ANNUAL REPORT 15/16

SOUTH AFRICA MOZAMBIQUE RWANDA

jembi
health systems NPC

Acronyms

AABB	American Association of Blood Banks
ACC	Advanced Care Centre
AfSBT	Africa Society for Blood Transfusion
ANSA	Anaesthesia Network South Africa
APAI-CRVS	Africa Programme on Accelerated Improvement of Civil Registration and Vital Statistics
API	Application Programming Interface
ART	Antiretroviral Treatment
ATNA	Audit Trail and Node Authentication
BM	Blood Management
BSIS	Blood Safety Information System
BSSP	Blood Safety Strengthening Programme
CBHI	Community-Based Health Insurance
CDC	United States Centers for Disease Control
CEO	Chief Executive Officer
CRVS	Civil Registration and Vital Statistics
CSD	Corporate Services Division
CSIR	Council for Scientific and Industrial Research
DHD	Digital Health Division
DM	Donor Management
EGPAF	Elizabeth Glaser Pediatric AIDS Foundation
EMR	Electronic Medical Records
FGH	Friends in Global Health
FHIR	Fast Healthcare Interoperability Resources
FOA	Federal Opportunity Announcement
GIS	Geographic Information System
GITEV/ IVSWG	Inter-Institutional Vital Statistics Working Group
HMIS	Health Management Information Systems
HPRS	Health Patient Registry System
HTTP	Hypertext Transfer Protocol
ICSM	Integrated Clinical Services Management
IGAD	Intergovernmental Authority on Development
IHE	Integrating the Healthcare Enterprise
IP	Intellectual Property
ISBT	International Society of Blood Transfusion
IT	Information Technology
I-Tech	International Training and Education for Health
LBTS	Lesotho Blood Transfusion Service
MDR	Multi-Drug Resistant
M&E	Monitoring & Evaluation
MGCAS	Ministry of Gender, Children and Social Welfare
MINJUS	Ministry of Justice, Constitutional and Religious Affairs
MOASIS	Mozambique Open Architecture Standards and Information Systems

MoH	Ministry of Health
MOU	Memorandum of Understanding
MSF	Médecins Sans Frontières
MSH	Management Sciences for Health
NGO	Non-Governmental Organisation
NHI	National Health Insurance
NHLS	National Health Laboratory Service
NOA	Notice of Award
NPC	Non-Profit Company
OpenHIE	Open Health Information Exchange
OpenHIM	Open Health Information Mediator
OpenMRS	Open Medical Record System
OpenSRP	Open Smart Register Platform
OQ	Operational Qualification
PBF	Performance Based Financing
PEPFAR	United States President's Emergency Plan for AIDS Relief
PIH	Partners in Health
RBC	Rwanda Biomedical Centre
RCT	Randomised Controlled Trial
RHIE	Rwanda Health Information Exchange
RSSB	Rwanda Social Security Board
SASA	South African Society of Anaesthesiologists
SI	Strategic Information
SIS-H	National Hospital Health Information System Mozambique
SIS-MA	National Health Information System for Monitoring and Evaluation (Mozambique)
SI-M&A	Monitoring and Evaluation Information System (Mozambique)
SIS-ROH	Intra-Hospital Death Registration System (Mozambique)
SLA	Service Level Agreement
SMT	Server Monitoring Tool
SOW	Scope of Work
THRIVE	Technologies for Health Registers, Information and Vital Events
UAT	User Acceptance Testing
UCSF	University of California, San Francisco
UCT-CIDER	The University of Cape Town Centre for Infectious Disease Epidemiology and Research
UEM	University of Eduardo Mondlane
UKZN	University of KwaZulu-Natal
UNECA	United Nations Economic Commission for Africa
USAID	United States Agency for International Development
USD	United States Dollar
USG	United States Government
WAHO	West African Health Organisation

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Chairman's report
for the year ended February 2016

It is my pleasure to present to you Jembi's work over the 2015/2016 financial year. During this time Jembi has developed a diverse range of projects, strengthened its internal systems and secured a number of new long-term cooperative agreements, all of which bode well for the organisation's future. Appropriate and reliable health information is a fundamental component of well-functioning health systems which is why Jembi's work is critical in supporting the improvement of quality of healthcare in Africa.

The strength of Jembi is in its staff, who numbered 63 in February with new recruits joining every month. Each member of staff contributes more than they realise to the collective well-being of the organisation and my thanks go to each one of them for their continued hard work. Jembi's staff are supported by excellent organisational and financial systems, which give the team the confidence to implement small and large projects with excellent results, time and again. In particular I would like to acknowledge the CEO Prof Chris Seebregts who masterfully balances high-level scientific rigour with the operational demands of a growing organisation. This leadership has resulted in greater stability and strong organisational growth during 2015/2016. This growth includes securing a number of five-year cooperative agreements which will allow Jembi to further refine its expertise.

Greater involvement in South African health systems, as well as renewed work in Rwanda and Mozambique, are important strategic steps and financially the year ahead looks very positive.

As a Board we have reluctantly accepted the departure of Ms Glaudina Loots who contributed significantly to our strategic thinking and we thank her for her input. We have a commitment and stability in the Board that enables us to provide appropriate support to Jembi as it matures into a leading non-profit organisation in South Africa.

I am happy to present the annual report of Jembi Health Systems for the year ending February 2016.

Prof Steve Reid

Chief Executive's report
for the year ended February 2016

During 2015/2016 Jembi experienced another year of consistent growth. This was achieved by maintaining the pattern of activities followed in previous years: continuing to implement its mission and strategy, as well as expanding its core programmatic and technology platforms. 2015 was a landmark year for Jembi as it initiated several projects with new partners on new contracts. Jembi also applied for a significant number of new opportunities at the beginning of 2016. The organisation maintained a similar income and staff complement to the previous financial year, but has started an active recruitment drive in anticipation of an increase in projects and funding during the next years.

Jembi's Corporate Services Division (CSD) continued to provide strong financial, legal, human resources and administrative support to all Jembi offices and staff during this period. The CSD provides a solid platform on which Jembi's projects and programmes are based. The division continues to excel in all aspects of corporate

services and was able to deliver an unqualified audit for the sixth time in a row at the end of the 2015/2016 financial year.

In South Africa Jembi has continued to expand its collaborations with national and provincial departments of health. At national level Jembi continues to develop and maintain infrastructure for the MomConnect project, including the process of extending the system to other mobile providers. MomConnect is widely cited as the first national scale mobile health intervention in South Africa and one of the most important mobile health programmes in the world. Jembi is also working closely with the Strategic Planning Chief Directorate of the National Department of Health, the Council for Scientific and Industrial Research's (CSIR) Meraka Centre for Infectious Disease Epidemiology and Research (CIDER) at the University of Cape Town (UCT) on systems at the health facility level in South Africa. These projects include linking the national Health Population Registry System (HPRS) to systems for HIV/TB patient and information management (i.e. TIER.Net).

Jembi also continues its work at the provincial department of health level. In the Western Cape, Jembi is working with the provincial Department of Health and UCT-CIDER on aspects of health information exchange for systems in the province. In the Free State province Jembi has been working with Kheth'Impilo, a local HIV focused NGO, to strengthen advanced HIV/TB care in the province as part of a five-year grant to Kheth'Impilo from CDC.

Based on work in previous years developing the Blood Safety Information System (BSIS) Jembi, in February 2016, was awarded a five-year cooperative agreement with CDC to further develop and implement BSIS across Africa. The Blood Safety Strengthening Programme (BSSP) was established and the initial BETA implementation of BSIS began at the Lesotho Blood Transfusion Service (LBTS) in December 2015. The "go live" of BSIS in Lesotho is scheduled for April 2016 following a full ISBT defined software validations process. BSSP is a substantial new programme for Jembi focused on developing a sustainable open source application for countries in Africa. BSIS will be formally launched at the Africa Society for Blood Transfusion (AfSBT) Congress in June 2016.

In April 2015 Jembi's Mozambique programme (MOASIS) started work on its second five-year cooperative agreement with CDC Mozambique in the area of health management information systems (HMIS).

