

Jembi Health Systems

Annual Report

2019/20

Head Office | Cape Town

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Abbreviations

AHIE	African Health Information Exchange
AIDS	Acquired Immunodeficiency Syndrome
CCDHI	Collaborating Centre for Digital Health Innovation
CDC	United States Centers for Disease Control
CHAI	Clinton Health Access Initiative
EMR	Electronic Medical Record
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HIS	Health Information Systems
HIV	Human Immunodeficiency Virus
M&E	Monitoring and Evaluation
MoH	Ministry of Health
MoU	Memorandum of Understanding
NACC	National AIDS Control Commission of Cameroon
PHDC	Provincial Health Data Centre
PMTCT	Prevention of mother-to-child transmission
SAMRC	South African Medical Research Council
SA-NDoh	South African National Department of Health
SI-M&A	Monitoring and Evaluation Information System (Mozambique)
SIS-MA	National Health Information System for Monitoring and Evaluation (Mozambique)
TB	Tuberculosis
UCT	University of Cape Town

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Letter from the Chief Executive Officer

I am pleased to be able to report on the accomplishments of Jembi in the 2019 to 2020 financial year and the continued implementation of our vision and mission.

Jembi experienced a substantial increase in activities during this reporting period, both in Mozambique and South Africa, with total income across both countries exceeding R172 million (a 75% increase of R98 million on the previous financial year). We started the year with over 130 staff members and ended it with 127, reflecting the natural termination of several large projects in South Africa and Mozambique. Staff are spread almost equally between Jembi's headquarters in South Africa and its main country office in Mozambique.

During this period, Jembi also rationalised its organogram and settled into a structure with two main programme areas, with projects supported out of South Africa and Mozambique respectively, supported by our Corporate Services division. Working from these two bases, Jembi is also supporting projects in a number of other African countries, including Cameroon, Kenya, Uganda, Malawi, Ethiopia, eSwatini and Lesotho. The Technology and Products teams are presently incorporated within the South Africa programme and Jembi continues to maintain core competencies in programme management, software and product development, and system integration. Some of the core technologies we support include health information exchange, standards, system integration, mobile health and medical record software.

Jembi's Programmes Divisions experienced an exceptional year with a number of existing projects continuing and new projects starting up. Through its local MOASIS office, the Jembi Mozambique programme continued its longstanding partnership with the USA Centers for Disease Control and Prevention, supporting the national implementation of a medical record system

for back-end data entry and a pilot point of care system in Mozambique. The collaboration with the Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise Giuseppe Caporale (IZSAM) project in Italy in the area of One Health and the eVet initiative also proved particularly timely, considering the outbreak of a novel Coronavirus (COVID-19) towards the end of 2019.

Jembi's South Africa-based Programmes also experienced continued growth over this period, particularly for the Regional Programme, based out of our new office in Durban. These include the Regional Action through Data project and the HealthConnect project, funded by the Department of Science and Technology, Elma Philanthropies, Johnson and Johnson, and Metropolitan Health. This innovative project is delivering an NDoH app store, content management system and several approved health apps for the NDoH. Other programmes and projects in the Regional programme include the Journey immunisation app for cross-border populations and the digital register system (OpenSRP) for perinatal health facilities in Malawi, funded by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Jembi also continued work on a number of other projects in South Africa out of the Cape Town office, including as a sub-contractor to the University of Cape Town (UCT) on the African Health Information Exchange (AHIE) project, funded by the Bill and Melinda Gates Foundation. This work was also adapted to cater for the COVID-19 information requirements in the Western Cape. This office also coordinates the Open Health Information Exchange programme as well as several projects with PATH and the Digital Square initiative.

Jembi's Technology group within the South Africa programme also continued to provide expert technology services to the programmes, including software development, product management, analysis and design using modern agile software engineering methods to develop high quality software and health information systems, consistent with international standards. This core team is a major asset for Jembi in executing its vision and supporting the Programmes function.

The South African Medical Research Council (SAMRC) – Jembi Collaborating Centre for Digital Health Innovation (CCDHI) was started in 2018 with an idea to explore and coordinate digital health innovation activities in the public and private sectors in South Africa. Jembi has been working within the MRC environment as well as other parastatal entities and developing strategies to support the South African National Department of Health, as well as driving forward a new area in data science and governance.

During the financial year, Jembi's Corporate Services Division has continued to provide its usual high level of financial, legal, human resources administrative and ICT support to all Jembi divisions, programmes and offices. The team expanded its staff complement in line with the expansion of the Programmes function in all offices. This work was recognised with an unqualified audit for yet another year which is testimony to the high quality of work and operations and financial management in this Jembi division.

I am privileged to have led Jembi over this period and overseen its successful scale-up and achievements. We expect to see the organisation size and turnover stabilise and potentially reduce as several long-term projects come to a natural end in 2020. However, I believe that Jembi will continue to deliver on its mission and adapt to the significant increase in global interest in the area of digital health.

With best wishes

Dr Christopher Seebregts
Founder and Chief Executive Officer



Jembi has been working within the MRC environment as well as other parastatal entities and developing strategies to support the South African National Department of Health, as well as driving forward a new area in data science and governance.



Letter from the Chairman

I am pleased to reflect on Jembi's activities over the past year. Jembi, under the leadership of its visionary and dynamic CEO Chris Seebregts, has continued its trajectory of robust growth both in terms of income and staff numbers, but more importantly the quality of its activities as a leader and innovator in digital health in Africa.

Jembi's activities over the past year have certainly advanced the Jembi vision of 'a world in which health systems and information advance global health'. The organisation's growth also reflects the global growth and increased interest in digital health. For a number of years, Jembi has played a pioneering role in developing innovative health software applications and enabling interoperability between silo-ed health information systems. This includes its work on electronic medical record systems, health information exchanges and mobile applications.

More recently, Jembi has built capacity in data science and is exploring how big data analytics and artificial intelligence can be incorporated into the next generation of digital health applications and systems.

As the incoming Board Chair, I am supported by the new Deputy Board Chair Dr Dayne Morkel and the other Board members, Dr Quentin Williams, Mr Andy Gray and Prof Steve Reid. We wish to extend our gratitude to Prof Reid, the outgoing Board Chair, who successfully steered the Jembi ship over two terms of three years, after taking over from Jembi's inaugural Board Chair, Mr Andy Gray, who had also served for two terms. We are grateful that they have agreed to remain on the Board and that we can continue to lean on their vast experience and expertise. At the same time, we will continue to recruit new Board members, to inject new energy and to increase the diversity and representativity of the Jembi Board.

Although Jembi experienced substantial growth during this period, it is also coming to the end of a natural funding cycle with several long-term projects coming to an end during 2020. The organisation is in the process

of transitioning to new projects and funding that will naturally determine the activities in the coming years. The increased interest in digital health has resulted in a substantial number of new organisations working in this area, including a number of large international organisations and NGOs. However, Jembi's innovative approach to digital health strongly equips it to participate in this new reality with its strong and established base in Programmes, Technology and Corporate Services.

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 the South African government, United States government agencies, international donor agencies, private philanthropies, foundations and corporate sources, to whom we remain indebted. Jembi has managed to diversify its sources of income during this year and at the same time increased funding from US government sources. We look forward to the next phase of Jembi's journey with existing and new funders and partners.

I am happy to present to you Jembi's 2019/2020 Annual Report.

With kind regards,

Dr Deshen Moodley
Jembi Board Chairman

Associate Professor, Department of Computer Science, University of Cape Town Deputy Director, South African National Centre for Artificial Intelligence Research

01

Programmes

Regional Programme

South Africa Programme

Mozambique Programme

International and Contracting Programme

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Regional Programme

The Jembi Regional programme supports a number of national projects and initiatives on the African continent, including South Africa, Kenya, Uganda, Cameroon and Malawi.

Jembi is supporting a wide range of activities across the continent, working with many international and local partners and funders, including CDC, USAID, GIZ, IGAD, the South African Medical Research Council, Johnson and Johnson and ELMA Philanthropies. We are excited to be growing our footprint in Africa.



01

BUILDING THE NATIONAL EMR IN CAMEROON

After a successful implementation of OpenMRS Bahmni in Cameroon where Jembi lead the product development of the Cameroon EMR, the focus has now shifted to providing technical assistance to CDC Cameroon, the National AIDS Control Commission of Cameroon (NACC) and the Ministry of Health to improve the National EMR. Jembi is also working with the NACC to build capacity into their team to lead the electronic medical record (EMR) development and maintenance as well as leading the Cameroon EMR (Bahmni) product development. The project is funded by CDC through Cardno.

TOP: OpenMRS Bahmni Developer Training led by the Jembi Team in Douala, Cameroon: Laura Vignoli, Tresor Mvumbi and Jean Pierre. Also included in the picture are representatives from the Ministry of Health, NACC and University of Yaoundé.

BOTTOM: Following a successful User Requirements Workshop led by the Jembi Team (Lisa George, Jean Pierre and Wayne Naidoo) in Yaounde, Cameroon. Also included in the picture are representatives from the Ministry of Health and facility staff.

02 REGIONAL ACTION THROUGH DATA (RAD)

Since Inception *(September 2018)*
to March 2020



12,000

registrations



90,000

vaccination events



97%

retention rate of vaccination events per patient recorded using Journey



Design work on Journey solution **published and presented at User Experience (UX) HealthCare Conference in London**

as part of a PhD study regarding Improving HealthCare Environments through Human-Centred Design.

