CIDRZ
for a healthy Zambia
20 years

2021 - 2022
ANNUAL REPORT

Amplifying our impact to improve access to quality healthcare.


Amplifying our impact to improve
access to quality healthcare.
AMBULAN
IVECO

Table of **Contents**

Vision

A Zambia and a region, in which all people have access to quality healthcare and enjoy the best possible health.

Mission

To improve access to quality healthcare in Zambia through innovative capacity development, exceptional implementation science and research, and impactful and sustainable public health programmes.

Our Core Values

Accountability

Our staff members embody ownership and embrace accountability for their contributions and decisions.

Equality

CIDRZ fosters a culture of fairness and equal opportunity.

Honesty

Our staff members consistently uphold integrity and transparency in all their activities.

Productivity

Our team strives for excellence and consistently delivers high-quality results.

Respect

We nurture a workplace culture where all individuals, including partners and stakeholders, are valued and their differences are celebrated.

Transparency

Our organization embraces open communication and fosters an environment for constructive, open, and honest problem solving.

Who We Are

The Centre for Infectious Disease Research in Zambia (CIDRZ) is an independent non-governmental organisation committed to answering key research questions relevant to Zambia and the region. CIDRZ support local ownership of high quality, complementary, and integrated healthcare research and services within the Zambian public health system and facilitate clinical, research, and professional development training.

CIDRZ has over twenty years of ongoing collaboration with the Government of the Republic of Zambia (GRZ) and its ministries. Our longevity and success are in great part attributed to our deep relationships with leading local and international universities, foundations, and partner organizations. CIDRZ ensures that the latest research methodologies are used to answer locally relevant questions to improve healthcare delivery. CIDRZ also support fellowship programmes for Zambian scientists and researchers focused on building the knowledge and skills needed to drive evidence generation to support health policy development.

Over the past two decades, our focus areas have evolved organically, shifting from primarily an HIV (Human Immunodeficiency Virus) focus to encompass other infectious diseases such as enteric pathogens, which contribute significantly to morbidity and mortality particularly for children and the immunocompromised. At CIDRZ, we aim to serve diverse populations that are most vulnerable to illness or poor outcomes. We use our skills in social and behavioural change, health systems improvement, laboratory work, and supply chain management to enhance the delivery of health services. As we look ahead, we plan to expand our efforts to anticipate and tackle new global health threats, with a focus on monitoring Antimicrobial Resistance, fortifying our lab capabilities, and expanding our vaccine portfolio.

Board Chair and CEO Note

Bradford Machila
Board Chairman

Izukanji Sikazwe
Chief Executive Officer

In FY2022, CIDRZ celebrated two major milestones, the first was the start of construction of a new Head Office building, which will solely be owned by CIDRZ. Secondly, we successfully commissioned a new branch of the CIDRZ Central Laboratory on the Copperbelt Province.

As an organisation, we remain steadfast on our path to achieve our vision of a Zambia and a region, in which all people have access to quality healthcare and enjoy the best possible health. The collaborative support from the Ministry of Health (MOH) and our various partners and funders is one of the driving forces to our success as an organisation.

To augment our impact and improve access to quality healthcare, CIDRZ handed over the first-ever Zambia National Non-Communicable Disease and Injuries (NCDIs) Poverty Commission Report to the Ministry of Health (MOH). Based on the work of the NCDI Commission, we were awarded funding to implement the Package of Essential NCD (Noncommunicable Disease) Interventions (PEN-Plus) project which is an integrated delivery strategy for chronic care of severe NCDIs at intermediate-level facilities such as district hospitals. The project aims to provide mid-level healthcare providers such as nurses and clinical officers with the shared competencies needed to deliver integrated care for groups of related conditions, including psychosocial support and palliative care.

We also partnered with Qure.ai, a leading health-tech company that builds artificial intelligence (AI) powered medical imaging diagnostic solutions, to implement comprehensive screening in Zambia. This partnership was supported by the U.S. Centers for Disease Control and Prevention (CDC) through a cooperative agreement with the U.S. Civilian Research and Development Foundation (CRDF Global, an independent non-profit organization that promotes international scientific and technical collaboration, particularly between countries where official relations are strained). Through this partnership, we made significant contributions to ending TB by the year 2030, including the development of qXR solutions for Chest X-rays, which will increase tuberculosis (TB) detection and monitoring in health facilities across the country.

Through FY2022, CIDRZ worked with many stakeholders to address health disparities across health segments including diarrhoeal diseases, TB, and HIV for children, adolescents, women, and men. With support from the United States Agency for International Development (USAID), we were able to extend our work to improve the health of Zambians by preventing new HIV infections among key and priority populations, through the new USAID Controlling HIV Epidemic for Key and Underserved Populations (CHEKUP) I project.

With support from the United States (US) Presidents Emergency Plan for AIDS Relief (PEPFAR) and CDC, CIDRZ provided technical assistance to the MOH through the Lusaka Provincial Health Office (LPHO). CIDRZ support included health care provider trainings, technical support and mentorship, and service delivery through the Key Population Investment Fund Program (KPIF).

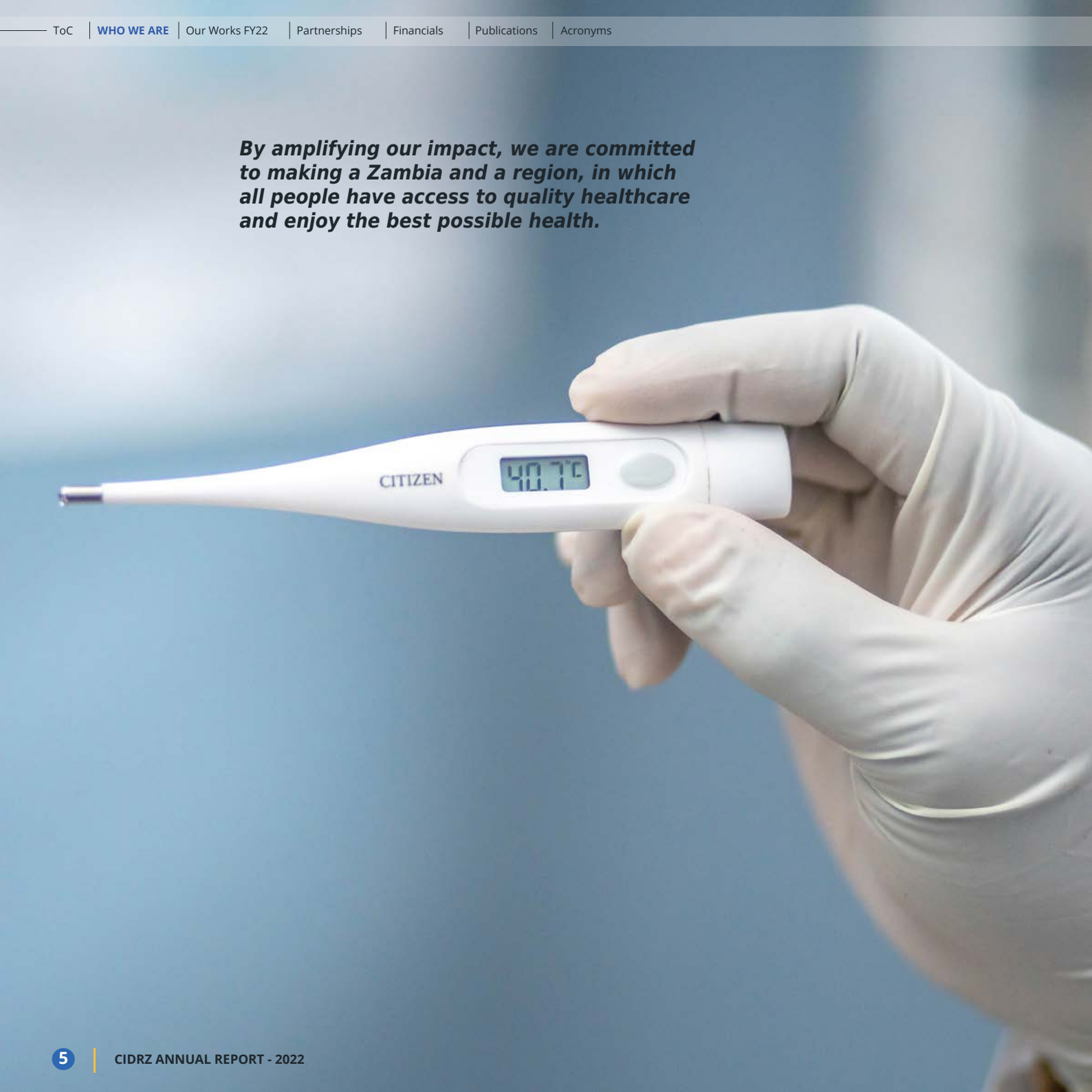
Our team of researchers carried out exceptional research to find answers and contribute to scientific evidence around diarrhoeal diseases in children and adults, TB diagnoses, mental health, and COVID-19.

We express our sincere gratitude to all our Funders and Partners that have contributed material, technical, and financial resources to support our work. We would like to thank the CIDRZ Management and Staff for their contribution and commitment towards implementing and achieving CIDRZ's new strategic objectives.

We hope you enjoy reading about the success that CIDRZ achieved this year.

CIDRZ worked towards providing quality healthcare to all people in Zambia with the support of partners and funders, while achieving significant milestones and carrying out exceptional research

By amplifying our impact, we are committed to making a Zambia and a region, in which all people have access to quality healthcare and enjoy the best possible health.



Board of Directors

Bradford Machila

Board Chair
Senior Special Assistant to the President of the Republic of Zambia. Member of the Law Association Zambia and the International Bar Association.

Kondwa E. Sakala-Chibiya

Deputy Board Chair
Lawyer and advocate of the High Court and Supreme Court of Zambia and Managing Partner of J.B. Sakala Legal Practitioners. Founding member and vice President of the Female Lawyers Association of Zambia and a member of the Institute of Directors.

Dr. Barbara Castelnuovo

Head of Research at the Infectious Disease Institute (IDI) and College of Health Sciences, Makerere University in Uganda.

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Prof. Michael Saag

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Chief Executive Officer

Emanuel Qua-Enoo
Deputy Chief Executive Officer

Ackim Sinkala
Chief Financial Officer

Dr. Carolyn Bolton-Moore
Chief Medical Officer

Ronald Sinkala
Company Secretary

Mwansa Lombe
Human Resource Director

Our aim is to improve access to quality healthcare in Zambia through innovative capacity development, exceptional implementation science and research, and impactful and sustainable public health programmes.

Leadership Team

Dr. Michael Herce
Dir. Implementation Science

Emmanuel Lumbwe
Dir. Internal Audit

Dr. Mwangelwa Mubiana Mbewe
Dir. Child and Adolescent Health

Dr. Monde Muyoyeta
Dir. Tuberculosis

Dr. Mwanza Wa Mwanza
Dir. Clinical Care

David Ojok
Dir. Central Laboratory

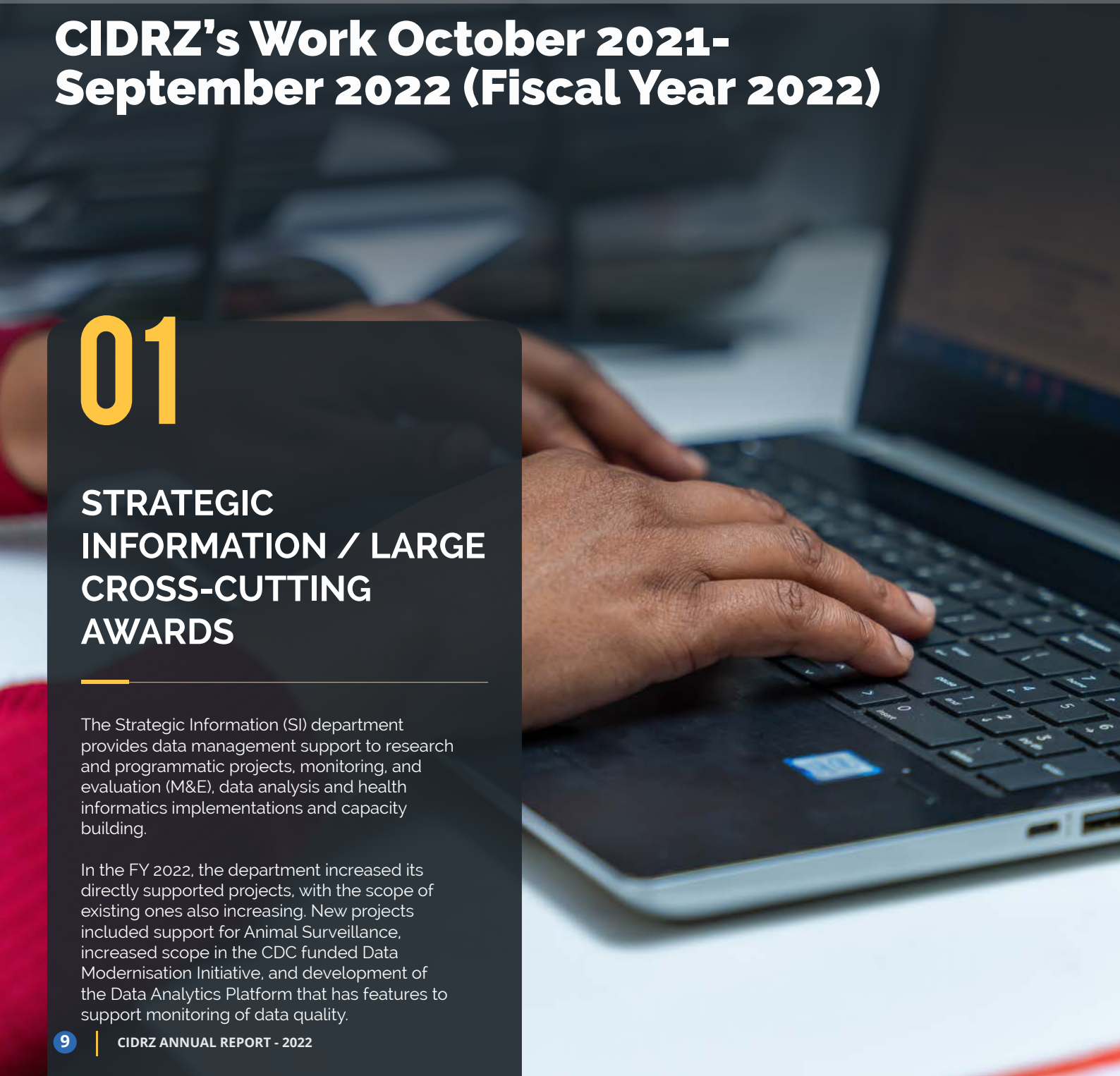
Ms. Cheryl Rudd
Dir. Primary Care and Health Systems Strengthening

Dr. Theodora Savory
Dir. Monitoring and Evaluation/COP ACHIEVE & PROUD-Z

Michelo Simuyandi
Director Enteric Disease Vaccine and Research Unit

We envision a Zambia and a region, in which all people have access to quality healthcare and enjoy the best possible health.

CIDRZ's Work October 2021-September 2022 (Fiscal Year 2022)



01

STRATEGIC INFORMATION / LARGE CROSS-CUTTING AWARDS

The Strategic Information (SI) department provides data management support to research and programmatic projects, monitoring, and evaluation (M&E), data analysis and health informatics implementations and capacity building.

In the FY 2022, the department increased its directly supported projects, with the scope of existing ones also increasing. New projects included support for Animal Surveillance, increased scope in the CDC funded Data Modernisation Initiative, and development of the Data Analytics Platform that has features to support monitoring of data quality.

PROUD-Z- Provincial Ownership to Uplift Delivery of HIV/TB services in Zambia.

Funder: The Center for Disease Control and Prevention (CDC), USA **Time Period:** Oct 2020 - Sep 2025

During 2022, great strides were made towards attainment of the 95-95-95 targets for Lusaka Provincial Health Office (LPHO). Ninety five percent of people living with HIV know their status, 95% of the identified positives are on medication, and, as a milestone for CIDRZ, the target of 308,153 clients current on ART in LPHO was 100% achieved. Great progress has been made with the third 95, where 90% of eligible clients had a viral load test completed and 95% are virologically suppressed. Most clients are receiving six months of medication (89% of the facilities have 90% of their clients on 6 Multi Month Dispensation (MMD). Our focus in FY22 was to maintain clients in care, and this will continue in FY23.

The gaps that need attention are finding HIV positive children and adolescents, and engaging them in care, this will be the focus for FY23. The results of a Recent Infection and baseline Viral Load testing are being used to identify hotspots of active transmission of HIV. In response, enhanced generalized case finding and prevention activities have started in those geographical areas to stop this active transmission.

Collaboration and coordination with LPHO, District Health Offices (DHOs), IPs Implementing Partners (IPS) and CDC has improved, with CIDRZ support appreciated at all levels. The team successfully supported COVID-19 vaccination, IPC activities and men's clinic activities in Southern, Eastern and Lusaka Provincial Health Offices.

PROUD Z - SmartCare support

The department continued its support to the National Electronic Health Records (EHR) system, SmartCare (SC). It was focused on aligning reports to standard reporting guidelines. In addition, new reports were introduced in the Electronic Health Records (EHR) per MoH and other HIV-based implementing partners' request. In this activity, the department's development team worked very closely with the Institute for Health Measurements (IHM) development team, who are the SC development partners supporting MoH.

PROUD Z (RECENCY)- Recent Infection Surveillance

CIDRZ, in collaboration with the MOH and CDC, continued to lead the implementation of the recent infection surveillance program during 2022 and through partner collaborations provided all stakeholders with the surveillance data for immediate public health action. This testing identifies hotspots of active (less than one year) HIV transmission. The implementation was conducted in Lusaka, Copperbelt, Central and Southern provinces.

By the end of September, a total of 680 facilities were activated for Recency with 46,503 Recency test conducted. The coverage of recency testing for newly identified HIV positive people increased from 50% at the beginning of the year to 73% by the end September. Successes were noted by the increased tester pool from 344 to 550 lab staff at year-end and four new hub-laboratories were activated. CIDRZ conducted data use orientations and provided access to the dashboard hosted on Power BI (Business Intelligence). The IPs monthly reporting tool was included in the DHIS2 platform.

