7TH EAST AFRICAN HEALTH AND SCIENTIFIC CONFERENCE: TECHNOLOGY FOR HEALTH SYSTEMS TRANSFORMATION AND ATTAINMENT OF THE UN SUSTAINABLE DEVELOPMENT GOALS

27-29 MARCH 2019
Julius Nyerere International Conference Centre
Dar es Salaam, Tanzania

Conference Report and Recommendations
www.eahealth.org

The 7th East African Health and Scientific Conference was organized by:

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The East African Health Research Commission would like to thank all the participants for their engaging and invaluable contributions at the Conference. The more than 700 participants played a valuable role, ranging from speakers, chairs, co-chairs and panellists to exhibiters, presenters, and the rapporteurs and participants of symposia. We wish to acknowledge the support of the Government of the Republic of Tanzania, Co-organizers of the Conference, without whom this event would not have been possible.

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Content

Foreword

The 12th Ordinary Session of the EAC Council of Ministers (2006) approved the annual East African Health and Scientific Conference (EAHSC) & International Health Exhibition and Trade Fair to be convened in East Africa and hosted on a rotational basis by the EAC partner states through their respective National Ministries responsible for EAC Affairs, Ministries responsible for Health, and other relevant organisations, and in close collaboration with Regional and International health-related organizations, Civil Society Organizations, individuals, and stakeholders.

Based on the Protocol establishing the East African Health Research Commission (EAHRC), the Commission is tasked with the responsibility of coordinating the East African Health and Scientific Conference & International Health Exhibition and Trade Fair. The 14th Sectoral Council of Ministers of Health directed the EAHRC to convene the 7th EAHSC from 27th to 29th March 2019 in the United Republic of Tanzania (EAC/Health/14SCM/Directive 40) and directed the United Republic of Tanzania and the EAHRC to commence mobilization of the necessary resources for the convening of 7th EAHSC (EAC/Health/14SCM/Directive 41). It is with deep satisfaction that we present the report of the 7th EAHSC.

EAHSC continues a tradition of bringing together researchers, academics and professionals, policy makers from all over the EAC region to contribute towards strengthening regional cooperation in health in line with Article 118 of the Treaty for the establishment of EAC as well as other relevant provisions of the EAC Common Market Protocol. It enhances the ideals of the EAC, which is free movement of People, Services, and Goods.

The 7th EAHSC main theme was "**Technology for Health Systems Transformation and Attainment of the UN- Sustainable Development Goals'**. The conference was pivotal in bringing participants from EAC partner states and all over the world around the conference theme. The conference particularly launched the Digital Regional East African Community Health Initiative strategic plan which will implement the decision of EAC Head of States to invest in Digital Health Technology for better research for health, health services delivery and health outcomes. The conference also launched other EAHRC initiatives such as the Young East African Health Research Scientists' (YEARS) Forum and the East Africa Web Portal for Health information. The conference allowed the interaction of young researchers and senior scientists from academic and research institutions in formal and informal settings to present and to discuss research and its challenges. The contribution of YEARS helped to make the conference outstanding as it has been. This report, together with all materials of the 7th EAHSC available on www.eahealth.org will furnish the scientists of the EAC with an excellent reference book. We trust also that there will be an impetus to stimulate research for health in the region.

We thank all the participants during the 7th EAHSC for their contribution. We invite you to the 8th EAHSC expected to be held in Nairobi, Kenya in March 2021.

Professor Gibson Kibiki
Executive Secretary
East African Health Research Commission

Executive Summary

The 7th EAHSC was held from 27-29 March 2019 at the Julius Nyerere International Convention Centre. It was jointly organized by the EAHRC, the Ministry of Health, Community Development, Gender, Elderly and Children (MOHCDGEC) of Tanzania Mainland, the Ministry of Health and Social Welfare of Zanzibar and the Ministry of Foreign Affairs and East African Cooperation of the United Republic of Tanzania. The National Institute for Medical Research (NIMR) was the conference Secretariat. A National Steering Committee and seven subcommittees led the preparations.

The objectives of the conference were to provide a forum that brings together policymakers, academicians and researchers to exchange and share experiences on aspects of health and health-related research and to provide an interdisciplinary forum for researchers, practitioners, development partners and academicians to present, exhibit and discuss recent trends, innovations, concerns and best practices in healthcare, health and health-related research.

The main theme of the conference was *"Technology for health systems transformation and attainment of the UN-Sustainable Development Goals"* and the keynote speech was "Invest in Digital Health to catalyze East Africa attain the UN-Sustainable Development Goals".