Jembi has partnered with BroadReach Healthcare as part of a consortium with Duke University, the Intergovernmental Authority on Development (IGAD) and the West African Health Organisation (WAHO), in response to the Regional Action through Data (RAD) Project funded by the USAID Africa Bureau for Sustainable Development.

Jembi's focus area was on improving health outcomes for all individuals, implementing innovative technologies to improve continuity of care for mobile cross-border populations. Jembi led the design and development of the Patient-Provider Level solution, which was successfully implemented as the Journey solution at four healthcare facilities on the Kenyan/Ugandan border for the priority area of immunisation services in September 2018.

Over a year later the system has continued to work with no major downtime or issues reported. The Jembi team continues to provide ongoing remote support and maintenance, supporting Hospital Administrators who have been championing adoption and use of the system with support from IGAD.

Apart from support, Jembi has continued to look for further opportunities to expand the solution from the initial pilot sites as well as enhance the Journey solution starting from improvements to the printed starter-pack designs and NFC card technology to the designs of Journey Server Boxes currently installed at each site.

03 HEALTHCONNECT APP STORE

Mobile Health (mHealth) has the potential to assist in strengthening health systems and service delivery across low resource health settings, particularly where reliance on community based health workers is increasing. This has resulted in significant activity and a substantial number of innovative solutions to address the management and implementation challenges in deploying mhealth solutions effectively and sustainably. However, mHealth solutions will only reach their full potential if they become part of the formal public health sector and are endorsed by the Ministry or National Department of Health (NDoH).

That is why Jembi Health Systems developed an App Store for the National Department of Health.

All the apps within the app store are specially developed and supported to ensure health workers can find the apps they need and receive the same standardised information that is curated by their department of health. In addition to finding all these apps in the same place, the registered health worker is able to download the apps at no mobile data costs to the health worker (reverse billed to the provider). Whether this is a survey app, a training app or clinical guides with pictures and even videos, all content to the health worker is free. This means that a health worker can download these apps on their smartphones and not need to use their mobile data account to do their work – even if their mobile data balance is Zero!

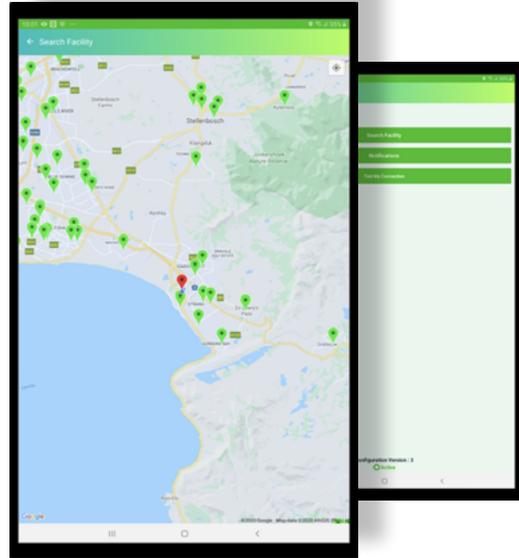


NDoH App Store poster, depicting how the app store would be used in the field.

04 CARECONEKTA

The CareConekta study lead by Kate Clouse of Vanderbilt University, USA, is a study conducted in South Africa which is home to the world's largest antiretroviral therapy (ART) programme. Sustaining high retention along the HIV care continuum has proven challenging in the country and throughout the wider region. Population mobility is common in South Africa, but important research gaps exist describing this mobility and its impact on engagement in HIV care. Post-partum women and their infants in South Africa are known to be at high risk of dropping out of HIV care after delivery and are frequently mobile. Therefore the study proposed the development of a smartphone app which will be able to help characterise mobility trends for participants of the study.

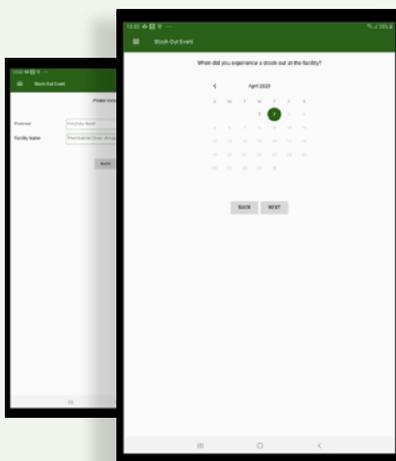
Vanderbilt University approached Jembi to help in this regard. Jembi was able to rapidly develop a robust system to meet the needs of the CareConekta study, including an android app and a web-based reporting module for real-time mobility reporting. Jembi is currently providing ongoing support.



CareConekta Android app screenshots.



Post-partum women and their infants in South Africa are known to be at high risk of dropping out of HIV care after delivery and are frequently mobile. Therefore the study proposed the development of a smartphone app.



Mezzanine Stock-Out app screenshots.

05 MEZZANINE STOCK-OUT

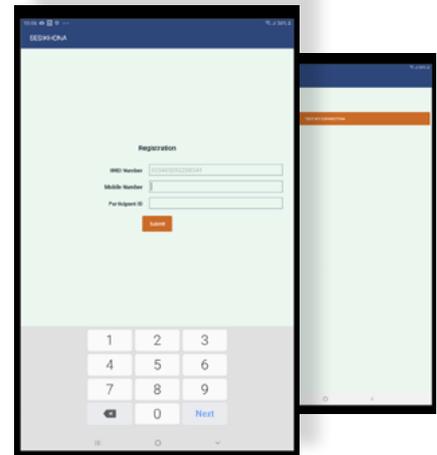
Mezzanine is a subsidiary of the Vodacom Group, who work with the National Department of Health and have requested Jembi to assist in the development of a mobile application that will allow the general public to report stock-out events at public health facilities across the country.

Jembi was able to rapidly develop the Android App, Backend Platform and Integrate with the existing Mezzanine system.

06 AHRI SESIKHONA APP

AHRI is The Africa Health Research Institute, which is committed to working towards the elimination of HIV and TB diseases. AHRI approached Jembi to help develop an app that would assist with the tracking of their study participants and integration with their current data capturing systems.

Jembi was able to rapidly develop an Android application that could be preloaded on devices AHRI would bulk purchase for distribution to their study participants as an incentive scheme. The Android app although not having any front-end capabilities collects information such as GPS location periodically. A back-end platform was also developed to work with Android Application for Registration and Reporting requirements.



Sesikhona Android app screenshots.



07 MALAWI PROGRAMME

Jembi has been contracted by GIZ Malawi to provide support in the strengthening of health systems related to reproductive, maternal, newborn and child health (MNCH) in health facilities in Malawi by promoting data analysis, interpretation and use through the customisation and implementation of an electronic register system, OpenSRP. Jembi is collaborating with GIZ Malawi, the Ministry of Health, ONA and HISP Malawi on this project.

In addition to the eRegister project, Jembi was tasked with the development of an Integrated Hospital Information blueprint for Malawi. At the beginning of October 2019, GIZ and Jembi hosted a Digital Health Roadmap workshop in Cape Town.

The workshop was attended by representatives from the MoH led by Dr Andrew Lakaka, HISP Malawi, ONA, Luke International, as well as directors, doctors and nurses from various levels of health facilities.

Malawi Digital Health Workshop held in Cape Town. In attendance is Jembi team (including Chris Seebregts, Wayne Naidoo, Martin Weiss, Lisa George, Julian Naidoo, Taahir Kathree, Moabi Nyokong). From Satvix (India) we have Ajeenkya Gadewar, from Malawi the Ministry of Health led by Dr Andrew Lakaka, GIZ represented by Simon Ndira and Paul Dielemans, as well as other organisations such as Luke International, HISP and ONA.

The workshop included presentations from external speakers in order to showcase innovation, opportunities and develop strategic partnerships that can strengthen the Malawi Digital Health Roadmap.

In January 2020 the Malawi MoH hosted a User Requirements and Business Process analysis workshop funded by GIZ and facilitated by Jembi, ONA and HISP. The workshop consisted of 110 participants that included key representatives from all stakeholder groups, i.e. nurses, doctors, data managers, facility directors, ICT staff, district and national level MoHP support and programme leads and community health representation.



Jembi, HISP and GIZ team outside a health facility in Malawi.

08 eREGISTER PROJECT

The kickoff meetings for this project began in April 2019, with the Child Health Module being the first module scheduled for Go Live. Bilira Health Centre was highlighted as the flagship facility for the eRegister Project.

Child Health Module: Development of the Child Health Register began in May 2019. The HISP Team carried out a Training and UAT Workshop from 24 to 30 September 2019 at the Bilira Health Facility. The participants included the Ministry of Health, GIZ, Jembi and HISP.



Sept 2019	ANC Module: Ongoing development took place on the ANC register with ONA doing a walkthrough of the module with HISP and Jembi. User guide review and preparation was underway from September 2019 .
Oct 2019	OPD Module: Development of the OPD register began in October 2019 . Testing of the ANC and OPD modules took place at Bilira Health Facility on 28 and 29 November 2019 .
Dec 2019	Maternity Module: Development of the Maternity register began in December 2019 . Testing of the Child Health and OPD modules took place at Bilira Health Facility on 28 and 29 December 2019 .
Jan 2020	As part of the January 2020 requirements workshop in Mponela, ONA facilitated the workshop on 23 and 24 January ; the focus was on the OPD, ANC, Maternity and PNC modules for the Malawi eRegister Project with the aim of getting feedback and requirements from the RHD and OPD teams.
Feb 2020	The eRegister Child Health App was successfully deployed to Production on 22 February 2020 , with Administration of Production handover done with the HISP team on 26 February 2020. Go Live use of the system took place from 27 February 2020 .