In collaboration with CDC, CIDRZ continued to enhance data analytics and use GIS applications to map clusters of recent infection. A recent infection response guideline was developed with the MOH and LPHOs, additionally, CIDRZ is piloting a Recency hotspot response for adolescent girls in Chawama and Kanyama.

PROUD Z (CBS)- Case Based Surveillance

During FY22, CIDRZ continued to provide Technical Assistance to MOH in implementing the HIV Case Based Surveillance (CBS) and continued to adapt solutions to requirements as the programme evolved. These included putting in place CBS documentation, clarifying data analysis and data management work streams following identification of bottlenecks to routine availability of high-quality data from the National Data Warehouse.

Through various partner engagements, best practices were adopted which included routine production and dissemination of subnational level CBS reports to promote public health response, which will be intensified in 2023. Visibility of the program was enhanced through various dissemination of CBS analysis work at both local and international fora in form of poster and oral presentations. These analyses on viral load suppression and interruption in treatment among children and adult recipients of care (RoC), highlighted challenges in achieving HIV care-cascade goals, and advocated for investment in antiretroviral therapy (ART) initiation and adherence support for males and younger RoC.

PROUD Z (HIS)- Health Information System Support

CIDRZ continued to support the four provincial health offices and partners in implementing and providing support for the Monitoring and Reporting information system (MORE-ZM). Through various capacity building activities, Provincial Health Office (PHO) Information Specialists were enabled to administratively manage their instances. Initiatives to improve reporting through automation were implemented, with routine data upload activities enhanced to eliminate manual processes.

To increase data demand and data use, a Data Analytics Platform (DAP) was developed that provided an intuitive and comprehensive reporting function of the HIV prevention and treatment programme. The platform has since been utilised by over 100 users including clinicians, M&E, community, and program implementation leads across various program areas. CIDRZ also participated with other partners to integrate the automated Data Quality Monitoring and Improvement System (DQMIS) tool into DAP to strengthen data usage and analysis.

PROUD Z (DMI) - Data Modernization Initiative

CIDRZ received funding from CDC, made available through the American Rescue Plan Act of 2021, for three years to implement the Data Modernization Initiative. This project is being implemented in collaboration with MOH, Institute for Health Measurements (IHM), Zambia National Public Health Institute (ZNPHI), and Association of Public Health Laboratories (APHL). CIDRZ brings its vast health information systems deployment and data analytics expertise to the project.

The outcome of the project is to have a strengthened public health system that will provide government decision makers with more timely, accurate, and comprehensive public health data to better prevent, detect, and respond to public health threats. A key focus area for CIDRZ in this initiative is to coordinate the development of data governance policies and a health informatics curriculum and certification program.

PROUD Z (Telemedicine) - Adoption of Innovative Approaches to ensure continuity of Quality TB services during COVID-19 pandemic in Lusaka and Livingstone Zambia.

During the COVID-19 pandemic, government restrictions on movement decreased access to health care. Although Differentiated Service Deliver (DSD) models have been widely adopted in HIV programs, this is a novel approach for TB programs. Zambia's National TB and Leprosy program (NTLP) has already changed policy to allow such adaptations of service delivery.

In response, CIDRZ is conducting a study to evaluate DSD models for both TB treatment and TB preventive therapy (TPT) using standardized indicators in three Health facilities in Lusaka and two Health facilities in Southern province. The study uses innovative approaches using digital platform such as SMS and phone call to follow up and remote monitoring adverse effects for recipients of care who have received ATT for two months during intensive phase and four months during the continuation phase and those who have received 3HP for three months or INH for six months. Overall study targets were met. Participant enrolments were completed in September 2022. .

PROUD Z MC PROGRAM

The CIDRZ VMMC (Voluntary Medical Male Circumcision) Programme completed its first year of Technical Assistance (TA) on a positive note. All WELS (Western, Eastern, Lusaka and Southern) provinces exceeded their respective targets for Male Circumcision (MC) numbers for FY22 including the 80% target for the 15–29 priority age group. Through our quarterly visits to all WELS provinces, the team has seen considerable progress, some of these in the last 12 months include:

One Human Centred Design (HCD) training was done in Eastern Province with 51 participants trained and certified. HCD orientations were done in 15 districts in Lusaka and Southern Province. Segmentation mentorship (for the three men segments of older men, opinion leaders and religious figures) were conducted in all districts in Lusaka, Eastern and Southern Provinces. Soccer tournaments were held in Luangwa, Rufunsa and Chirundu districts; road shows took place in Lusaka and Chirundu. The CIDRZ VMMC team participated at Kazanga, Nc'wala, and Kulamba ceremonies. The surgical truck has been instrumental in increasing capacity for the VMMC service provision during various national events and traditional ceremonies, and providing services in remote areas.

For all four provinces, CIDRZ procured supplies for both the dorsal slit and ShangRing device methods. This efficient and timely procurement avoided stockouts in the WELS Provinces. CIDRZ successfully trained over 180 ShangRing providers and orientated over 120 providers in the use of combination lidocaine and bupivacaine topical anesthetic (LiB) in the WELS Provinces. In addition, 38 ShangRing Trainers of Trainers (TOTs) were trained. Providers in LPHO were continuously mentored in various areas of service provision. In collaboration with the PHOs (Provincial Health Offices), two sites in each of the WELS Provinces were successfully transitioned into VMMC Centres of Excellence.

PROUD Z TA (PAEDS)- Technical Assistance Paediatrics

Funder: CDC **Time Period:** Sep 2020 - Sep 2025

We continued to build LPHO and facility capacities to sustain quality paediatric HIV care. Focus for this year has been to intensify HIV case finding through the Know Your Child's HIV Status (KYCHS) and improve viral load coverage and suppression. The year ended with a KYCHS completion rate of 92%, viral load coverage of 87% and suppression rate of 94%.

PROUD-Z Technical Assistance- Adult Care and treatment

Technical Assistance (TA) support focused on improving collaboration and building capacity for Lusaka Provincial Health Office (LPHO) staff in providing client-centred services through the provision of combined prevention, care, and treatment interventions in the 7 supported districts in Lusaka across all age groups and populations. We mainly used the Continuous Quality Improvement (CQI) approach to identify gaps in service provision, align capacity building interventions, and engage LPHO staff to successfully implement activities in line with the 95-95-95 targets and CDC priorities.

We scaled up community posts and men's clinics in 35 Health facilities. Focused HIV case finding was facilitated with the help of risk screening tools, HIV Self-tests and index testing, and followed by immediate (94%) treatment initiation. This resulted in 308,511 People Living with HIV (PLHIV) currently receiving ART (100% of the Lusaka target). Improved management of PLHIV on medication, resulted in 90% of clients receiving a Viral Load test and 95% being Virologically Suppressed (without detectable virus in their blood).

With support from CIDRZ, LPHO managed to provide 6 Months of Dispensation (6-MMD) to 89% of eligible patients and reduce attrition to treatment (84% at 12 months). Additional support was provided to LPHO in achieving the 70% COVID-19 vaccination target. ART community dispensation was conducted in 18 high-volume facilities in Lusaka districts with over 15,000 RoCs who were late and brought back to care between February and June 2022.

PROUD Z (CETA)- Mental Health Services for PLHIV: Common Elements Treatment Approach (CETA)

Over the past years, mental health challenges have been inadequately managed especially among people living with HIV (PLHIV). The impact of untreated mental health conditions is significant and negatively affects treatment adherence and retention for PLHIV. Although various interventions have been used to address these challenges, the client burden is too high for mental health professionals.

CIDRZ and the MOH, with consultants from Johns Hopkins Bloomberg School of Public Health (JHU), continued to implement the Common Elements Treatment Approach (CETA) for PLHIV. CETA was integrated into the antiretroviral treatment services in selected health facilities, with an initial focus on clients having difficulties with HIV treatment adherence and unsuppressed viral load. By the end of 2022, 57 counsellors were trained in 27 clinics and the clients who completed the CETA course showed a marked improvement of 92-95% in their mental health, based on the CMF (client Monitoring Form) scores.

PROUD Z (ANC) Antenatal Care COVID - Covid in ANC study

Funder: CDC **Time Period:** Oct 2022 - Dec 2022

The ANC COVID Surveillance Study aims to determine the seroprevalence of COVID (SARS-CoV-2) in pregnant women aged 15-49 years who present to the 39 selected study sites in Chadiza, Chipata, Chongwe and Lusaka districts for their first antenatal care (ANC) visits.

Study activities commenced with stakeholder engagement meetings with Provincial and District Health Directors, lead laboratory and safe motherhood coordinators. A total of 113 nurse-midwives, laboratory staff and community health workers from ten health facilities per district were trained in protocol, laboratory procedures and data tools. Community sensitisation meetings were held with 20 representatives of Neighbourhood Health Committees from within the study sites' catchment areas.

By the end of September 2022, the study had recruited 9,003 participants from all districts and tested 6,805 samples, 68% of which were positive for SARS-CoV-2 Human IgG while 4.5% of the samples need to be retested. The results will be shared in 2023.

PROUD Z - SI Other activities

In May and June 2022, the Strategic Information participated in the COVID vaccination campaign with the Clinical teams, the main objectives were to monitor implementation of campaign activities and dissemination of the findings and recommendations. At the start of the campaign the vaccination coverage stood at about 20% with a target of 70%, after the 4 – 5 weeks activity coverage increased to 33%. At the end of 2022 MoH reached their target.

PROUD Z (IPC)- Infection Prevention Control

In FY22 CIDRZ, Adult Care and Treatment department received CARES funds to support the ministry of Health headquarter, Lusaka and Southern Provincial Health Offices in the implementation of the IPC Healthcare package aimed at breaking COVID-19 transmission and other infectious diseases. The objective was to enhance health safety amongst health care workers and the community.

CIDRZ has been providing support to 15 District Health Offices with Health System Strengthening in regards to IPC standards and COVID-19 related standards. The team managed to conduct training of 1,094 healthcare workers across 104 facilities, supported IPC data review meetings, supported the ministry of health and Provincial Health Offices to conduct supervisory visits. All supported sites were trained in IPC in collaboration with the respective district and provincial health offices. Following training, the sites received support via mentorship and IPC supplies like Information Education and Communication (IEC) materials, PPE (Personal Protective Equipment), chlorine, gloves, and stationery.

IPC committees were non-functional in more than half of the sites. After offering support and mentorship, all supported sites have functional IPC committees that conduct meetings at least once a quarter. Lusaka province managed to increase their committee meetings from one to six times per year on average while Southern Province conduct committee meetings quarterly.

All sites were mentored on how to assess their sites using the MOH assessment tool. By the end of the year all sites were able to self-assess monthly and generate action points.

PROUD Z- KPIF (Key Population Investment Fund)

The overall aim of the CIDRZ Key Population Investment Fund (KPIF) program is to build the capacity of Zambia's key population (KP) civil society organizations (CSOs) and improve access to HIV services among KPs, including Female sex workers, Men who have sex with men (MSM), People who inject drugs (PWIDs), Transgender people (TG), and Incarcerated people.

In FY22, the KPIF supported four districts, Kafue, Chilanga, Chongwe and Lusaka and four KP-CSOs to deliver comprehensive HIV prevention, treatment, and care. This was accomplished through sub-awards to KP CSOs to deliver services, transport, and lunch allowances for approximately 150 government health care staff, and partnership and capacity building of local MOH health facilities in KP-friendly services.

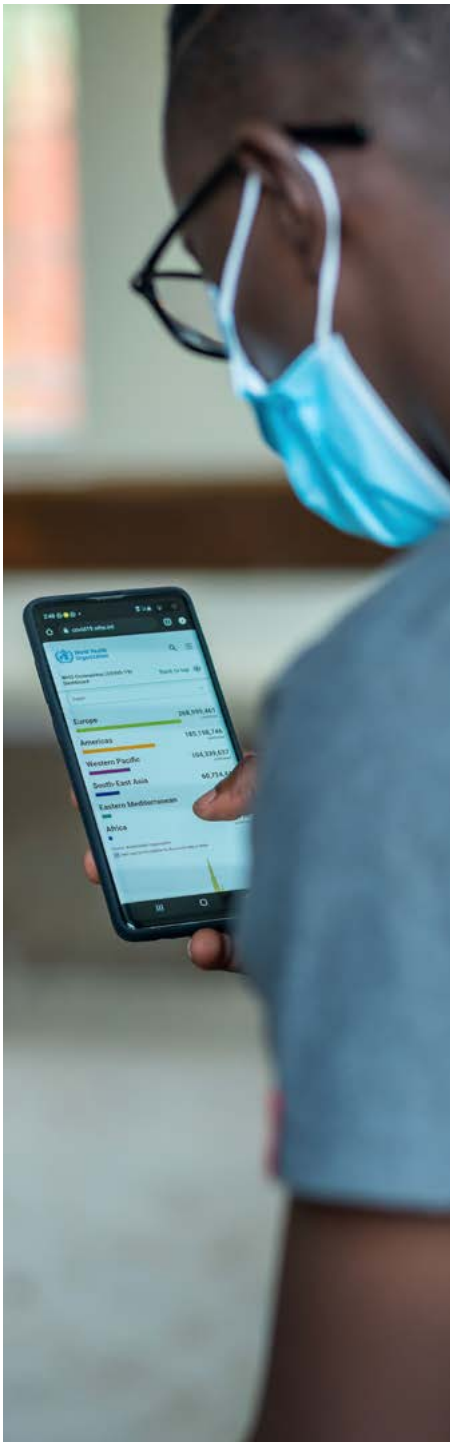
Over the last 12 months, a total of 19,380 KPs were reached across the four districts, representing an achievement of 134% against the annual DATIM Targets (n= 14,437). Of the 19,380 people reached, 10,297 (53%) were tested for HIV, of which 3,559 tested HIV positive (35%), 6,646 tested HIV negative (65%) and 92 were known positives already on antiretroviral therapy (ART). The CIDRZ KPIF programme also achieved 111% of the annual PrEP target by initiating 6,387 KPs on PrEP against the annual DATIM target of 5,763. In addition, a total of 337,637 lubricants and 46,4217 condoms were distributed across the KPIF districts.

PROUD Z - Support to ZNPHI, UTH and NALEIC

CIDRZ received funding to provide support to the Zambia National Public Health Institute (ZNPHI), University Teaching Hospital (UTH) and National Livestock Epidemiology and Information Centre (NALEIC) in various aspects that directly impact public health in Zambia. Support provided to ZNPHI included the procurement of equipment to facilitate the collection and response to disease surveillance data by the Public Health Emergency Operations Centre (PHEOC) at ZNPHI, in addition to contributing to the enhancement and maintenance of the current existing electronic Integrated Disease Surveillance and Response (eIDSR).

CIDRZ supported UTH by developing a web-based Influenza-Like Illness/Severe Acute Respiratory Infection (ILI/SARI) surveillance system to be deployed in 4 provinces. System development and testing was successfully completed with the goal of training and deploying the system by early March 2023. Support provided to NALEIC involved developing a mobile electronic animal health surveillance data collection tool with the goal of improving timely data collection, analysis, and reporting in 45 pilot animal health surveillance camps.

Furthermore, CIDRZ supported the procurement of tablets and desktop computers to be used by provincial, district and veterinary camp officers to collect, analyse and report various camp events on time. Training for all officers who will be involved in the pilot was successfully concluded and plans to start the first phase of data collection are also scheduled for early March 2023.



02

ADULT HIV CARE, TREATMENT, AND PREVENTION

The CIDRZ Adult HIV Care, Treatment, and Prevention department supports activities across the organization to improve the quality and delivery of HIV services including care, treatment, and prevention for adults. The department uses a model that focuses on improving collaboration and building capacity of provincial, district, and facility teams to provide client centred services.

During the period under review, the department supported significant activities under PROUD-Z award (described above) as well as for key and underserved populations through USAID CHEKUP I. The department also looked at supporting government to expand differentiated service delivery models in Lusaka. Research conducted under the period of review focused on supporting HIV patients with co-morbidities and new drug interventions.

USAID Controlling HIV Epidemic for Key and Underserved Populations (CHEKUP I)

Funder: United States Agency for International Development (USAID) **Time Period:** Oct 2021 - Oct 2026

CIDRZ is implementing a USAID-funded CHEKUP I project, whose goal is to prevent new HIV infections among priority and key populations. The target population groups are:

1) priority populations: adolescents aged 9 – 14 years, AGYW (Adolescent Girls and Young Women) aged 10 – 24, adolescent boys and young men (ABYM) aged 10 – 24, men aged 25 – 34, people living with HIV (PLHIV), discordant couples, and mobile populations; and

2) Key Populations (KP): men who have sex with men (MSM), female sex workers (FSW), and transgender people (TG).

CHEKUP I project is being implemented in nine districts: Livingstone, Lusaka, Ndola, Kitwe, Luanshya, Mufulira, Chingola, Chililabombwe, and Solwezi.

During the period October 2021 to September 2022, CHEKUP I project achieved the following:

- 192,695 individuals reached with HIV prevention services whilst 525 dialogue meetings were held on sexual and gender-based violence (SGBV) and HIV prevention with 10,903 (5,049 male and 5,854 female) community members. 3,716 KP, including MSM, FSW, and TG, were reached with HIV testing and prevention services.
- 620,311 condoms (602,104 male and 18,207 female condoms) were distributed; 2,424 AGYW, mostly 20 - 24 years old, were initiated on pre-exposure prophylaxis (PrEP).
- 85,800 AGYW were enrolled in the DREAMS (Determined, Resilient, Empowered AIDS free, Mentored and Schooled) program with 2,863 of these being enrolled for mental health counselling and support; 7,796 parents/caregivers of AGYW were enrolled in the Healthy Homes Parenting Program (HHPP). 22,154 AGYW were accessing family planning contraceptives in the DREAMS centres.
- 9,201 AGYW received educational support in the form of payment of school fees and uniforms.

For economic strengthening to mitigate the risk of HIV infection among AGYW, 5,047 underwent advanced financial literacy training, resulting in the formation of 469 savings groups with and ZMW1,123,094.50 of funds in circulation. 2,501 AGYW completed digital literacy training as a bridge to self or formal employment; 108 AGYW were linked to both short-and long-term job placements.

