Jembi Health Systems

IMPACT REPORT

2022/23

Contents

Letter from the Chief Executive Officer

The 2022/23 financial year was another successful year for Jembi as it continued implementing its vision and mission in a world returning to a pre-COVID state, and continued to see a strong global interest in digital health. Over this period, Jembi maintained its work in several African countries and expanded its activities to an Asian country.

Several projects reached the natural end of the grant period, resulting in Jembi's overall income for the year reducing to approximately R110 million. The staff complement over this period was 84, with 44 staff stationed in Mozambique, 39 in South Africa and one in Cameroon.

During this period, Jembi's technical and programmatic activities were mainly focused on its two five-year prime awards with CDC headquarters and CDC Mozambique, and on its three USAID-funded subcontracts with John Snow International (JSI) on the Country Health Information Systems and Data Use (CHISU) project, with Palladium on the Data for Information (Data.FI) and with PATH on a Digital Square project. Locally in South Africa, Jembi continued its work with the National Department of Health (NDoH) and the Western Cape Provincial Health Data Centre (PHDC). In Mozambique, Jembi worked with the Ministries of Health and Justice, Vital Strategies, NTTData, UNICEF and the Enhancing Research for Africa Network (ERFAN).

In terms of technology development, Jembi HQ was supported by the Patrick J McGovern Foundation to continue its work on two open source digital public goods, the Open Health Information Mediator (OpenHIM), a health information exchange interoperability layer, and JeMPI, a Master Patient Index application. Jembi continued to maintain these technologies as public goods and works with a number of countries who have adopted them and a community of implementers.

Jembi's HQ Programmes Division's Cooperative Agreement with CDC HQ on the Technical Assistance Platform (TAP) programme included country implementations in Cameroon, Ethiopia and Rwanda, as well as technical assistance in several other African countries, including Nigeria and Kenya. The activities mainly involve the implementation of health information exchange and data integration solutions to strengthen HIV patient and treatment centralisation, and patient and programme data management. As a core partner of CHISU, the division developed a digitisation plan for the Office of National Nutrition in Madagascar and interoperability solutions using the OpenHIM in Indonesia. With support from Digital Square, Jembi continued to support the OpenHIM implementation for PEPFAR's global DATIM programme monitoring application.

Work in South Africa continued with the NDoH on MomConnect, a highly successful maternal health application and implementation of the OpenHIM. Jembi's support for the PHDC included work on the Open Integrated Health Platform (OpenIHP) implemented in the Western Cape province and public health system. Jembi also has a collaboration with the University of Cape Town in the School of Public Health and the Department of Computer Science, AI Research Unit and Centre for Artificial Intelligence Research.

Jembi's Mozambique Programme continued work in the second year of its five-year cooperative agreement

with CDC, and its longstanding partnership with CDC Mozambique, which is now more than twelve years old. This included support for key health information systems in Mozambique, including the national implementation of a medical record system for HIV patient and treatment management, based on OpenMRS, a PEPFAR and MoH HIS help desk system and a voluntary medical male circumcision (VMMC) system. The programme also completed the integration between the CRVS system of the Ministry of Justice and the mortality registration system of the Ministry of Health. The programme successfully completed the maintenance, development, knowledge transfer and transition process of the system from another partner called the Instrument for Measuring the Performance of Post-GBV Care Services (e-IMD GBV) for the Ministry of Health, which also included the transition of the platform PHP for DHIS2 and its data migration.

The Data.Fi project, which aims to develop an interactive dashboard for the HIV Programme at Mozambique's MOH has brought positive results and diversified funding. In Zimbabwe Jembi has contributed towards the strengthening and improvement of the DHIS2 system for use in the Orphans and Vulnerable Children sphere, and in Mozambique, Jembi has strengthened the data analysis and visualisation capabilities within the HIV programme. The Mozambique programme also

continued running a successful pre-professional internship programme in collaboration with the Ministry of Labour. Now in its sixth year, the programme has produced a number of specialised HIS professionals for the Public, Private and Academic sectors.

Jembi's Corporate Services Division continued to provide financial, legal, human resources, grant administration and ICT support to Jembi's programmes and technical divisions. The financial services team managed all company finances and achieved another unqualified audit with no material findings during this financial year, contributing to Jembi's strong financial management record. The HR team provided human resources support to the programmes and divisions in South Africa and developed new policies for Jembi to strengthen the management of its human capital, including a new remuneration benchmarking policy. The ICT team in CSD provided support across the organisation in critical areas related to the procurement, deployment and implementation of ICT hardware and services.

It has been a pleasure to lead Jembi over this period and rewarding to see the organisation's continuous contribution to the increased interest in digital health and implementation of great projects and programmes. Jembi's vision and mission are highly relevant to the increased interest and application of digital health in low resource settings.

> *Jembi's Mozambique Programme continued work in the second year of its five-year cooperative agreement with CDC, and its longstanding partnership with CDC Mozambique, which is now more than twelve years old.*

With best wishes,

Dr Christopher Seebregts
Founder and Chief Executive Officer

Board Chairperson's Report

In 2023, during a post-COVID reality, Jembi continued to implement its mission and vision through projects that started during the COVID-19 period. This included significant funding from the United States Centre for Disease Control and Prevention (CDC) and subcontracts from John Snow International and Palladium with the United States Agency for International Development (USAID). This was supplemented by generous funding for its core technology products from the Patrick J. McGovern Foundation, Digital Square, and private organisations, such as BD (previously Becton Dickerson).

Reflecting on Jembi's activities over the past year, it is evident that, under the leadership of its visionary CEO, Dr Chris Seebregts, Jembi has continued to meet the new challenges and opportunities in a vibrant and exciting market for digital health and continued to realise its vision of "A world in which health systems and information advance global health". The COVID-19 pandemic demonstrated the opportunities that digital health continues to present to transform global health systems and positively impact health in Africa and other low-resource countries. Jembi has a strong track record of developing innovative health software applications. During this period, Jembi's innovation has had a significant impact on enabling interoperability between different health information systems towards building a coherent and integrated national digital health system. Jembi has developed novel technology in these areas and contributed significantly to international communities developing open-source digital public goods in electronic health record systems, health information exchanges and data integration, and increasing their adoption in low-resource environments.

Recognising the tremendous potential of Artificial Intelligence (AI) in public health systems, Jembi has strengthened its long-term partnership with South Africa's National Centre for Artificial Intelligence Research to leverage new and emerging AI and machine learning (ML) technologies in public health systems in developing countries. Despite the tremendous growth in ML and AI applications within the health sector, there is still ample opportunity to further leverage and innovate with AI technologies in digital health. This exciting area provides ample R&D and thought leadership opportunities. Jembi, with its strong track record in digital health and its African network, is ideally placed to establish and lead AI innovation ecosystems and networks in Africa, which provides an agile and sustainable long-term innovation platform to advance digital health.