South Africa Programme

Jembi's South Africa Programme currently comprises of several individual programmes and projects



The African Health Information Exchange (AHIE) is a four-year project funded by the Bill and Melinda Gates Foundation (BMGF) and led by Prof Andrew Boule of the University of Cape Town School of Public Health and Family Medicine (UCT-SPHFM). Other collaborators include Jembi, the Western Cape Provincial Health Data Centre (PHDC), South African National Department of Health (SA-NDoH), the National Health Laboratory Service (NHLS), the Council for Scientific and Industrial Research (CSIR) Meraka Institute and Health Systems Technologies (HST).

The South African Medical Research Council (SAMRC) – Jembi Collaborating Centre for Digital Health Innovation (CCDHI) is a three-year project initiated in 2018 with funding from the SAMRC to develop digital health in partnership with SAMRC units and programmes, as well as more widely in South Africa to support the Department of Health.

Several projects were conducted with the Health Information Research and M&E (HIRME) cluster of the NDoH, including the **TIER Centralisation project**, funded by Clinton Health Access Initiative; and the **Digital Square South Africa project**, funded by USAID South Africa through PATH and comprising of several sub-projects, including (i) Development of InfoHub; (ii) Connectivity Optimisation; (iii) Alerts and Notifications Service; (iv) TB Referral, and; (v) MomConnect.

Jembi has initiated a new **Maternal Newborn and Child Health (MNCH) programme** in collaboration with several other organisations, including the SAMRC's Health Systems Research Unit and the SAMRC's Maternal and Infant Health Care Strategies Unit and Research Centre for Maternal, Fetal, Newborn & Child Health Care Strategies, University of Pretoria as well as the National Institute for Communicable Diseases (NICD). The team has successfully developed an updated version of the Child Problem Identification Programme and plans for the development of an Electronic Birth Register (EBR) and an updated version of the Perinatal Problem Identification Programme (PPIP). The group also applied for several grants from international funders.



Jembi is working closely with development teams from UCT and PHDC to strengthen and mature the core software and implementations as well as to adapt the system to manage patient information supporting the COVID-19 case management in the Western Cape province.

01

AFRICAN HEALTH INFORMATION EXCHANGE (AHIE) PROJECT

The African Health Information Exchange (AHIE) is a core Jembi project which aims to strengthen and mature the use of health information exchange in the Western Cape and nationally in South Africa. The project is funded by the BMGF and is led by UCT-SPHFM in partnership with Jembi, the PHDC, NDoH, NHLS, CSIR and HST. During this period, the project has continued the development of a number of core open technologies, including the Single Patient Viewer (SPV) application and the Open Local Health Information Mediator (OpenLHIM) which are being implemented in the PHDC along with an instance of Jembi's OpenHIM and the Open Integrated Health Platform (OpenIHP). Jembi is working closely with development teams from UCT and PHDC to strengthen and mature the core software and implementations as well as to adapt the system to manage patient information supporting the COVID-19 case management in the Western Cape province.

02

SAMRC-JEMBI COLLABORATING CENTRE FOR DIGITAL HEALTH INNOVATION (CCDHI)

The SAMRC-Jembi Collaborating Centre for Digital Health Innovation (CCDHI) was launched in March of 2018 and completed its second year of operation during this financial period. The CCDHI continued to support and grow digital health in collaboration with MRC units and initiatives. The CCDHI completed the first phase of its flagship project, the development of a dedicated App Store, in partnership with MRC and in response to the South African National Digital Health Strategy, 2019-2024 launched by the National Department of Health. It also organised two workshops, a Seminar on Prioritising Research and Evaluation for Digital Health in South Africa at MRC Pretoria and a Workshop on Health Research Data Management at MRC Cape Town. A particular area of interest that has emerged is maternal, newborn and child health in partnership with the MRC's Health Systems Research Unit and the MRC's Maternal and Infant Health Care Strategies Unit and Research Centre for Maternal, Fetal, Newborn & Child Health Care Strategies, University of Pretoria. The CCDHI is also developing a data management portal for the SAMRC's Genomics working group to assist in coordinating and managing the activities of this group around the sharing of resources and data.

03 MATERNAL NEWBORN AND CHILD HEALTH (MNCH) PROGRAMME



Child Problem Identification Programme (ChildPIP) Project

The Child Healthcare Problem Identification Programme (Child PIP) is a mortality audit tool designed specifically for infants and children. The Child PIP programme team uses the information gathered from careful mortality reviews to improve the quality of care that sick children receive in the public health system and so reduce child mortality. In 2019, Jembi continued to re-develop the existing Delphi/MSSQL Server Express application in a modern programming language. This work will support the CHILD PIP programme's long-term sustainability by making it easier to implement, operate, maintain and upgrade the software.



Electronic Birth Register (EBR) Project

In September 2019 Jembi undertook an initial requirements gathering and validation phase for the development of an Electronic Birth Register (EBR), as the first step in supporting an effective architecture for how existing and proposed digital systems can work together effectively in the field of Maternal Newborn and Child Health. The integration with or redevelopment of the Perinatal Problem Identification Programme was also considered as part of the solution. Jembi also researched and evaluated existing systems that have potential to be adapted to meet the requirements gathered. The mandate from the NDoH was clear; they want a digital solution that is patient-centric and focused on enabling the clinicians in the labour ward to provide better care, with the collection of aggregated data for monitoring and evaluation and research purposes as a secondary requirement. The goal of this project was to identify practical solutions to meet the requirements identified in this phase, and develop a detailed scope of work for implementation of an EBR to begin in April 2020.

04 TIER.NET CENTRALISATION PROJECT

The Tier.net Centralisation Project was a National Department of Health (NDoH) initiative to implement centralised data centers for integrated HIV and TB patient information. The project was implemented jointly by Jembi and NDoH between April 2018 and April 2019 and was jointly funded by NDoH and CHAI. The data centre was established to provide patient-level and aggregate data to select users at the provincial and national level to facilitate improved epidemiological and programmatic analyses and broader programme surveillance.

Jembi provided project management and technical support to the NDoH-led team who were responsible

for establishing processes for system use and data management, as well as building local capacity to manage and maintain the system at a provincial level. Jembi's activities also included defining the system architecture, deploying the infrastructure, the provision of the solution to transfer data from the facility level to the provincial level, as well as developing standard operating procedures (SOP) for system management and maintenance. The Jembi team also developed the training material used to build capacity amongst Key NDoH TIER Implementers at provincial, district, and sub-district to use, manage and maintain the data centre.

05 DIGITAL SQUARE SOUTH AFRICA PROGRAMME

During the reporting period, Jembi worked with NDoH and PATH Digital Square on several projects funded by USAID South Africa, including the following:



Development of InfoHub

The Jembi project team supported PATH Digital Square to develop the InfoHub, an Enterprise Data Warehouse (EDW) for HIV patient and laboratory information management and reporting. The system maps source data to marts that support integrated views of the data. The system facilitates rapid ingestion of new clinical data into the EDW, integration with laboratory data and visualisation with a business intelligence software tool. Implementation of the system is component-based and can be deployed using different on-premises and cloud-based technologies. Jembi completed its part of the project at the end of September 2019.



MomConnect

Through this mechanism, Jembi also continued its support for the OpenHIM component of the MomConnect platform that connects the front-end cell phone registration and messaging system maintained by Prækelt.org to the back end National Department of Health DHIS2 reporting database supported by HISP South Africa. Jembi continued to upgrade the OpenHIM to meet new partner requirements and specifications as approved by the NDoH, and as part of routine operations. **The number of mothers uniquely registered on MomConnect was extended to almost three million.**



Connectivity Optimisation

Jembi developed designs to optimise connectivity solutions for public health facilities in South Africa and other low resource settings as well as reports providing a solid background and platform for the technical NDoH teams implementing connectivity solutions



Alerts and Notifications Service

Jembi developed designs for a centralised Alerts and Notification service that can be used by several different mobile applications and other services in the NDoH.



TB Referral

Drawing on experiences from the TIER centralisation project and data modelling as part of the InfoHub initiative, Jembi developed several possible solutions for tracing TB patients identified as lost to follow-up (LTFU).

Mozambique Programme

During the 2019/2020 Financial Year, Jembi continued to conduct its programme activities in the realm of information systems as a strategic partner of the Mozambique Government and donor organisations in the health, justice, social welfare, veterinary and One Health (combination of human, animal and environmental health) sectors.

With over USD10 million budget for the year 2019/20, Jembi became the biggest and most important Information System specialised non-profit organisation in the country.



The Jembi Programme marked its tenth year in Mozambique in 2019. Over the course of the decade it has constantly grown in dimension and projects under the direction of **Dr Alessandro Campione (Jembi Programmes Director)** and his coordination team, composed of Ivan Pinto (Mozambique Programme Manager), Mr Antonio Sitoi (Country Coordinator), Dr Moisés Mazivila (Coordinator of Human Resources and logistics) and Mr Michele Santoro (Coordinator of Corporate Services), in partnership with the UEM represented by Professor José Leopoldo Nhampossa.

The team continues to grow, with an additional 13 staff taking the organisation to 87 distributed across Mozambique in four Jembi offices. This includes eight seconded staff in the MoH and Provincial directorates supporting the national HMIS. Special attention is given to large and national HIV-oriented surveillance and information systems like the Point of Care (POC) development and implementation, the Electronic Patient Tracking System (EPTS) development, the national electronic Civil Registration and Vital Statistics (eCRVS) eCRVS, capacity building, infrastructure, system maintenance, interoperability and the organisation of workshops, events and the annual OpenMRS Conference which required a higher level effort considering that all activities were occurring simultaneously.