TGF HIV DSD SI- Long-Term Technical Service Providers of the Global Fund HIV Differentiated Service Delivery Strategic Initiative

Funder: The Global Fund to Fight AIDS, Tuberculosis and Malaria **Time Period:** Jan 2021 - Dec 2023

CIDRZ was awarded the Differentiated Service Delivery (DSD) Strategic Initiative grant as local technical assistance partner to the MOH. This catalytic fund is a strategic initiative awarded to 10 countries to incentivise increased programme quality along the HIV cascade.

To reach the last mile in identification of men living with HIV, CIDRZ is supporting the MOH through a fund to implement DSD models targeted at reaching men through community HIV prevention and treatment posts and men's clinics as referral points for management of advanced HIV disease (AHD). Both models have shown to increase uptake of men into HIV services. CIDRZ continues to participate as a member in the national DSD task force. Regular coordination meetings are held between WHO and the Zambia country team as well as in-country meetings between stakeholders.

VMMC Next- Piloting Interventions to Generate Demand for Resistant Segments of Voluntary Medical Circumcision in Zambia

Funder: DesireLine **Time Period:** Nov 2019 - Dec 2022

VMMC NEXT was designed to inform and frame a foundation for sustainable VMMC services in Zambia. CIDRZ' role is to bring implementation expertise and extensive relationships across the health system, at the national, provincial, and district levels.

Over the last two years, CIDRZ was responsible for coordinating engagement and uptake of the existing and innovated implementation models for 15–29-year-olds and the new models for 10–14-year-olds with local stakeholders. CIDRZ participated in several human centred design (HCD) co-creation workshops to develop new segmentation models for three resistant segments among males, including older men, opinion leaders and influencers, and religious figures within the communities. This was key to increasing awareness and uptake of VMMC services amongst resistant segments.

Through this program, CIDRZ also successfully conducted in depth interviews with key stakeholders to inform the transition/ sustainability plan. The team also piloted a novel SMS system to engage circumcision hesitant clients, reaching over 70 men and rolled out the segmentation approach across four new provinces. The team continues to engage through a team of mobilisers to hesitant men schedule appointments, tracking them through from procedure to healing, all the way to advocacy stage.

In partnership with DesireLine, the VMMC Next team embarked on the development of a tablet tool called VMMC NEXUS. This digital platform is designed to help facilitate data collection and tracking of hesitant clients via Inter-Personal Communication (IPC) agents using and HCD model. Implementation will begin in FY23.

IeDEA (International Epidemiologic Databases to Evaluate AIDS) NCD- The Burden of Non-Communicable Diseases Among Adults in Southern Africa: A Collaborative Multi-Country Analysis for IeDEA (IeDEA NCD Study)

Funder: National Institute of Health **Time Period:** Jul 2020 - Apr 2024

Antiretroviral therapy (ART) for HIV-infected adults and children has expanded significantly in the last decade, with large numbers of HIV-infected individuals starting ART and living longer, especially in resource-limited settings.

This project addresses a global public health priority and aims to understand and evaluate the long-term outcomes of people living with HIV. The issues the team addressed range from how patients can best be retained in care from HIV diagnosis to starting treatment, through to long-term outcomes of ART programs, prevention and treatment of disorders related to HIV such as cancer, mental illness, and the impact of substance abuse on HIV outcomes. The output from this programme of work will be translated into improved prevention and treatment programs for HIV across the world.

IeDEA Liver Fibrosis- Liver Fibrosis in Zambia HIV-HBV Co-infected Patients: A Long-Term Prospective Cohort Study

Funder: National Institute of Health **Time Period:** Jul 2013 - Apr 2026

The goal of this study is to determine the prevalence of significant levels of liver fibrosis in HIV-HBV patients in Zambia using non inversive tests to identify the predictors of significant fibrosis. The project aims to assess the impact of ART on the progression of liver fibrosis and to determine the rate of predictors of HBsAg sero clearance in ART treated HIV-HBV. The study is being conducted at Kanyama General Hospital, with 162 active participants from the 200 enrolled.

The study is currently conducting follow up visits for routine liver ultrasound tests, CT scans and measurement of liver enzymes as well as other HCC biomarkers.

IeDEA SRN- Sentinel Research Network for IeDEA

Funder: National Institute of Health **Time Period:** Jul 2020 - Apr 2026

The Sentinel Research Network for IeDEA (SRN) Study is a five-year, multi-regional project. It is a prospective study dedicated to exploring the epidemiology of NCDs (Non Communicable Diseases) and risk factors among HIV infected adult patients 40 years and older from the general population in Southern Africa.

The main objective of the project is to establish a network of research sites dedicated to capturing and analysing standardized data among several low- and middle-income countries (LMICs). Studies being implemented through this network are focusing on cardiovascular disease, mental health, alcohol, and substance use disorders, and liver diseases.

In Zambia, the study is being conducted at CIDRZ Kalingalinga Central Laboratory. The study is currently in follow up phase and all year one visits to measure lipid profile, test liver and kidney function and diabetes were conducted on all active enrolled participants during the reporting period.

IeDEA-TB SRN- Tuberculosis Sentinel Research Network (TB-SRN): A Prospective Cohort Study of HIV Co-Infection and Other Factors Associated with Short- and Long-Term Outcomes in Patients with Pulmonary Tuberculosis in Zambia

Funder: National Institute of Health **Time Period:** Jul 2020 - Apr 2026

The study is a prospective observational, non-interventional study open to enrolment to people 15 years and older who have been diagnosed with active pulmonary TB. The TB must be either bacteriologically confirmed or clinically diagnosed in HIV-positive and HIV-negative participants.

The study seeks to assess pulmonary TB treatment and long-term outcomes among people with and without HIV in the African population to inform policy and practise around TB treatment, as well as creating a platform for additional TB research in Zambia.

This work is being conducted in two study sites: Chawama and Kanyama General Hospitals, where the study is currently enrolling a target of 450 participants.

IeDEA DTG SWITCH- Longitudinal Analysis of Virologic Failure and Drug Resistance at and after Switching to Dolutegravir-Based 1st-Line ART

Funder: National Institute of Health **Time Period:** Jun 2020 - Dec 2022

The goal of the study is to recruit and characterize the short- and long-term outcomes of first line switch to Dolutegravir (DTG)-based ART in representative populations. The study also aims to assess the incidence of virologic failure and the contribution of drug resistance to virologic failure after switch. Beyond this the study plans to determine the incidence of neuro psychiatric, metabolic, and other side effects of dolutegravir based ART when it is associated with Tenofovir Alafenamide (TAF) or Tenofovir Disoproxil Fumarate (TDF) in African patients who have not yet been fully addressed. The study is being conducted in three sites; Kalingalinga Central Lab, Kanyama and Matero General Hospitals and has 1,410 participants enrolled. Study activities were completed by 31st December 2022.

IeDEA DTG Resistance - Dolutegravir Drug Resistance (DTG) Study: HIV-1 Sub Type-Specific Drug Resistance in Patients Failing Dolutegravir-Based 1st-Line, 2nd-Line or 3rd-Line Regiment: Multi-Regional Study

Funder: National Institute of Health **Time Period:** Mar 2022 - Aug 2024

This is a cross sectional non-interventional study open to adults who are 18 years and older and adolescents between the ages of 10 and 17. Participants must present with virologic failure on DTG based ART at clinical sites within six regions of the IeDEA cohort. The study aims to compare the prevalence of integrase strand-transfer inhibitors (InSTI) drug resistant mutations in adults and adolescents on DTG based ART regimen at time of virologic failure between HIV-1 sub types and treatment contexts. The project is being conducted in four sites: University Teaching Hospital (UTH), CIDRZ Kalingalinga Central Lab, Matero General Hospital and Kanyama General Hospital, with an enrolment target of 250.

CVD & HIV- D71-CVD AND HIV

Funder: National Institute of Health (NIH) **Time Period:** Sep 2021 - Mar 2023

CIDRZ, in partnership with Washington University in St. Louis, is developing research training in Zambia to address the epidemic of cardiovascular disease and mental illness amongst HIV infected populations. This D71 award will facilitate the development of a mentorship program to engage local Zambian clinicians and provide them opportunities to expand their research work into NCD work, a priority for the GRZ and CIDRZ as the HIV pandemic continues.

03

PAEDIATRICS, AND ADOLESCENT HEALTH

The Paediatrics, and Adolescent Health department implements work primarily under the PROUD Z award to provide TA to the LPHO on paediatric and adolescent HIV prevention, care, and treatment. CIDRZ also implements the USAID vulnerable children and adolescent programme (ECAP III) in Lusaka and Eastern provinces supporting health, school completion, economic stability, and safety.

Towards the end of the FY 2022, CIDRZ was re-awarded the MOH Global Fund adolescent SRH programme to be implemented in Western Province.

ECAP III - USAID Empowered Children & Adolescents Program III

Funder: USAID **Time Period:** Sep 2020 - Sep 2025

Empowered Children and Adolescent Program III (ECAP III) is a five-year USAID funded project implemented by CIDRZ in close collaboration with Project Hope and the Ministry of Health (MoH), Ministry of Community Develop and Social Services (MCDSS) and Ministry of General Education (MoGE).

The goal of USAID ECAP III is to mitigate the impact of HIV and improve the health and wellbeing of Vulnerable Children and Adolescent (VCA) through the delivery of high-impact, evidence-informed, and age-appropriate interventions customized for each VCA sub-population using a family-centred approach. The project seeks to improve the social and health outcomes of vulnerable households in seven high HIV burden districts across two provinces of Zambia (Lusaka and Eastern).

At the close of FY22, ECAP III supported 123 health facilities. At community level, both enrolled VCA and care givers received services under the schooled, stable, and safe domains. The Project achieved more than 100% on both PEPFAR KPI's (i.e., OVC_SERV and Orphans and Vulnerable Children (OVC) HIVSTAT) associated with massive scale up of project activities to 123 facilities from 84 facilities in FY21. Cumulatively, USAID ECAP III OVC_SERV of 111,298 beneficiaries representing 143% achievement against annual target.

Disaggregated by OVC program model, a total of 105,361 beneficiaries were reached through comprehensive programme (146% against the annual target) while 5,907 beneficiaries successfully completed the sessions under preventive model (112% achievement against annual target). In FY22 96% of the total VCAs (Vulnerable Children and Adolescents) reported HIV status.

Of these, 12,222 were reported HIV positive, 60,531 HIV negative and 3,111 had no reported HIV status (unknown). The rest (i.e., 116 VCAs) did not require the HIV test at the time based on the assessment done. All HIV positive VCAs were on ART. Of the 12,222 HIV positive VCAs 10,076 were eligible for VL and 8,382 (83%) had VL results documented in the patient file within the last 12 months, 7860 (94%) were virally suppressed.

P2G- Pregnant and Parenting Girls Living with HIV (P2G Project)

Funder: ViiV Healthcare Limited **Time Period:** Mar 2021 - Mar 2024

The overall goals of the project are to engage HIV positive adolescent mothers in health facilities and communities, and provide a comprehensive package tailored to help pregnant and parenting teens become effective parents and successful adults as well as improve adherence to HIV treatment and viral load suppression for both mother and baby.

The package administered through adolescent mother support groups includes Sexual Reproductive Health and Rights (SRHR), HIV treatment support, nutrition, skills empowerment, financial literacy, mental health and Gender Based Violence (GBV) screening. Targeted sites are George, Bauleni, Chaisa, Chilenje, Kamwala, Chainda, Matero level 1, Kanyama, Chawama, Chipata, Mtendere, Mandevu.

By September 2022, the project had reached 624 pregnant and parenting girls aged 10-19 years with various project interventions including HIV testing (410), SRHR (624), linkage to HIV treatment (288), skills development in various arts and crafts (624), treatment adherence counselling (394), and mental health screening (110).

MAC SEEAL - Strengthening Economic Empowerment to Adolescents Living with HIV

Funder: MAC AIDS FUND **Time Period:** Jun 2021 - May 2022

From June 2021 to March 2022, the intervention reached 1,607 adolescents and young people living with HIV aged 10-24 years old with various adolescent tailored products and services in Lusaka. The study team empowered 1,353 HIV positive adolescents with income generating skills and linked them to local markets. A total of 150 were enrolled in savings groups, 159 were trained in arts and crafts, and 158 participated in financial literacy training.

To improve access to sexual reproductive health (SRH) products and services for adolescents during the COVID-19 pandemic, the team identified and trained 19 mobile booth operators located in communities across Lusaka on how to provide products and services in a non-judgmental way. CIDRZ also stocked the mobile booths with SRH supplies for free distribution to those who needed them.

Further, the team engaged 17 peer educators (8 males, 9 females) as counsellors to actively provide SRH information and services via the "My Safe Space" mobile App which the team developed in the previous year. This team conducted four social media campaigns on the App using two local artists (B-flow and Wezi) via videos and live streams shared on their platforms, together the intervention reached approximately 20,000 young people with messages.

IeDEA-AYANI- Adolescents and Young Adults Network for IeDEA (AYANI Study)

Funder: National Institutes of Health **Time Period:** Jul 2021 - Apr 2026

This is a prospective study dedicated to investigating how care transitions, key co-morbidities and conditions, mental health challenges, and social environmental factors impact the outcome of ART adherence, viral suppression, care, and mortality among adolescents living with HIV (ALWH).

This study is being implemented at CIDRZ Kalingalinga central Lab. The study enrolled a total of 50 participants and is currently conducting follow-up visits.

Zambia NCDI Extension- Improving measurement of alcohol consumption among HIV-affected youth in sub- Saharan Africa: evaluation and implementation of biomarkers.

Funder: National Institutes of Health **Time Period:** May 2020 - Apr 2025

This is a 5-year NIH (National Institute of Health) K-grant, which will test the accuracy of an alcohol urine rapid test to identify adolescents living with or at risk of HIV who may have high risk behaviours. Because preventing adolescent HIV is a high priority in Zambia and alcohol fuels HIV transmission this project has important public health significance

04

BASIC SCIENCE & LABORATORY

The Basic Science and Laboratory department has been supporting the MOH through capacity building to ensure improved quality health care services to the public. This is done by improving access for microbiology diagnostics, detection and prevention of antimicrobial-resistant bacteria, and quality actionable data in 12 government hospital laboratories comprising of seven human health and five animal health laboratories.

Specifically, the department has supported procurement of reagents and equipment, renovation of sentinel laboratories, advanced microbiology training for laboratory staff, on-site mentorships, coordination support to the national Antimicrobial Resistance Coordinating Committee (AMRCC), among others.

The department is also leading research on Anti-Microbial Resistance (AMR) to profile current national trends and understand the key drivers to inform national AMR stewardship interventions.

LIFE- Laboratory Innovation for Excellence

Funder: CDC **Time Period:** Oct 2018 - Sep 2023

The goal of the CIDRZ Laboratory Innovation for Excellence (LIfE) project is to scale up laboratory services and provide high quality HIV diagnosis, care, and treatment towards the achievements of the 95-95-95 goals in Zambia under PEPFAR.

The team has been accelerating scale up of HIV Viral Load (VL) and early infant diagnosis (EID) use for clinical care, through strengthening laboratory systems by improving VL/EID sample courier networks, capacitating laboratories, enhancing Quality Management Systems (QMS), facilitating electronic laboratory data management, and results reporting.

The project works in close collaboration with Donors, the MOH and international and local implementing partners APHL, CLSI, FIND and WHC and has achieved the following:

- Capacitated 24 VL/EID laboratories to improve operational efficiencies.
- Provided training, technical support and mentorship to over 120 hub laboratories and associated staff.
- Facilitated transition from paper based to digital data capture and result return systems in all districts in four provinces and at individual facility level in 3 Provinces thus far.
- Established a regular sample agnostic laboratory courier system using a hub and spoke model in 4 provinces and fully transitioned the system to complete government control.
- Coordinated with partners and MOH to set up a laboratory monitoring & evaluation system in more than 120 hub labs and more than 10 central laboratories to ensure the HIV testing cascade from sample collection to result return is working optimally.
- Supported implementation of quality management systems to international accreditation in more than 10 labs while training local quality management systems mentors to transition the program to government.
- Supported development of a quality management system standard for district health laboratories that do HIV testing on point of care equipment.
- Improved and strengthened waste management systems in 21 central laboratories by repairing or installing incinerators and training environmental health and laboratory staff in waste management.
- Supported health facilities nationwide with solar energy to improve laboratory and SmartCare operations in more than 120 hub and central labs nationwide.
- Coordinated Diagnostic Network Optimization to allow point of care HIV testing at district facilities to reduce result turnaround time for infants and pregnant or breastfeeding mothers in over 120 laboratories.