The project extends the work done during the first five-year project and complements work being undertaken under Jembi's existing grant with USAID in Mozambique. Jembi-MOASIS will continue to work with the Ministry of Health and partners on a number of projects, including the development of HMIS infrastructure and interoperability and information exchange in patient-based systems. This work compliments Jembi's previous work on aggregate information systems in Mozambique.

Jembi's Rwanda programme also started a new five-year cooperative agreement with CDC in April 2015. The project is to assist with migrating systems for programmatic reporting. This work will supplement Jembi's subcontract to Management Sciences for Health (MSH) supporting general health information systems strengthening in Rwanda. The Rwanda office, with technical assistance from South Africa, continues to support the Rwanda Biomedical Centre in the maintenance of mobile support for the national Mutuelle health insurance programme and the Rwanda Health Information Exchange (RHIE), which was originally funded by the United States President's Emergency Plan for AIDS Relief (PEPFAR). The RHIE project has been transformed into the Open Health Information Exchange (OpenHIE) project that continues to be funded by PEPFAR through Cardno Emerging Markets and coordinated by the Regenstrief Institute. Jembi also explored several additional opportunities to expand the Rwanda office through new projects and collaborations during 2015/2016.

I am proud of the achievements of the Jembi team in the past year and excited about the opportunities to strengthen health systems that are arising from our new and renewed projects and funding. Jembi continues to grow its network of partners and collaborators and deliver on its mission. It will undoubtedly continue to excel in future.

Prof Chris Seebregts

Digital Health Division

T he newly renamed Digital Health Division (DHD), previously Health Information Systems Division, has had an eventful year with a growing number of projects being undertaken by an expanding team. Continuing the trend set in 2014/2015 the DHD team has increased its involvement in projects in South Africa and Rwanda, elaborated its multi-national Blood Safety Strengthening Programme and invested resources into developing project proposals for numerous projects in South Africa and other African countries, including Zambia and Zimbabwe. To support these developments, the DHD has expanded its team by seven members; increasing its skills in business analysis, technical development and programme management.

In South Africa, the DHD team has continued to build and strengthen its relationship with the national and provincial departments of health as well as health and technology focused organisations and private companies. Jembi's continued involvement in the implementation and expansion of the South African Department of Health's MomConnect initiative is a testament to both the technology it has developed and the relationships it has with relevant stakeholders in South Africa. Jembi has also been looking at opportunities to re-use the technologies it has developed for existing projects in other countries and areas of health care.

Building on the success of the Blood Safety Strengthening Programme (BSSP) Jembi has been awarded a cooperative agreement by CDC to continue to develop Blood Safety Information System (BSIS) as well as a mandate to implement the software in a number of African countries over the course of the five-year grant. The initial implementation of BSIS is underway in Maseru, Lesotho in partnership with the Lesotho Blood Transfusion Service (LBTS) and the American Association of Blood Banks (AABB). The Rwanda programme has also continued to expand with a prime award from CDC and several sub-awards, resulting in a number of health information systems being developed and implemented in Rwanda.

The DHD team has put much effort into future planning over the last few months and has developed a number of projects and proposals for new projects and grants, including joint planning with the South African National Department of Health and Medical Research Council and Meraka Institute and co-creation workshops with the United States Agency for International Development (USAID). These efforts will result in new projects and in coming years to complement existing projects, such as the BSSP Cooperative Agreement with CDC.

All in all, the DHD has flourished during 2015/2016 and looks set to continue to do so over the coming year.

2015-16 Highlights

Project: BSSP/BSIS

The Blood Safety Strengthening Programme (BSSP) has had an exciting year. With continued support through the CDC we have developed and released the first version of the Blood Safety Information System (BSIS) Donor Management (DM) module. This module is responsible for managing a safe donor base for blood donations, and forms the base of all of the BSIS modules.

The team continues to develop the Blood Management module (BM)—responsible for managing the processing of blood components, labelling and issuing—towards a Version 1.0 release. The BSSP Implementation team together with our implementing partners, the Lesotho Blood Transfusion Service (LBTS) and their technical assistance providers AABB, have successfully implemented BSIS DM at LBTS and completed two of the three validation steps for implementing the software (installation and operational qualifications). The 'go live' of the software is planned for mid-April 2016.

LEFT: Mrs Maleqhoa Nyopa, Head of the Lesotho Blood Transfusion Service, signing off on the qualification steps of the implementation

Project: OpenHIE

The OpenHIE project has continued to advance the interoperability layer and shared health record communities as well as their reference technologies. Jembi has also been active in supporting the DATIM work around PEPFAR data reporting from implementing partners and is excited to see the use of the OpenHIM as part of the OpenHIE solution to the DATIM project. Jembi has also embarked on supporting the creation of various helper tools to support de-duplication of patients and advanced mediators to help move health data through an exchange. The Jembi team have again attended the IHE North America Connectathon as part of OpenHIE and achieved certification for the OpenHIM as part of OpenHIE.

LEFT: Hannes Venter and Ryan Crichton at IHE NA 2016 (January 2016)

Project: mHero

Jembi has supported IntraHealth in the advancement of the mHero (www.mhero.org) technical solution. Jembi's focus has been on advancing the base technologies of mHero to make it easier for deployment.

Jembi has also participated in authoring documentation and an article around the mHero. In the coming year Jembi will continue to be a part of the team that develops the mHero software solution to better support the needs of ministries of health in low-resource settings in communicating with their health workforce.

Project: Civil Registration and Vital Statistics (CRVS)

During 2015 Jembi participated in the development of a Guidebook for the Digitisation of Civil Registration and Vital Statistics (CRVS) systems under the auspices of the Africa Programme for Accelerated Improvement of Civil Registration and Vital Statistics (APAI-CRVS) in collaboration with the African Development Bank, United Nations Economic Commission for Africa (UNECA) and Plan International. The Guidebook is focused on tools and techniques that are relevant in low-resource settings.

It is published as a web book that is openly available at www.crvs-dgb.org. The content is available both in English and French and has recently been translated by a team from Jembi and UNICEF into Portuguese.

Project: MomConnect/Khuphukani

The Jembi team has forged ahead with the national MomConnect initiative, integrating NurseConnect workflows into the architecture, upgrading components of the backend infrastructure including the openHIM interoperability layer and mediator components, and enabling other implementing partners to submit data through data channels in addition to the USSD channels already in use.

Almost a million women have interacted with the MomConnect system since the programme began in August 2014. Pregnant women and young mothers receive stage-based information about their pregnancy and babies, are able to rate the service they receive at clinics, and access a help desk to ask questions and submit compliments or complaints.

Jembi has also been working with the CSIR Meraka Institute and the National Department of Health to improve interoperability between central systems and point-of-care applications like TIER.net.

LEFT: The CSIR Meraka software development team in Cape Town for a workshop with Jembi and the National Department of Health

Project: mothers2mothers

The mothers2mothers head office in Cape Town has engaged Jembi Health Systems to implement DHIS2 as their new monitoring and evaluation (M&E) platform, migrating data from six countries into a central platform and providing the country coordinators with an extensible platform for data capture and analysis. This is an exciting project which will continue as mothers2mothers moves towards a patient-centric mHealth architecture.

Project: UNICEF/Praekelt FamilyConnect

Pierre Dane, Jembi's Head of Technology, visited Kampala, Uganda with the Praekelt team to meet with the Ministry of Health, UNICEF and other partners to assess the current eHealth landscape in Uganda and give strategic advice and recommendations on the future architecture of the national Health Information Exchange.

This was part of the Praekelt FamilyConnect initiative and an extension of MomConnect South Africa.

LEFT: Jembi's Development Team Manager, Pierre Dane, in Uganda meeting with the Ugandan Ministry of Health and colleagues of Unicef and Praekelt Foundation

Project: Vitalwave

The Jembi team worked with the Western Cape Department of Health and representatives of UCT-CIDER (Centre for Infectious Disease Epidemiology and Research) to build a web application that provides clinicians with a graphical view of a patient's clinical, pharmacological and laboratory data. The viewer, funded by the Bill and Melinda Gates Foundation through Vital Wave, was successfully developed and is now being piloted at Groote Schuur Hospital.

Jembi was also contracted by Vitalwave to provide further assistance with the development of recommendations for the national Health Information Exchange in Malawi, in support of the Data Use Partnership project funded by the Bill and Melinda Gates Foundation. Members of the Jembi team visited Malawi and met with key stakeholders and the Ministry of Health.