To this end, several Jembi staff received specialised training in different technical areas to ensure that our teams were sufficiently equipped to respond adequately and timeously to the needs of the national institutions and donors we serve.

Despite natural disasters like Cyclone Idai and the high volume of activities that rely on external feedback and collaborative efforts, it is worth noting that 90% of all work plans were satisfactorily achieved during this financial year. The current report offers detailed information on key achievements and activities conducted over the past year.

01

ELECTRONIC PATIENT TRACKING SYSTEM (EPTS)

The Electronic Patient Tracking System (EPTS) is the main PEPFAR system used to collect data on HIV patients and to manage medical records in health facilities. There is a need for a system that produces quality data for PEPFAR reporting, and for MoH Health Management Information systems (HMIS). Jembi, as a specialised and dedicated organisation with no role in health service delivery, is leading the process of updating, harmonising and centralising the OpenMRS EPTS platform in coordination with Friends in Global Health (FGH), the Ministry of Health (MoH), and other PEPFAR clinical partners under CDC coordination and funding. The Jembi coordinator for the EPTS project is Ms Zainabe Dadá.

There have been challenges managing report definitions because of different versions of OpenMRS being used by clinical partners as well as some differences in databases and concept dictionaries. In addition, different architecture models are being used by the partners to distribute and manage their EPTS implementations and data flow, with some of the clinical partners using a centralised model. In those models, each clinic connects to a district or provincial level server instead of each facility managing their own set of patient IDs to help with reducing patient record duplicates. The remaining partners have implemented standalone EPTS, OpenMRS, instances in each Clinic, which presents the problem of manually updating the version, merging data, and managing duplicates at higher levels. Jembi and FGH have been developing joint plans of action to address all these challenges and ensuring that the data collection and reporting of all PEPFAR clinical partners is harmonised and updated, and data is produced through a certified practice to guarantee quality of the data elaboration process and minimising errors.



Jembi technical team at 2019 OpenMRS Conference (left to right: João Machiana, Kétmia Matavele, Edgencio Rubene, Lalitha Moodley, Simão Mazive, Itélio Lucas, Amós Isaías).

Key Results

- **Technical Assessment** of EPTS platform and architecture, workshops with stakeholders, general requirements and documentation preparation
- **Joint EPTS workplan** defined and M&E system in place
- **Regular meetings** with PEPFAR and MoH for requirements gathering and clarifications
- **Regular changes** to the PEPFAR MER indicators and MoH reports
- **Requirements documents** produced and updated for PEPFAR Monitoring, Evaluation and Reporting (MER) indicators for HIV and TB: TX-PVLS, TX-NEW, TX-CURR, TX-TB, TB-PREV, TX-ML
- **Partners' environments upgraded** to the same OpenMRS version
- **Create and manage** the Help Desk and the eSaude portal
- **All EPTS** Quarterly, Semi-Annual, and Annual Releases with all required deliverables and artifacts (user stories, templates, installation guides and user manuals, source code packages, reporting module, and database update scripts)
- **Applied testing** strategy according to CDC recommendations comparing results of indicators built by FGH against those built by Jembi (restore sample database to a testing server, restore FGH report scripts, import Jembi's report module, test both FGH and Jembi's reports, compare results, deep analysis of the results, present user stories and requirements, testing reports, and corrections of the code before final release
- **Presentation** of the centralised architecture proposal to clinical partners at PEPFAR HIS partner meetings
- **Elaboration** of the full manual set for user and administrators
- **Provide equipment** and installation in the defined and priority HFs to improve the efficiency of the IT infrastructure including servers at MoH and Provinces
- **Elaboration** of EPTS Harmonisation plan
- **Investigation and development** of EPTS Harmonisation tool



Jembi Mozambique Help Desk team carrying out virtual Help Desk Training to PEPFAR Implementing Partners (front: Eduardo Velichane and Elisio Macia, back: Marcelino Mugai and Yolanda Pelembe).

02 HELP DESK

The Help Desk and Support Services (HDSS) is a line of communication and consequent action for solutions and support, led by Jembi and coordinated by Mr Marcelino Mugai with team members Mr Eduardo Velichane, Ms Yolanda Pelembe and Mr Elisio Macia. It is directed to provide support for EPTS system and related equipment and infrastructure financed by PEPFAR.

It is a communication service between the different departments of Jembi (BA, developers, implementers, infrastructure, and logistics), users, and all clinical and funded partners of PEPFAR. It solves a wide range of problems through a complex, standardised, and organised workflow, with strict roles of confidentiality and security and regular M&E and statistics production for reporting. As the lead PEPFAR HIS partner in Mozambique, Jembi is fully responsible for the HDSS for the EPTS systems and infrastructure funded by PEPFAR. The HDSS is the first working and efficient example of professional services with the client (MoH, users, and all the PEPFAR clinical partners and sub-awardees).

Key Results

- ✔ **Help Desk operational plan** defined and under implementation
- ✔ **Workshop with PEPFAR** clinical partners to gather requirements for the Help Desk system
- ✔ **Help Desk terms of reference** and Standard Operating Procedures defined and being implemented
- ✔ **Certified Help Desk training** for Jembi and MoH staff from the Health Information Department
- ✔ **139 tickets received /** 83 tickets closed
- ✔ **Satisfaction rate** from PEPFAR partners using the Help Desk service is at 100%



According to the HD terms of reference agreed with CDC, Jembi's primary roles are:

- ✔ Support to daily bugs (sync issues, upgrade issues, docker issues, and others)
- ✔ Support hardware implementation issues
- ✔ Support HIS installation, implementation, and use issues
- ✔ Support partners to upgrade their OpenMRS instances
- ✔ Implement report and form changes for PEPFAR and MoH and deploy to partners
- ✔ Implement a comprehensive monitoring system to report tickets and elaborate reports and statistics about the nature of problems, origin, and time for solution.

3

MoH Staff trained in Help Desk

8

Jembi staff received Help Desk Intensive Training



Jembi/Moasis M&E officer Filipe Macuacua and health staff celebrating POC go-live and good performance at one of the health facilities where the POC system was implemented.

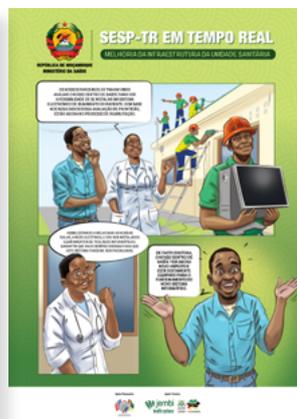
03 SESP-TR (POINT OF CARE SYSTEM – POC)

Jembi was responsible for the development and implementation of the point of care system in Mozambique. The system, named by the MoH as SESP-TR (Electronic Patient Registration System in real time) or SESP-POC, was fully re-engineered and developed by Jembi in coordination with the MoH in eight months. We provided modules for registration, follow-up, tracking, and real-time health information for HIV patients assisted in the NHS including Pharmacy and Laboratory functionalities. It is a fully compliant electronic medical record system based on OpenMRS Bahmni and built on a robust engineering process, fully documented, certified, and approved by the MoH and CDC.

The SESP-TR system in all its parts (software platform, infrastructure, equipment, logistics, documentation, and procedures) was concluded and piloted during four months in two large health facilities. Each SESP-TR implementation has more than 30 elements, including workstations, servers, security, power backups and recovery systems, solar power supply, new electrical certification, and every possible best practice element, including projects, work flows, manuals, and change management tools. The system demonstrates efficiency beyond existing paper-based operations, reduced significantly the waiting time of patients and the ability to fully replace legacy information systems. During the pilot implementa-



The system demonstrates efficiency beyond existing paper-based operations, reduced significantly the waiting time of patients and the ability to fully replace legacy information systems.



TOP LEFT: Jembi POC development team and implementers working overnight to finish the system and configure the mini servers for the go-live.

TOP RIGHT: Workshop with MoH end users for validation of POC requirements.

ABOVE: Comics depicting POC training (Left) and Jembi infrastructure team installing electrical, network, security and IT infrastructure at a health facility (Right) for POC implementation.

tion, the system proved to significantly improve the health facility's patient workflow and its operational efficiencies due to the full automation of the processes and its ability to manage real-time decision-support among different points of care including registration, appointments, HIV clinical services, laboratory, and pharmacy.

The pilot implementation demonstrated important limitations due to many factors completely independent of Jembi's work and recognised by the MoH and CDC. These included the limitation of funding, challenges for the MoH to scale and sustain the system in a wide number of health facilities due to the high complexity and cost of infrastructure adaptation and equipment maintenance, conditions at the HFs that require an enormous investment. Jembi is currently preparing the handover of all products, artefacts and equipment, the full documentation and is transferring all equipment and specialised manpower to other PEPFAR priority projects including EPTS, iDART, DISA, and MoH priorities.

Key Results

Development

- ✔ Completion of full requirements gathering for all modules
- ✔ Completion of requirements review and validation workshops with end users
- ✔ Completion and approval of all requirements documents by Technical Working Group
- ✔ Bahmni translation from English to Portuguese
- ✔ Development of the system modules (five packages)
- ✔ User Acceptance Testing (UAT) at two pilot Health Facilities
- ✔ Compilation of list of change requests based on UAT results
- ✔ Completion of User and Technical specifications documents (including wireframes, data dictionary)
- ✔ Completion of user manuals and training materials
- ✔ Completion of prioritised list of changes and bug solving
- ✔ Release of the system per package
- ✔ Approval of the system package released and final version of the documentation
- ✔ Training of Jembi technicians in deep development of OpenERP and OpenELIS systems

03 SESP-TR (POINT OF CARE SYSTEM – POC) CONTINUED



Jembi Network Technician Alberto Maquite (fourth from left) accompanied by MoH infrastructure technicians during POC network installations.