MBIRA- Mortality from Bacterial Infections Resistant to Antibiotics (MBIRA) study in Zambia

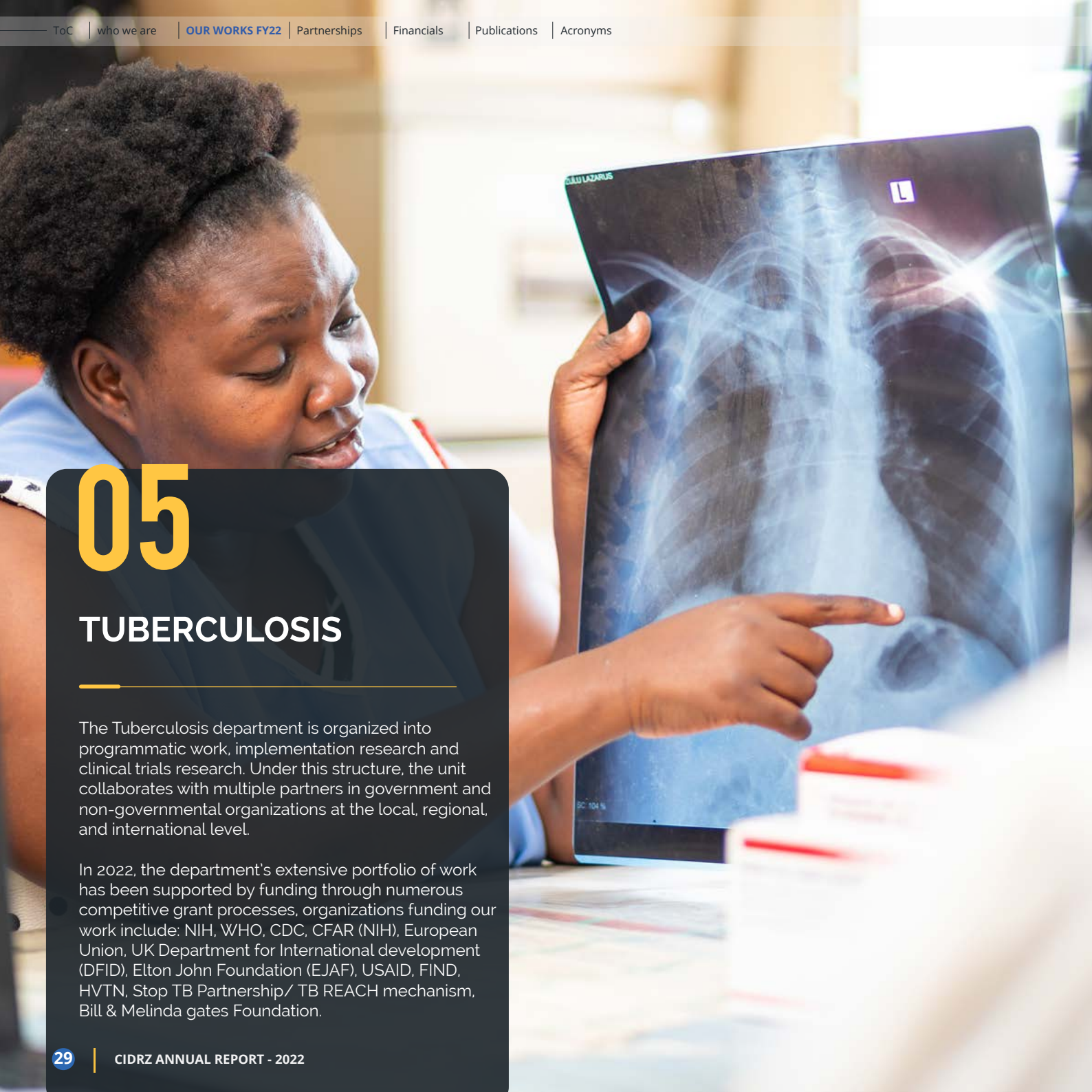
Funder: London School of Hygiene & Tropical Medicine **Time Period:** May 2020 - Jan 2022

Antimicrobial resistance (AMR) is one of the major global health challenges of the 21st century. Efforts to quantify the burden of AMR are limited by lack of data linking resistance status with clinical outcomes in LMICs particularly in sub-Saharan Africa.

The MBIRA study is a prospective study that collected data through January 2022 in ten hospitals in different African countries to quantify the association between AMR status and clinical outcomes (mortality and length of hospital stay) for inpatients with proven Gram-negative bacteraemia (all Enterobacteria except Salmonella species). Bacteraemia hospital inpatients (with infections caused by relevant species of Gram-negative bacteria) and matched uninfected inpatient controls in participating hospitals.

The study recruited a total of 1,200 bacteraemia patients (120 per hospital) with two matched inpatient controls per case. All age-groups (adult, children, and neonate) were eligible for inclusion. Non-infected controls were randomly selected from all concurrent hospital inpatients matched by ward, age-group, and length of stay.

This study is the first patient-level evaluation of AMR impact in bacteraemia across sub-Saharan Africa.



05

TUBERCULOSIS

The Tuberculosis department is organized into programmatic work, implementation research and clinical trials research. Under this structure, the unit collaborates with multiple partners in government and non-governmental organizations at the local, regional, and international level.

In 2022, the department's extensive portfolio of work has been supported by funding through numerous competitive grant processes, organizations funding our work include: NIH, WHO, CDC, CFAR (NIH), European Union, UK Department for International development (DFID), Elton John Foundation (EJAF), USAID, FIND, HVTN, Stop TB Partnership/ TB REACH mechanism, Bill & Melinda gates Foundation.

FujiLAM Prospective Evaluation

Funder: Foundation for Innovative New Diagnostics (FIND) **Time Period:** Jun 2020 - Apr 2022

This study evaluated the FujiLAM, a 2nd generation LAM test to determine sensitivity and specificity among people living with HIV. In addition, the study will also evaluate Vistect, a qualitative point of care CD4 count, to determine its sensitivity and specificity compared the current gold standard. Results of the study are currently under review by the funder and will be released in FY2023.

CDC-CRDF

Funder: CRDF GLOBAL **Time Period:** Apr 2022 - Feb 2023

Chest radiography has been used for screening and diagnosing pulmonary TB for a long time, but its usefulness has been restricted by several factors, including inter-reader variability, a shortage of radiologists, hardware costs, and accessibility, particularly in low-income nations like Zambia. The development of computer aided detection (CAD) an artificial intelligence (AI) system that analyses Chest x-ray (CXR) images for the presence of abnormalities suggestive of pulmonary TB offers much-needed remedies to problems mentioned above.

This project is currently operating in ten high volume facilities in Lusaka and Southern provinces (Kanyama Hospital, Matero Hospital, Chawama Hospital, Chilanga Mount Makulu Clinic and Kafue Hospital in Lusaka and sites in Southern province are in Mazabuka at Kaonga Urban Clinic, Monze Mission Hospital, Choma General Hospital, Mahatma Gandhi in Livingstone, and Livingstone UTH). The project aims at scaling up the use of Computer Aided detection and build capacity among HCWs (Health Care Workers) in reading CXR and diagnosing pulmonary TB.

During the period under review stakeholder engagement meetings were held along with technical and supportive supervisory visits at all participating sites. All procurements of licensing and software were installed at study sites.

MRI TBV02- E01

Funder: Bill and Melinda Gates Foundation **Time Period:** Feb 2022 - Feb 2024

A multi-country, epidemiologic study to assess the interferon gamma release assay (IGRA) positivity, and to build capacity to conduct a tuberculosis (TB) vaccine efficacy study, in populations with a high TB disease burden.

This project aims to assess the proportion of IGRA positivity by site and to build a pivotal Phase 3 TB Vaccine efficacy study. In Zambia, this longitudinal cohort study successfully enrolled 160 participants who are currently in follow up phase.

Google Health AI- Validation of Google Health Artificial Intelligence in TB and Covid Screening and TB Diagnosis in Zambia.

Funder: Bill and Melinda Gates Foundation **Time Period:** May 2021 - Feb 2023

The main purpose of the study is to investigate the value of Google's TB algorithm, normal versus abnormal and COVID-19 algorithm for use as a triaging test amongst presumptive TB patients to reduce the total cost of diagnosis and increase patient through put.

The study aims to show that the algorithm achieves a performance of 90% sensitivity at 65% specificity in presumptive TB patients in Zambia. This is a two-phase prospective study aiming to enrol participants from Chainda South Clinic, Kanyama and Chawama Level one Hospitals. The study began enrolments in November 2021, and have 1,912 of the target 2,432 participants enrolled to date.

In addition, the study was amended to include collection of cough sound recordings for use in development of cough AI for TB screening. Data collection closed 23 December 2022, and the study is currently analysing data.

USAID Tuberculosis Local Organisations Network (TB LON)

Funder: USAID **Time Period:** Mar 2020 - Mar 2025

CIDRZ was awarded the Tuberculosis Local Organisations Network (TBLON) project which is being implemented in Lusaka and Southern Provinces. The project goal is to support the prevention, care, and treatment of TB in Zambia.

TBLON uses a health system strengthening approach, aimed at reaching the most at-risk TB populations through increased demand for TB preventive, diagnostic and treatment services, greater diagnostic yield, and improved patient linkage to treatment and preventive services and improved treatment outcomes. The project uses a collaborative, adaptive and learning approach to address bottlenecks in TB programming at various levels Currently in active implementation and expanding to six additional provinces.

- 94,825 PLHIV initiated on TB Preventive Therapy (TPT)
- TPT completion rate 97%
- 961 Health care workers oriented on TB infection prevention.
- 100% entry screening in prisons
- 100% contact tracing among drug resistant TB patients
- 95% access to Xpert testing for presumptive TB patients.
- TBLON COVID support:
- 38,438 people received first dose vaccinations.
- 80,509 received last doses of recommended vaccine.
- Recruited 110 short term nurses to support the covid response.
- Procured and donated high quality medicines and medical instruments to MOH worth K7,479,569.00
- Trained 300 HCW (Health Care Workers) in infection prevention and waste management

06

ENTERIC DISEASES

The Enteric Disease and Vaccine Research Unit started in 2013 with a small cohort study aimed at describing the immunogenicity of Rotarix™ among Zambian children. The unit expanded its portfolio of pathogen foci to include other diarrheal pathogens (Shigella, ETEC, and V. Cholerae), non-diarrhoeagenic pathogens including, HIV, Hepatitis B, Epstein-Barr, SARS CoV-2, and Arbo viruses.

The unit has also expanded its research laboratory capacity to include molecular platforms (qPCR), microbiology, immunology (ELISPOT, ELISA), multiplex molecular or immunology platforms (Magpix-Luminex™, LAMP, NOVODIAG, Micronutrient and Environmental Enteric Dysfunction Assessment Tool (MEEDAT) , and whole genome sequencing (Miseq and MiniON).

The unit operates a network of clinical trial sites across Lusaka and Ndola and has pioneered a Human Challenge Model for evaluating rotavirus vaccines. This capacity signifies that the unit can carry out a diverse portfolio of research spanning basic science, clinical trials (vaccine and other therapeutics) to translational research.

HIC Rota study- Human challenge with live-attenuated rotavirus to assess next-generation rotavirus vaccines in Africa

Funder: Medical Research Council- UK through Imperial College of Science, Technology and Medicine **Time Period:** Sep 2020 - Aug 2023

Despite the widespread roll-out of several vaccines against rotavirus (RV), RV diarrhoea continues to be a significant cause of diarrhoeal disease morbidity and mortality across LMICS. Recognizing challenges associated with oral rotavirus vaccination, several parenteral vaccines are currently in development.

The HIC Rota study assesses protection against rotavirus infection and investigates immune correlates of protection following vaccination with a novel injectable VP8 subunit rotavirus vaccine used alone or in combination with oral rotavirus vaccines https://www.clinicaltrials.gov/. NCT04658914. The trial is conducted in collaboration with the Imperial College London and PATH.

The study received all ethical and regulatory approvals from UNZABREC, ZAMRA (Zambia Medicines Regulatory Authority) and NHRA (National Health Research Authority) prior to beginning recruitment. This year the study successfully completed enrolment, with over 85% reaching their primary end study end points of post challenge follow up.

On the laboratory testing and analysis, the team has (i) set up and started to run the quantitative PCR assays for tracking rotavirus shedding post challenge, (ii)completed the whole blood ELISOPT assays on the subset of study participants, (iii) validating the assay for ELISA.

The study also received additional funding form the BMGF to do additional T and B cell immunology to understand which subsets are associated with protection post vaccination.

BactiVac- BACTIVAC CHOMEM

Funder: University of Birmingham **Time Period:** Oct 2021 -Mar 2022

This grant is aimed at supporting early career researchers establish collaborations with UK researchers as well as develop preliminary data for larger grant applications and hypothesis generation. The aim for this project is to characterise long-term, antigen-specific memory B cells to oral cholera vaccine(OCV) in population living in cholera hotspots.

The study has been able to recruit and collect samples (serum and peripheral mononuclear cells) and have also managed to set up the ex vivo memory B cell assay. Currently running these assays and later do data analysis. The investigators hope to understand long-term immunity to OCV which can support the pre-emptive vaccinations every three years in at risk areas.

EDCTP ChoVaxim- Profiling Immunological Characteristics of a Population at Risk of Cholera before and after 1st and 2nd dose of Oral Cholera Vaccine.

Funder: EUROPEAN AND DEVELOPING COUNTRIES TRIALS PARTNERSHIP **Time Period:** Jul 2018 - Dec 2021

Killed whole-cell oral cholera vaccines (OCV) are becoming part of standard cholera control and prevention methods in countries continuously affected by the disease such as Zambia. However, we do not yet understand the immune profiles of individuals who have received this vaccine. Therefore, this study sought to determine whether Shanchol (OCV) can elicit a competent specific immunological response against cholera in Zambian individuals.

The study enrolled a cohort of 223 participants between the ages of 18 and 65, from whom serum samples were collected at baseline, day 28 before administration of the second dose, and consecutively at 6, 12, 24, 30, 36, and 48 months. Some of the specific objectives include determining cholera specific antibody titres at baseline (prior vaccination) and vaccine wane off at 6, 12, 24, 30,36, 42 and 48 months post second dose OCV. The study also investigated whether vitamin A deficiency, being HIV positive and having certain genetic characteristics such as blood group status reduces the uptake (immunogenicity) of OCV.

In the last year, the study has closed out and successfully met all milestones; (i) Publish all the three planned manuscripts, (ii) The MSc student on the project graduated and (iii) establishing the B- cell ELISPOT assays for studying cholera immunology.

Non-Replicating Rota Virus Study (NRRV)- A phase 3 double-blinded randomized active comparator-controlled group-sequential multinational trial to assess the safety, immunogenicity, and efficacy of a trivalent rotavirus P2-VP8 subunit vaccine in prevention of severe rotavirus gastroenteritis in healthy infants

Funder: PATH with support from Bill and Melinda Gates Foundation **Time Period:** Apr 2019 - Jun 2024

The aim of this study is to assess the safety and immunogenicity of a new parenteral rotavirus vaccine. Trivalent rotavirus P2-VP8 subunit vaccine (TV P2-VP8) is a trivalent rotavirus VP8 subunit with a tetanus toxin P2 epitope and fusion proteins adsorbed to aluminium hydroxide adjuvant. The TV rotavirus P2-VP8 subunit vaccine is produced in E. coli and adsorbed onto aluminium hydroxide (0.5625 mg/dose). Each 0.5 mL dose, to be administered intramuscularly, contains 30 µg of each of the three antigens (derived from a P [4], a P [6] and a P [8] strain of rotavirus), for a total of 90 µg of subunit protein.

The three antigens are derived from DS1, 1076 and Wa strains, respectively. Infants are randomized to receive either the active comparator which is Rotarix® and for the placebo a clear, colourless, locally licensed Oral Rehydration Solution, or the infant will receive intramuscular (IM) TV P2-VP8 with the placebo of normal saline and followed up for two years.

In the past year, upon futility analysis with the set criteria of TV P2-VP8 being superior to oral rotavirus vaccine, the study unfortunately met the futility criteria indication that the candidate vaccine was not superior to the current licensed ones.

The study is now following the participants and tracking any episodes of gastroenteritis for us to now run an efficacy analysis to determine the actual efficacy of the TV P2-VP8 as well as other secondary analysis to further understand the immunogenicity of the candidate vaccine in this population. The study is planning to close out by June 2023.

ROTA-biotic- Measuring the impact of rotavirus vaccines on paediatric antibiotic usage.

Funder: Wellcome Trust through Amsterdam Institute for Global Health and Development (AIGHD) **Time Period:** Jun 2020 - May 2023

This study, being carried out in both Ghana and Zambia, seeks to evaluate the impact of rotavirus vaccinations on antibiotic usage by quantifying the incidence of community antibiotic usage in the first two years of life as a primary objective. It will also profile the microbiome composition of both vaccinated and unvaccinated infants, the latter form the control group.

The study has two arms, a vaccinated cohort that will give prospective information on antibiotic usage for infants enrolled in the parent trial, and the community cohort arm that will inform on the background incidence of community antibiotic use. The vaccinated cohort is further divided into two arms, in one, the participants are followed up weekly for antibiotic usage data while in the other participants are not subjected to medication or weekly follow up, however they do have their samples collected at specific intervals.

The study is being conducted in three Zambian research sites: Matero Level 1 Hospital, George Clinic and Chainda South Clinic. The collected samples, stool, and urine will be used for metagenomic sequencing and urine antibiotic metabolites analysis, respectively. In the past year, the study finished recruiting participants and began following them up to the second year of life.

This being a nested study that is under the NRRV vaccine trial study, the study will exit every participant until the last enrolled participant is one year old (March 2023). This is in view of the parent study (NRRV) meeting futility hence a reduction in our intended follow-up time. The study plans to exit participants by Q1 of 2023 after which it will proceed to ship samples to the Netherlands, Amsterdam for processing.

ETVAX III- An Epidemiological surveillance study to determine the incidence of ETEC in children and infants in Lusaka.

Funder: European and Developing Countries Clinical Trials Partnership (EDCTP) **Time Period:** Mar 2020 - Feb 2025

Enterotoxigenic E. coli (ETEC) is one of the major causes of moderate-to-severe diarrhoea (MSD) among children both globally as well as in Zambia. The overall aim of this study is to document the burden of ETEC associated diarrhoea in Zambian children under the age of three. This study seeks to determine diarrhoea aetiology, calculate the incidence of moderate-to-severe ETEC-associated diarrhoea, and describe the frequency of ETEC colonization factors and enterotoxin types in children under 3 years old in Zambia.

The prospective, longitudinal, and observational study was conducted in five clinical research sites: Chawama General Hospital, Matero General Hospital, Chainda South Clinic, George Clinic and Kanyama General Hospital. The study launched by conducting a household census within the catchment areas of participating health facilities for a total of 4,065 surveyed households. This was followed by passive 12-month diarrhoea surveillance at each participating health facility.

The surveillance study was completed in October 2021 and analysis for determination of incidence of ETEC, and other confections was completed in June 2022. The results were presented at the 10th Zambian National Health Conference held in October, Lusaka, and the Vaccines against Shigella and ETEC (VASE) conference in Washington DC, November 2022. The investigators are currently preparing manuscripts for publications as they also prepare site for the phase III efficacy study to evaluate the ETVAX vaccine.

ShigOraVax Project- Early Clinical Development of an Oral Shigella Vaccine Through Phase II Study in Africa

Funder: European and developing countries clinical trials partnership (EDCTP) **Time Period:** Oct 2019 - Sep 2024

Shigella infection is among the leading causes of childhood diarrhoea, estimated to cause as many as 164.7 million cases annually, of which 163.2 million occur in LMICS. The EDVRU (Enteric Disease and Vaccine Research Unit) at CIDRZ showed that Shigella was the second leading attributable cause of moderate-to-severe diarrhoea (MSD) in Zambian children under five years.

There is currently no licensed vaccine against Shigella, which is unfortunate because it could be a cost-effective and reliable way to decrease the morbidity and mortality in the face of poor water, sanitation, and hygiene (WASH) facilities.

