023/
	Implementation of National Electronic Prescription.	The course aims for participants to comprehend the FHIR Implementation Guides (IG) for National Electronic Prescription platforms. This enables them to have specific rules for data exchange in each use case of this project. **Modules:** 1. Interoperability: Navigation and understanding of an IG in HL7® FHIR®. 2. Application of the Implementation Guide. This workshop aims to provide participants with basic introductory knowledge of Mirth Connect and an initial approach to system integration through a practical exercise. It leverages architectures and interoperability schemes available in MIRTH.	16h (17/07/23 – 07/08/23) E-Learning, Paid Course	Healthcare professionals, IT specialists, clinicians, and digital health innovators with knowledge in the HL7® FHIR® standard, and/or individuals interested in FHIR® implementations.w	https://cens.cl/aplicacion-de-receta-electronica-nacional/
CENS	Introductory Workshop Mirth 2024	This workshop aims to provide participants with basic introductory knowledge of Mirth Connect and an initial approach to system integration through a practical exercise. It leverages architectures and interoperability schemes available in MIRTH.	B-Learning	-	*Still developing* https://cens.cl/cursos-y-talleres/

Tanzania

Platform	Name of the Course	Content	Link
Digital Health Promotion in Iringa, Tanzania	-	Increased health education has the potential to facilitate better use of health care services and to promote early treatment, thus it can strengthen the health care system, and ultimately reduce morbidity and mortality. In this study, we will develop and test the effect of digital health messages related to HIV, Tuberculosis (TB) and Taenia solium cysticercosis/taeniosis (TSCT) (the intervention diseases) in Migoli and Izazi (the intervention villages), in Iringa, Tanzania (TZ). The intervention is planned as follows: A digital platform, providing the intervention villages with digital health messages related to the above-mentioned diseases, will be implemented in TZ in 2019. The platform will be accessible free of charge, through own devices and tablets based in the local Wi-Fi spots in the villages. In the first part of this project, the doctoral research fellow will participate in developing the digital health messages, together with experts from the medical and teaching environments in Tanzania, Norway, Germany and USA.	-
HISP Tanzania launches a new Academy course digitally	-	Since 2011, HISP Tanzania has worked with other regional HISP groups in East Africa to host regional DHIS2 Level 1 Academies and had responsibility for maintaining and updating course material for the Design & Customization course that was delivered by other HISP groups worldwide. HISP Tanzania had proposed an update to this course in late 2019, based on feedback from students, to bring together concepts of DHIS2 design with their related analytics outputs. A pilot version of a newly redesigned course, Design for Analytics, was planned for mid-2020. When the HISP network met in March 2020 to decide how to deliver training during the pandemic, it was decided that HISP Tanzania should go forward with this pilot course in an online format. It was also agreed that registration in this course — and all other DHIS2 Academies — would be offered at no cost to participants, to make it easier for Ministries of Health to meet their critical needs for DHIS2 capacity building.	-
Immunization and Vaccine Development (IVD) e-Learning Platform	-	The Tanzania government, supported by CHAI, first piloted the digital initiative in 2015. Called the Immunization and Vaccine Development (IVD) e-Learning Platform, the online tool was developed to train immunization officers across the country. It provides a complement to current face-to-face training, but with a comparative advantage: immunization officers can do the training from anywhere, providing cost-savings in terms of travel to workshops and other related expenses. The platform also ensures uniformity of materials, meaning that all officers receive the same quality of training, as well as continuous access to training – a benefit to officers who previously could only attend training updates every one or two years.	-
National e-learning Platform for Health	-	Tanzania Ministry of Health (MoH) support development of a national consolidated Continuing Professional Development (CPD) Framework for all health care providers in Tanzania, both those licensed and those currently not licensed. The National eLearning for Health Care platform in Tanzania gives useful platform for healthcare providers access CPD to improve healthcare system by enhancing the provision of quality care to the population of Tanzania.	-

Platform	Name of the Course	Content	Link
Institute of Accountancy Arusha	Master's degree	-	https://elearning.iaa.ac.tz/login/index.php
Muhimbili University of Health and Allied Sciences	Moodle based eLearning platform is used for online teaching and assessments, also for CPD programs.	-	https://soma.muhas.ac.tz/