IT Network technicians Isack Lipoche and Kelvine Young testing servers installed for POC system installation.



ABOVE LEFT TO RIGHT:

Rack with switches, path panel, router and a 650 VA UPS installed by the Jembi field team in one of the health facilities where POC was implemented.

Electric Control Panels installed by Jembi infrastructure team in one of the health facilities where the POC was implemented.

Gutters for electric cables installed by electricians at one of the health facilities where POC was implemented.

Power inverters to support power backup systems for POC to continue working in the event of a power outage.



Caravans for POC field teams in rural area implementations.



Jembi network and electrical infrastructure technicians prepare the ground for cabling.



Comics depicting POC use at doctor's office (left) and clinician communicating the change in the health facility to a patient (right).



POC materials and equipment warehouse, including computers, SIS-Compact stations, mini servers, bar code scanners, power backup equipment (solar panels, inverters, batteries, UPS), cables, switches, etc.

Key Results

Implementation preparation

- ✔ Completion and approval of requirements and specifications gathering: hardware architecture, infrastructure, and equipment, technology, test lab
- ✔ Completion, submission and approval of plans and protocols: Change Management Plan, Communication plan, Physical Security and Disaster Plan, Readiness Assessment plan, HR terms of reference, Installation plan, and training plan
- ✔ Procurement, purchase and storage of USD3.5 million of POC hardware, materials, vehicles and equipment: servers, hardware and equipment, installation materials, IT infrastructure, computers, vehicles, tents, caravans, solar panels, UPS, inverters, batteries, label printers, bar code scanners, cabling
- ✔ Readiness Assessments in 35 health facilities

Pilot implementation

- ✔ Joint planning for pilot implementation with CDC and MoH
- ✔ Installation of physical, electrical and network infrastructure in 14 health facilities
- ✔ Training of trainers of 45 staff from 6 health facilities
- ✔ System Go-Live on 21st of October 2019 at two large HF (CS Ndlavela and CS 1 de Maio)
- ✔ Support to health staff and PEPFAR Implementing Partners in data entry at the two pilot facilities
- ✔ Deployment of the complete version of the POC software (Installation and training)
- ✔ Post-Implementation assistance provided to system users



From left to right: Zainabe Dadá, Internship programme coordinator; Simão Mazive, former intern hired as Junior Developer; Sheila Mussane, former intern hired as Project Assistant; Dr Moisés Mazivila, Corporate Services Coordinator; Sebastião Libombo, former intern; Lézimo Notisso, former intern hired as Communications Assistant.

7 interns finished the Jembi internship programme of which

4 were hired as permanent staff



staff trained in Basic Computer Literacy

45

National Health System (NHS) Staff attended Training of Trainers for the POC system from 6 HF

132

NHS staff trained in POC system use in 6 HF

04 CAPACITY BUILDING

Since inception of the programme in 2009, training and recruitment of local staff has been at the centre of Jembi's support to national institutions in Mozambique in partnership with UEM, CRDS (Regional Centre of Training in Health), and the Ministry of Labour. This project, coordinated by Ms Marina Chichava, aims to ensure local ownership and project sustainability.

According to data from SIFo, Mozambique's national information systems for health sector training, as of March 2020 Jembi has supported the training of 2,666 health sector professionals, of which 1,474 were trained in basic module and SIS-MA, 231 in SIS-ROH, 58 in SIS-H, 335 in ICD-10, 16 in DHIS 2 Academies, 202 in SESP-POC, 252 in Basic IT, 16 in Project Manage-

8

Jembi staff received Help Desk Intensive Training

3

3 MoH Staff trained in Help Desk

9

Jembi developers trained in Deep Dive PDI

Jembi team at Mozambique's National Employment Fair where the President of the Republic visited the Jembi stand (left to right: José Chauque, Alberto Maquite, Marina Chichava, Johar Mucussete and Katia Paulino).



Jembi business analysts at the 2019 Southern Africa BA Summit in Cape Town, South Africa (left to right: Pinki Meggi, Lisa George, Linda Taylor, Zainabe Dadá).



Health Staff trained in Computer Literacy for POC implementation at Matola II Health facility.



Head of ICT Department at Mozambique MoH Momade Sumalgy and Jembi/Moasis Technical Project Coordinator Marcelino Mugai representing Mozambique at the 2019 HELINA Conference in Botswana.

ment, 25 in the Mid-level health statistics course, 9 in advanced Excel, and 48 in other courses. Jembi aims to continue building local capacity in the health and social sector for students and young professionals.

Jembi also focuses tremendously on building capacity of its staff in Mozambique, which is 95% Mozambican. Jembi's capacity building activities include attending conferences and events to share information, exchange experiences, gain new knowledge and network with the digital health and overall information systems communities at the national, regional and international levels. This year, the Jembi Mozambique team participated at ID4AFRICA Conference in South Africa, HELINA Conference in Botswana, OpenMRS Implementers Conference in Mozambique, the ERFAN Network Workshop in Namibia, BA SUMMIT in South Africa, and the National Employment Fair in Mozambique.

12

Jembi Implementation, Help Desk and M&E staff trained in POC system

35

NHS Staff trained in use and maintenance of national HIS in the provinces of Cabo Delgado and Zambézia.



3

Jembi Developers trained in **Pentaho**

6

Jembi senior staff trained in **Agile Project Management**

4

Jembi senior Business Analysts attended the **BA Summit in Cape Town**

25

Health Statistics technicians trained through the Regional Centre for Health Development



05 CIVIL REGISTRATION AND VITAL STATISTICS (CRVS)

Jembi continues to provide technical and coordination support to the national Civil Registration and Vital Statistics (CRVS) system through Interinstitutional Working Group for Vital Statistics (GITEV) and the Ministry of Justice, Constitutional and Religious Affairs (MJCR) and other stakeholders. This year, Jembi attended several national CRVS meetings convened by GITEV, the World Bank, the MJCR and other stakeholders to discuss the second national CRVS assessment and interoperability between eCRVS and other systems. Jembi supported the participation of two MJCR and two MoH staff in the Annual ID4AFRICA Conference where the Government of Mozambique began negotiations to nominate one of its cadres to become an ID4 Africa Ambassador. In addition, the ID4 AFRICA Conference planted a seed for the organisation of Mozambique's very first event on legal identity attended by the President of the Republic and hosted by the MJCR with support from Jembi and other stakeholders. Jembi is also providing technical assistance to the MJCR in interoperability between the Hospital Data Management Module (MGDH) and eCRVS systems.

Key Results

- ✔ Participation at ID4AFRICA
- ✔ Support for organisation of legal identity event in Tete, Mozambique
- ✔ Maintenance of eCRVS system
- ✔ Technical support provided through one staff seconded to the MJCR
- ✔ Requirements and design documents for interoperability between MGDH and eCRVS systems
- ✔ Demo of the interoperability solution presented to the MoH and MJCR



Jembi senior HIS specialist seconded to the MoH, Amisse Momade, training health staff on system use.

06 SIS-MA

Jembi provides support in the maintenance of the SIS-MA, national M&E system for the health sector developed and implemented with technical support from Jembi in 161 sites, with software and hardware in six provinces. In addition to technical support, the Jembi team helps the Ministry of Health produce health statistics based on SIS-MA data at the district and provincial levels. All provinces supported by Jembi have a SIS-MA reporting rate above the 80% target with a cumulative reporting rate of 98%. Jembi's IT technicians in the provinces resolved 99% of the requests for technical support related to SIS-MA hardware and software at the provincial, district and health facility levels in the six priority provinces. Jembi senior HIS specialist seconded to the MoH supported the Department of Health Information in the production of monthly health statistics bulletins to inform decision-making at the central level.

07 iDART

iDART is a software solution designed to support the dispensing of ARV drugs in the public health care sector. It supports pharmacists in their important role of dispensing accurately to an increasing number of patients while being able to engage and assist the patient. Jembi's role in this project is to update the user manual and administration and update the old version with the current version 2.0 of iDART. The list of 17 HFs

using the iDart belonging to the CCS partner, where Jembi is providing support in implementing the system with the SIS-Compact Station, includes: CS Zimpeto, CS Bagamoyo, CS Magoanine A, HG Polana Caniço, CS 1º de Maio, CS Xipamanine, CS Chamanculo, CS José Macamo, CS Pescador, CS Albasine, CS 1 de Junho, CS Mavalane, CS Alto Maé, CS Malhangalene, CS Porto, CS Polana Cimento, CS Maxaquene.

08 OPENMRS CONFERENCE

Jembi, under the coordination of Mr António Macheve Jr. in collaboration with the OpenMRS Community, organised and led the 13th Implementers' Conference in Maputo on 2-6 December 2019, which had over 200 international participants from 32 countries. OpenMRS is the most widespread and used open source medical record system in public health centers and hospitals in low resource settings across the world, with over 4,000 installations. It has been present in Mozambique since 2008, currently covering 44% of the National Health System health facilities. The conference was fully organised by Jembi and facilitated by the Director of the OpenMRS Community. Support was provided by other OpenMRS leads and experts through unconferencing sessions as per OpenMRS tradition, where participants choose the themes they would like to discuss in parallel sessions and show different techniques and software that are being implemented, share a variety of experiences, challenges and successes each country is facing by using OpenMRS. The event also included a two-day Hackathon where developers worked on topics pertinent to Mozambique and the broader community. Jembi/UEM-Moasis, co-organiser of the event, also sponsored and brought expert staff to support all sessions.