A multidisciplinary, international consortium funded by the European and Developing Countries Clinical Trials Partnership (EDCTP) was assembled to develop a safe, efficacious, and affordable Shigella vaccine. The consortium includes the European Vaccine Initiative (Germany); MSD-Wellcome Trust, PATH, FATH, Walter-Reid Institute; Leiden University Medical Centre (Netherlands); Gothenburg University (Sweden); Groupe de Recherche Action en Santé GRAS (Burkina Faso); and CIDRZ.

Among the activities to be carried out on the ShigOraVax are epidemiological baseline studies in Burkina Faso and Zambia to provide accurate and specific epidemiological Shigella disease burden data to guide the implementation of the clinical trials. In Zambia, the baseline studies began in September 2020 and completed follow-ups for all enrolled participants and the study was completed in November 2021.

During the current reporting period,

(i) The study team presented at the 10th Zambian National Health Conference held in October, Lusaka and the Vaccines against Shigella and ETEC (VASE) conference in Washington DC, November 2022 and are currently preparing manuscripts for publications,
(ii) Provided capacity building and technology to Groupe de Recherche Action en Santé GRAS (Burkina Faso) for their surveillance study.
(iii) Whole genome sequencing was done on isolates from this study and data analysis is underway to determine relatedness of Zambian isolates to those in the region, as well as the antimicrobial genes present in strains circulating in our population.

EDCTP ROVAS 2- A randomized controlled trial of two versus three doses of Rotarix™ vaccine for boosting and longevity of vaccine immune responses in Zambia.

Funder: European & Developing Countries Clinical Trials Partnership (EDCTP) **Time Period:** Apr 2018 - Mar 2023

Oral rotavirus vaccines (ORV) are important tools for prevention of rotavirus associated diarrhoea morbidity and mortality in children especially in the African region where disease burden is high. However, these existing ORV exhibit modest immunogenicity within LMICs. The EDVRU at CIDRZ has previously shown that ORV seroconversion rate is low, rotavirus infections still occur even among vaccinated children, and induced immunity from primary vaccination is not long lasting in Zambia. Improved performance of existing vaccines is an important way in which rotavirus infections can be further prevented.

The ROVAS-2 was set up to assess a booster dose of ROTARIX® ORV administered at nine months of age aimed at enhancing anti-rotavirus immunity as an alternative to the current two dose schedule for Zambian infants. The study was conducted at George Health Centre in Lusaka, Zambia.

The study successfully assessed the safety of the vaccine when administered concurrently with measles-rubella vaccination. The study also successfully established the rotavirus antibody immunoassay at CIDRZ which facilitated capacity building of local scientists for future rotavirus vaccinology studies in Zambia. The study was able to document the effect of a booster dose on immunity in vaccinated children with insights for further research and policy on these vaccines and primary paper published.

MEEDAT- Impact of environmental enteric dysfunction and human cytomegalovirus infection on immune responses to rotavirus vaccines among Zambian Infants

Funder: Bill and Melinda Gates Foundation (BMGF) **Time Period:** May 2021 - May 2022

Environmental enteric dysfunction (EED) and human Cytomegalovirus (HCMV) are two common conditions thought to affect infants in LMICS. EED is a poorly defined condition described as inflammation, reduced absorptive capacity, and reduced barrier function in the small intestines, HCMV is a subclinical infection yet has been shown to suppress the host immunity.

The aim of this study is to assess if EED and HCMV infection at the time of infant vaccination is negatively associated with rotavirus vaccine immunogenicity as well as validate the multiplex assays tool "Micronutrient and Environmental Enteric Dysfunction Assessment Tool (MEEDAT)" which quantifies biomarkers of EED.

MEEDAT is capable of measuring biomarkers associated with micronutrient deficiencies, growth faltering and inflammation – all measures proposed to contribute to oral rotavirus vaccine immunogenicity. All sample testing for both EED markers using the ELISA as well as with the MEEDAT machine was completed in the past year.

Data analysis and reparation of manuscript and dissemination meetings are schedule for Q3 2023.

Wellcome Trust Fellowship- T-cell responses in rotavirus vaccinated Zambian infants: impact of human cytomegalovirus infection.

Funder: Wellcome Trust **Time Period:** Mar 2018 - Mar 2023

This is a PhD level project awarded to Miss Natasha Laban (Wellcome Trust International Fellowship 211356/Z/18/Z). The study is nested within the EDCTP ROVAS-2 project and is registered with the London School of Hygiene and Tropical Medicine.

Oral rotavirus vaccines are important in protecting infants against rotavirus associated diarrhoea morbidity and mortality, but immune correlates of protection (CoP) are currently lacking. While B-cell mediated antibody responses are widely studied in vaccinated children, there is limited knowledge on the T cell immune responses induced by vaccination and association with vaccine seroconversion.

There is also no data on whether cytomegalovirus, which is a common infection among African children, may affect this T cell or antibody response to rotavirus vaccine. Improved understanding of rotavirus cellular immunity could provide insights for identification of CoP for ORV.

The PhD study was set up to measure T cell responses in rotavirus vaccinated infants and investigate the influence of human cytomegalovirus on the vaccine immunogenicity in Zambian infants. The study was conducted at George Health Centre in Lusaka, Zambia. The study continues to test the cell samples to generate the date on T cell immune responses.

During the period under review, the primary paper for this work has been published as well as research article reporting the influence of cytomegalovirus on vaccine induced rotavirus specific antibody responses and seroconversion.

07

IMPLEMENTATION SCIENCE

CIDRZ's Implementation Science department operates at the interface of high-quality research and health service delivery. The unit aims to maximize the reach, effectiveness, equity, and sustainability of CIDRZ programs, and to identify programmatically impactful questions to rigorously examine through the lens of implementation science research.

Since the department's inception in 2018, it has established expertise in understanding the impact of HIV service delivery innovations introduced in Zambia's PEPFAR programme, including HIV case finding, test and treat, and serving KPs, as well as looking to the future of achieving NCD integration and universal health coverage in Zambia.

To ensure growth and sustainability, the department serves as a local capacity building resource, partners with collaborators from Zambia and around the world, and supports projects funded by NIH, CDC/PEPFAR, bilateral donors, and foundations.

SKILLZ- Reaching 90-90-90 in Adolescents in Zambia using our SKILLZ.

Funder: U.S. National Institute of Health **Time Period:** May 2018 - Jun 2023

SKILLZ is a quasi-experimental study where communities are randomly assigned either the SKILLZ GIRL package (including different components of the programme) or regular school-led comprehensive sexuality education programs (CSE).

The overall purpose of the SKILLZ study is to assess the impact of the SKILLZ GIRL Package, aimed at both HIV-infected and uninfected adolescent schoolgirls over an 18-month period on the outcomes of HIV testing and contraceptive uptake continuation for pregnancy prevention.

This study is being conducted across 46 high-population density areas in Chilanga, Chongwe, Kafue, and Lusaka districts, where CIDRZ supports government MOH clinics with ARV services, electronic data management, and youth-friendly trained clinical personnel, and where Grassroots Soccer (GRS) has been implementing their basic SKILLZ GIRL curriculum and events in secondary schools.

LTFU Project - (Lost to Follow Up)

Funder: International Association of Providers of AIDS Care (IAPAC) **Time Period:** Apr 2021 - Oct 2022

This study aims to investigate the barriers to retaining key populations (KP) in care following initiation on HIV treatment. It explores the barriers and facilitators of using the adapted SNS (Social Network Strategy) approach to reach KPs living with HIV who have fallen out of care in the Key Population Investment Fund (KPIF) program funded by CDC/PEPFAR.

The project also examines the reach, effectiveness, adoption, implementation, and maintenance of using the adapted SNS to bring back to care KP who have disengaged from HIV treatment and care. Finally, the study is investigating other implementation outcomes of our adapted SNS strategy, including acceptability, feasibility, and fidelity associated with reaching KPs and returning them care.

TASKPEN- Mixed methods formative research and pilot testing of a task-shifted adaptation of the WHO-PEN intervention to address cardio-metabolic complications in people living with HIV in Zambia

Funder: U.S. National Institutes of Health **Time Period:** Sep 2020 - Dec 2022

The University of Zambia in collaboration with CIDRZ, are establishing a care package for integrated services for HIV and cardiometabolic non-communicable diseases (NCDs) like high blood pressure and diabetes that can form part of MOH's national HIV/AIDS guidelines and can be scaled nationally at primary care level, in line with the WHO recommended package of essential non-communicable diseases interventions for primary care (WHO-PEN).

The TASKPEN package addresses challenges faced by HIV patients who have cardio-metabolic complications related to HIV or its treatment by improving their detection and management to reduce cardiovascular disease risk, as well as clinical improvement in several secondary endpoints, including HIV viral suppression, for HIV- positive patients attending PEPFAR-supported HIV clinics in Lusaka.

The formative research phase of the project was completed at the end of 2022 and has been used to shape a pragmatic stepped-wedge trial to rigorously evaluate the impact of the TASKPEN package scheduled to start in 2023.

GATES - PCC (Person Centred Care)- Leveraging Person-Centred Public Health to Improve HIV Outcomes in Zambia (PCPH)

Funder: Bill and Melinda Gates Foundation **Time Period:** Aug 2017 - May 2022

The Leveraging Person-Centred Public Health to Improve HIV Outcomes in Zambia (PCPH)study aims to test the effect of a series of interlinked interventions to improve HIV care and, thus, improve patient retention, experience, and HIV viral suppression.

The approach is to train healthcare workers (HCW) on Patient Centred Care skills in 24 sites and provide: mentorship to facilities who receive training on PCC, data on patient experience in data review meetings to improve quality of care and lastly, incentives to facilities based on how well they do with improving the patient experience.

Because HIV care has moved from being acute in nature to a chronic condition, interest in patient provider interactions has grown rapidly. Interactions between patients and providers may be the single most crucial factor in keeping or losing patients in HIV care in sub -Saharan Africa.

While studies have explored how patient provider relations may influence engagement in care, a better understanding of these clinic-based drivers of engagement is needed to improve the patient experience and offer a more patient-centred care (PCC) approach. Little is known about how to evaluate and implement PCC in HIV care in Zambia and how it affects clinical outcomes in real life.

No experimental evidence exists to improve HCW behaviour and patient experience in sub-Saharan Africa hence the study conducted a stepped-wedge cluster randomized trial of a multicomponent intervention that could change HCW behaviour and improve outcomes.

SQI PCC- Strengthening Quality Improvement through Person Centred Approaches (S-QIP)

Funder: Bill and Melinda Gates Foundation **Time Period:** Sep 2022 - Sep 2023

This project started after the successful implementation of the Person-Centred Care (PCC) Study between August 2017 and May 2022. The project seeks to improve the quality of public health care services in Zambia leading to better healthcare outcomes for PLHIV by supporting the MOH Performance Improvement/Quality Management (PI/QM) strategy.

The project objectives include assessing the current landscape of the national PI/QM agenda; engaging diverse stakeholders to develop a roadmap for strengthening PI/QM programs and integrating promising activities from the recently completed person-centred care (PCC) study; and providing a combination of technical assistance, policy development/advocacy, and engagements to facility, national, regional, and global quality improvement efforts.

Through these processes, the study team is identifying and supporting policy entrepreneurs and MOH focal persons who champion PI/QM strengthening and integration of PCC approaches, facilitate integration of PCC into structural (e.g., governance, finance, monitoring and evaluation) and directional (e.g., guidelines) policies, and track metrics of successful PCC integration into PI/QM policy and programmes.

PCC-MPILO Project- Person Centred care for men.

Funder: Population Services International **Time Period:** Jan 2022 - Dec 2023

The Provider Empathy Collaboration aims to improve male patient-provider dialogue about patient experiences by helping providers to prioritize (a) comprehending the circumstances, perspectives, and feelings of male patients (b) communicating this to patients in a respectful manner and (c) acting on that comprehension in a beneficial manner to the patient.

The Implementation Science Technical Assistance will be responsible for providing scientific input on the development and quality assurance of the products and tools needed to successfully implement and evaluate Provider Empathy. CIDRZ is working with PSI and local partners in the Republic of South Africa (RSA) to guide the project design, and to present a coherent technical approach building on its expertise in delivering and evaluating patient experience in Zambia. CIDRZ will design measurement platforms for patient experience among men to understand provider empathy.

In addition, technical assistance will be provided to deliver a provider empathy curriculum (focusing on concepts like empathy, respect, autonomy and related communication skills, and shared decision making). The curriculum model will emphasize patient centeredness and communication skills, which will be delivered in the initial training and reinforced through coaching with support from CIDRZ.

Given the need for an adaptive design to field realities and the current uncertainties, technical assistance in modification of implementation processes and monitoring tools will be requested as needed. Finally, CIDRZ provided support for the roll out of the project with a rigorous mid-term evaluation ongoing.

PEN Plus Project- Domestication and Implementation of the PEN Plus Clinical Model in the Zambian Health System

Funder: The Leona M and Harry B. Helmsley Charitable Trust **Time Period:** Nov 2021 - Oct 2024

The project builds on the WHO Package of Essential NCD interventions (WHO PEN) and it focuses on first level hospitals and care for more severe NCDs. The three objectives of the project are to:

1. Demonstration of the PEN Plus clinical model through the establishment of the two PEN Plus clinics in the two study sites; Mwachisompola First Level Hospital and Matero General Hospital.
2. Establishment of the PEN Plus training centres through the upgrading of the PEN Plus clinics into training centres in preparation for the national scale up.
3. Development of PEN Plus policies national operational plan through engagements with the MOH and other national stakeholders to describe, measure and advocate for PEN Plus, support the development of a national operational plan for scale up following the grant period.

The project stakeholder consultation group went through the priority setting exercise which led them to agree on the top 10 NCD conditions that the project will focus on. The team also worked with specialists from Ministry of Health to train our first group of health care workers assigned to the project in the NCD conditions through intensive didactic training sessions and clinical attachments.

The team plans to operationalize the clinics in November 2022, and will also put in place a site clinical mentorship programme, and implement a mentorship program to help primary care health facilities to improve diagnosis, linkage to care and retention in care for patients with severe NCDs.

NCDI- Zambia NCDI Commission Project

Funder: The Leona M & Harry B. Helmsley Charitable Trust

Time Period: Apr 2019 - Jun 2022

The commission was established in 2018 and was co-chaired by CIDRZ and the Ministry of Health. This commission consisted of more than twenty (20) stakeholders from the Ministry of Health, civil society, academic, and research institutions as well as implementing partners who came together to define the burden on non-communicable diseases and injuries (NCDIs) in Zambia.

The commissioners also undertook a rigorous priority setting exercise where they identified more than 50 conditions that are critical for Zambia to address in the health planning system. The commission also produced a report which demonstrates the national burden of NCDIs, and it also shows health systems intervention recommendations and policies that support the ongoing fight against NCDs and Injuries for all Zambians. The commissioners also worked on an academic manuscript which is currently undergoing peer review.

08

PRIMARY CARE & HEALTH SYSTEM STRENGTHENING

The Department of Primary Care and Health Systems Strengthening provides technical assistance and innovative approaches to improve primary care and strengthen health systems. It has been working with the MOH Child Health and Nutrition Unit since 2010, along with other line ministries, supporting initiatives in the Expanded Programme on Immunisations (EPI), including providing technical assistance and support for the introduction of new vaccines, including COVID-19, strengthening cold chain, modelling/implementing system design to improve the immunisation supply chain, and collective impact approaches to improve immunisation coverage.

The department is also working with the Zambia National Public Health Institute (ZNPHI) to strengthen polio surveillance, and has led projects in WASH, behaviour change and health facility infection prevention and control.

During the fiscal year, the department was heavily involved in increasing COVID-19 vaccination of which fully immunised adult coverage increased from 6% to 61%. In addition, the department diversified its scope, working with ZNPHI to strengthen polio surveillance systems, along with providing national and subnational support to respond to multiple disease outbreaks including cholera, measles, and polio.

Gavi PEF- Partnership Engagement Framework (PEF) Technical Country Assistance (TCA) support to improve immunisation services in Zambia.

Funder: Gavi, the Vaccine Alliance **Time Period:** Jul 2022 - Mar 2023

PEF support provided critical TA (Technical Assistance) to the immunisation programme at national and subnational levels. The project supported four Zambia Immunisation Technical Advisory Groups (ZITAG) to review and guide the MOH on various immunisation policy recommendations.

Technical support was provided to ensure all vaccine shipments were received and reported, including regulatory approval, waivers, and applications for import permits, including for COVID-19 vaccines. Technical Country Assistance (TCA) supported child health weeks, Human Papilloma Virus data harmonisation, campaigns for COVID-19, polio and Oral Cholera vaccination, and an orientation in Adverse Events Following Immunisation. The department also supported the development of the National Immunisation Strategy.

GAVI HSS- Health Systems Strengthening Programme

Funder: Gavi, the Vaccine Alliance **Time Period:** Aug 2020 - Sep 2022

The EPI-Optimisation (EPI-OPT) project's aim was to have improved and more accurate, equitable coverage rates in Southern and Western Provinces. This was done through a consortium comprising the MOH, the Churches Health Association in Zambia (CHAZ), UNICEF (United Nations Children's Fund), and PATH. CIDRZ supported two of the four project objectives focused on strengthening and improving EPI knowledge and skills of HCWs at lower levels on vaccine and improving supply chain management and data quality and improving the immunisation supply chain and logistics performance.

Since project inception, CIDRZ supported 30 months of vaccine delivery to health facilities using multi-stop routes developed through system design to strengthen the supply chain system. An average of 331 EPI health facilities in Southern Province were reached each month with monthly vaccine deliveries based on health facility requests. This last mile delivery of vaccines ensured vaccines were taken to hard-to-reach areas and vaccine stocks were always available.

During these visits mentorship was provided by district staff to strengthen vaccine management, stock, and data practices The project saw notable improvement in health facilities recording vaccine wastage with Southern province improving from 28% to 80% reporting and in Western province it improved from 50% to 68%. Other improved practices include recording antigens with a Vaccine Vial Monitor (VVM) in stage 3 or 4 which indicates it is not viable. In Southern province, this improved from 58% to 80%, and in Western province it improved from 75% to 81% Improvements were also noted in completion of micro plans, adherence to the immunisation schedule, recording vaccine refrigerator temperatures and stock control cards matching physical stock counts.