I would like to thank the members of the Jembi Board for their support and contribution during this period: Dr Dayne Morkel (Deputy Board Chair), Dr Chris Seebregts (CEO), Dr Quentin Williams, Mr Andy Gray, Prof Steve Reid, Dr Ziyanda Vundle and Mr Thiru Moodley, as well as Jembi's division and programme directors, Dr Alessandro Campione, Mr Wayne Naidoo and Ms Jonnea Smith. The team has contributed significantly to the strategic direction of Jembi in specialist areas such as public health, computer science, information systems, finance, governance and administration. We are very grateful to both Dr Morkel and Prof Reid, who left the Board recently, for their long periods of service. We welcomed a new Board member, Mr Thiru Mudaly, who joined the Jembi Board at the beginning of 2023, and we're looking forward to his contribution to the finance and governance portfolio.

I also want to acknowledge and thank the many funders and donors who have contributed to Jembi's success and without whom this important work could not be undertaken. We have received substantial contributions from three United States Government agencies (PEPFAR, CDC and USAID), Digital Square, the Patrick J. McGovern Foundation, BD and others, for which we are deeply grateful. As a company, Jembi has a focused direction and a positive balance sheet and many opportunities aligned with its vision and mission.

We look forward to continued activity in line with Jembi's mission during the next phase of its journey with existing and new funders and partners.

I am happy to present to you Jembi's 2022/2023 Annual Report.

Dr Deshen Moodley
Jembi Board Chairperson

NRF/DSI SARCHI Chair in Artificial Intelligence Systems
Associate Professor, Department of Computer Science and AI Research Unit, University of Cape Town
Co-Director, South African National Centre for Artificial Intelligence Research

Corporate
Services

General review of operations

Jembi Health Systems NPC ("Jembi") had a decrease in both income and expenditure during the financial year running from March 2022 to February 2023, which is explained in further detail in the Operations and CEO reports. Jembi's planning works around a five-year cycle that also links into the period of our funding awards. In October 2022, Jembi moved into year three of our five-year COAGS with CDC. Jembi feels very fortunate in today's trying times to have been able to enter year 3 of our COAGS, in addition to many shorter projects starting within this new cycle. This solidifies Jembi's operational stability as we transition into FY24.

Jembi's overall **income decreased by 11% to ZAR 110.1 million** at the end of the financial year FY23. This figure does not include interest earned. **Expenditure** figures were closely aligned to income over the same period, **decreasing by 10% to ZAR 110 million**, excluding non-current asset expenditure. The company's reserves saw an increase of ZAR 1.3 million linked to interest earned and deliverable-based agreements.
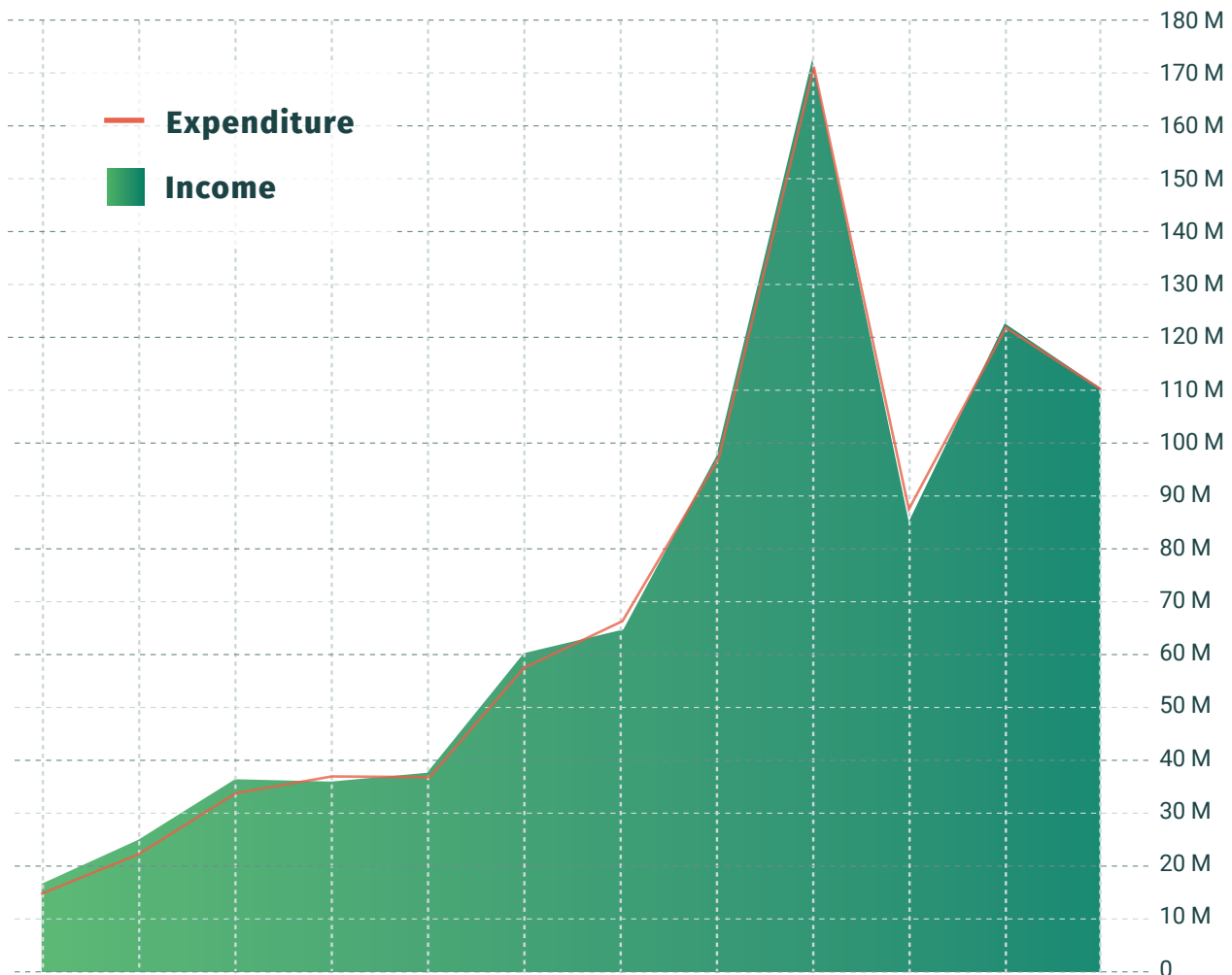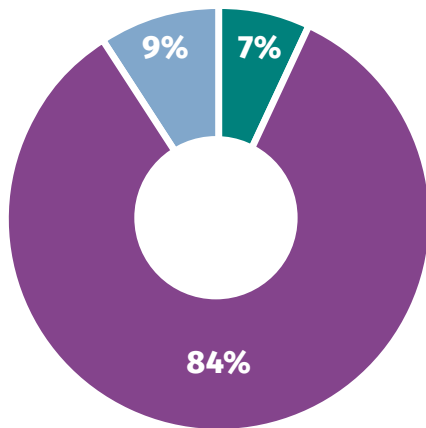