LEFT: Malawi Implementing Partners meeting with Vital Wave and the Bill and Melinda Gates Foundation

Project: UCT/Western Cape Department of Health

Jembi has been involved in a number of projects with UCT, including enhancement of TIER.net, the extension of the Redcap research database tool to interact with a central database to ensure that surveys are linked with clinical records, and the development of a viewer application.

LEFT: Software Developers Hannes Venter and Clive Seebregts working at the Western Cape Department of Health offices
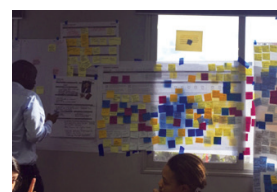
Project: USAID Co-Creation Workshops

Jembi has attended two co-creation workshops with USAID. The first, curated by the USAID Global Development Lab, was in Washington DC where 20 organisations were brought together to brainstorm technical solutions to combat the Ebola outbreak in West Africa. Participants then formed groups to take the top five ideas through to proposal stage. Jembi is involved in the 'Empty Box Interoperability Layer' group which is tasked with strengthening the use of interoperability layers in epidemic response.

The second workshop was held by the USAID Africa Bureau in Accra, Ghana. This was aimed at solutions to improve health in sub-Saharan Africa. Jembi is working with WAHO, IGAD, Broadreach and Duke University to develop a proposal to use big data platforms and personal health records to solve health issues in cross-border areas.

ABOVE: Ghana co-creation workshop

LEFT: USAID BAA STIP co-creation workshop in Washington DC

Project: Kheth'Impilo

The Kheth'Impilo-led Free State Advanced Care Centre (ACC) project aims to improve the quality, efficiency and effectiveness of care delivered to patients presenting with complex cases of HIV and MDR TB in the Free State province. In the past year the Jembi team has assessed and documented HIV/TB patient management process flows and referral systems as well as electronic data accessibility, capability and usage at five provincial Department of Health-identified ACC sites. Based on this assessment the Jembi team developed two HIV specific referral forms: one for up referral of complex-case HIV patients to ACC hospitals for specialised care and another form for down referral back to primary health centres/clinics after the patient is stabilised.

In addition Jembi has worked with ACC sites to deploy computers at these hospitals and register 29 hospital clinicians on the NHLS TrakCare Webview system for checking laboratory results. This resource will facilitate retrieval of patient-specific clinical data required for decision-making such as blood or sputum laboratory results.

Project: MSF Mobile Data Collection and OpenMRS Integration

Jembi was contracted by MSF in South Africa to develop and implement an open source mobile-based data capture form entry solution with an integration into OpenMRS. All project milestones were delivered on schedule and MSF expressed satisfaction on the delivery of the project and support provided during the design, development, UAT, training and implementation. Following the completion of the project in July, we signed an SLA agreement to provide maintenance and monitoring support from August to December 2015.

TOP: Field testing and site visit led by Wayne Naidoo, Senior Programme Manager

BOTTOM: Community Health Worker training in Eshowe led by Wayne Naidoo, Senior Programme Manager

Featured Case Studies

BSIS Implementation at Lesotho Blood Transfusion Service (LBTS)

In December 2015 Jembi began the process of implementing the Blood Safety Information System (BSIS) at the LBTS. BSIS is an open source blood donor and donation information management system designed specifically for use in low resource blood services.

The Blood Safety Strengthening Programme (BSSP) implementation team, made up of technical and training staff, traveled to Maseru to deploy BSIS on the LBTS server and train a small compliment of LBTS staff so that they were ready to begin the system validation process. The Jembi Blood Safety Strengthening Programme implementation plan for BSIS follows ISBT and AfSBT guidelines for the validation of software that forms a critical part of the blood safety chain within blood services. This is a three-step process looking at infrastructure and installation readiness (installation qualification), whether the software being implemented meets functional specifications (operational qualification) and if the system is fit for purpose for the blood service environment in which it is being installed (performance qualification). Following the Jembi visit the LBTS team, supported by their blood safety technical assistance partners the American Association of Blood Banks (AABB), carried out the operational qualification (OQ). With LBTS having signed off the OQ the Jembi team returned to Maseru in February 2016 to train the full LBTS staff compliment on the use of BSIS. The training went well and the LBTS team and partners are now moving forward with the performance qualification and staff competency aspects of the implementation. BSIS is on track to go live at LBTS in April 2016!

ABOVE: The LBTS team with their training certificates after completing training on the BSIS Donor Management module

Anaesthesia Network South Africa (ANSA)

The Anaesthesia Network South Africa (ANSA), an off-shoot of the SA Society of Anaesthesiologists, approached Jembi in 2015 to assist them in achieving their vision by developing a management system for peri-operative anaesthesia data in South Africa. Jembi is currently developing a prototype for a centralised information system that will allow anaesthetists timeous access to information online about patients prior to admission. The system will allow clinicians to assess information about patients regarding their risk of surgical complications and enable them to identify the patients that require more detailed in person pre-operative assessments. The aim is to drive improved patient outcomes through the provision of information at an early stage of surgical planning.

The system will also provide the anaesthetists and surgeons with much needed patient feedback with regards to how their patients experienced the surgery as well as any post-operative positive and negative outcomes. This will give anaesthetists an understanding of how they are perceived by their patients, as well as the ability to trace complaints.

Finally, the system will allow for clinical and performance bench-marking and allow clinicians to learn from existing practice and work towards implementing safer surgery.

Mozambique Programme

The year has been largely focused on nationwide expansion of health information systems for M&E and death registration, as well as technical and advisory assistance to strategic information-related groups in Mozambique in the health, social welfare and vital statistics arenas, including USG implementing partners, the IVSWG, the eSaude Community and the Master Facility Group. Jembi has also been cooperating more closely at the local level directly supporting the provinces and districts through formal MOUs signed with provincial health directorates and IT technicians in the southern provinces.

In Mozambique, under long term MOUs, Jembi continues to provide technical support to the Ministry of Health (MoH), the Ministry of Justice, Constitutional and Religious Affairs (MINJUS), and the Ministry of Gender, Children and Social Affairs (MGCAS). Jembi has also extended its cooperation to the local level, recently signing MOUs with Maputo Province, Maputo City and Gaza Provincial Health Directorates, formalising its direct support in the provinces and districts. The formalisation process with the Inhambane and Cabo Delgado provinces is in its final stages as the Jembi/UEM-Moasis team assists all the above-mentioned provinces in the maintenance of national health information systems, data collection, use, analysis, quality and dissemination, particularly SIS-MA and SIS-ROH.

The monitoring and evaluation system based on DHIS2 developed for the MGCAS (SI-M&A) under the USAID cooperative agreement was successfully piloted in 14 sites in Mozambique's four southern provinces: Maputo Province, Maputo City, Inhambane and Gaza. Jembi is currently at the planning stage for the national roll-out of the system. The technical staff in Mozambique also developed the interoperability layer for information exchange between the prototype based on DHIS2 and the national database for the MGCAS.

Jembi/UEM-Moasis is proactively involved in promoting collaborative efforts in Mozambique's key working groups for strategic information in the health, social affairs and justice sectors through workshops and jointly coordinated activities. These are aimed at creating interoperability mechanisms for systems integration and information exchange to boost efficiency and reduce duplication of efforts. The key working groups include the strategic information United States Government (USG) implementing partners in Mozambique, the eSaúde Community (OpenMRS Implementers), the Inter-institutional Working Group for Vital Statistics and the Master Facility List Group.

From a project standpoint, the 2015-2016 year has witnessed a completion of over 85% of the activities for Jembi's work plan in Mozambique with all reports made available to the donor community, partners and interested parties in a timely manner, reporting on the following projects: SIS-MA, SIS-ROH, CRVS, SI-M&A, OpenHIE, SI-MA, SIS-Compact Station, IT support in the provinces, MoH & MGCAS capacity building, support to the eSaúde community and participation in international conferences and meetings.