The project worked to achieve sustainability after the project ended in September 2022, with all Southern Province districts providing their own vehicles and Ministry staff for last mile delivery of vaccines to health facilities.

The overall aim of this project was to improve and have more accurate equitable coverage. Overall EPI coverage across the country declined during the grant period, with similar trends in Southern and Western provinces. An end line survey was also conducted in 685 households in Southern Province using Lot Quality Assurance Sampling (LQAS) to assess vaccination coverage.

The drop in coverage is mainly attributed to a drop in routine services during the COVID-19 pandemic. The reported 2022 DPT3 coverage for Southern Province in Health Management Information System (HMIS) was 79%, a drop from 90% at the beginning of the project period (2019). Though the end line survey coverage estimated coverage at 76%.

Gavi, the Vaccine Alliance COVAX TA- Technical Assistance for COVID-19 Vaccine Delivery Preparation and Readiness

Funder: Gavi, the Vaccine Alliance **Time Period:** Feb 2021 - Dec 2021

Through the TA for COVID-19 Vaccine Delivery Preparation and Readiness support, CIDRZ supported various aspects of country preparations for the vaccine introduction. CIDRZ provided TA support for the delivery of the COVID-19 vaccine through coordination of vaccine introduction across the various programmatic areas.

CIDRZ supported the Zambia Immunization Technical Advisory Group (ZITAG), which provided evidence-based recommendations regarding the COVID-19 vaccination roll-out. The ZITAG Secretariat and Liaison provided regular updates on global and regional guidance on COVID-19 vaccination. The country managed to fully vaccinate 24% against its targeted 30% of its eligible people aged 18 years and above by December 2021.

TA was provided to the Cold Chain and Logistics sub-committee that developed the Standard Operating Procedures for Pfizer's receipt, transportation, and storage according to manufacturer specifications for temperature requirements. The committee monitored COVID-19 stock status, utilisation, wastage, and reverse logistics across the country.

The M&E sub-committee was supported to conduct onsite training in selected districts' vaccination sites to strengthen capturing and reporting of COVID-19 data. The data entry officers were oriented on verification of vaccination data.

GAVI CDS Early Access- COVID-19 Vaccine Delivery Support (CDS) Early Access Window (EAW)

Funder: Gavi, the Vaccine Alliance **Time Period:** Dec 2021 - Dec 2022

In April 2021, the MOH and partners introduced COVID-19 vaccination as part of the country's COVID-19 response. Vaccinations were offered through the national EPI for free in public and selected private facilities. COVID-19 Vaccine Delivery Support (CDS) Early Access Window (EAW) funds were designed to enable rapid roll-out and scale-up of COVAX-funded COVID-19 vaccine doses in the country, which was being implemented by CIDRZ, WHO, and UNICEF.

CIDRZ worked with the MOH to support microplanning Training of Trainers (TOTs) in 44 districts and 1,562 health facilities across eight provinces, training 217 TOTs and 1,850 HCWs. The trained HCWs developed COVID-19 vaccine micro plans according to national guidelines, which were consolidated into district micro plans for sub-national planning and coordination. The trainings built HCWs capacity to plan, coordinate and manage COVID-19 vaccine delivery. Micro plans allowed sites to plan for vaccine introduction appropriately. During the fiscal year, the number of vaccination sites increased from 350 to over 3,400.

CIDRZ supported vaccinator outreach activities in nearly 50% of districts, covering 1,285 Health facilities. TSS (Technical Support Supervision) activities in 57 districts were supported by CIDRZ, which enabled district supervisors to conduct monitoring visits, provide mentorship to health facilities, and ensure adherence to COVID-19 micro plans. A supervisory tool for COVID-19 vaccination was developed and used to guide TSS and mentorship.

Districts formed teams that conducted these activities, which comprised of HCWs from across all EPI pillars. During TSS, supervisors provided mentorship on correct vaccine management practices, appropriate vaccination messaging and data capturing and reporting.

CIDRZ also seconded an M&E coordinator to the country's COVID-19 Emergency Operations Centre (EOC) to monitor and track national and subnational coverage and preparedness for campaigns.

VR Polio Laboratory Assessment- Zambia Polio Sample Referral System Assessment

Funder: Village Reach **Time Period:** Mar 2022 - Jul 2022

With support from Village Reach, the Polio Sample Referral System (SRS) assessment aimed to identify bottlenecks affecting Zambia's polio surveillance sample tracking and analysis capabilities. CIDRZ worked in collaboration with the Zambia National Public Health Institute (ZNPHI), the World Health Organisation (WHO) MOH to conduce surveys from all levels including government, partners, the UTH virology lab, and subnational levels of understand the country's polio SRS performance.

The qualitative and quantitative data findings highlighted persistent constraints such as transportation challenges, limited funding, weak results sharing and feedback systems from the National Referral Laboratory (NRL), and inadequately trained staff and community volunteers in polio case identification and sample referral system.

The data indicated that health facility staff often improvised and adapted around the constraints to provide solutions, and that funds are allocated for sample transportation but are not reaching operational levels promptly.

Following data analysis, a report was shared, and recommendations were developed in collaboration with the MOH and stakeholders. The proposed recommendations and solutions were presented to WHO-AFRO (Regional Office for Africa) and the Bill and Melinda Gates Foundation (BMGF) with a proposed implementation roadmap focusing on the sample transport needs in line with the country's overall Polio Surveillance Plan, which was approved for funding.

09

REPRODUCTIVE, MATERNAL, NEWBORN, AND CHILD HEALTH

The Department of Reproductive, Maternal, Newborn, and Child Health (RMNCH) was founded in 2016. Since its inception, the Department has been working closely with the Ministry of Health through provision of technical expertise (i.e., ANC services, strengthening labour and delivery and postnatal care for small and sick newborns, etc.), research (i.e., neonatal hypothermia, postnatal growth restrictions, cervical cancer), and development of national guidelines including the Service Standards for Health Institutions Providing Neonatal Care in Zambia (2020), Kangaroo Mother Care (2018), National Essential Newburn Care Course (2017), among others.

The department is one of the very few in the country that conducts clinical research, translates them into programs, and supports their inclusion in national guidelines and policies. The extensive portfolio of work conducted by the department is supported by funding received through numerous competitive grant processes from multiple agencies, including NIH, CDC, Chiesi Foundation, Swiss Cancer Foundation, and others. Since its inception, the department has completed 10 studies and has seven ongoing studies. The departmental portfolio is comprised of the following fields:

The Departmental portfolio is comprised of the following fields:

Safe Motherhood	-	Antenatal syphilis, Postpartum haemorrhage, Postpartum depression
Newborn and Child Health	-	Birth asphyxia, prematurity, hypothermia, Postnatal growth restrictions. Point of Care for HIV diagnosis
Cervical Cancer	-	AI for early detection of cancerous and precancerous lesions, Mathematical modelling of cervical cancer policies, Progression of Human Papilloma Virus
Data Validation/Field Performance	-	Cervical cancer screening tools, Screening of vital signs among pregnant women

Advancing Cervical Cancer Screening in HIV-positive women: An in-depth, multifaceted analysis of the sentinel program in Zambia; identifying bottlenecks, facilitators, and barriers to providing cervical cancer care in Zambia (ACCHIVe)

Funder: Swiss National Science Foundation

Time Period: Oct 2019 - Sep 2023

To address the high incidence and mortality due to CaCx the study aims to develop an evidence-based Cervical Cancer Prevention and Care Cascade to monitor scale-up of CaCx screening across ART programmes in Southern Africa that already integrate CaCx screening services. The study, which will utilize both qualitative and quantitative data, has the following objectives: develop an internationally agreed-upon CaCx Prevention and Care Cascade to monitor scale-up of CaCx screening across SA ART programs that integrate CaCx screening service; test the CaCx Prevention and Care Cascade, to study the full continuum of CaCx service provision, and identify gaps; and perform an in-depth, multifaceted analysis to identify bottlenecks, facilitators, and barriers to providing CaCx care.

The qualitative component of the study was conducted in 2020. A total of 17 focus group discussions (with 140 participants) and 18 in-depth interviews were conducted across Lusaka, Lundazi, and Chipata Districts. Preliminary findings from the FGDs (Focus Group Discussions) and IDIs were used to develop a survey to quantify the qualitative findings and assess associations between cervical cancer services and key predictors.

The cross-sectional survey was administered among 976 women accessing ART services across 8 health facilities in Lusaka and Chongwe district - 122 participants per site - from 16th March to 12th May 2022. Data analysis is currently underway.

Diagnostic test accuracy of a mobile colposcope (Gynocular™), HR-HPV testing, and VIA for detection of high-grade squamous intraepithelial lesions of the cervix in women living with HIV (Gynocular)

Funder: Esther Switzerland Partnership Project Grant & NIH/IeDEA Network

Time Period: Oct 2018 - Jul 2023

The main objective of this study was to determine the diagnostic test accuracy of the Gynocular™ colposcope and validate the Swede score in a population of WLHIV. Additionally, this study aimed to develop an AI algorithm for early detection of women with cancerous and pre-cancerous lesions.

Lastly, the study aims to monitor disease progression, and provision of treatment up to 36 months following study enrolment at Kanyama General Hospital.

During this period, the study participants underwent screening for cancerous and pre-cancerous lesions using VIA, Gynocular colposcope, HPV subtypes, Trichomoniasis, and histopathology obtained through punch biopsies, and monitor for disease progression at baseline and during follow up visits (6 months and 30-36 months).

The study has enrolled all study participants and is scheduled to complete the 36-month follow-up visit by May 2023.

ANC Syphilis- Syphilis Treatment in Pregnancy in Zambia: Treatment Rates and Pregnancy Outcomes

Funder: University of Alabama at Birmingham

Time Period: Oct 2021 - Mar 2022

Syphilis is a key cause of morbidity and mortality in pregnant women and their infants. There are significant barriers to effective treatment and prevention that must be overcome to improve the health of pregnant women and infants in Zambia and other Sub-Saharan African countries.

This pilot project aimed to gather preliminary data about barriers to treatment and birth outcomes of syphilis in pregnancy in Zambia. The study's objective was to quantify treatment rates and birth outcomes among pregnant women with syphilis diagnosed at 10 urban/semi-urban ANC clinics in Lusaka, Zambia.

The study collected data on approximately 64,000 pregnant women. The study found that of all women who attended ANC clinic, only 44% were screened for Syphilis while 88% were screened for HIV. Of those who were tested for syphilis, 5% (approx. 1,300) tested positive for syphilis. Additionally, of those who tested positive for syphilis, only 44% were linked to care and only 12% of their partners were referred for treatment.

Randomized Controlled Trial of Higher volume Feedings with Breastmilk in Preterm Neonates

Funder: Chiesi Foundation **Time Period:** Dec 2021 - Feb 2023

Postnatal growth failure (<10th percentile) occurs in about 50% of very low birth weight infants, and severe postnatal growth failure (< 3rd percentile) occurs in about 25%. Rates of growth failure in preterm infants born in LMICs are also high, contributing significantly to childhood stunting. Malnutrition contributes to mortality associated with prematurity, which is now the leading cause of neonatal mortality worldwide. In addition, postnatal growth failure is linked to adverse outcomes among preterm infants including neurodevelopmental impairment.

The primary hypothesis was that very preterm infants between 28 0/7 to 31 6/7 weeks with a birth weight from 1000-1999 grams allocated to the HV breastmilk group (200-240 mL/kg/day) until hospital discharge or 40 weeks' post-menstrual age (PMA), whichever comes first, will have increased growth velocity compared to those given UV breastmilk (140-180 mL/kg/day).

The secondary hypothesis was that very preterm infants between 28 0/7 to 31 6/7 weeks will have (a) improved weight gain, head circumference, mid-arm circumference, and length, and (b) decreased duration of hospital stay, institutional neonatal mortality, mortality by 40 weeks' PMA, and hospital readmission.

The proposed study was a non-blinded randomized controlled trial with a 1:1 parallel allocation of infants to higher-volume feedings (200-240 ml/kg/day) or usual-volume feedings (140-180 ml/kg/day) using computer-generated random-block sequences. The study enrolled a total of 214 study participants including 190 preterm infants randomized controlled trial of HV feedings and 24 mothers of enrolled infants and healthcare workers for in-depth interviews. Study enrolment is completed, and data analysis is underway.

Understanding the Epidemiology of Trauma-Related Acute Kidney Injury in Children and Adolescents for Improved Rapid Detection in Low-Resources Settings

Funder: University of Alabama at Birmingham (UAB) **Time Period:** Oct 2022 - Jan 2023

Acute kidney injury (AKI) has a high mortality rate and is estimated to affect one in three hospitalized children and one in five hospitalized adults worldwide. Trauma is the leading cause of mortality for children and young adults, and AKI remains a silent and deadly complication of trauma. However, the relationship between AKI and trauma has been poorly studied, and there have been no change to the AKI diagnostic test last updated in the 1950s.

The general research objectives for the larger research agenda are to: (1) prospectively identify risk factors and incidence of paediatric and adolescent trauma-related AKI in Zambia, and (2) evaluate novel point-of-care tests for AKI diagnosis compared to current gold-standard of serum creatinine.

The goal is to implement a pilot study to determine feasibility and best practices for a larger epidemiological study on trauma-related AKI and to assess the incidence of trauma-related AKI among a small sample size of paediatric and adolescents admitted to UTH, Lusaka Zambia, to inform sample size calculations for a larger epidemiological study. Study enrolment has completed and is undergoing data analysis at the moment.

Comparative effectiveness and cost-effectiveness of cervical cancer prevention policies in Zambia: Mathematical model and interactive web-based learning platform

Funder: Swiss Program for Research on Global Issues for Development **Time Period:** Dec 2022 - Nov 2023

Zambia has a high burden of both cervical cancer and HIV. Early detection of (pre-) cancerous cervical lesions improves survival. As women living with HIV (WLHIV) have a higher risk of developing cervical cancer than the general population, the question about the optimal screening test for WLHIV remains debatable.

The issue is further complicated by the vast number of screening policies, where each may include different modalities, screening intervals, and triage tests. In a limited-resource setting like Zambia, priority setting for public health programmes is inevitable. Policymakers need solid evidence of population health benefits and implications for resource allocation when making decisions regarding the comparative merits of different policies. Such data is scarce for WLHIV. Even if the data is available, it is not robust for reasons such as 1) few randomized controlled trials, 2) often short follow-up periods, 3) effects are known only up to intermediate outcomes.

To generate evidence, in limited data setting, policymakers rely on in-silico approaches. Mathematical policy models (MPMs) developed for representing the dynamics of public health problems have been used to quantify the impact of cervical cancer screening. However, there is no MPM to guide cervical cancer screening policies in Zambia. Existing MPMs are not easily transferable to Zambia as the set of feasible screening policies will differ due to infrastructure and other country-specific constraints.

On the other hand, simply waiting for more country specific evidence to accumulate would represent missed opportunities to improve survival of women at the highest risk. This project aims to assist policymakers in Zambia in deciding on the optimal cervical cancer screening policy and to provide educational resources for regional capacity building.

Feasibility of Vital Sign Assessment by Community Health Workers during Antenatal Care Community Outreach (NeoSpot)

Funder: NeoPenda LLC, Wellcome Trust Fund **Time Period:** Oct 2022 - Jun 2023

Continuous vital sign monitoring is a basic tenet of specialized care in the developed world that is vastly underutilized during hospital or clinic admissions or outpatient routine visits in most LMICs. Despite the positive outcomes associated with vital sign monitoring (i.e., increased survival-to-discharge rates, lower complication rates and shorter length of stay in hospital), the prohibitive costs of conventional patient monitors and the difficulty in maintaining complex medical equipment limit its practice in the developing world.

NeoPenda's solution intends to improve the quality of patient care over the standard-of-care and addresses the unmet need for a feasible way to monitor multiple key vital signs. The neoGuard ™ product is designed to operate in dynamic clinical environments with space constraints, unreliable power supply and limited numbers of health staff.

At less than a 1/10th of the average cost of conventional patient monitors ($230 vs. $2,500), the neoSpotTM technology provides an affordable and sustainable vital sign monitoring solution. The wearable band is bio-compatible, reusable, and easy to sterilize, ensuring that there are no additional costs spent on single-use accessories.

This pilot is a feasibility trial at the Kanyama 1st Level Hospital and its wider catchment area among a prospective cohort of pregnant women during community ANC outreach activities. The test device, NeoSpot, is being used by CHWs (Community Health Workers) and monitors vital signs and blood pressure in each participant.

Postpartum Depression among Newly Delivered Mothers based on Neonatal Disease Severity

Funder: University of Alabama at Birmingham **Time Period:** Jun 2022 - May 2023

Postpartum depression, which commences from the antenatal period up to 1-year post-delivery, has been associated with poor delivery outcomes, breastfeeding practices, malnutrition, etc. However, despite this knowledge, research revolving around PPD in Zambia has been linked to only HIV care and treatment, and none have looked at the impact of the required postnatal care of the newborn on maternal PPD.

In order to ensure family-centred care, including skin-to-skin care and exclusive breastfeeding, and improved delivery and postnatal outcomes, the study proposes to determine the prevalence of PPD among newly delivered mothers (N=1,056), grouping the findings based on the required postnatal care of their newborn – admission to the postnatal ward (n=352), Kangaroo Mother Care ward (n=352), or Neonatal Intensive Care Unit (n=352) at the Women and Newborn Hospital, University Teaching Hospitals, in Lusaka, Zambia.

Study findings will assist in better understanding the impact of postnatal care, especially NICU and KMC admissions, on maternal wellbeing.

Point of Care HIV-1 Diagnosis to Improve Rates of ART Initiation among Infants (CDC Detect)

Funder: CDC **Time Period:** Oct 2018 - Dec 2021

This study evaluated the impact of the Point of Care (POC) EID Community model using Alere™ q HIV-1/2 Detect on health outcomes for HIV-exposed and HIV-infected infants in Zambia.

Specifically, the study will describe the operational experience of integrating mobile POC EID testing into community-level HIV activities. This information will inform scale up of this novel model, estimate the effects of our POC EID Community Model on EID testing positivity (i.e., "yield"), HIV-positive infant case finding, and ART linkage, initiation, and 3-month retention among HIV-infected infants and young children (IYCs).