2023

↓ Income *reduced* by 11% to **ZAR 110.1 million**

↓ Expenditure *reduced* by 10% to **ZAR 110 million**

2022

↑ Income *rose* by 42% to **ZAR 123.4 million**

↑ Expenditure *rose* by 40% to **ZAR 121.7 million**

2021

↓ Income *reduced* by 50% to **ZAR 86.6 million**

↓ Expenditure *reduced* by 49% to **ZAR 87 million**

Donor landscape

9%   7%

84%

Income in this financial year was mainly derived from United States government federal grants , which represented 93% of the total income and was split between the Centres for Disease Control (84% of the total income) and USAID (9% of the total income), both through Prime awards and sub awards. The remaining 7% of annual income was derived from other donors. Our non-USG funders are a combination of local and international organisations, with funding coming through philanthropy and foundations as well as partner organisations.

■ **CDC**   ■ **USAID**   ■ **Other donors**

Federal USG
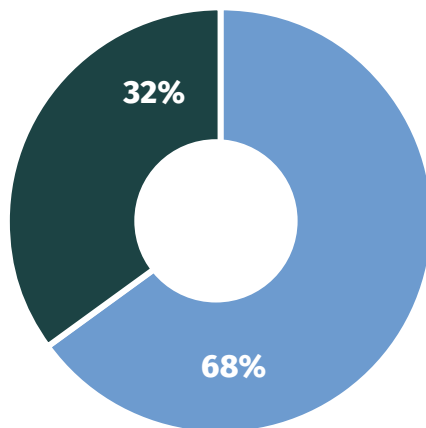
Programmes breakdown

32%

68%

Jembi's programmes are grouped into two programme areas for the year ending FY 2023: The Mozambique Programme and the HQ Programmes Division. The annual expenditure across the two programme areas was broken down as follows: Mozambique (32%) and HQ Programmes Division (68%).

■ **Mozambique Programme**   ■ **HQ Programmes Division**

Cost areas

18%

62%   20%
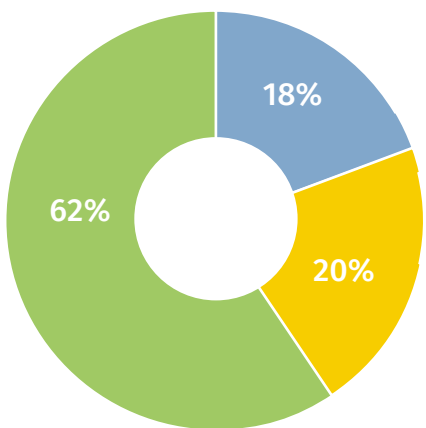
Jembi's expenditure-by-cost category maintained the use of contractors to supplement Jembi's staff component to fulfil our work plans within the HQ Programmes Division. The hybrid model of staff and contractors means that we have flexible teams to ensure the delivery of our work plans. The main cost area for Jembi remains staff, with 62% of our spend linked to staff and 18% of our spend linked to contracts.

■ Staff   ■ Contracts   ■ Other

Decrease of Staff in 2023

By the end of February 2023, Jembi's staff numbers had dropped to 84 (a decrease of 30 from the prior year's total of 114 staff members). The Mozambique office experienced a decrease of 29%, ending the year with 44 staff members, and the South Africa/International base decreased by 24% to 39 staff members.

2020

↑ Income *rose* by 75% to **ZAR 172.2 million**

↑ Expenditure *rose* by 75% to **ZAR 171.1 million**

2019

↑ Income *rose* by 48% to **ZAR 98,6 million**

↑ Expenditure *rose* by 46% to **ZAR 98 million**

2018

↑ Income *rose* by 11% to **ZAR 66.6 million**

↑ Expenditure *rose* by 15% to **ZAR 67.2 million**

Technology & Programmes Overview

Jembi: an expert in subjects that matter

In a world where healthcare challenges are as diverse as they are complex, expertise in key subject areas is not just beneficial – it's essential.

The following section showcases Jembi's mastery in various domains that are critical to global health. From Technical Assistance to Health Information Systems, we delve into projects, partnerships and impacts that make Jembi an international subject matter expert in digital health.

Read on to explore how we're making a tangible difference in digital health in Africa and South Asia.

Visit jembi.org/innovation to dive deeper into any of these topics.

Artificial Intelligence: pioneering new frontiers in healthcare

In the rapidly evolving world of healthcare, Artificial Intelligence (AI) is no longer a futuristic concept; it's a transformative reality. At Jembi, we are not just spectators in this revolution; we are active contributors, pushing the boundaries of what AI can achieve in healthcare, particularly in low-resource settings.

Thought leadership

Following on from previous work on ontologies and prediction algorithms, our publication, "Re-imagining health and well-being in low-resource African settings using an augmented AI system and a 3D digital twin," is a cornerstone in this field.

The paper by Prof. Deshendran Moodley, Jembi Board Chair and Co-Director of the Centre for Artificial Intelligence Research (CAIR), and Jembi CEO, Dr Christopher Seebregts, explores the untapped potential of AI and digital twins in public health emergency response and epidemic control.

The promise of AI

The paper explores how AI can revolutionise healthcare in low-resource African countries by leveraging data for advanced analysis and prediction. It proposes an initial augmented AI system architecture that works in tandem with a 3D digital twin to achieve public health goals. The paper identifies key research challenges such as scientific knowledge discovery, continual learning, pragmatic interoperability, and interactive explanation and decision-making.

Key insights

- ✅ AI can play a critical role in public health emergency response and epidemic control.
- ✅ Advanced AI methods can leverage the increasing availability of data for analysis and prediction.
- ✅ AI systems can work synergistically with digital twins to address complex public health challenges.

Our work in AI is a testament to our commitment to innovation and our vision for a healthcare system that is both equitable and advanced.

As we continue to explore the possibilities that AI offers, we are setting the stage for a new era in healthcare.