Ghana

Platform	Name of the Course	Content	Duration and Modality	Target Audience	Link
Ghana Health Service	Administration and Management of Digital Health Systems	**Modules:** 1. Modules and Maintaining Computer Systems 2. Troubleshooting and Maintaining Computer Software 3. Essential Knowledge in Networking and Network Devices 4. Server Administration 5. Implementing Access Control 6. Integration and Interoperability of ICT Infrastructure 7. End User Support	Online (six weeks) and In-person (1 week)	Ghana Health Service IT managers and officers	https://ghsvirtualplatform.com/app/v4/course/view.php?id=1050
	Introduction to Basic ICT	**Modules:** 1. Computer Systems 2. Office Suite 3. Internet and World Wide Web 4. Internet Security and Privacy 5. Common Digital Tools for Health Service Delivery 6. Ghana Health Service Digital Platforms 7. Information Technology Legal Frame Work	Online (2 weeks)	All Ghana Health Service staff	https://ghsvirtualplatform.com/app/v4/course/view.php?id=1043
	Virtual Facilitation	**Modules:** 1. Understanding computer systems 2. Definition of computers 3. Microsoft Office (Word, Excel, PowerPoint) 4. Internet and the World Wide Web 5. Protecting Your Data and Privacy 6. Data Maintenance 7. Malware Attacks 8. Email and Browser Attacks 9. Protecting Your Online Privacy	Online (2 weeks)	Health Care workers interested in facilitating courses and sessions on the e-learning platform	https://ghsvirtualplatform.com/app/v4/course/view.php?id=1043
	Cybersecurity Essentials	**Modules:** 1. Legal and Policy Framework for Cybersecurity 2. Overview of Information Security 3. Protecting Systems and Devices 4. Cybercrime and Mitigating Measures 5. Disaster recovery and business continuity	In-person (1 week) Online sessions (3 weeks)	Ghana Health Service IT professionals, Health Information Officers and Bio-statisticians	https://ghsvirtualplatform.com/app/v4/course/view.php?id=1051#section-0

Sierra Leone

Name of the Course	Content	Duration and Modality	Target Audience	Link
Basic Computer and Internet Skills	**Modules:** 1. Introduction to Computer Basics 2. Identifying Commonly used Apps 3. Creating a word document 4. Open a Saved Document 5. Using the internet 6. Using email 7. Protecting your personal data and privacy 8. Commonly used terms	-	Primary and secondary healthcare workers at both primary and secondary levels	Not available online
Basic Trouble-shooting Skills	**Modules:** 1. Introduction to Basic Trouble-shooting 2. Computer Plugged In But Not Charging 3. Mouse or keyboard not working 4. Computer cannot go online 5. Computer sound is not working 6. Computer is slow or frozen 7. Computer Screen is blank 8. Cannot login to computer 9. Taskbar and application icons missing 10. Application cannot open on a device 11. Saved or deleted Items not found on device 12. Common tips to prevent computer damage or malfunctioning		Primary and secondary healthcare workers at both primary and secondary levels	Not available online

Malawi

Name of the Course	Content	Duration and Modality	Target Audience	Link
Quality of Care	• **Module 1:** Evidence-Based Practice for Maternal and Newborn Routine Care and Management of Complications (Standard 1), • **Module 2:** Effective Communication, • **Module 3:** Healthcare Quality Management, • **Module 5:** Emotional Support to Women and Families, • **Module 6:** Respectful Maternity Care, • **Module 7:** Community Based Maternal and Neonatal Care, • **Module 8:** Effective Communication between Health Care Professionals	-	**Practitioners/frontline health workers/technical staff:** • Physicians • nurses • lab personnel • pharmacy • dentist • radiographer • ophthalmologists • Ortho pediatrician • anesthetist etc.	https://elearning.health.gov.mw/course/search.php
Leadership and Management for Health Facility	• **Module 1:** Essentials Of Leadership, • **Module 2:** Quality Management, • **Module 3:** People management & Ethics	-	• National and district Managers • Heads of departments • In-charges • supervisors • mentors • coaches	https://elearning.health.gov.mw/course/search.php
Health Information Management and Data Quality	• **Module 1:** HIS Concepts, • **Module 2:** Data Management, • **Module 3:** Digital Literacy, • **Module 4:** Electronic Data Management Systems, • **Module 5:** Data Quality, • **Module 6:** Data Analysis and Use, • **Module 7:** Data Security, • **Module 8:** User Support	-	• Data clerks • Data officers • Registry officers	https://elearning.health.gov.mw/course/search.php
Civil Registration and Vital Statistics	• **Module 1:** Introduction to civil registration and vital statistics, • **Module 2:** Birth Registration, • **Module 3:** Death Registration, • **Module 4:** Medical Certification and Cause of Death (MCCoD), • **Module 5:** ICD 11 and Multiple Cause Selection of Cause of Death	-	• Data clerks • Data officers • Registry officers • health workers	https://elearning.health.gov.mw/course/search.php

Name of the Course	Content	Duration and Modality	Target Audience	Link
ICT for Health Workers	• **Module 1:** Using Android Tablet for Beginners, • **Module 2:** ICT Fundamentals, • **Module 3:** Internet, Email and Social Media for Beginners	-	• Data clerks • Data officers • Registry officers • health workers	https://elearning.health.gov.mw/course/search.php
Clinical Guidelines	Malawi Standard Treatment Guidelines(MSTG) - 6th Edition https://elearning.health.gov.mw/course/view.php?id=205	-	**Practicioners/frontline health workers/technical staff:** • Physicians • nurses • lab personnel • pharmacy • dentist • radiographer • opthamologists • orthopeadiatrician • anaethetist etc	https://elearning.health.gov.mw/course/search.php

© GIZ / Bernd Kubisch