The Jembi Mozambique team showed the different OpenMRS implementations, shared the experience of using OpenMRS in Mozambique and led visits to Health Facilities where OpenMRS is being implemented in Maputo City and Province. Jembi's roles and responsibilities for the conference included planning; lead organisational and scientific committee; logistics (accreditation, transport, site visit approvals, visa, travel, accommodation, banners, catering, conference dinner, etc.); managing the Hackathon; communications; secretariat; procurement; translations; and conference agenda.

TOP TO BOTTOM:

Director of Planning and Cooperation at Mozambique MoH – Dr Sãozinha Agostinho delivering keynote address at 2019 OpenMRS Conference opening hosted by Jembi and UEM (panelists left to right: UEM Rector - Prof Orlando Quilambo, OpenMRS INC Director – Dr Paul Biondich, Dr Alessandro Campione)

2019 OpenMRS Conference participants doing the traditional OpenMRS Jazz Hands!

2019 OpenMRS Conference participants sharing information and knowledge between sessions.

2019 OpenMRS Conference hostesses composed of Jembi staff and interns from UEM.

UEM Rector Prof. Orlando Quilambo, with 2019 OpenMRS Conference Coordinator and Jembi Mozambique M&E and Communications Coordinator António Macheve Jr.



09 EDUCAMAZ

EDUCAMAZ, coordinated by Ms Marina Chichava, is a three-year project in its second year of implementation that aims to raise the quality of inclusive preschool education services by improving the professional training of child operators in Mozambique and strengthening the innovative M&E information system of the Ministry of Gender, Children and Social Action (MGCAS). Financed by Terre des Hommes Italy, the project supports MGCAS in collaboration with Jembi Health System and other partners. Jembi, which supported MGCAS in the development of its Monitoring and Evaluation Information System (SI-M&A), contributes to this project by supporting the expansion of SI-M&A in Sofala province. The purpose of these actions is to strengthen the capacity to collect, process, present, analyse and use MGCAS data by strengthening the information system and coordinating with the actors involved. Jembi directly supports the Provincial Directorate for Gender, Children and Social Action in Sofala, through a dedicated full-time technician based in this institution.

Key Results

- **In spite of** the adverse effects of the Idai cyclone, which hit Beira and the greater Sofala Province, Jembi's IT technician in that province continued to work with the district-level technicians to provide technical support to social units in the maintenance of SI-M&A software, hardware and in filling in the paper-based forms
- **SI-M&A was expanded** in 3 additional districts of Sofala, namely: Chibavava, Gorongosa and Cheringoma. It is currently installed in eight districts of Sofala Province, including Beira



Master Trainer for the Cardno project Dr Ernestina David at Mavalane hospital (4th from left)

10 CARDNO MASTER TRAINER PARTNERSHIP IN MOZAMBIQUE

Jembi has a partnership with Cardno Mozambique coordinated by Mr António Macheve Jr. to support a gynaecologist Master Trainer for Cervical Cancer capacity building in Mozambique. In this partnership, Jembi plays a key role in supporting the Gynaecologist Master Trainer that leads the regional training and coordination of mentoring and clinical supervision of MoH clinical providers in the provinces where providers were previously trained by MD Anderson. The monitoring and

supervision component, under Jembi's responsibility aims to ensure quality and long-term sustainability of cervical cancer prevention and treatment skills. The services provided by Jembi for this particular project include recruitment of the Master Trainer; human resources, contract management, and payroll; monitoring and evaluation of project activities; logistics, field trips, and administrative support; office space, supplies, and equipment.

11

ONE HEALTH and ERFAN AFRICAN NETWORK FOR VETERINARY SCIENCE

In its efforts to support One Health initiatives in Africa, which aim at expanding interdisciplinary collaborations in healthcare for humans and animals, Jembi Health Systems signed an MoU with Istituto Zooprofilattico Sperimentale dell’Abruzzo e del Molise (IZSAM) under the leadership of Dr Alessandro Campione. It is working together with other institutions on the consolidation of a collaborative network (ERFAN) to strengthen research capacity for veterinary sciences and address human health issues linked to animal health.

The main objective of One Health is to promote concerted efforts toward the acceleration of biomedical research and enhancement of public health through early findings of possible health threats to human and animal health, as well as possible environmental factors and threats.



Dr Alessandro Campione facilitating one of the Working Groups at the 2019 ERFAN Network Workshop in Namibia.

With the aim of expanding to a larger One Health project involving the development of information systems for veterinary health and possible integration with human health in the future, Jembi is currently supporting a smaller project which aims to train veterinary staff in informatics, provide logistical support to veterinarians in Maputo Veterinary Lab, and organise veterinary health events and courses.

12 SOCIAL & SOLIDARITY

The Jembi Mozambique team periodically comes together to celebrate birthdays and special days that are of importance to our staff. It is an opportunity for our staff to connect and embrace each other as a community. This year, individual staff in Mozambique and South Africa mobilised their personal resources to help our colleague in Beira rebuild his home after it was hit by Cyclone Idai in March 2019.



TOP RIGHT: Birthday celebrations with Dr Moisés Mazivila, Lalitha Moodley and João Machiana.

RIGHT: Jembi celebrating Mozambique Women’s Day on 7 April 2019 at the main Maputo office. First row from left to right: Albertina Luís, Office Maintenance Assistant; Dulce Monteiro, Administrative Assistant, Kátia Paulino HR Officer. Second row from left to right: Anatórcia Chichango, Administrative Officer; Johar Mucussete, Project Assistant; Avelina Zavale, Office Maintenance Assistant; Yolanda Pelembe, Help Desk Technician; Zainabe Dadá, Project Coordinator; Marina Chichava, Project Officer; Maria Rein, CDC Project Officer; Kétmia Matavele, Business Analyst; Josefa Da Graça, Office Maintenance Assistant.



International and Contracting Programme

Jembi's international and contracting programme continued to grow in the 2019/2020 financial year, with several new projects coming online, and a focus on supporting a core technical team working on Health Information Exchange (HIE) architecture and application development, as well as support for training, implementation and community engagement on projects and programmes leveraging HIE and Jembi's software, such as the OpenHIM.

Jembi actively participates in several international communities of practice, supporting local and international teams, NGOs and ministries of health with interoperability and health. Our projects over the past year include continued work across various OpenHIE communities, strengthening of the OpenHIM and other HIE tooling, instantiation of the OpenHIE architecture, and participation in the global Tracking with Recency Assays to Control the Epidemic (TRACE) initiative funded by the Centers for Disease Control and Prevention (CDC).

We also said goodbye to our flagship Blood Safety Strengthening Programme, although the BSIS footprint continues to grow through a new contract with the Swiss Red Cross to implement the system in Juba, South Sudan. New partnerships with ICAP and the University of Pretoria continue to extend the teams work in the HIV case-based surveillance and PMTCT field and provide scope for further growth of the programme in the year ahead.

01 OpenHIE

Jembi is one of the founders and leaders of the Open Health Information Exchange (OpenHIE) (www.ohie.org) international community. Jembi is responsible for the interoperability layer and shared health record communities as well as being a leader of the OpenHIE Implementers Network (OHIN).



2019/20 Key Activities

- ✔ Under the banner of Leadership and Advocacy, Jembi continued to engage and lead in the leadership and architecture communities of OpenHIE
- ✔ Jembi continued work around the broader Community and Reference Tool Curation where it curates the Interoperability Layer (IOL) and Shared Health Record (SHR) communities, and maintains the reference tools for each community; the OpenHIM (www.openhim.org) for the IOL component and HEARTH for the SHR
- ✔ Jembi successfully supported the OpenHIE 2019 Community Meeting, both facilitating the meeting, presenting on our projects, and coordinating the Hackconnect-a-thon event
- ✔ Collaboration with international teams in providing DATIM Support to the DATIM development project that utilises Jembi's OpenHIM tool
- ✔ Jembi continued to curate the OpenHIE Implementers Network.
- ✔ Continued releases of the OpenHIM software
- ✔ Participation in regional and international meetings presenting on the OpenHIM and its role as an interoperability layer in a Health Information Exchange (HIE)



02 Instant OpenHIE

The Instant OpenHIE project is funded through an investment from Digital Square, with an aim to reduce the costs and skills required for software developers to rapidly deploy OpenHIE architectures, providing a preconfigured OpenHIE architecture that can be easily installed to show a complex HIE system working for a real use case, and illustrating how interoperability can work to solve health

challenges using open source tooling. Jembi has partnered with IntraHealth International to work on Phase 1 of the project, focused on a health workforce use case and development of component packaging, scripting and containerisation to produce a packaged version of OpenHIE architecture, comprised of a set of HIE reference technologies and other appropriate tools.



ABOVE: Daniel Futerman presenting on the OpenHIM and OpenHIE at the Global Digital Health Forum that took place in Washington, DC in Dec 2019



ABOVE: Peter Imrie at the OpenHIM training workshop in Adama, Ethiopia, September 2019.

03 >>> OpenHIM

Jembi has continued to strengthen and maintain the OpenHIM product offering through various investments, including a Digital Square award focused on core enhancements for improved performance and security, advancing the OpenHIM mediator capabilities through an updated bootstrap mediator framework and development of a generic mapping mediator to allow implementers to rapidly configure and deploy custom mediators, as well as a communications initiative

to improve documentation and revisit community engagement mechanisms.