2015-16 Highlights

Project: SIS-MA

SIS-MA was implemented in 180 sites where over a thousand staff of the Ministry of Health were trained in system use and DHIS2 Academy Level 1. In this process manuals were produced for administrators and users at the district, provincial and national levels and over 200 were printed and distributed to the MoH. In addition, all migration requirements and prototypes have been developed for systems such as SIS-H and SIS-ROH to be integrated into SIS-MA.

Project: SIS-ROH

Jembi finalised the technical development of SIS-ROH 2.0 and supported the updates from the previous version in 48 sites nationwide. The system is currently functioning properly in 95% of the sites and collecting mortality data routinely. To date, SIS-ROH has collected over 100 000 deaths. In addition, Jembi/UEM-Moasis conducted a SIS-ROH 2.0 expansion to five new sites in the province of Sofala – the rural hospitals of Nhamatanda, Buzi, Muxungue, Caia and Marromeu. Sixty-three staff were trained in SIS-ROH 2.0 and ICD-10 during the installation. From January 2015 until March of 2016, the rural hospital of Cuamba published three mortality data analysis reports independently using SIS-ROH data, demonstrating local capacity to collect, analyse and disseminate information retrieved from an information system built for the local context.
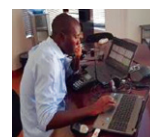
ABOVE: Jembi Mozambique developer, Paulo Sergio Matsinhe, remotely performing SIS-ROH upgrades and maintenance from version 1.0 to 2.0 with health staff in 56 sites nationwide

Project: National M&E System for the MGCAS

The Ministry of Gender, Child and Social Affairs of Mozambique (MGCAS) piloted its new M&E system (SI-M&A) based on DHIS2 with advanced technical support from Jembi/UEM-Moasis in four provinces at 14 sites where 54 MGCAS staff were trained. The development process included a general assessment, a review of the paper-based system and indicators, the development of an interoperable electronic system and the central database MGCASInfo. The project is currently at the final stage of preparation for implementation of the system in seven provinces.

Project: OPENHIE

Jembi successfully conducted a workshop on OpenHIM at the University Eduardo Mondlane where all eSaúde members (EGPAF, UCSF, ICAP, I-TECH, FGH and others) participated. The aim was to present Phase 1 of the project called Integration of Health Information Systems through the Moz-OpenHIM System to the DHIS2 Platform, and to demonstrate the full working system called Mozambique Open Health Information Mediator (Moz-OpenHIM) and the architecture for the Open Health Information Exchange (OpenHIE).

The goal is to enable partners to send aggregate HIV data from OpenMRS to DHIS2 through the Mozambique OpenHIE architecture, the system Moz-OpenHIM and the specific OpenMRS mapping and export application that allows the mapping of all HIV indicators in OpenMRS and export to DHIS2 through the OpenHIM. The system will allow OpenMRS partners to automatically send HIV aggregate data from OpenMRS through the Moz-OpenHIM into DHIS2 and visualise the aggregate data and reports in a centralised, web-based system and database, accessible to all authorised users, customised for the Mozambique environment that includes all DHIS2 features, reports, dashboards and GIS functions.

TOP: MozOpenHIM Workshop at University Eduardo Mondlane organised by Jembi/ UEM-Moasis

BOTTOM: eSaúde Community and USG Implementing partners at MozOpenHIM Workshop at University Eduardo Mondlane organised by Jembi/UEM-Moasis

Project: CRVS

Jembi/UEM-Moasis continues to provide technical support to the Ministry of Justice, Constitutional and Religious Affairs (MINJUS) supporting the continuation of the CRVS project and the Inter-institutional Vital Statistics Working Group known as GITEV in Mozambique. The technical assistance mainly revolves around facilitating interoperability, systems integration and information exchange among all stakeholders, recording data on vital events relevant to the larger CRVS system. Jembi/UEM-Moasis was also involved in the production of the CRVS Digitisation Guidebook, an online resource that provides step-by-step guidance for countries to plan, analyse, design and implement digitised systems and automated processes for CRVS.

The Cuamba Case

As a result of SIS-ROH implementation supported by Jembi/UEM-Moasis (which consists of installation, training on ICD-10 codes, system use, data collection, analysis, use and dissemination, and maintenance and support) the Rural Hospital of Cuamba is the first hospital in Mozambique to independently publish its full mortality statistics report. The mortality data analysis report was produced using SIS-ROH data. The Rural Hospital of Cuamba has published three reports since January 2015. These developments are profoundly encouraging in the context of project sustainability and reaffirm the possibilities found in technical interventions with a strong focus on local capacity building.

SIS-MA and SIS-ROH on the SIS-Compact Station ICT4HEALTH

Jembi/UEM-Moasis presented a live demo of SIS-MA and SIS-ROH embedded in the SIS-Compact Station at the ICT4HEALTH Conference held at the University of Stellenbosch in November 2015. The SIS-Compact station is a low-cost micro-computer designed and developed by Jembi/UEM-Moasis. It allows a list of pre-determined systems and restricted functionalities, contributing to lower virus contamination. The SIS-Compact station is also low on power consumption and allows for embedded 3G modems for connectivity in low-resource settings. The participants at ICT4HEALTH were pleased with both the software and the SIS-COMPACT station.

ABOVE: Ivan Pinto at the Jembi stand at the ICT4HEALTH Conference

Job Shadowing

Jembi/UEM-Moasis continues to give high value to the transferring and sharing of knowledge and skills through job shadowing among its technical and programmatic teams. This year João Machiana and Paulo Sérgio Matsine, two technical developers from the Mozambique office, joined Jembi's developer's hub in Cape Town to boost their capacity on OpenHIE and DHIS2 and to finalise some of the technical projects from Mozambique working closely together with their Cape Town counterparts. In addition, they were introduced to some of Jembi's new and ongoing projects, including the Blood Safety Strengthening Programme and MomConnect.

Rwanda Programme

Jembi is currently supporting three national projects in Rwanda. Under the Rwandan Health Systems Strenthening Activity project funded by USAID, Jembi has been sub-contracted by Management Sciences for Health (MSH) to provide technical assistance across a variety of strategic projects. The focus over this period has been on strengthening the Rwanda Ministry of Health (MoH) Data Warehouse. This runs on the DHIS-2 platform, providing technical support to the Rwanda Social Security Board (RSSB) during the Community-Based Health Insurance (CBHI) programme transition from the MoH to RSSB. It also supports the MoH and Rwanda Biomedical Center (RBC) in developing the roadmap for the National Electronic Medical Records System Implementation.

The second project is with the University of Rwanda, School of Public Health, providing technical assistance on an implementation science project to evaluate the clinical impact and cost of eHealth in Rwanda using innovative frameworks and local capacity development.

Jembi has been awarded a CDC prime award in Rwanda to provide technical assistance primarily focused on strengthening the PEPFAR reporting system.

2015-16 Highlights

Project: Rwanda MSH RHSSA

With the refining of the MSH Health Systems Strengthening Activity plan, the scope of work originally planned by Jembi Health Systems NPC shifted away from mobile technology landscaping to a more technical assistance focus to better reflect priorities on the ground in Rwanda. Following an information gathering and planning exercise in Rwanda with the local MSH team in May 2015, we developed an updated five-year work plan made up of eight work packages, namely:

1. Rwanda Social Security Board (RSSB) Technical Assistance
2. Rwanda Biomedical Center (RBC) Technical Assistance
3. Ministry of Health (MoH) DHIS Data Warehouse Technical Support
4. Performance Based Monitoring (PBF) Mobile Money Integration: Advocacy and Limited Technical Design and Support
5. Community Health Worker Supply Chain System Application Development
6. National Facility Registry Tool Evaluation and Recommendation
7. National Lab Information System and eIDSR Integration Support
8. eLMIS and DHIS-2 Integration Technical Support.