For more insights into our AI research, please visit https://www.jembi.org/topics/artificial-intelligence.

Capacity building: nurturing expertise for sustainable healthcare solutions

In the evolving field of healthcare informatics, Jembi contributes to Capacity Building efforts. We focus on providing practical training programmes, workshops, and collaborative projects to support healthcare professionals and systems. Our work in this area reflects our ongoing commitment to fostering a sustainable and knowledge-based healthcare environment.

Pioneering projects

Our Patient Identity Management (PIM) Technical Workshop in Cape Town and Master Patient Index (MPI) Planning Workshop in Durban are prime examples of our commitment to solving Patient Identity Management and interoperability challenges. These workshops have not only provided a platform for knowledge sharing, but have also led to the development of actionable roadmaps for countries like Ethiopia, Kenya and Nigeria. The formation of specialised Country Engagement teams post-workshop ensures the sustainability of our initiatives.

BELOW: Participants attend the PIM Technical Workshop in Cape Town.

In May 2022, we held a week-long Central Data Repository (CDR) Workshop in Cape Town, South Africa. The workshop was designed to increase local capacity for the Ministry of Health (MoH), Addis Ababa City Administration Health Bureau (AACAHB), and ICAP. Using a hybrid approach consisting of online collaborative training and in-person sessions, the workshop featured two tracks aimed at leadership and technical staff, ensuring comprehensive training for CDR project success at AACAHB.

In September 2022, our Health Informatics Exchange Policy and Standards Workshop took place in Adama, Ethiopia. Delivered in collaboration with the Ethiopian Ministry of Health, CDC Ethiopia,

University of Gondar, and Compelling Works, the workshop engaged over 24 participants from multiple regions in Ethiopia. With a hybrid approach combining online and in-person participation, this workshop not only validated the Health Information Exchange Policy and Standards, but also spurred active stakeholder engagement.

In November 2022, as part of the CDC Technical Assistance Platform (TAP) programme, we held the first in a planned series of Technical Workshops in Kigali. This workshop aimed to support the CDC Rwanda in-country implementing partner in reviewing the OpenHIM interoperability layer and exploring the potential for enhancing data processing with
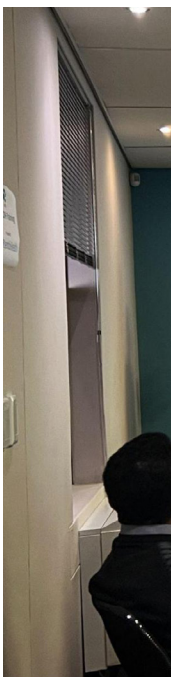
Data Integration and Information Systems (DISI) products. The workshop included attendees from the Rwandan Ministry of Health, QT Systems, The Centre for Impact, Innovation and Capacity building for Health Information Systems and Nutrition (CIIC-HIN), Jembi Health Systems, CDC Rwanda and CDC Headquarters. The activities ranged from reviewing existing Interoperability Layer solutions to patient matching solutions, thereby contributing to the realisation of a large-scale solution implementation in Rwanda.

In collaboration with CDC Cameroon, our PEPFAR Data Streams/Monitoring, Evaluation and Reporting (MER) Refresher workshop in Douala provided invaluable insights into Digital Health Strategy and the Electronic Medical Record (EMR). This workshop was a precursor to a micro-planning meeting that led to the finalisation of the Year 3 work plan, thereby ensuring a structured approach to healthcare informatics in Cameroon.

Our Mozambique Capacity Building initiative has been

pivotal in training and recruiting local staff in Mozambique. In partnership with Eduardo Mondlane University and the Ministry of Labor, we've trained 3,733 professionals in various courses, ensuring local ownership and project sustainability. Our internship programme and staff training in Mozambique further amplify our commitment to building local capacity.

Partnerships and collaborations

Our collaborations with organisations like PATH, University of California San Francisco (UCSF), and various Ministries of Health have been instrumental in enhancing our credibility and amplifying our impact in capacity building. For instance, our Health Information Systems (HIS) Project Management Toolkit Training in Ethiopia was developed in partnership with PATH and the University of Washington, aimed at equipping project managers with the skills needed for effective Health Information Systems (HIS) project management.

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These workshops have not only provided a platform for knowledge sharing, but have also led to the development of actionable roadmaps.

BELOW: Barry Dwyer demonstrates the CDR development during the workshop in Cape Town at the Jembi Offices.

BELOW (LEFT): Participants Attend the Master Patient Index (MPI) Planning Workshop in Durban.

Long-term impact

Our Digital Health Leadership Training for Informatics Professionals and Digital Health Leadership Training for Non-Informatics Professionals have had a significant impact. These training sessions were designed to equip healthcare leaders with

BELOW: The Jembi Team, together with CDC, University of Gondar and the Federal Ministry of Health, participate in the Health Informatics Exchange Policy and Standards Workshop held at Hillside Hotel Adama.

BOTTOM: Executive and Senior management staff from Regional Health Bureaus, stakeholder and partners attend the Digital Health for Leadership for Informatics Professionals two-day training at the Hillside Hotel in Adama, Ethiopia.

the fundamental knowledge they need to make informed decisions in public digital health. The accreditation of the HIS PM Toolkit Training for CPD points in Ethiopia is a notable achievement that underscores the long-term impact of our training programmes.

Key impacts

- Development of actionable roadmaps for PIM and interoperability in multiple countries.
- Training of over 3,733 healthcare professionals in Mozambique since 2011.
- Training of over 100 healthcare professionals in project management and technical skills in Ethiopia.

- Engaged stakeholders from multiple regions in Ethiopia through our Health Informatics Exchange Policy and Standards Workshop.
- Comprehensive training provided for Central Data Repository (CDR) project success at AACAHB.

Our work in Capacity Building transcends individual projects to contribute to a larger, more resilient healthcare ecosystem. We are not just building capacities; we are building futures.

For a deeper dive into our Capacity Building initiatives, please visit jembi.org/topics/capacity-building**.**

Data integration: orchestrating seamless healthcare data solutions

In the complex field of healthcare, Data Integration serves as a crucial component for comprehensive healthcare solutions. At Jembi, we contribute by facilitating the smooth flow of data across various platforms and stakeholders. Our work goes beyond simply combining data; we aim to create an efficient, outcome-focused integrated data ecosystem.

ABOVE: Architecture of the OpenHIM as a Generic FHIR Medicator for the Indonesian health sector.