All outcomes will estimate the "real world effects" of the Alere™ q HIV-1/2 Detect when implemented in an integrated fashion within the national Option B+ program, where lifelong antiretroviral treatment is provided to all pregnant and breastfeeding women living with HIV (and their sexual partners) irrespective of their CD4 count or WHO clinical stage.

For the qualitative component, in-depth interviews will characterize the feasibility and acceptability of using the Alere™ q HIV-1/2 Detect at community level.

For this 18-month study, 814 HEI records were reviewed from the pre-intervention phase, 814 HEIs will be enrolled during the post phases at 6 public sector clinics in urban Lusaka (see Table 1); 20 parent/guardians of the HEI infants; 20 healthcare providers and 12 study staff conducting the test using the Alere™ q HIV-1/2 Detect POC platform.

All 3 clusters will be equipped with the Alere™ q HIV-1/2 Detect POC platform. The study is currently undergoing data analysis.

10

SOCIAL BEHAVIOURAL SCIENCE

The Social and Behavioural Science department was established to provide technical assistance and support to CIDRZ' departments and partner organizations to contribute to research as well as to impactful and sustainable health programmes.

The department's vision is to produce high quality research that adds to the relevance and sustainability of priority health programmes in Zambia and the region, as well as the global body of knowledge on public health.

SSRG's strong expertise in design and implementation of qualitative studies is the foundation for various disciplines including ethnography, phenomenology, and grounded theory. Together with the SI and AU departments, SSRG has led various mixed method studies to address key social and behavioural questions.

PENDA- Evaluation of the hygiene and behaviour change coalition for COVID 19 prevention

Funder: International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDRB) **Time Period:** Jan 2021 - Feb 2022

COVID-19 has made persons with disabilities even more vulnerable as they face a greater risk of infection and are prone to suffer severe illness leading to hospitalization, intensive care, ventilation, or even death. These risks are heightened with age and/or with the presence of underlying medical conditions.

The aim of this project was to evaluate the inclusiveness, effectiveness, and outcome of Hygiene Behaviour Change Communication interventions (designed to limit risk of COVID-19 among the general population) for persons with disabilities, older people, and caregivers in Zambia.

Research staff collected data in Samfya- Luapula province, Monze – Southern Province and Mongu- Western province, using surveys, in-depth interviews, key informant interviews and Photovoice. In randomly selected six administrative areas (clusters) per province, the study sequentially screened households using the Washington group questionnaire, until they enrolled 8-9 persons with disability and their age matches who were without disability and living in the same location.

Results of the evaluation showed that programs did not deliberately map the locations and needs of persons with disability and older people, and few programs included them in designing products, infrastructure or programs that were implemented in the communities. The study also highlighted during COVID-19, there was the need for:

(i) Operationalising Zambia's policy framework for inclusion of persons with disabilities and older people.,
(ii) Increased awareness of COVID-19 prevention behaviours through mass and social media and interpersonal communication with the aid of clinic staff, religious and traditional leaders;
(iii) Tailored hygiene infrastructure, materials, and products to facilitate good hygiene practices among persons with disability and older people; and (iv) involvement/engagement of persons with disability and older people in community activities and consideration of provision of their water and sanitation needs so that they can more independently care for themselves.

The study recommendation was the operationalizing and resourcing of the national inclusiveness policy to proactively support health and safety including access to health care and Water, Sanitation and Hygiene (WASH) facilities which is more effective and less costly than building in reaction to public health emergencies.

Alcohol Biomarkers- Exploring alcohol and substance use patterns and perceptions of service use among HIV-affected adolescents in Zambia: A qualitative study.

Funder: National Institute for Alcohol Abuse and Alcoholism **Time Period:** May 2020 - Apr 2025

In Zambia, substance abuse among adolescents is on the increase and can contribute to risky sexual behaviour, accidents, injury, and violence. Additionally, alcohol intoxication at a younger age can lead to oesophageal cancer and liver disease later in adulthood.

CIDRZ conducted a formative qualitative study to describe the context of alcohol and substance use among HIV-affected adolescents (a population that includes adolescents living with HIV, orphaned by HIV, living with someone who is HIV positive, or at elevated risk for HIV infection) in Lusaka, Zambia and explored perceptions of existing and potential alcohol and substance use programs.

The study team completed data collection in four sites in Lusaka with a high burden of substance abuse. A total of four focus group discussions (FGD) were held with each group of adolescents, caregivers and lay counsellors. Eight key informant interviews were also conducted. Preliminary findings were presented at an international conference on youth mental health in Copenhagen, Denmark.

SanQol Project- Understanding Sanitation-Related Quality of Life in Rural Zambia

Funder: World Vision **Time Period:** Oct 2020 - Sep 2023

Within Zambia, water, sanitation, and hygiene (WASH) interventions and corresponding efforts have been a recurring priority for the government. However, notable efforts focused on WASH among rural populations continue to lag, contributing to the increasing annual under-five deaths.

Funded by World Vision United States (WVUS), CIDRZ studied Sanitation-Related Quality of Life in rural Zambia (SANQOL). For these five months, the study team captured the diversity of sanitation related experiences through interviews with 32 individuals living in 24 villages in two different World Vision programme areas in rural Chongwe.

The team surveyed 400 households representing vulnerable groups and determined how they ranked their existing sanitation quality and preferences. These findings are being used to design better measurement of sanitation-related quality of life and interventions that promote sanitation facilities in rural Zambia.

Informational and structural barriers to uptake of preventive behaviours among healthcare workers working in both isolation and non-isolation sites during COVID 19 in Zambia.

Funder: The Royal Society of Tropical Medicine & Hygiene **Time Period:** Oct 2020 - Jan 2022

This study aimed to explore Health Care Workers' perspectives on their knowledge and skills needs, their attitudes, and their ability to practice preventive behaviours in the context of COVID-19 in Zambia.

Study staff conducted a total of 20 in-depth interviews (IDIs) via phone due to COVID-19 restrictions on conducting in-person research. Ten were conducted from an isolation facility and 10 from a non-isolation facility. The study found that HCWs had sufficient information on how COVID-19 is transmitted, managed, and prevented.

Though only 70% from the isolation ward and 50% from the non-isolation ward were trained on oxygen therapy, infection prevention practices, donning and doffing, and admission of critically ill patients. Facility changes such as increased staffing, outdoor screening tents, and temperature checks helped reduce the spread within the facilities.

HCWs continued to practice infection prevention to protect themselves from COVID-19 but faced challenges of insufficient supplies and equipment to meet prevention needs and treat COVID-19 and NCD patients. HCWs also mentioned the emotional stress of treating patients, especially during the surge where they felt overwhelmed and anxious handling patients.

HCWs felt they needed mental health services available, as well as adequate and consistent supply of well-fitting Personal Protective Equipment (PPE) test kits and medication for comorbid diseases like diabetes and hypertension, and availability of products to prevent infection such as running water, soap, hand sanitiser, and gloves.

KP STIGMA- Barriers to HIV Prevention and Treatment Services for High-Risk Young Men

Funder: NIH **Time Period:** Jan 2021 - Dec 2021

Intersectional stigma contributes to increased risk of HIV infection and decreased use of healthcare for those living with HIV. There is a dearth of programmes to counteract the different forms of stigma that high-risk young men face in Zambia.

This study is aimed to identify drivers/facilitators and manifestations of intersectional stigma against high-risk young men in clinical settings through policy reviews and in-depth qualitative interviews with high-risk young men, healthcare providers, and key stakeholders; explore the effects of intersectional stigma in clinical settings on high-risk young men's (dis)engagement in the HIV treatment through surveys among high-risk young men and healthcare providers.

11

EMERGING DISEASES & GLOBAL THREATS

Emerging infectious diseases and global health security remain at the forefront of public health awareness as COVID-19 is integrated into our routine work. Emerging infectious diseases are defined as new infections among populations or geographies. Over the past year CIDRZ continued to remain responsive in its support the GRZ and its response to COVID-19.

To help meet this challenge, CIDRZ has supported ongoing research, TA, and community awareness programs to support the response by government. As investigators look forward CIDRZ is committed to its continued focus on emerging infectious diseases and global health threats as CIDRZ expands our support and work to include antimicrobial resistance, SARS, and Middle East Respiratory Syndrome (MERS) as well as through investment into vaccine development and vaccine research.

Crown Coronation- CROWN CORONATION Study

Funder: The Washington University **Time Period:** Aug 2020 - Jul 2022

An international, Bayesian platform adaptive, randomized, placebo-controlled trial assessing the effectiveness of candidate interventions in preventing COVID-19 disease in adults (CROWN CORONATION).

MATUMAINI- Modelling Analysis to Understand Mental Health and HIV/AIDS in Hotspots (MATUMAINI) and inform COVID19/HIV decision thresholds for HIV and related service delivery during COVID-19

Funder: New York University **Time Period:** May 2021 - Mar 2023

The study's main purpose is to investigate types of HIV hotspots, their association with mental health disorders, and the potential impact of mental health interventions in achieving epidemic control. This work aims to establish whether mental health services can help break the cycle perpetuating HIV hotspots in sub-Saharan Africa.

A similar study titled "Telehealth vs In-Person Services for HIV Testing and Treatment" aims at determining the incremental effectiveness of higher-contact versus lower-contact HIV services in different populations, assess the risk of infections associated with higher-contact versus lower-contact HIV services, and determine when and for whom lower-contact services improve health by assessing when the non-HIV infection risk outweighs the lower HIV service effectiveness.

Both studies utilise agent-based modelling approaches using EMOD to answer the research questions. Currently, the models are being revised and re-calibrated using the latest data. Literature review of mental health interventions and their role in the HIV care continuum is being conducted. Analysis of data (DHS, PHIA, HIV recency testing) to understand how hotspots can be identified and classified is currently underway.

A reprioritization exercise to identify country-specific priority interventions for treatment of depression enabled the refinement and incorporation of input parameters related to mental health treatment into the Zambia models. Investigators continue to receive modelling training and courtesy access to NYU's supercomputers to build capacity.

RSTMH –To study ethical dilemmas in times of COVID 19: Screening and tracing methods in the Zambian context.

Funder: The Royal Society of Tropical Medicine & Hygiene **Time Period:** Oct 2020 - Jan 2022

This exploratory research aimed to gather HCWs' perspectives on their knowledge and skills needs, their attitudes towards, and their ability to practice preventive behaviours in the context of COVID-19 in Zambia. These perspectives will help inform interventions that reduce the risk of COVID-19 transmission in health care settings.

HBV (hepatitis B virus) Functional Cure- Hepatitis B functional Cure mechanisms in HIV (HEPMEC) study.

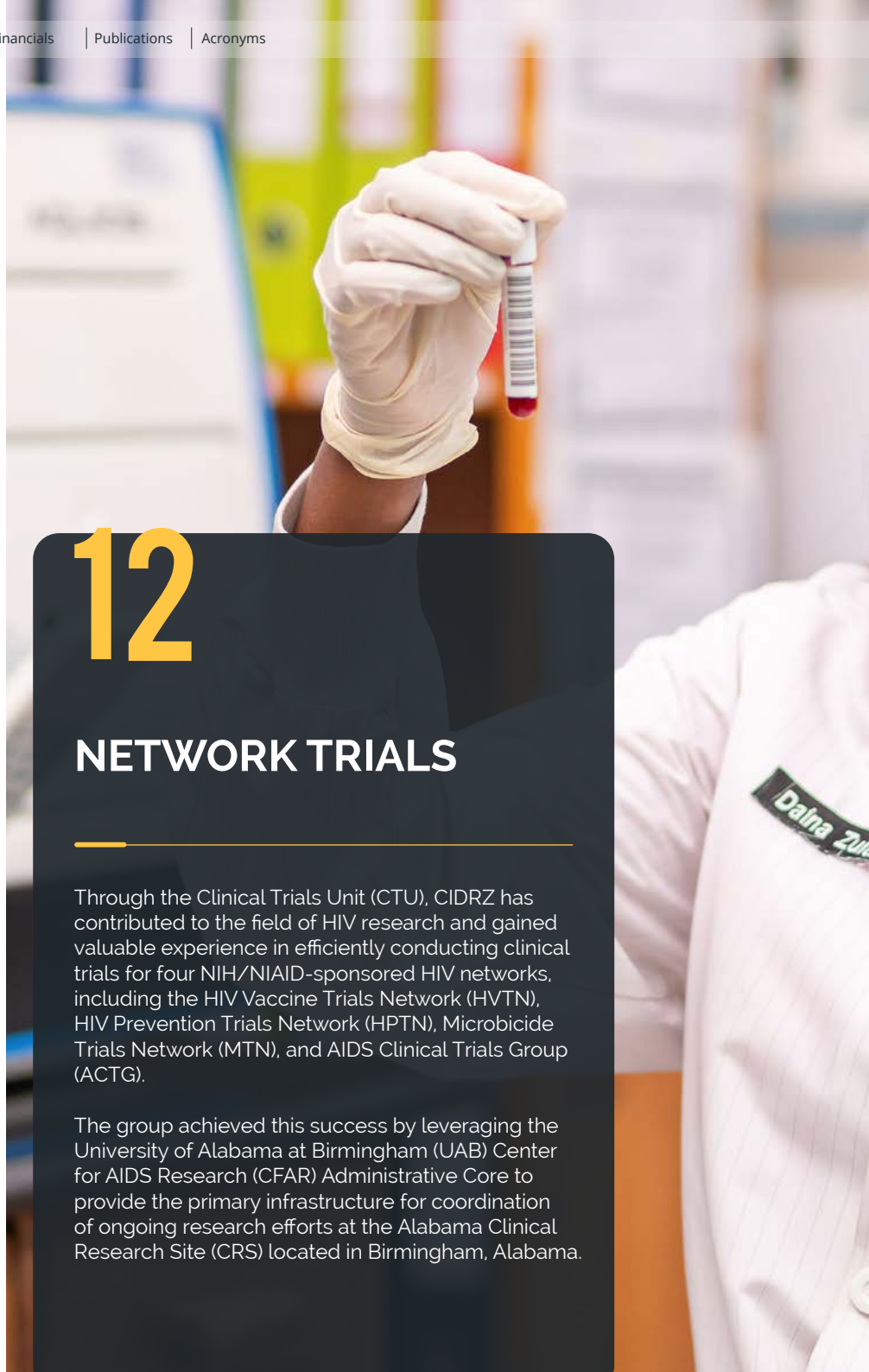
Funder: U.S. government via National Institutes of Health

Time Period: Sep 2019 - Aug 2024

Hepatitis B is a common, yet neglected, infectious disease in Zambia. 6% of adults and 1% of children in Zambia have chronic hepatitis B. After TB, it is the most common and serious HIV-confection. This study focuses on the immunology of hepatitis B cure, which happens rarely in response to treatment.

The study was conducted at three sites in Lusaka: Kanyama Level 1, Matero Level 1, and University Teaching Hospital. At each site people with hepatitis B were recruited, both with and without HIV confection. In the past year, 68 treatment-naïve adults with hepatitis B enrolled, retention was 85%. 55 participants had a liver fine needle aspiration, the main approach to study immunology in the liver.

Results from the study have been presented locally and at a Liver conference in South Africa. The study team will begin to disseminate results locally and at international HIV and Hepatitis conferences. Although the study is in the fourth year of the five-year project, activities are approximately one year behind schedule due to the COVID-19 pandemic. During FY23, investigators involved in the study plan to submit 2-3 new grant applications to continue and expand work on hepatitis B at CIDRZ.



12

NETWORK TRIALS

Through the Clinical Trials Unit (CTU), CIDRZ has contributed to the field of HIV research and gained valuable experience in efficiently conducting clinical trials for four NIH/NIAID-sponsored HIV networks, including the HIV Vaccine Trials Network (HVTN), HIV Prevention Trials Network (HPTN), Microbicide Trials Network (MTN), and AIDS Clinical Trials Group (ACTG).

The group achieved this success by leveraging the University of Alabama at Birmingham (UAB) Center for AIDS Research (CFAR) Administrative Core to provide the primary infrastructure for coordination of ongoing research efforts at the Alabama Clinical Research Site (CRS) located in Birmingham, Alabama.

UAB CTU-MATERO CRS- A-Z Clinical Trials Unit-UAB CTU-Matero CRS

Funder: National Institute of Health **Time Period:** Dec 2021 - Nov 2027

This is a collaboration between the University of Alabama at Birmingham and CIDRZ which seeks to continue to work with the NIH HIV Clinical Trials Networks to improve the quality and longevity of lives of PLHIV, end the HIV epidemic, and eliminate disparities for PLHIV with a focus on the HIV epidemic in the Southeast US where incidence remains high, and in Sub Saharan Africa where the global burden of HIV exists.

This project supports regulatory, clinical, data, laboratory, and implementation activities for all active Clinical Trials Unit affiliated studies being conducted at Matero Clinical Research Site (CRS); During the reporting period, the award supported the following network studies; HVTN 705, HVTN 405/HPTN 1901, CoVPN (Covid 19 Vaccines Prevention Network) 5001 and CoVPN 3008.

HVTN 705- A multicentre, randomized, double-blind, placebo-controlled phase 2b efficacy study of a heterogeneous prime boost vaccine regimen of Ad26. Mos4.HIV and aluminium phosphate-adjuvanted clade C gp 140 in preventing HIV-1 infection in women in Sub Saharan Africa.

Funder: Janssen Vaccines & Prevention B. V. (Leiden, The Netherland) **Time Period:** Sep 2018 - Jun 2022

The HVTN 705 'Imbokodo' Study kicked off in 2017 and has been active at the CIDRZ Matero Clinical Research site since 2018. The primary objective of this study was to evaluate the efficacy of the Ad26. Mos4.HIV and aluminium phosphate-adjuvanted clade C gp 140 vaccines in preventing HIV infection in women residing in Sub Saharan Africa who received the first three immunizations per protocol while the secondary objective was to evaluate the safety and tolerability of the vaccine regimen.

At CIDRZ Matero CRS the study team enrolled a total of 107 HIV uninfected woman between 18 to 35 years of age at risk of HIV infection. The participants were tested every three months, for a maximum of 36 months, and they received vaccinations at 0, 3, 6 and 12 months. All participants were offered comprehensive prevention methods including PREP (Pre-Exposure Prophylaxis) and PEP access.