The OpenHIM 2020 roadmap includes continued development on performance and mediator offerings to enable simpler and quicker use of the OpenHIM by end users. At the end of 2019, Jembi attended and presented on the OpenHIM at the Global Digital Health Forum and Digital Square Global Good Implementers Meeting in Washington DC.

04 openIMIS

Jembi is supporting the emerging openIMIS community created to support this open source health financing tool. Jembi has operated as a regional hub on the African Continent, supporting the development of interoperability designs to facilitate data exchange between openIMIS and other systems, and participation in the OpenHIE Health Financing towards Universal Health Coverage (UHC) subcommunity. Under this work area, Jembi supported the development of OpenHIE and FHIR-based workflows and standards for UHC, and promotion of interoperability and the use of the OpenHIM for openIMIS integration projects with other POS applications (e.g. OpenMRS, Bahmni) and DHIS2. Jembi is also working with other members of the openIMIS community to develop an online starter kit for openIMIS which details how to go about gathering functional and nonfunctional requirements, implementing and monitoring digital health systems like openIMIS. In 2019 Jembi attended both the openIMIS developers and implementers meetings, and had the opportunity to present on openIMIS on various occasions, including the OpenHIE 2019 Community Meeting, the Health Informatics in Africa (HELINA) conference in Botswana, the OpenMRS Implementers Meeting in Mozambique, and the Global Digital Health Forum in Washington DC.



Daniel Futerman joins the openIMIS developers community at the annual dev workshop that took place alongside the OpenHIE 2019 community meeting in Addis Ababa, Ethiopia.



Daniel Futerman (Jembi) with Uwe Wahser (GIZ) and their poster presentation on openIMIS at the Health Informatics in Africa (HELINA) Conference in Botswana, November 2019.

05 BLOOD SAFETY STRENGTHENING PROGRAMME

Jembi's award-winning Blood Safety Strengthening Programme (BSSP) came to an end in September 2019. During the four-year programme Jembi developed and released three versions of BSIS (Version 1.0, 1.3 and 1.4). The Jembi BSSP also implemented the BSIS system at five blood centres across Africa: the Lesotho Blood Transfusion Service (LBTS), Maseru, Lesotho, the Southern Area Blood Centre (SABC), Accra, Ghana, the National Blood Bank Service (NBBS) Centre, Addis Ababa, Ethiopia, the Zambia National Blood Transfusion Service (ZNBTS) University Teaching Hospital (UTH) Centre, Lusaka, Zambia and the Yaounde Central Hospital Blood Service Centre (YCHBS), Yaounde, Cameroon. The Jembi-designed implementation process, based on International Society of Blood Transfusion (ISBT) and AfBST good practice guidelines, together with Jembi's experience of implementing health information systems in low resource settings, has ensured that the implementations are sustainable and fully operational without Jembi technical support.

TOP TO BOTTOM:

Nurse using BSIS at donor clinic at the Southern Area Blood Centre (SABC) in Accra, Ghana.

Laboratory Technician labelling blood at the Lesotho National Blood Transfusion Service.

BSIS generated label being placed on blood bag at the Lesotho National Blood Transfusion Service.



06 Fondation Pierre Fabre

In 2018 Jembi's Blood Safety Strengthening Programme (BSSP) received an award from the Global South eHealth Observatory, a Fondation Pierre Fabre initiative designed to identify, document, promote and help develop eHealth initiatives that improve access to quality healthcare and medicines for the most disadvantaged populations in resource-limited countries. The award included a grant that was used by Jembi to support the BSIS implementation at the Yaounde Central Hospital Blood Service in Cameroon. The funds were used to procure an initial stock of labels for the blood service, as well as the translation of the BSIS Version 1.4 user manuals into French. The project ended in July 2019.



07 BSIS SOUTH SUDAN

In December 2019 Jembi was awarded a contract to implement BSIS in Juba, South Sudan. The implementation process kicked off in February 2020 with a trip by the managers of the BSIS team to Juba to carry out an assessment of the site, as well as train the local staff on the BSIS implementation process and basic project management. This transfer of skills will help facilitate the implementation of BSIS at the site and ensure its sustainability once implemented.

TOP: Linda Taylor and Rhonwyn Cornell with representatives of the National Blood Transfusion Service of South Sudan and South Sudanese Red Cross.
 LEFT: Rhonwyn Cornell speaking to the Minister of Health, Director General of Policy, Planning, Research and Monitoring and Evaluation and the Director of the National Laboratories of South Sudan.
 RIGHT: Staff from the National Blood Transfusion Service of South Sudan participating in an implementation planning workshop.

08 OPENCRRVS

Jembi continued our work with PLAN international and other partners in 2019, providing technical support to the OpenCRVS initiative. OpenCRVS is an open-source digital civil registration and vital statistics (CRVS) information management solution that is free to use, adaptable to the country context, interoperable with other government systems (e.g. health and ID systems), and rights-based to ensure it protects and provides for those most vulnerable. At the end of December 2019 OpenCRVS alpha 2.0 was complete and ready for PLAN to implement in a pilot covering two districts in Bangladesh in early 2020.

09

TRACE (Tracking with Recency Assays to Control the Epidemic)

Working with the University of Columbia's ICAP team, Jembi is providing digital health technical assistance (TA) to the Centers for Disease Control and Prevention's (CDC) funded HIV Tracking with Recency Assays to Control the Epidemic (TRACE) initiative. As digital health TA to ICAP Jembi has supported the implementation of data collection tools (eg. RedCAP and ODK) and aggregate reporting systems (e.g. PowerBI) as well as training on interoperability in several countries including Eswatini, Ethiopia, Lesotho and the Democratic Republic of Congo.

10

ETHIOPIA STRATEGIC INFORMATION PROJECT

Jembi is working with the University of Columbia ICAP, CDC Ethiopia, the Ethiopia Public Health Institute and the Federal Ministry of Health (FMOH) to support the ehealth Strategic Information Programme through the development and documentation of requirements and technical specifications for the development of an interoperable case-based surveillance (CBS) system. The team has worked with stakeholders to draft an HIE architecture that brings together several stand-alone systems (both paper and electronic) at point-of-care, reference laboratory and surveillance levels. This architecture presents an ideal use case to start the instantiation of the Ethiopian HIE in 2020 and test the architectural design and the system components, including connections to existing systems such as the national facility registry. The project also supported training in Ethiopia on HIE architecture and the use of the OpenHIM.

02

Presentations

Deep South Developer Meetup

*Grand Challenges Africa and the
Bill & Melinda Gates Foundation's
Knowledge Integration Initiative*

UX South Africa

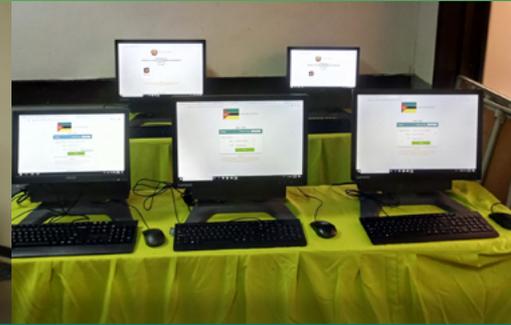
*World Health Organisation Computable
Guidelines and Machine Learning*

HELINA

Global Digital Health Forum

Expert Convening

LECTIONS



2019

April

Deep South Developer Meetup

📍 Tokai Cape Town

Matthew Dickie // *Intro to GraphQL*

October

Grand Challenges Africa and the Bill & Melinda Gates Foundation's Knowledge Integration Initiative

📍 Addis Ababa Ethiopia

Chris Seebregts // *Harnessing Data Science and Analytics to Strengthen Maternal, Newborn and Child Health Monitoring and Eliminate HIV Transmission in Low Resource Settings*

November

HELINA

📍 Gaborone, Botswana

Marcelino Mugai // *Development and implementation of point of care system in Mozambique*

Daniel Futerman // *Integrating Health Financing into the OpenHIE Architecture*

Deep South Developer Meetup

📍 Tokai Cape Town

Barry Dwyer // *Building Desktop Apps in the Web Era*

LEFT TO RIGHT:

Attendees at the April 2019 Deep South Developer Meetup.

Attendees of the November 2019 Deep South Developer Meetup.

SIS Compact Station: Computer developed by Jembi/Moasis for health information systems as part of the development and implementation of point of care system in Mozambique.

Jembi and MoH developers being trained in Bahmni.

User Acceptance testing for SESP-POC at Habel Jafar health facility.

Health staff training on computer literacy at the November 2019 Development and implementation of point of care system in Mozambique.