Pioneering projects

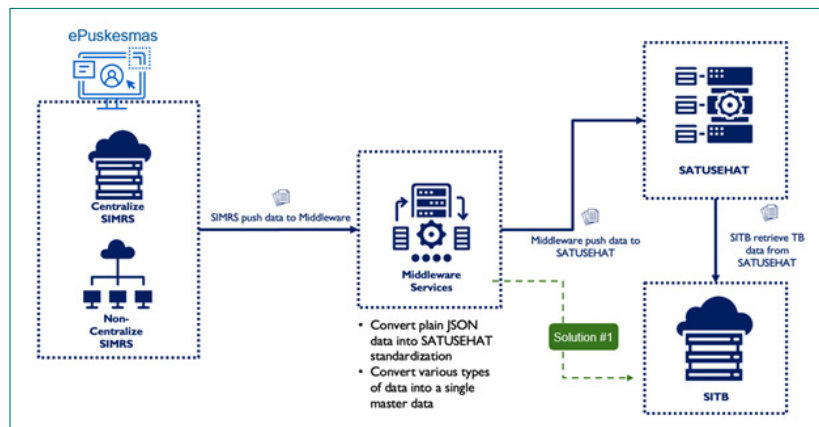**CDC Headquarters Technical Assistance Platform (TAP) Programme:** Jembi is one of three prime awardees under this initiative by CDC, aimed at developing digital public goods and providing expert technical assistance in digital health. The programme is in its third year and is funded by PEPFAR, with Jembi receiving funds for country buy-ins in Cameroon, Ethiopia and Rwanda.

Country Health Information Systems and Data Use (CHISU): The CHISU project is funded by USAID and led by John Snow Inc (JSI) In partnership with a number of other prime subcontractors. As part of CHISU, we have strengthened health information systems in Indonesia, enhancing data quality and utility. We have also developed plans for Madagascar.

Technical Workshop in Kigali: This workshop aimed to support the Rwanda in-country team in reviewing the OpenHIM interoperability layer and enhancing data processing with Data Integration and Systems Integration (DISI) products.

The workshop reviewed existing solutions and explored opportunities for scalable implementations.

GPHDI Country and Partner Convention: Our presentation at the Global Public Health Data Innovation (GPHDI) Country and Partner Convention in Washington DC focused on Data Standards, further emphasising our commitment to seamless data integration across healthcare systems.

Technological innovation

Our DISI Platform, a configuration of Jembi's OpenHIM Platform, is not just about data collection. It's about making that data actionable for healthcare providers. This platform is part of a broader suite of tools that work synergistically to offer comprehensive healthcare solutions.

Key impacts

✅ Streamlined data processing and management in multiple countries to enhance data accuracy and accessibility.

✅ Developed a suite of interoperable tools that

ABOVE: Jembi Head of Engineering, Ryan Crichton (right), and Ishimwe Ntwali Loic (left) hard at work in Kigali.

enhance healthcare delivery and patient engagement.

✅ Our work in Data Integration is an integral part of a larger vision to revolutionise healthcare. We are not just integrating data; we are weaving a network where information flows freely and securely, connecting healthcare providers, policymakers and communities.

For a deeper dive into our projects and their impacts, please visit jembi.org/topics/data-integration.

Digital health: A catalyst for transformative healthcare

In the field of Digital Health, Jembi serves as a collaborative partner focused on healthcare improvement. Our work includes data collection and harmonisation, as well as developing reliable systems for healthcare providers.

Pioneering projects

Consider the Electronic Patient Tracking System (EPTS) and PEPFAR Systems Documentation Support projects in Mozambique. Jembi has provided a critical support service to the primary partner supporting the EPTS system. These initiatives have not only streamlined data collection, but have also ensured that healthcare providers have reliable, up-to-date information.

In partnership with BD (previously, Becton Dickinson), we developed the BD Safety App, a digital safety guide in the form of a mobile application for Android and Apple-based mobile phones. Aimed at supporting local health workers in the field, this app assists in understanding, practising and implementing safety standards when dealing with potentially hazardous materials and equipment. The system leverages Jembi's mHealth content management platform and offers curated content, reduced operational costs, and usage metrics, among other benefits. The success of this app indicates a strong need for such material in the sector.

Research and innovation

Adding to our portfolio, we've been part of a collaborative research effort that led to the publication of "Establishing a Central Data Repository (CDR) for Human Immunodeficiency Viruses (HIV) treatment and follow-up data in Ethiopia." This work goes beyond server-side software and infrastructure; it involves an open-source system based on the FHIR standard, successfully implemented at the Addis Ababa City Authority Health Bureau. The system collates data from 33 health facilities and aligns with Ethiopia's architectural guidelines, enhancing programme monitoring.

Our latest contribution is the article "Customizing and Implementing a Health Information Exchange Policy and Standards Guideline for the Federal Ministry of Health in Ethiopia." This research involved localising a pan-African guideline, validated through multiple rounds with the Ministry of Health and endorsed by expert panels. This initiative not only shortens the development time but also ensures technical interoperability within Ethiopia, showcasing our commitment to adaptable and sustainable Digital Health solutions.

Partnerships and collaborations

Our partnership with the Ministry of Health (MoH) in Mozambique is another testament to our

BELOW: IT and M&E technician Elias Machava assembling and configuring computer equipment in DPS Gaza.

expertise and institutional engagement at regional level. Through HIS Support to the MoH, we've provided direct technical assistance, including on-the-job training, to ensure the sustainability of Health Information Systems (HIS) in the country. Our efforts have led to the harmonisation of key strategic documents of the National Health System, such as the Health Information System Strategic Plan and Health Information System Policy. and the publication of monthly statistical bulletins, among other achievements.

Long-term impact

Similarly, our IT Technicians in the Provinces (ITP) project has had a long-lasting impact. For over 12 years, we've supported the MoH in hardware and software maintenance, as well as health statistics reporting at the provincial and district levels. The project was so successful that it transitioned to the Provincial

Health Directorate in 2022, a move that speaks to its sustainability and impact.

Key impacts

- ✅ Harmonised data collection across PEPFAR clinical partners, enhancing healthcare delivery.
- ✅ Provided technical support in the training of healthcare technicians, strengthening the national healthcare system.
- ✅ Supported the MoH in hardware and software maintenance, resolving all requested technical interventions at the provincial level.

Our work in Digital Health goes beyond individual projects; it's about creating an ecosystem where data-driven healthcare can thrive.

For a deeper dive into our projects and their impacts, please visit jembi.org/topics/ digital-health.

BELOW: Jembi Mozambique software developer Carlos Massavanhane was allocated to the MoH, supporting the training of Mozambique MOH staff on the e-IMD Gender-based violence system.