The focus over this period has been on strengthening the Rwanda Ministry of Health (MoH) Data Warehouse which runs on the DHIS2 platform, providing technical support to the Rwanda Social

LEFT: Jembi and Thoughtworks Team outside the MSH Office in Kigali. Left to right: Emmanuel Rugomboka (Jembi Rwanda Country Coordinator), Lisa George (Jembi Senior BA), Randy Wilson (MSH Team Leader), Wayne Naidoo (Jembi Senior Programme Manager), Pankaj Kanchankar (Thoughtworks Client Principal)

RIGHT: Jembi Developer Kaweesi Joseph (right), based in Uganda, visited Kigali for three weeks to support the RBC developers to upgrade the MoH OpenMRS Platform. Here with Faustin Maniragena (RBC Developer)

Security Board (RSSB) during the Community-Based Health Insurance (CBHI) programme transition from the MoH to RSSB. Specifically the RSSB support has focused on transitioning the Mutuelle Membership Management System developed by Jembi into the RSSB ecosystem. Finally, the last major focus over this period has been on supporting the MoH and Rwanda Biomedical Center (RBC) in developing the roadmap for the National Electronic Medical Records System Implementation, starting with the development of Business Processes and Requirements documentation for the National EMR.

LEFT: Pierre Dane (Jembi Senior Development Manager) training the MoH team on the Data Warehouse synchronisation mechanism developed by Jembi

Project: Rwanda CDC Study TA and SLA (SPH)

Jembi has been sub-contracted by the University of Rwanda, School of Public Health to provide technical assistance on an Implementation Science Project to evaluate the clinical impact and cost of eHealth in Rwanda using innovative frameworks and local capacity development. The primary research questions for the study include:

1. What are the determinants of successful EMR implementations, and what are the operational challenges of scaling up equipment and support?
2. What is the impact of large scale rollout of EMR systems on structural, process and clinical outcomes related to the pre-ART cascade?
3. If these systems are effective, do they also pass a test of cost-effectiveness?

There are three planned components for the study focused on a subset of Ministry of Health (MoH) OpenMRS implementation sites:

1. System monitoring, usability, usage and data quality to assess site performance and optimise intervention sites.
2. Randomised Controlled Trial (RCT) to evaluate the impact of patient summaries and alerts on

HIV care, randomising 100 sites split into 50 intervention and 50 controlled sites.
3. Costing of implementing and maintaining an electronic medical record system to a high standard.

Jembi has developed a Server Monitoring Tool (SMT) to be deployed across the study sites to help collect data (which is submitted automatically to DHIS2) on system utilisation as well as key indicators on the server, internet connectivity etc. This will help provide the MoH with a tool to better monitor the OpenMRS implementations countrywide and help the study team to better understand where the challenges are and identify the intervention

LEFT: Erick Gaju (MoH National eHealth Coordinator) opening the EMR Business Analysis Workshop led by Jembi in Kigali

sites. In addition to developing the SMT, our primary focus has been to upgrade the existing MoH OpenMRS HIV package to the latest stable version of OpenMRS and migrate across three key interventions developed and used by Partners in Health (PIH) Rwanda for a number of years in their supported sites. These interventions include the HIV Adult Consult Sheet, Lost to Follow-up Report and Patient Summary, all of which Jembi will be implementing on the upgraded MoH OpenMRS implementation.

LEFT: Lisa George (Jembi Senior BA) guiding one of the working groups during the recent EMR Business Analysis Workshop hosted in Kigali

Project: Rwanda CDC Co-Agreement: Technical Assistance

Jembi has been awarded a CDC prime award in Rwanda to support the project titled 'Implementing an Electronic Monitoring and Reporting System in the Republic of Rwanda' under the President's Emergency Plan for AIDS Relief (PEPFAR).

The PEPFAR FOA and NOA were originally framed around the maintenance of PRPMS (the PEPFAR reporting system in Rwanda which was subsequently replaced by DATIM) and PEPFAR reporting needs. Following the receipt of the Notice of Award in July 2015, Jembi engaged and worked closely with the CDC Rwandan team to review the work plan. Through this process, the CDC Rwandan team recommended that Jembi's scope of work and work plan for Year 1 and 2 be revised to address certain SI/M&E PEPFAR needs.

The revised scope of work (SOW) for Year 1 ending March 2016 therefore included the following two activities:

- Migrate historical PEPFAR data (DATIM data points only) from PRPMS in DATIM.
- Create a dashboard for PEPFAR indicators that USG Rwanda and IP staff can use to analyse data for evidence-based strategic planning.

TOP: MSH and Jembi leading an Information Systems Architecture workshop with the Rwandan Social Security Board (RSSB) Senior Management team in Ruhengeri Rwanda to start the process of developing an RSSB Enterprise Architecture

BOTTOM: Jembi supported the Rwanda eHealth 2020 Strategic Planning workshop in Gisyeni, Rwanda led by the MoH and MSH

Technology Radar

FHIR

Jembi Health Systems has embraced the newest HL7 Health Information Exchange Standard – Fast Healthcare Interoperability Resources (FHIR). This is a set of standards for exchanging health data via RESTful HTTP services. It's much easier to understand and implement than some of the older, more verbose standards. Jembi engineers are prototyping a FHIR Shared Health Record using MongoDB, have implemented FHIR interfaces to a number of health data warehouses, developed REDCap/FHIR integration interfaces and have implemented FHIR entity registry de-duplication systems. There is also a generic FHIR form builder framework in the offing!

DHIS2

Jembi has worked extensively with DHIS2, implementing a number of prototypes using Tracker, including a CRVS application and an ICDM application, using the Tracker API and the DHIS2 database with an angular.js front end. An innovative way of exporting data from OpenMRS to DHIS2 has also been developed and demonstrated to the OpenHIE HMIS community and the Mozambique Ministry of Health and PEPFAR partners. In Rwanda we developed a system to sync data between source DHIS2 installations and a data warehouse, and in South Africa we developed a full M&E system for mothers2mothers. Jembi is a member of the University of Oslo DHIS2 Experts group and attends and presents at the Experts Academy in Oslo every year.

OpenHIM

Jembi continues to add features to the OpenHIM interoperability layer. It is in use in provincial, national and global implementations, including mHERO for Ebola response in West Africa, Global DATIM data exchange for PEPFAR, MomConnect in South Africa and a host of other settings. Its new ATNA audit repository was tested at the IHE North American Connectathon in Cleveland.

OpenMRS

Jembi Health Systems is an active member of the OpenMRS leadership group and a founding member of the OpenMRS implementers community. Jembi is working with the University of the Limpopo to install OpenMRS in four rural primary health care clinics, and has a strong relationship with Thoughtworks, the company that is developing Bahmni. Jembi is also involved in upgrading the national rollout of OpenMRS in Rwanda and planning the future of patient-based systems in the country.

OpenSRP

Jembi's Software Architect, Hannes Venter, participated in a THRIVE sprint in Nairobi in March to help complete the development of OpenSRP with the Ona and IHS Informatics teams. It was also an opportunity to learn more about the OpenSRP platform and bring some associated expertise back to Cape Town!

BSIS

Jembi continues to refine and develop the functionality of the Blood Safety Information System (BSIS). The purpose of the BSIS is to facilitate the electronic management of information about blood donors and donations in low-resource blood services. This improves the traceability of the blood components produced by blood services and ultimately blood safety within implementing countries. BSIS is built using a open source technology stack including Java, Spring, AngularJS and a MySQL database. The first module of BSIS, the Donor Management Module, was released in February 2016 and BSIS version 1.0, which includes the Blood Management Module, is scheduled for release later in 2016.