2020

November

UX South Africa

📍 Observatory Cape Town

Zane Dickens // *Employee Experience Design: Redesigning an Organisation for Social Impact*

World Health Organisation Computable Guidelines and Machine Learning

Improve Health Service Access, Quality and Accountability Workshop: Review and Planning for Maternal Health and Primary Health Care

📍 Hermance, Switzerland

Chris Seebregts

December

Global Digital Health Forum

📍 Washington DC, USA

Daniel Futerman // *Improving financing for UHC workflows in OpenHIE: using openIMIS as a reference technology*

Daniel Futerman // *Sharing Data to Improve Health Outcomes with the OpenHIM*

January

Expert Convening

📍 Washington DC, USA

Hosted by Vital Wave Consulting to discuss and evaluate global-level PEPFAR investments, focused on standards, open source and/or LMIC-accessible software, and systems interoperability

Chris Seebregts

SECTION 3

03

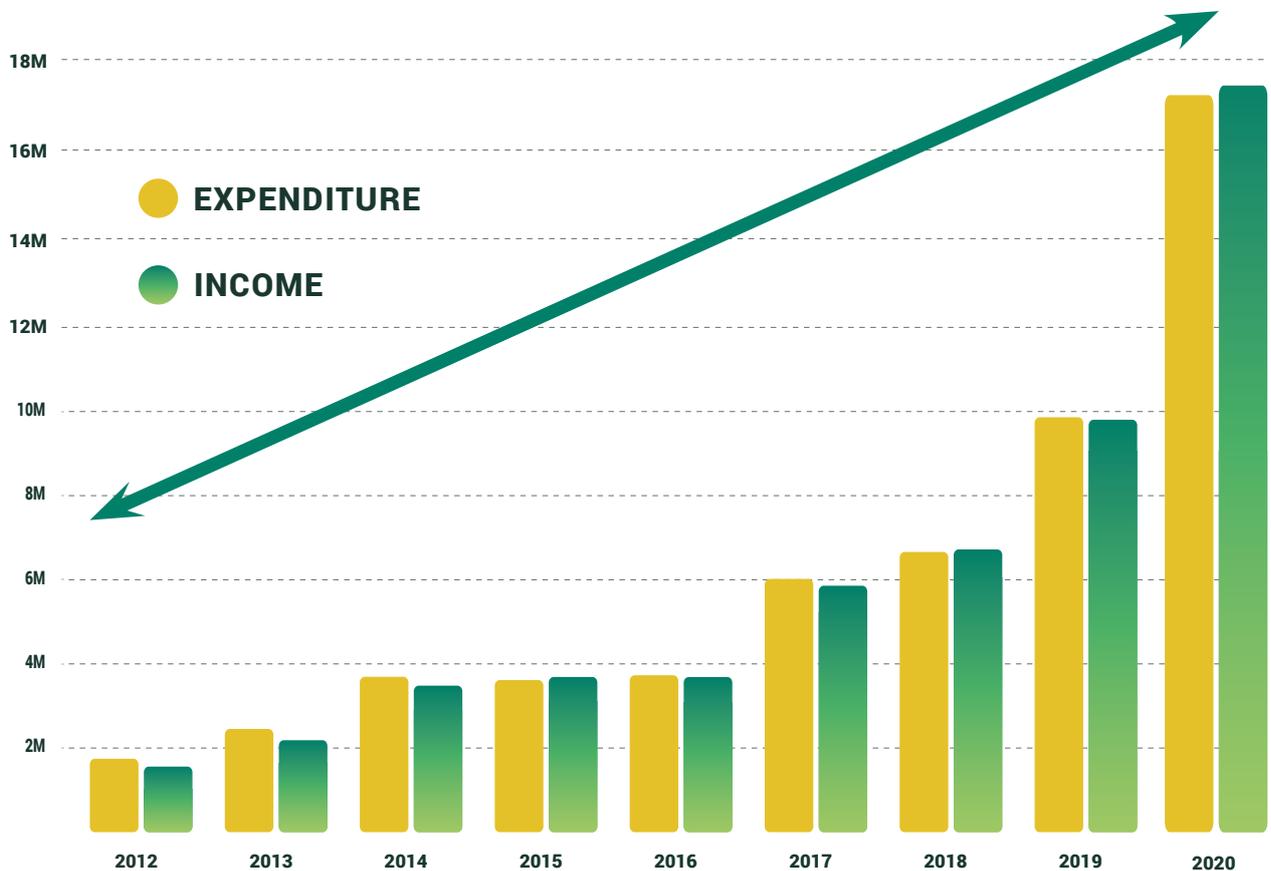
**Corporate
Services**

General review of operations

Jembi Health Systems NPC (“Jembi”) experienced a year of substantial growth during the financial year running March 2019 to February 2020, which is explained in further detail in the Operations and CEO report.

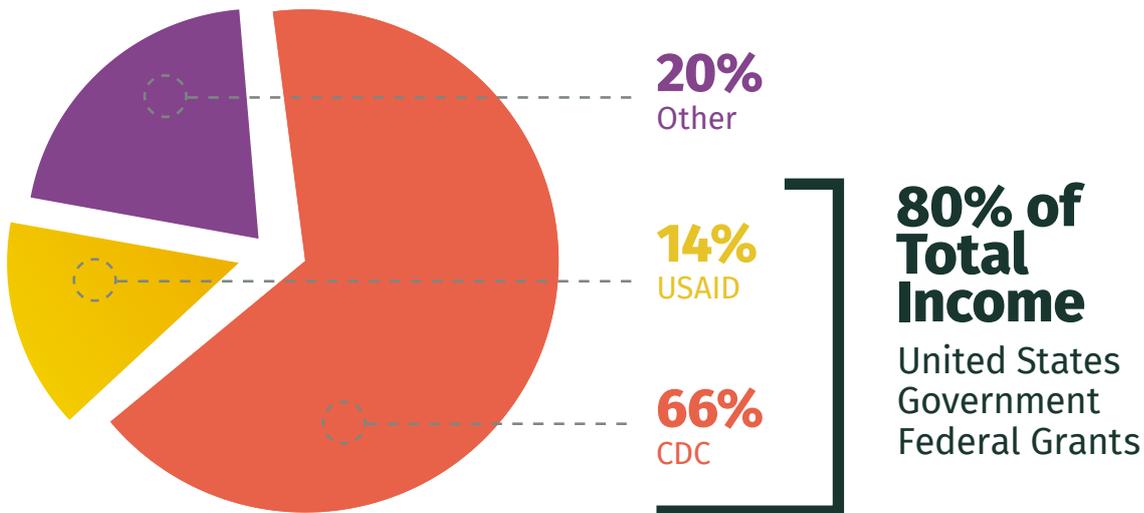
Income rose by 75% to ZAR172.2 million at the end of financial year FY20. Expenditure figures were closely aligned to income over the same period rising 75% to ZAR171.1 million. The company reserves saw an increase of ZAR1.97 million. The increase of reserves was linked to an increase in assets held by the company on the balance sheet and an increase in cash reserves linked to contract work.

**75%
Income
Growth**



Donor Landscape

Income in this financial year was derived largely from United States government federal grants, which represented **80%** of the total income and was split between the Centers for Disease Control (66%) and USAID (14%), both through Prime awards and Sub agreements. The remaining 20% of annual income was derived from other donors, most of whom funded the South African and Regional programme. These were a combination of local donors and the international community, with funding coming through philanthropy and foundations.





Decrease of Staff in 2020

At the end of February 2020, staff numbers had decreased to 127, with the Mozambique office experiencing an increase of 4%. With the wrap-up of two large projects both in Mozambique and the South Africa programme at the end of September resulting in the overall decrease of staff numbers by 6% from FY19.

Our Impact



279 182
Units of blood labeled and issued



2.9 MILLION registrations since 2014

used in **95%** of Public Health Clinics in South Africa

Expenditure Breakdown

Jembi programmes are grouped into four programme areas for the year ending FY2020: South Africa, International and Contracting, Mozambique and Regional.

The Jembi Regional Programme

includes projects and activities in Rwanda, Malawi, Cameroon, South Africa and East Africa as well as innovative contractual projects, as a sub-awardee under the USAID-funded Regional Action through Data (RAD) programme as well as sub agreement through Cardno Emerging Market for the work in Cameroon and a Prime agreement through the German Cooperation for work in Malawi.

The International and contracting programme

is work directly linked to JEMBI core products under OHIE and OHIM projects as well as linked projects funded by Digital Square. Also included in this category is the Multi Country programme which includes the Blood Safety Programme (BSSP), the Civil Registration and Vital Statistics Programme (CRVS) and the new awards through ICAP for the project TRACE and Ethiopia SI.

The Mozambique programme had an expansion in projects and funding under the Centers for Disease Control prime award as well as projects

under Terres Hommes agreement in country and The Italian cooperation. The Mozambique programme also introduced a new project through Cardno Emerging Markets.

The South African Programme saw another year of expansion with projects under Digital square, The Gates Foundation, ELMA Philanthropies, Johnson and Johnson, CHAI as well as projects linked to Department of Science and Technology, SA Medical



Research Council and The University of Pretoria. The Expenditure across the four Programme Areas is broken down as: South Africa 19%; International and Contractual 10%, Mozambique 55%; and Regional 16%.

Expenditure figures excluding capital procurement increased to ZAR171.1 million over the year, with the largest percentage of expenditure linked to staff costs of ZAR77 million (45% of total expenditure).



Journey
To shared health

12 000
Registrations

90 000
Vaccine Events

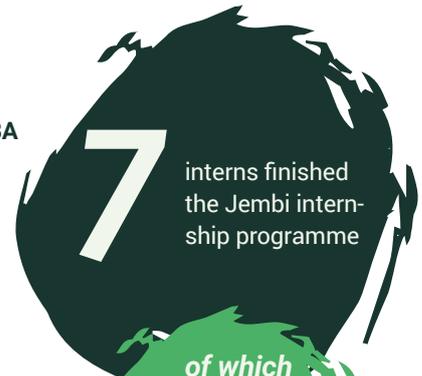
97%
Retention Rate

Single Patient Viewer

SPV has made helping

58 854 patients easier since 2017

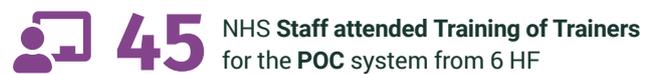
Capacity building



Ministry of Health



National Health System



Regional Center for Health Development



Jembi's Collaborators

JEMBI thanks all our collaborators for a successful year.





Jembi Health Systems

Annual Report

2019/20

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