Health information systems: pioneering sustainable solutions for global health

In the constantly changing field of global health, Jembi contributes to Digital Health through a range of projects. We offer direct technical assistance to Ministries of Health and develop solutions for issues like gender-based violence and HIV prevention.

Pioneering projects

Our long-standing collaboration with the Mozambican Ministry of Health (MoH) has been a cornerstone in strengthening national HIS. Through on-the-job training and technical support, we've harmonised key documents and published monthly statistical bulletins, thereby elevating the quality of healthcare data. Similarly, our IT Technicians in the Provinces (ITP) project has had a transformative impact, resolving hundreds of technical interventions and transitioning successfully to the Provincial Health Directorate, a testament to its sustainability.

In the area of Civil Registration and Vital Statistics (CRVS), our work has been groundbreaking. We've implemented interoperability mechanisms and trained technicians, thereby streamlining the registration of vital events. Our gender-based post-violence care assessment

BELOW LEFT: Jembi Mozambique senior Implementer Adelino Covane facilitates the sensitisation workshop of the Data.Fi.

BELOW RIGHT Zainabe Dadá, the Jembi Mozambique projects coordinator, presents the support activities provided for the DataFl project in Mozambique during the DataFi Leadership Meeting in Washington DC.

BOTTOM RIGHT Jembi's IT and M&E technician Azerlino Guambe supports the social services of the Province of Sofala with routine data from the sector.

and monitoring system (e-IMD GBV), which seeks to generate indicators that ensure that the care offered to victims of violence is accessible, is a PEPFAR-funded digital health project that was successfully developed using the DHIS2 platform and transitioned to the Mozambique MoH. As a recognized HIV prevention tool, the development and maintenance of the Voluntary Medical Male Circumcision (VMMC) system was commissioned to Jembi by PEPFAR in collaboration with the MoH to ensure the monitoring of targets set to reach 80% of men aged between 15 and 29 years – the group where VMMC is expected to have the greatest impact on reducing HIV transmission.

Adding to our portfolio is our involvement in the COVID-19 project, funded under the USA Coronavirus Aid, Relief, and Economic Security (CARES) Act. This initiative has been particularly impactful for the development of a standard-based Health Information Exchange (HIE). Designed to support public health reporting, patient matching and real-time data streaming, this HIE serves as a model for how healthcare data systems can be both functional and adaptable, particularly in the context of HIV and COVID-19.

We were also involved in the PEPFAR initiative, which has been instrumental in supporting health information systems for HIV/AIDS and related diseases. With the advent of the COVID-19 pandemic, these systems have been adapted to also support COVID-19 surveillance, data collection, analysis and reporting. The CDC's work serves as an example of how investments in HIS can go beyond their initial purpose to address new public health issues.

Our collaboration with the University of Pretoria on the Child Problem Identification Programme (CHPIP) marks another milestone. We've developed and handed over version 4 of the application, which will be implemented in selected health facilities in the next phase.

Partnerships and collaborations

Our partnership with Palladium in the Data.FI project exemplifies our commitment to data-driven solutions. We've supported the development of dynamic dashboards for the MoH HIV Programme in order to help expedite the achievement of PEPFAR targets.

Long-term impact

The IT in the Provinces (ITP) project, operational for over 12 years, transitioned to the Provincial Health Directorate, a sign of its long-lasting impact and sustainability.

Key impacts

- ✅ Harmonised and published key government policies, strategies and plans in the realm of digital health.
- ✅ Implemented interoperability mechanisms in CRVS.
- ✅ Developed a standard-based HIE through the CARES Act Project.
- ✅ Developed dynamic dashboards for MoH HIV Programme.
- ✅ Developed and handed over version 4 of the CHPIP application.

Jembi's work in Health Information Systems is not an isolated endeavour, but part of a larger vision to revolutionise global health. We are not just connecting systems; we are connecting communities, healthcare providers and policymakers.

For a deeper dive into our projects and impacts, please visit jembi. org/topics/health-information-systems.

Implementation: pioneering systems for sustainable healthcare

In the complex field of healthcare informatics, Jembi focuses on Implementation. We go beyond design and development to ensure that systems are robust, scalable and sustainable. Our work reflects our commitment to contributing to a functional and sustainable healthcare ecosystem.

Pioneering projects

Our **Helpdesk** project, operational since October 2018, serves as a linchpin for health information systems across Mozambique. It's not just a technical support centre; it's a communication nexus between various departments within Jembi, PEPFAR clinical partners, and users. With a resolution rate of 97% for the tickets received this year, the Helpdesk exemplifies our commitment to efficient and effective implementation.

PEPFAR Infrastructure Support is another cornerstone in our implementation portfolio. We handle everything from standardisation and procurement to the installation and maintenance of IT infrastructure. This comprehensive approach ensures that health information systems are not just implemented, but are also sustainable and reliable.

The **SIS COMPACT STATION** is a Jembi Mozambique project featuring a low-power micro-computer with open-source software. It runs a set list of admin-approved applications, enhances data security, and prevents misuses like watching movies or installing inappropriate software.

In a demonstration of our versatility, the **MINEDH M&E Call Center (SMTR)** project showcases our capability to adapt and implement systems beyond healthcare. Developed for the Ministry of Education and Human Development, this real-time monitoring system is a testament to our multidisciplinary expertise.

Partnerships and collaborations

Our collaborations with organisations like the CDC, UNICEF, and various Ministries not only enhance our credibility but also amplify our impact in the field of implementation.

Long-term impact

Our Programme Monitoring and Knowledge Management project underscores the long-term impact of our implementation strategies.

ABOVE*: The Helpdesk team trains users of the Helpdesk system.*

By focusing on routine performance monitoring and knowledge management, we ensure that our projects are not just implemented but are continuously improved and adapted.

Key impact

✅ Resolved 97% of Helpdesk tickets received in 2022.

✅ Managed over 1,000 pieces of equipment in PEPFAR Infrastructure Support.

✅ Successfully developed, installed and delivered the full project package of the Real Time Monitoring System and the call centre for COVID-19 and natural disasters to Mozambique's Ministry of Education and Human Development.

Jembi's work in Implementation goes beyond individual projects to contribute to a larger, more resilient healthcare ecosystem.

For a deeper dive into our projects and their impacts, please visit jembi.org/topics/ implementation.

Interoperability: bridging systems for holistic healthcare solutions

In the multifaceted world of healthcare, interoperability serves as a crucial element for comprehensive solutions. Jembi focuses on facilitating the smooth exchange of information across different platforms and stakeholders. Rather than just linking systems, we work towards building an efficient and patient-centred healthcare ecosystem.