The opening ceremony was officiated by Her Excellency Samia Suluhu Hassan, the Vice President of the United Republic of Tanzania and the closing ceremony by the Minister of Foreign Affairs and East African Cooperation, Honorable Palamagamba Kabudi.

The 7th EAHSC comprised of various sessions including the conference opening; keynote speeches; plenary presentations; parallel session presentations; interactive presentations and symposia. In addition to the conference scientific sessions, an international health exhibition was held during the conference, where research institutions, health care facilities, medical /health academic institutions, medical and pharmaceutical industries, Ministries, EAHRC Secretariat, Civil Society organizations, Non-Governmental Organizations, International organizations, and UN agencies, showcased their products and activities. The conference was attended by more than 700 participants. The working language of the conference was English.

During the opening ceremony of the 7th EAHSC, by Her Excellency Samia Suluhu Hassan, the Vice President of the United Republic of Tanzania, launched three EAHRC initiatives: the Digital Regional East African Community Health (Digital REACH) Strategic Plan 2019-2028, the YEARS' Forum and the East Africa Web Portal for Health Information.

Recommendations

Recommendations of the 7th East African Health and Scientific Conference: *"Technology for health systems transformation and attainment of the UN-Sustainable Development Goals".*

The 7th EAHSC had nine (9) recommendations from the proceedings for EAC implementation.

1. Expedite development and application of innovative approaches (such as the cross-border health unit model) to cross border health, disease outbreak, preparedness and response in border areas while adding values to the national health system.
2. Promote establishment of national bio-banks and data repositories among the partner states and develop a regional policy for guiding the use and security of the repositories.
3. Partner states should participate in development, evaluation and formalization of emerging technologies intended for promoting digital health.
4. Harmonize regional intellectual property policies to guide development and uptake of digital health technologies.
5. Strengthen the platform for digital inclusion where communities have full access to information on surveillance and disease management.
6. Fast track the adoption and implementation of evidence-based surveillance and enhance mechanisms of sharing information and best practice.
7. Enhance coordination and collaboration between East African countries and international institutions involved in diseases control including the African CDC.
8. Promote the involvement of frontline healthcare workers in the design of digital health tools to ensure readiness, for easy adoption, decreasing cost, and increased sustainability.
9. Develop and adopt innovative regional public private partnership (PPP) policies and models specific to digital health technologies.

Conference preparatory activities

In accordance with the concept note of the EAHSC approved by the 15th Sectoral Council of Ministers of Health (EAC/Health/15SCM/Decision 22), preparatory activities of the 7th EAHSC were coordinated by the EAHRC Secretariat and conducted at the host country, as well as in all EAC partner states through the EAHRC National Focal Points.

In line with the concept note of the EAHSC, each EAC partner state appointed a national steering committee with seven subcommittees to prepare for the 7th EAHSC. Members for each subcommittee were appointed from different institutions and ministries according to their expertise. Each committee/subcommittee had an appointed chair. The sub-committees were:
1. Scientific sub-committee
2. Resource mobilization, administration, and finance sub-committee
3. Procurement and logistics sub-committee
4. International health exhibition and trade fair sub-committee
5. Communication, ICT and audio-visual sub-committee
6. Welfare and social events sub-committee
7. Protocol and security sub-committee

The chair of the scientific sub-committee of the host country was the chair of the conference. A regional steering committee was appointed by EAC partner states to consider reports of national steering committees. The conference was publicized during the preparatory period through various fora including EAHRC fora such as the East Africa web portal for health information, specifically the East Africa web portal for health https://conferences.eahealth.org/

EAHRC Secretariat organized a regional press conference on the 7th EAHSC; during the conference the NIMR and MOHCDGEC social media handles provided conference coverage. All major media houses in Tanzania were present including media from the EAC Secretariat. At partner states level, publicity was done under coordination of the EAHRC National Focal Points through their websites, TV spots, newspapers, social media (Facebook, Twitter and WhatsApp) and emails to stakeholders.

Scientific activities such as call for abstracts, abstracts review and conference programme were handled by the EAHRC Secretariat in collaboration with the scientific sub-committee of the host country of the 7th EAHSC, the United Republic of Tanzania.

The EAHRC Secretariat also developed instructions and guidelines that were used for the conference to guide the presenters, chairs and rapporteurs of sessions, symposia organizers, speakers and participants.