Research Publications, Presentations & News

Presentations

2015-04 / DHIS Conference Bloemfontein / Prof C Seebregts & Ivan Pinto / Development and Implementation of the New Mozambique National Health Information System for M&E (SIS-MA), a Systemic Implementation using DHIS2 Platform

http://www.jembi.org/wp-content/uploads/2015/04/SISMA-presentation-HISP-Bloemfontein-FINAL-1.pdf

http://www.jembi.org/wp-content/uploads/2015/04/Chris-Seebregts_HISP-Presentation-OpenMRS-3.pdf

http://www.jembi.org/wp-content/uploads/2015/04/PS15_Chris-Seebregts_HISP-Presentation-HIE-5.pdf

2015-06 / Ministry of Gender, Children & Social Welfare / Marcelino Mugai & Marina Chichava / MGCAS M&E System Assessment Presentation

2015-08 / Ministry of Justice / Dr A Campione, Prof L Nhampossa & Prof C Seebregts / Support for the Strengthening of the CRVS System in Mozambique

2015-08 / Medinfo 2015 Conference São Paulo, Brazil / Prof C Seebregts

2015-10 / African Mortality Statistics Expert Workshop in Cairo / Ivan Pinto / Mozambique's National Mortality Registration System

http://www.jembi.org/ministry-health-justice-uem-moasisjembi-presented-mozambiques-national-mortality-registration-system-african-mortality-statistics-expert-workshop-cairo/

2015-11 / ICT4HEALTH2015 Stellenbosch / Ivan Pinto / SIS-MA, SIS-ROH and SIS-Compact Station Presentation

2015-11 / 12th Africa Symposia on Statistical Development (ASSD) Meeting Libreville, Gabon / Prof C Seebregts / Launch of the CRVS Digitisation Guidebook

http://www.jembi.org/jembi-launches-crvs-digitisation-guidebook-2/

2015-12 / Union World Conference in Lung Health 2015 Cape Town / Prof C Seebregts / Panel Session

2016-01 / University Eduardo Mondlane / Dr A Campione / Mozambique OpenHIM Presentation

Publications

Seebregts CJ, Pillay A, Crichton R, Singh S, and Moodley D. **Enterprise Architectures for eHealth in "Global Health Informatics to Improve Quality of Care",** Editors: Celi LA, Fraser HS, Nikore V, Osorio JS, Paik K. MIT Press 2016 in press

Seebregts CJ, Benjamin P, Tanna, G and Barron P. **MomConnect: An exemplar national mobile maternal health implementation in South Africa (2016).** South African Health Review, 2016, 125-136

Ogundele K, Moodley D, Pillay A and Seebregts CJ. **An ontology for factors affecting tuberculosis treatment adherence behaviour in sub-Saharan Africa (2016).** Patient Preference and Adherence, 2016, 10, 669

Ogundele K, Moodley D, Seebregts CJ and Pillay A. **An Ontology for Tuberculosis Treatment Adherence Behaviour. Proceedings of the 2015 Annual Research Conference on South African Institute of Computer Scientists and Information Technologists (2015)**

TOP: Chris Seebregts (Jembi CEO), Ivan Pinto (Mozambique Programme Manager), Pierre Dane (Developer Team Lead) at DHIS2 Conference

BOTTOM: The launch of the CRVS Digitisation Guidebook

News

Jembi lead developers Pascal Brandt and Ryan Crichton are the first Masters students to graduate from HeAL in the UKZN/Council for Scientific and Industrial Research's (CSIR) Meraka Centre for Artificial Intelligence Research. Both graduates received a bursary from the UKZN Health Architecture Laboratory, funded by the IDRC and Rockefeller Foundation.

LEFT TO RIGHT: Dr Deshen Moodley (Supervisor), Pascal Brandt, Ryan Crichton, Mr Anban Pillay (Supervisor)

Some people hear their own inner voices with great clearness. And they live by what they hear. Such people become crazy... or they become legend.
Duma Mtungwa

Teamwork makes the dream work. Struggles and Criticism are the prerequisites for greatness.
Jono Gebers

I'd rather attempt to do something great and fail than to attempt to do nothing and succeed.
Herve Rutagarama

On the path of health equality: The idea that some lives matter less is the root of all that is wrong with the world.
Laura Vignoli

With dedication, motivation, vision, talent, dialogue and teamwork contribute to the development of society.
Jose Chauque

Ubuntu! Seek the stars of a fortunate future, but plan for a healthy today.
Brian Armstrong

There is always a light after the tunnel.
Memory Bunza

Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has. **Lisa George**

The ones who are crazy enough to think they can change the world, are the ones that do.
Dagmar Timler

Let's work together and take universal wellness to new frontiers. Health for all!
Marina Chichava

Experience is simply the name we give our mistakes. **Banucho Cassamo**

Do not be afraid to think differently from others, afraid to think alike, and discover that they are all wrong.
Adelino Covane

If you want to go fast, go alone; if you want to go far, go together... We want to go far! **Carl Fourie**

Every theory has to come down to practice. **Jose Da Silva**

"Start by doing what's necessary, then do what's possible and suddenly you are doing the impossible."
Nathan Floor

It seems impossible until it´s done! **Nayo Macamo**

Eventually everything connects - people, ideas, objects. The quality of the connections is the key to quality per se.
Daniel Futerman

Blessed are the pure in heart, for they will see God.
Andrew Napier

Try not to become a person of success, but rather try to become a person of value. **Brett Ausmeier**

If you cannot do great things, do small things in a great way. **Lindie Spies**

At Jembi we throw the heart beyond the hurdle, towards better health for all in Africa, then we think about how the hell we get there!
Stefano Marmorato

Those who bring sunshine to the lives of others, cannot keep it from themselves. **Owen Heckrath**

Our prime purpose in this life is to help others. And if you can't help them, at least don't hurt them. **Sanet Seebregts**

When the heart is at ease, the body is healthy. When the body is healthy the mind is wealthy.
Corbin Roman

PLUR: Peace, Love, Unity, Respect.
Martin Brocker

You must be the change you wish to see in the world. **Chris Seebregts**

Perfection is not attainable, but if we chase perfection we can catch excellence.
Ryan Crichton

There are no speed limits on the road to excellence.
Tariro Mandevani

If you don't have a dream you cannot have a dream come true. **Sichale Silungwe**

It is health that is real wealth & not pieces of gold and silver.
Jonnea Smith

A necessidade é a mãe das invenções.
Ivan Pinto

If you can hold it on mind; you can hold it in your hands.
Evans Mutale

The diversity of the countries that are our goals. **Sergio Cardoso**

Human development by means of analysis and synthesis enriched by constant discussions.
Oreste Parlatano

Your work is going to fill a large part of your life, and the only way to be truly satisfied is to do what you believe is great work. And the only way to do great work is to love what you do. **Deshen Moodley**

Keep your eyes on the stars and your feet on the ground. **Linda Taylor**

In every crisis lies the seed of opportunity. **Antonio Macheve Jr.**

It always seems impossible... till it´s done!
Quintin Spies

I've never been certain whether the moral of the Icarus story should only be, as is generally accepted, 'Don't try to fly too high,' or whether it might also be thought of as, 'Forget the wax and feathers and do a better job on the wings.' **Hannes Venter**

Innovation requires collaborative genius.
Andy Gray

Unthinking respect for authority is the greatest enemy of truth. **Pierre Dane**

All that a dream needs to be done is someone who believes that it can be done.
Antonio Sitoi

Healthy citizens are the greatest asset any country can have. **Clive Seebregts**

In the business world everyone is paid in two coins: cash and experience. Take the experience first, the cash will come later.
Amisse Momade

Jembi staff are my family! **Edah Williams**

Pure air, sunlight, abstemiousness, rest, exercise, proper diet, the use of water, trust in Divine power-these are the true remedies.
Kaweesi Joseph

"I am not a product of my circumstances. I am a product of my decisions."
Gloria Makeleni

"The mind is not a vessel to be filled but a fire to be kindled."
Joy Oba

jembi
health systems NPC

2015-16 Financials

General Review of Operations

The period running March 2015 to February 2016 was a very exciting period for Jembi Health Systems with three new prime awards through the Centers for Disease Control and Prevention (CDC) being awarded to Jembi. All three awards started on the 1st of April 2015 and run until the end of March 2020. The awards include a new prime award to fund Jembi's work in Mozambique, which also acts as a continued support mechanism from CDC with the past five year award ending in June 2015. A new prime award to fund our work in Rwanda was awarded as well as a new prime award to support the Blood Safety Strengthening Program (BSSP) through Jembi.

Alongside continued support from CDC, which makes up 77% of the organisation's funding, we were able to increase our income through USAID to 14% and also increase smaller contractual/deliverable based income streams to 9%. This is a great achievement for the team where diversification of funding is still a key outcome we are striving to achieve. Income figures grew slightly from year ending February 2015 with income growth of 3%. The forecast for the new year ending February 2017 is that growth of income and expenditure is forecast to be 50% higher than the year ending February 2016 with new prime awards going into Year 2 and full implementation of BSSP to new countries alongside new grant opportunity applications with a very high success probability.

Linked to the increase in funding, staff numbers grew to 63 – an increase of 21% from the previous year. The largest growth was in the South African-based teams with new roles coming in under our BSSP award, strengthening of our programme management team, improving our efficiency with a new senior analyst post and adding more highly skilled technical developer staff members. With the forecast of 50% increase in income and expenditure in the new year we predict that these figures will increase dramatically as we enter Year 2 of our new awards and continue to gain a name as experts in National Health Information systems development and implementation in Africa.