Pioneering projects

Adding to our portfolio, the Development of the Open Health Information Mediator (OpenHIM) Platform in partnership with the Patrick J McGovern Foundation marks a significant milestone. This project has led to further development of the OpenHIM Platform, a scalable and secure solution for large-scale interoperability in digital health. Implemented in Ethiopia and more than ten other countries in Africa and South-East Asia, and

poised for national-level adoption in Rwanda and Indonesia, the platform addresses the growing need for individual-level information management in low and middle-income countries.

Our collaboration with NTT DATA under the World Health Organisation Digital Clearinghouse project exemplifies our commitment to setting global standards. We've played a pivotal role in defining a set of criteria to assess if any given digital situation can exchange data

with national systems through open interoperability standards, a cornerstone for healthcare systems in low- and middle-income countries.

Similarly, our collaboration with the Ministry of Justice and the National Institute of Health supported by Vital Strategies under the Bloomberg Philanthropies Data For Health Initiative in Mozambique has been impactful. We facilitated interoperability between the national Electronic System
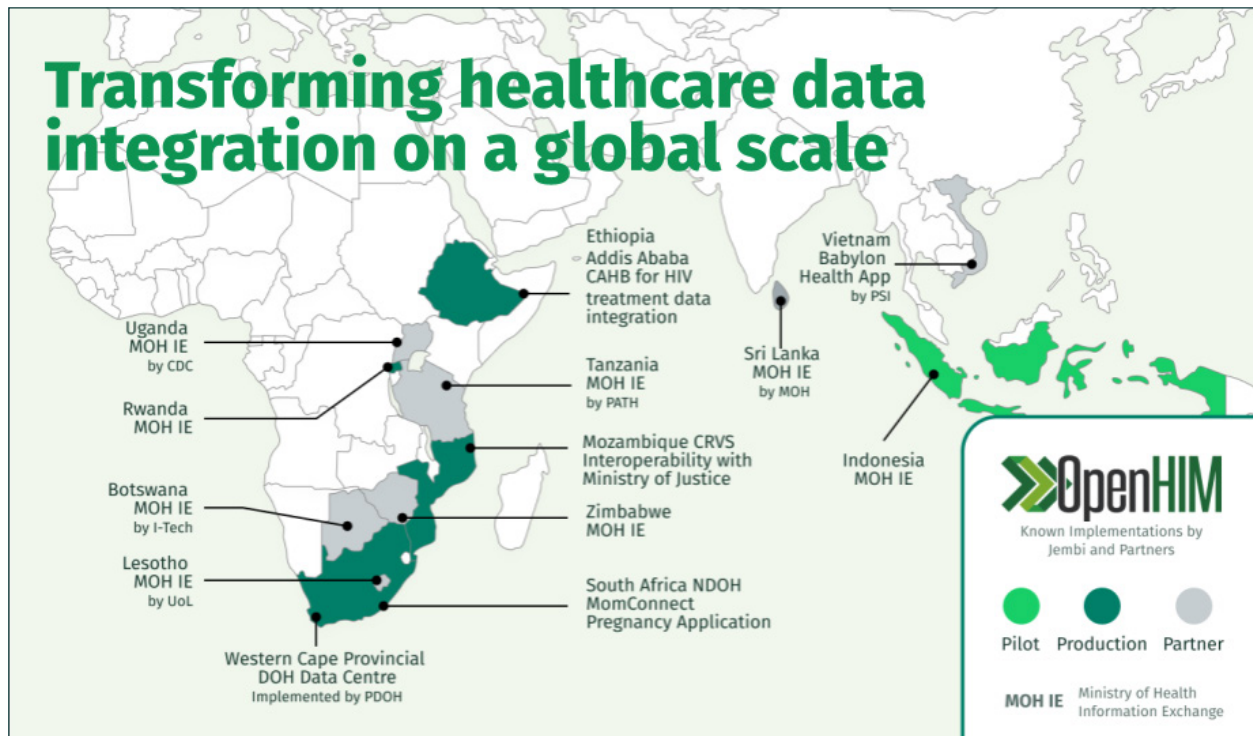
ABOVE: Known Implementations of the OpenHIM.

for Civil Registration and Vital Statistics (e-SiRCEV) and the Community Vital Events Surveillance system (SIS-COVE) using the OpenHIM interoperability layer. This has streamlined the registration of births and deaths at the community level.

Our support for the MomConnect application in South Africa further emphasises our commitment to interoperability. In partnership with the National Department of Health, REACH Digital and HISP-SA, we maintain the OpenHIM interoperability layer that connects MomConnect's mobile application with the DHIS2 registry and HMIS, while also enhancing system security.

Technological innovation

The Open Integrated Health Platform (OpenIHP), the clinician and administrator-centred application developed by the Western Cape Provincial Health Data Centre and to which Jembi has contributed, focuses on patient health information. It's not just about data

> **It's not just about data collection; it's about making that data actionable for healthcare providers.**

collection; it's about making that data actionable for healthcare providers. The application is part of a broader suite of tools, including the Patient Facing Interface (PFI) and Open Local Health Information Mediator (OpenLHIM), that work in tandem to offer comprehensive healthcare solutions.

Key impacts

- Implemented OpenHIM in more than ten countries in Africa and around the world.
- The development and continued support of the Open Health Information exchange community.
- Established assessment criteria for an interoperability assessment framework for low- and middle-income countries.

- Streamlined the registration of vital events, enhancing data accuracy and accessibility.
- Developed a suite of interoperable tools that enhance healthcare delivery and patient engagement.

Our work in interoperability is not an isolated endeavour but part of a larger vision to revolutionise healthcare. We are not just connecting systems; we are connecting communities, healthcare providers and policymakers, creating a network where information flows freely and securely.

For a deeper dive into our projects and their impacts, please visit jembi.org/topics/ interoperability.

Patient Identity Management: a cornerstone for integrated healthcare

In the complex field of healthcare data, Patient Identity Management (PIM) is essential for ensuring data quality, integrity and security. Jembi has been actively involved in initiatives that address the intricate challenges of patient data deduplication and identity verification across various settings.

Pioneering projects

We worked with representatives from Kenya to explore patient identity management alternatives as part of work funded under the American Rescue Plan Act (ARPA). The project culminated in a comprehensive roadmap, developed during a hackathon in Cape Town and subsequently pilot-tested. In Zambia, Jembi is actively involved in the Data Modernisation Initiative. These projects are not just about technology; they are about creating a unified, reliable source of patient data that enhances healthcare delivery.

During December 2022 Jembi completed the core development of the MPI solution known as JeMPI. The core development included the capability to scale to national level; support environments with low connectivity and inconsistent power, and allow for incremental adoption.