By June 2020, all participants had completed vaccinations. Primary interim analysis confirmed that the vaccine is safe and tolerable, though it does not provide enough protection against HIV. The study has since been completed, and results were disseminated to participants and relevant stakeholders.

CoVPN 5001- A Prospective Study of Acute Immune Responses to SARS-CoV-2 Infection

Funder: National Institute of Health **Time Period:** Jul 2020 - Mar 2022

The study aimed to help researchers understand early SARS-CoV-2 infections and the body's early immune responses to the virus that causes COVID-19 illness.

The study's objective was to generate standardized datasets, characterizing the quality, magnitude, and kinetics of humoral immune responses to SARS-COV-2 infection in and symptomatic participants (both hospitalised and un-hospitalised). These participants experience a range of clinical outcomes to prepare for assessments during trials of best immune preventive strategies.

This study was conducted at the CIDRZ Matero CRS Additional Location; Chainda South Clinic. A total of 56 participants were enrolled with a 100% retention rate. By March 2022, all study participants had been exited from the study.

CoVPN 3008- Multi Centre Randomized Efficacy Study of COVID-19 mRNAn Vaccine in Regions with SARS-CoV-2 on Variants of Concern

Funder: National Institute of Health

Time Period: Sep 2021 - Apr 2024

This trial has been designed to provide as rapid of an assessment of efficacy and is designed to be conducted in places where access to effective vaccines is limited.

The study specifically evaluates the clinical efficacy of the COVID-19 ancestral strain mRNA vaccine in preventing the disease regardless of severity and preventing severe disease in people in areas of the world where the prevalence of the SARS-CoV-2 1.351 strain is universal. Breakthrough viruses in fully and partially vaccinated individuals in both treatment groups are being sequenced.

The study is taking place at Matero CRS and has enrolled 351 participants. The study is currently conducting final vaccination visits. The focus for the next year is to maintain a retention rate of over 90% and to conduct all fortnight COVID-19 surveillance visits/contacts.

CIDRZ PARTNERSHIPS

CIDRZ works closely with the Government of the Republic of Zambia, and local and global donor and research organizations to improve the health outcomes of Zambians. Our valued partners include:

Ministry of Chiefs and Traditional Affairs
Ministry of Community Development and Social Welfare
Ministry of General Education
Ministry of Health
Ministry of Home Affairs
Ministry of Local Government and Housing
Zambia Correctional Service

National HIV/AIDS/STI/TB Council
National TB and Leprosy Control Program
University Teaching Hospitals

University of Zambia
Zambia Correctional Service
Cancer Diseases Hospitals

INDUSTRY/ RESEARCH:

Abbvie Pharmaceuticals
Agence Preventive Medicines (AMP)
Alere
American College of Gynecologists
Aurum Institute, South Africa
Beckman Coulter India
CRDF GLOBAL
Crown Agents
DesireLine
DIGNITY
Delft Imaging
Gavi, The Vaccine Alliance
GlaxoSmithKline
NeoPenda
PATH
Partners in Health
Population Services International
PPD Global Limited
Roche Molecular Systems
Sanitation and Hygiene Applied Research for Equity (SHARE) Consortium
VillageReach

FOUNDATIONS:

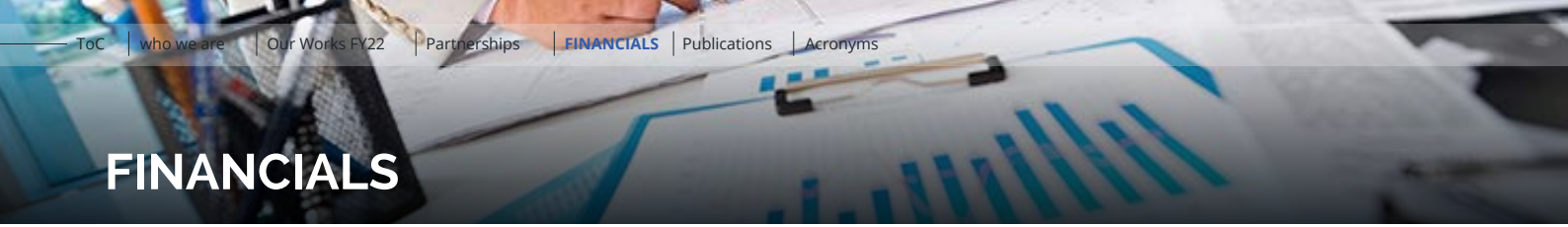
Ark
Bill & Melinda Gates Foundation
Bush Institute
Chiesi Foundation
Clinton Health Access Initiative
Comic Relief
Doris Duke Charitable Foundation
Elizabeth Glaser Pediatric AIDS Foundation
Elton John Foundation
Foundation for Innovative New Diagnostic (FIND)
George W. Bush Foundation
KNCV Tuberculosis Foundation
M.A.C AIDS Fund
Medical Imaging Research Unit (South Africa)
Mott MacDonald Foundation
The ELMA Foundation
The ELMA Vaccines and Immunisation Foundation
Tides Foundation
Swiss National Science Foundation

US UNIVERSITIES

Columbia University, USA
Harvard University, USA
Fred Hutchinson Cancer Research Center
Johns Hopkins University, USA
New York University
University of Alabama at Birmingham, USA
University of California, San Francisco, USA
University of Maryland, Baltimore
University of Rochester
The Washington University
Vanderbilt University, USA
Yale University, USA
European Universities
London School of Hygiene and Tropical Medicine, UK
Research Center Borstel- Leibniz Lung Center (RCB)
Swiss Tropical and Public Health Institute
The Amsterdam Institute for Global Health and Development (AIGHD)
University of Bern, Switzerland
University of Heidelberg, Germany
University of Nijmegen, Netherlands
University of Oxford
University of Rochester
University of Sussex

AFRICAN UNIVERSITIES

University of Zambia
UNILUS
University of Johannesburg
University of the Free State
Stellenbosch
University of Rwanda



FINANCIALS

* *Full Financial Statements are available at cidrz.org or by request.*

CONSOLIDATED STATEMENT OF INCOME AND EXPENDITURE AND OTHER COMPREHENSIVE INCOME

	2022 Kwacha	2021 Kwacha
Programme income	**987,767,259**	796,354,303
Programme expenses	**(835,521,660)**	(683,738,742)
Operating surplus	**152,245,599**	112,615,561
Other income	**78,001,265**	105,588,746
Administrative expenses	**(241,474,369)**	(207,039,625)
Results from operating activities	**(11,227,504)**	11,164,682
Finance income (expense)	**3,273,755**	(25,123,420)
(Deficit) surplus for the year	**(7,953,750)**	(13,958,738)
Tax credit (expense)	**133,069**	(482,338)
(Deficit) surplus for the year after tax	**(7,820,681)**	(14,441,076)
Items that will not be reclassified subsequently to profit or loss		
Amortisation of revaluation surplus	**345,316**	345,316
Total comprehensive (loss) surplus for the year	**(7,475,365)**	(14,095,760)

CONSOLIDATED STATEMENT OF FINANCIAL POSITION AS AT 30 SEPTEMBER 2022

ASSETS	2022 Kwacha	2021 Kwacha
Non-current assets		
Property, plant and equipment	**96,909,731**	71,075,582
Investment in subsidiary	**-**	-
Deferred tax asset	**449,806**	25,160
	97,359,537	71,100,742
Current assets		
Inventories	**12,866,114**	6,446,206
Trade and other receivables	**93,912,937**	94,762,122
Financial assets – Held to maturity	**5,993,297**	24,492,854
Cash and cash equivalents		
-Restricted	**117,376,089**	138,192,602
-Un-Restricted	**15,206,425**	40,351,159
	245,354,862	304,244,943
TOTAL ASSETS	**342,714,399**	375,345,685
Reserves and grants		
Revenue reserves	**135,634,271**	143,109,636
Capital grant	**28,745,723**	28,790,154
Revaluation reserve	**9,786,574**	10,131,890
Total equity	**174,166,568**	182,031,680
Liabilities		
Current liabilities		
Deferred income	**95,661,976**	130,942,284
Trade and other payables	**72,613,323**	62,199,303
Income tax payable	**272,532**	172,418
	168,547,831	193,314,005
TOTAL LIABILITIES	**168,547,831**	193,314,005
TOTAL EQUITY AND LIABILITIES	**342,714,399**	375,345,685

CONSOLIDATED STATEMENT OF CASH FLOWS FOR THE YEAR ENDED 30 SEPTEMBER 2022

ASSETS	2022 Kwacha	2021 Kwacha
CASH FLOWS FROM OPERATING ACTIVITIES		
(Deficit) surplus for the year	**(7,953,750)**	(13,958,738)
Adjustments for:		
Depreciation charge	**16,436,800**	13,453,214
Impairment of trade receivables	**(3,388,052)**	4,412,221
Interest income	**(3,232,351)**	(10,488,152)
Loss on disposal of property and equipment	**1,494,713**	11,785,106
Exchange (gains) Losses	**41,403**	35,611,572
Net cashflows from operations before tax	**3,398,764**	40,815,223
Income tax paid	**(191,463)**	-
	3,207,301	40,815,223
Changes in working capital		
(Increase) decrease in inventories	**(6,419,908)**	(710,916)
Decrease (increase) in trade and other receivables	**4,237,236**	(67,840,212)
(Decrease) increase in deferred income	**(35,280,308)**	44,048,894
(Decrease)Increase in trade and other payables	**10,414,020**	(17,092,509)
Net cash (utilised) generated in operating activities	**(23,841,658)**	(779,520)
CASH FLOWS FROM INVESTING ACTIVITIES		
Interest received	**3,232,351**	10,488,152
Project Grant	**(44,431)**	691,524
Reduction (Increase) in financial instruments	**18,499,557**	48,012,565
Capitalisation of CIDRZ Limited	**-**	-
Purchase of property and equipment	**(43,765,662)**	(22,019,531)
Net cash generated (used) in investing activities	**(22,078,186)**	37,172,710
Net (decrease) increase in cash and cash equivalents	**(45,919,844)**	36,393,191
Cash and cash equivalents at 1 October 2021	**178,543,761**	177,762,142
Exchange differences	**(41,403)**	(35,611,572)
Cash and cash equivalents at 30 September 2022	**132,582,514**	178,543,761

PROGRAMME INCOME

Programme Income	2022 Kwacha	2021 Kwacha
PROUD Z	**177,099,708**	32,314,536
LIFE	**166,307,643**	174,806,723
USAID SDHP	**146,277,733**	-
USAID TB LON	**96,848,713**	59,554,114
USAID ECAP III(SDVCA)	**91,436,615**	63,540,937
GAVI	**47,888,706**	19,132,186
NRRV	**23,357,230**	15,867,946
ACHIEVE	**23,002,109**	157,512,449
NIH TASKPEN	**15,620,496**	10,344,413
ZAM AMR	**15,186,366**	49,526,371
Mental Health	**12,790,427**	6,606,344
leDEA	**12,684,861**	10,196,151
ETVAX PROJECT	**11,929,420**	20,227,353
CoVPN 3008 Protocol Funding	**11,323,583**	6,865,743
Google health Al	**10,718,001**	12,583,037
DSD SI	**9,993,572**	-
ROTAVAC TRIAL	**8,529,325**	8,099,700
GENERIC BRANDING	**6,681,261**	7,251,737
HVTN	**6,681,261**	5,974,485
PEN-Plus Project	**5,495,538**	-
HEPATITIS - B	**5,044,814**	2,998,773
SHIGORA VAX	**4,858,866**	14,169,939
GATES PCC	**4,830,784**	3,044,462
CORONATION STUDY	**4,820,306**	-
VMMC	**4,632,953**	-
LAM FRESH/ FUJILAM	**4,241,698**	3,037,449
NIH – CTU	**1,759,213**	28,215,881
SKILLS	**1,052,420**	6,716,904
HBV Functional Cure	**-**	5,077,285
ROTA-biotic project	**-**	4,291,060
TB REACH	**-**	2,546,321
EDCTP ROVAS 2	**-**	2,322,141
EDCTP CHO VAXIM	**-**	2,322,141
CIRCUITS	**-**	1,919,949
ARCHIEVE ADVANCING CERVICAL CANCER SCREENING	**-**	1,094,962
OTHER PROJECTS	**56,673,637**	58,192,811
	987,767,259	796,354,303

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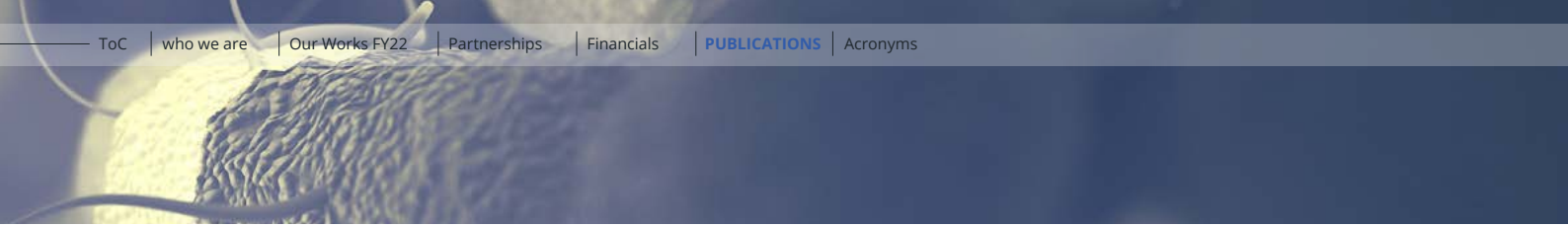

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ACRONYMS

ABYM	adolescent boys and young men
AGYW	Adolescent Girls and Young Women
AHD	Advanced HIV disease
AI	Artificial Intelligence
AIDS	acquired immunodeficiency syndrome
ALWH	Adolescents living with HIV
AMR	Antimicrobial resistance
AMRCC	Antimicrobial Resistance Coordinating Committee
ANC	Antenatal care
APHL	American Public Health Laboratories
ART	anti-retroviral therapy
ARV	anti-retrovirals
ATT	anti-tuberculosis treatment
BMGF	Bill and Melinda Gates Foundation
CBS	Case-based Surveillance
CDC	Centers for Disease Control and Prevention
CFAR	Centers for AIRS Research
COVID	corona virus disease
CRS	clinical research sites
CSE	comprehensive sexuality education
CTU	Clinical Trial Unit
CVD	cardiovascular disease
CXR	chest x-ray
DFID	UK Department for International development
DREAMS	Determined, Resilient, AIDS-free, Mentored Safe
DTG	Dolutegravir
ECAP	Empowered Children and Adolescents Program
EDVRU	Enteric Disease Vaccine Research Unit
EED	environmental enteric dysfunction
EHR	electronic heath records
EID	Early Infant Diagnosis
ELISA	enzyme-linked immunosorbent assay
ELISPOT	enzyme-linked immune absorbent spot
EOC	Emergency Operations Centre
EPHO	Eastern Provincial Health Office
EPI	Expanded Programme on Immunisations
ETEC	Enterotoxigenic Escherichia coli
ETVAX	ETEC Vaccine
FGD	Focus Group Discussions
FIND	Foundation for Innovative New Diagnostic
FSW	female sex workers
FY	Financial Year
GAVI	Global Alliance for Vaccine Immunisation
GBV	Gender Based Violence
GRZ	Government of the Republic of Zambia
HBV	hepatitis B virus
HCD	human centered design
HCW	Health Care Worker
HIC	Human Infection Challenge
HIS	Health information systems
HIV	human immunodeficiency virus
HMIS	health management information systems
HPV	human papillomavirus
HSS	Health System Strengthening
HVTN	HIV Vaccine Trials Network
IEC	information, education and communication
KP	Key Populations
LIFE	Laboratory Innovation for Excellence
LMIC	Lower middle-income countries
LPHO	Lusaka Provincial Health Office
LQAS	Lot Quality Assurance Sampling
LTFU	Lost to follow up
MC	male circumcision
MERS	Middle East respiratory syndrome
MMD	multi month dispensing
MOH	Ministry of Health
MSD	moderate-to-severe diarrhoea
MSM	men who have sex with men

ACRONYMS

NCD	Non-Communicable Diseases
NHRA	National Health Research Authority
NIH	National Institutes of Health
NRRV	Non-Replicating Rotavirus
NTLP	National Tuberculosis and Leprosy Program
OCV	oral cholera vaccines
OVC	orphans and vulnerable children
PCC	Patient Centred Care
PCR	polymerase chain reaction
PEF	Partnership Engagement Framework
PEP	post-exposure prophylaxis
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PHO	Provincial Health Office
PLHIV	people living with HIV
PMTCT	prevention of mother to child transmission
POC	point of care
PPE	Personal Protective Equipment
PREP	Pre-exposure Prophylaxis
RMNCH	Reproductive, Maternal, Neonatal and Child Health
SARS	Severe Acute Respiratory Syndrome (SARS)
SC	SmartCare
SGBV	sexual and gender based violence
SNS	Social Network Strategy
SPHO	Southern Provincial Health Office
SRH	sexual and reproductive health
TA	Technical Assistance
TPT	TB Preventive Treatment
TSS	technical supportive supervision
VCA	Vulnerable Children and Adolescents
VIA	visual inspection with acetic acid
VL	Viral LoadViral Load
VMMC	Voluntary Medical Male Circumcision
WASH	water, sanitation and hygiene
WELS	Western, Eastern, Lusaka and Southern provinces
WLHIV	women living with HIV
ZITAG	Zambia Immunisation Technical Advisory Group
UNICEF	United Nations International Children's Emergency Fund
UNZA	University of Zambia
UNZABREC	University of Zambia Biomedical Research Ethics Committee
USAID	United States Agency for International Development
UTH	University Teaching Hospital
VCA	Vulnerable Children and Adolescents
VIA	visual inspection with acetic acid
VL	Viral Load
VMMC	Voluntary Medical Male Circumcision
WASH	water, sanitation and hygiene
WHA	World Health Assembly
WHO	World Health Organization
WLHIV	women living with HIV
ZAMR	Zambia Anti-Microbial Resistance
ZAMRA	Zambian Medical Research Authority
ZCS	Zambian correctional services
ZITAG	Zambia Immunisation Technical Advisory Group
ZNPHI	Zambia National Public Health Institute

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