Expenditure dipped slightly in FY16 with a reduction of 0.05% with the largest expenditure being staff payments (76% of total expenditure). This is linked to Jembi in-house expertise and building of in-house technical development skills opposed to high-level use of external contractors. The split of expenditure across Jembi's three main programme areas remained close to FY15 data with South African expenditure making up 35% of total expenditure, Mozambique remaining Jembi's main programme with expenditure of 58% and Rwanda starting to grow again with new awards through CDC, a sub-award through University of Rwanda and continued support through MSH USAID's sub-award making up the remaining 7% of Jembi expenditure. Jembi was able to lower the project support costs to only 9% of overall expenditure. This is a testament to Jembi's aim to be a highly efficient and effective non-profit organisation, utilising donor funds to fulfil our vision of a world in which health systems and information advance global health.

2016 INCOME BY FUNDER

- CDC, 77%
- USAID, 14%
- In country income Rwanda, 1%
- Other, 8%
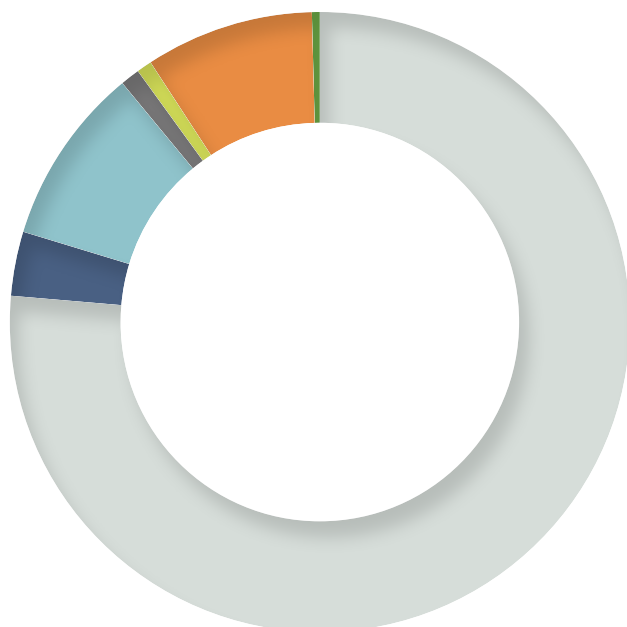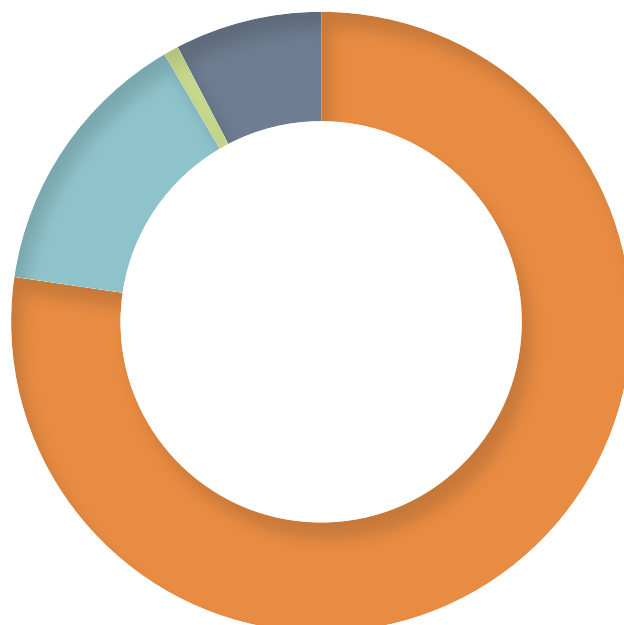
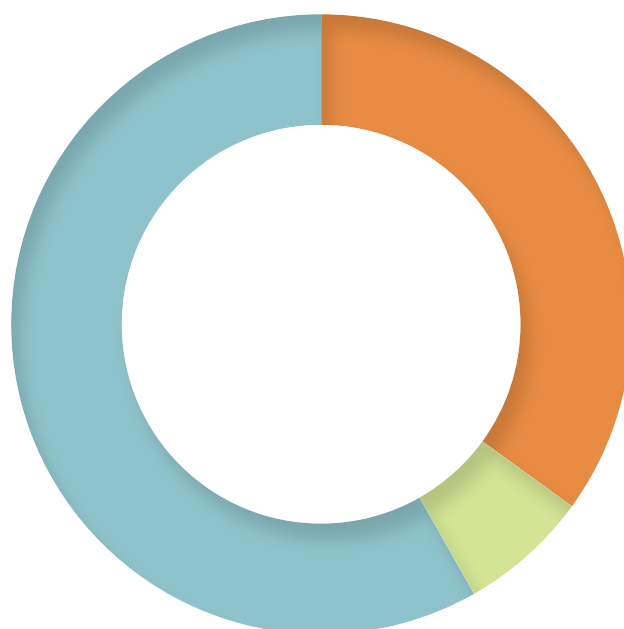## **2016** EXPENDITURE BY COST CATEGORY
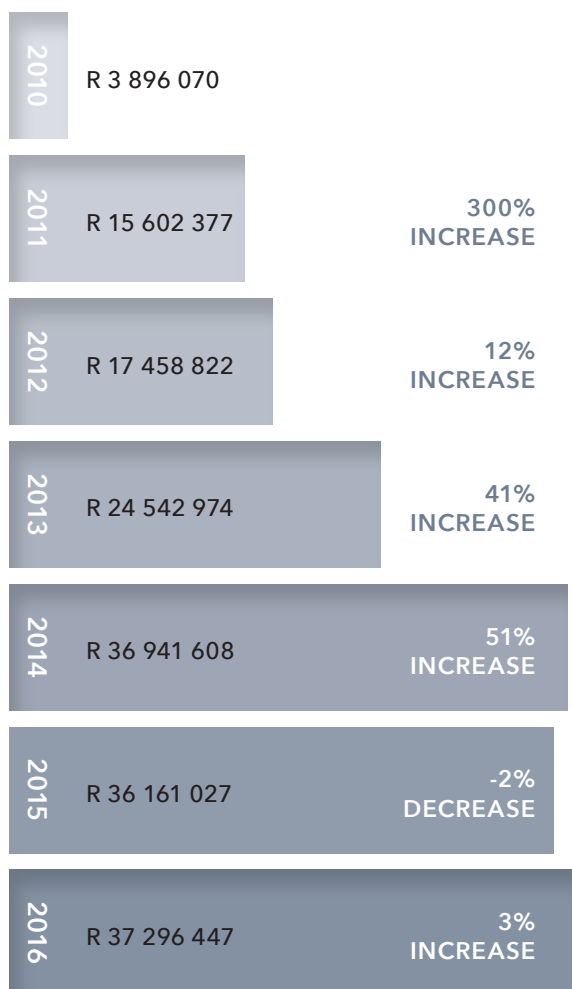
Salaries, 76%
Procurement, 3%
Project support costs, 9%
Governance/strategy and comms work, 1%
Training, 1%
Travel, 9%
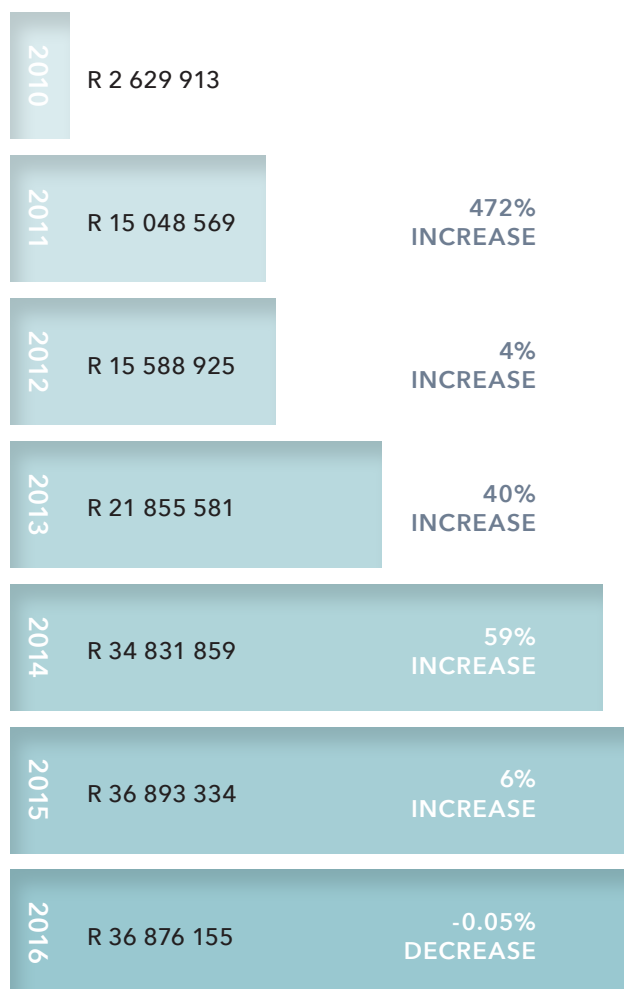Contractual, 0,3%