We recently partnered with PATH and UCSF under the TAP programme to hold a PIM Technical Workshop in Cape Town. The workshop aimed to share knowledge about approaches and tools used to solve PIM and interoperability challenges in Ethiopia, Kenya and Nigeria. Furthermore, an internal Master Patient Index planning workshop was held to create a clear development roadmap and implementation plan for 2023, focusing on governance, patient matching and interoperability.

Partnerships and collaborations

Our collaboration with Palladium, the Centre for Infectious Disease Research in Zambia (CIDRZ), and the CDC has been instrumental in shaping our PIM solutions. These partnerships have allowed us to delve deep into the specific needs of each country, thereby tailoring our solutions for maximum impact. The recent technical workshop in Cape Town saw participation from more than 60 people from various organisations, emphasising the collaborative nature of our projects.

Long-term impact

The PIM projects in Kenya and Zambia are designed for scalability and long-term sustainability. They serve as a blueprint for other countries facing similar challenges, thereby amplifying their impact beyond immediate implementation.

> " *The recent technical workshop in Cape Town saw participation from more than 60 people from various organisations, emphasising the collaborative nature of our projects.*

BELOW: JeMPI Core Components.
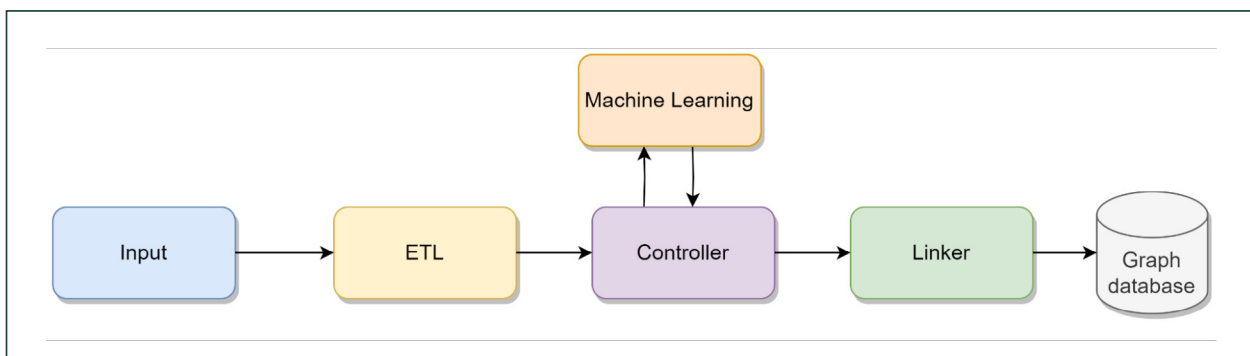
The workshops held recently have led to the development of roadmaps for strengthening patient identity management and interoperability in Ethiopia, Kenya and Nigeria.

Key impacts

- Developed comprehensive roadmaps for PIM implementation in Kenya, Zambia and Uganda.
- Conducted multiple workshops and hackathons, fostering cross-border knowledge sharing.
- Strengthened partnerships with key stakeholders like Palladium and CDC, enhancing Jembi's credibility.
- Developed roadmaps for strengthening patient identity management and interoperability in Ethiopia, Kenya and Nigeria.

Jembi's work in Patient Identity Management is a testament to our commitment to revolutionising healthcare through data integrity and security. Our projects serve as a catalyst for broader healthcare goals, from improving patient care to enhancing data-driven decision-making.

For a deeper dive, please visit jembi.org/ topics/patient-identity- management.

Technical assistance: elevating global health through targeted expertise

In the evolving field of global health, Jembi offers practical Technical Assistance initiatives. Our approach is not just about delivering solutions; it's about enabling countries to manage their healthcare more effectively.

Pioneering projects

Our work under the CDC Headquarters Technical Assistance Platform (TAP) Programme exemplifies our commitment to sustainable healthcare solutions. In Cameroon, Ethiopia and Rwanda, we've been the primary implementing partner, focusing on EMR implementations, data management and capacity building.

Partnerships and collaborations

Our credibility is further enhanced by partnerships with esteemed organisations like Palladium and Mott MacDonald. In Zimbabwe, we've provided DHIS2 technical assistance for the Orphans and Vulnerable Children (OVC) with their management information system (MIS). The MIS is a case management system that allows local community-based organisations to provide wraparound services to more than 200,000 children across 10 provinces.

Another significant project is our collaboration with the South African Medical Research Council (SAMRC) and the Better Health Programme South Africa, where we've been instrumental in a scoping study for an Electronic Death Registration System (EDRS) in South Africa and developing digital blueprints for healthcare systems.

Long-term impact

Our work in Cameroon continues to focus on EMR implementations, training and technical assistance, contributing to the ongoing development of the country's healthcare system. Similarly, our engagement with the Rwandan Ministry of Health has led to the creation of roadmaps and technical solutions that will serve the nation for years to come.

Key impacts

- Implemented EMR systems and capacity-building initiatives across multiple countries to enhance healthcare data quality.
- Conducted technical evaluations and created roadmaps for healthcare systems, setting the stage for future improvements.
- Provided ongoing technical assistance and capacity building, ensuring the sustainability of healthcare initiatives.
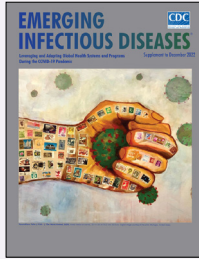
Jembi's Technical Assistance initiatives are more than a series of projects; they're a testament to our commitment to revolutionising global health.

For a deeper dive, please visit jembi.org/topics/technical- assistance.

Publications & Presentations

Publications

Muzna Mirza, Yoran Grant-Greene, Marie P.J.S. Valles, Patrice Joseph, Stanley Juin, Stephan Brice, Patrick Dely, Marie G.R. Clement, Manish Kumar, Meredith Silver, Samuel Wambugu, **Christopher Seebregts,** Daniel Futerman, Fitti Weissglas, Veronica Muthee, Wendy Blumenthal, Tadesse Wuhib, Steven Yoon, Daniel H. Rosen.

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Emerging Infectious Diseases, 2022/12, 28 (13), 49-58. Centers for Disease Control and Prevention. https://wwwnc.cdc.gov/eid/article/28/13/22-0751_article

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Presentations

December 2022   📍 GPHDI Country and Partner Convention, Washington DC

Data Standards "Day _Data Standards_Colin Pinkham Jembi.pdf" // By Colin Pinkham.

Jembi's Collaborators

We'd like to thank all our collaborators for a successful year.

Jembi Health Systems

Impact
Report

2022/23

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