2016 EXPENDITURE BY PROGRAMME

- Digital Health, 35%
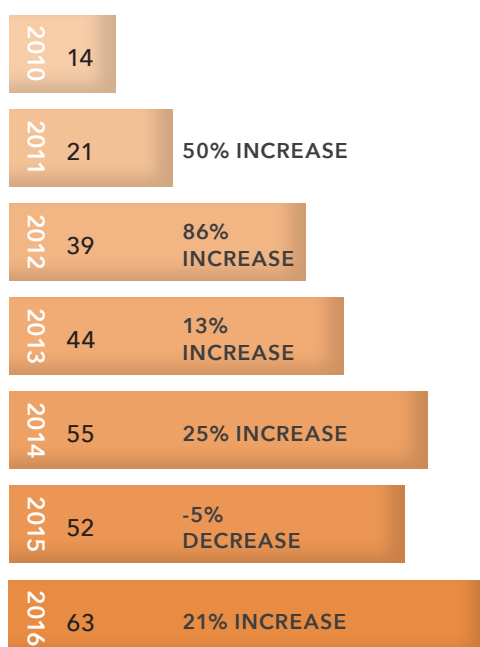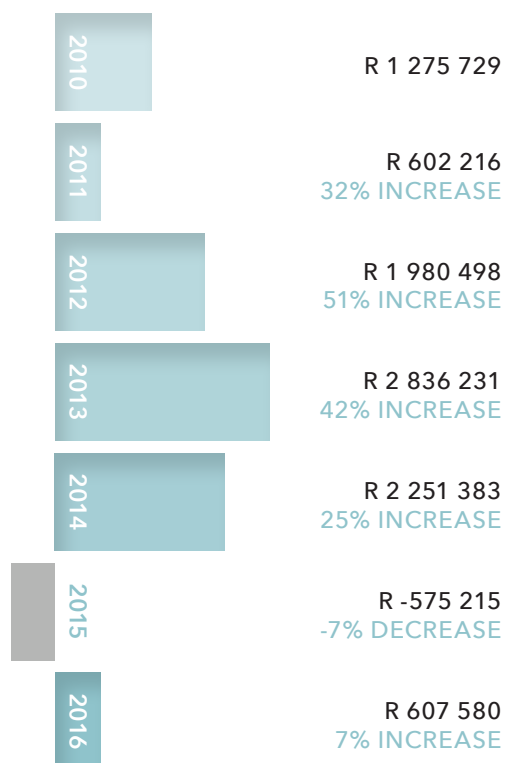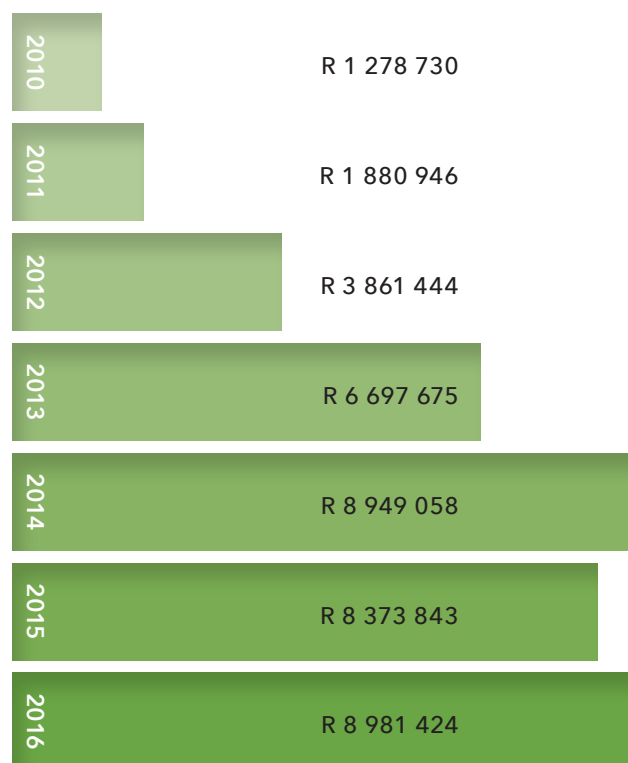- Rwanda, 6%
- Mozambique, 58%

INCOME

Year	Amount	Change
2010	R 3 896 070	
2011	R 15 602 377	300% INCREASE
2012	R 17 458 822	12% INCREASE
2013	R 24 542 974	41% INCREASE
2014	R 36 941 608	51% INCREASE
2015	R 36 161 027	-2% DECREASE
2016	R 37 296 447	3% INCREASE

EXPENDITURE

Year	Amount	Change
2010	R 2 629 913	
2011	R 15 048 569	472% INCREASE
2012	R 15 588 925	4% INCREASE
2013	R 21 855 581	40% INCREASE
2014	R 34 831 859	59% INCREASE
2015	R 36 893 334	6% INCREASE
2016	R 36 876 155	-0.05% DECREASE

STAFF NUMBERS

Year	Number	Change
2010	14	
2011	21	50% INCREASE
2012	39	86% INCREASE
2013	44	13% INCREASE
2014	55	25% INCREASE
2015	52	-5% DECREASE
2016	63	21% INCREASE

RESERVES, ADDITIONS AND REDUCTIONS

2010 R 1 275 729

2011 R 602 216
32% INCREASE

2012 R 1 980 498
51% INCREASE

2013 R 2 836 231
42% INCREASE

2014 R 2 251 383
25% INCREASE

2015 R -575 215
-7% DECREASE

2016 R 607 580
7% INCREASE

TOTAL CUMULATIVE RESERVES

2010 R 1 278 730

2011 R 1 880 946

2012 R 3 861 444

2013 R 6 697 675

2014 R 8 949 058

2015 R 8 373 843

2016 R 8 981 424

STAFF NUMBERS BY COUNTRY
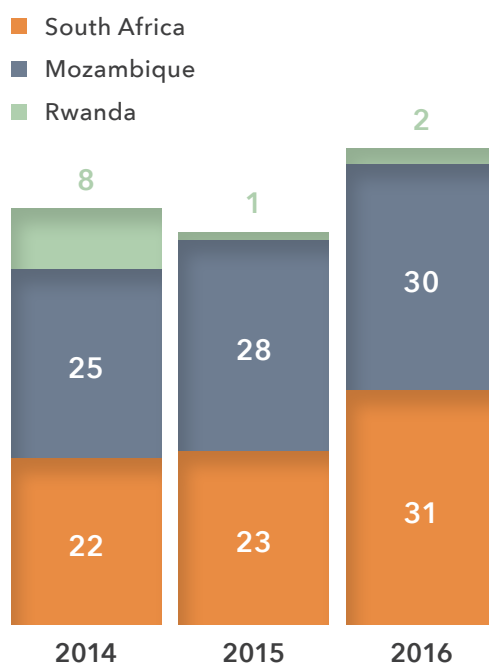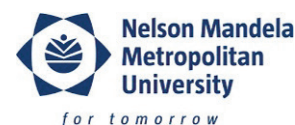
- South Africa
- Mozambique
- Rwanda

	2014	2015	2016
Rwanda	8	1	2
Mozambique	25	28	30
South Africa	22	23	31

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