Preconference meetings

The 7th EAHSC was preceded by a lot of events including:

• The 18th Ordinary Meeting of the EAC Sectoral Council of Ministers of Health

  The sessions of the 18th Ordinary Meeting of the EAC Sectoral Council of Ministers of Health were held from 21st to 26th March 2019 as follows:

  o   Session of Senior Officials: 21st - 23rd March, 2019
  o   Session of Principal/Permanent Secretaries: 25th March, 2019
  o   Ministerial Session: Tuesday, 26th March, 2019

• **The 3rd Young East African Health Research Scientists' Forum**

The Young East African Health Research Scientists' (YEARS) Forum is an initiative of the East African Health Research Commission (EAHRC) to empower East African Community (EAC) young researchers to shape the future of health research in the region. The 3rd YEARS' forum was held in Dar es Salaam, Tanzania from 25th to 26th March 2019 as a pre-conference meeting of the 7th EAHSC. YEARS visited research and academic institutions in Dar es Salaam on the first day and had mentorship sessions on the second day. The mentorship session was led by international facilitators from international organizations such Vital Wave and the Community Health Academy/Last Mile Health; it focused on integration of PhD graduates in different organizations. YEARS were also involved in the preparations and organization of the 7th EAHSC venue and chaired interactive sessions during the conference. A number of the YEARS also had abstracts that were presented during the conference sessions

- **The 1ˢᵗ East African Government Leaders, Legislators and Legal Executives' Forum**

East African Government Leaders, Legislators and Legal Executives' Forum (EAGLES' Forum) is a dialogue between Bureaucrats and Technocrats that brings together EAC Government Leaders, Members of Parliament, Officials from the Judiciary System, Health Experts and the EAHRC to discuss health issues. EAGLES' Forum brings together three pillars of governance in the EAC and its partner States, the forum allows for consensus building and collective position on pertinent health issues. Through an exchange of views on evidence and SMART solutions, EAGLES' Forum provides diverse stakeholders a platform to place a spotlight on regional/global health issues, catalyze political momentum, and commit to action. The 1ˢᵗ EAGLES' Forum discussed about aligning Digital REACH Initiative with Digital Health Initiatives in EAC Partner States and addressing issues of resources mobilization for the Digital REACH Initiative. It resolved among others that Digital Health Initiative be supported by EAC Partner States as it will contribute to reduce the cost of health services in the EAC region, and to each of the EAC Partner States. It also recommended to EAHRC to develop a business case for each of the Digital REACH workstreams; and to make sure the resolutions/decisions of EAGLES' Forum feed into the meeting of the Sectoral Council of Ministers of Health.

Conference theme, subthemes and symposia

Theme
Technology for Health Systems Transformation and Attainment of the UN- Sustainable Development Goals

Sub themes of the 7ᵗʰ East African Health and Scientific Conference
a) Technologies supporting data for health system decision-making
b) Technologies for Disease Surveillance, Disease Outbreak Detection and Response, and Cross border mobility and disease tracking
c) Innovative technologies and solutions for application in, and improvement of healthcare service delivery and health outcomes
d) Costing and Financing Health: the role of Digital Health, International Remittances, Universal Health Care, and EAC status on the UN-SDGs
e) Health knowledge management through digital technologies and solutions in East Africa: health research, training, and care

Satellite Symposia
- Role of Government in providing a robust enabling ecosystem for scaling uptake and utilization of technologies in health: leadership, policies, regulation, and enabling environment for digital technology and solutions in health
- Status and gaps in Digital Health in the region: readiness of the health sector to transition to Digital Health, and the health workforce to embrace technology. Capacity for data analytics, and responsible data practice

- Regional role: harmonization, standardization, interoperability, responsible data practice, privacy, security, investment in technology for health, scaling uptake and utilization of technologies, and regional digital health implementation initiatives
- Public Private Partnership (PPP): role of private sector and development partners; investment opportunities and win-win investment cases; cooperation between health and ICT sectors; enabling ecosystem for investment. Utilization of locally available minerals, raw materials, and other resources for digital health industrialization.

Conference Programme

Conference Sessions Day 1: 27 March 2019

Opening session

Welcome and Opening Keynote Speeches

The opening ceremony was officiated by Her Excellency Samia Suluhu Hassan the Vice President of the United Republic of Tanzania. H.E Samia Suluhu Hassan informed the audience that she was witnessing first-hand the enthusiasm of EAC to drive efforts to promoterapid technological and digital transformation to support the implementation of health sector interventions and programmes, which is surely a step in the right direction towards the attainment of SDG 3 and universal health coverage. She highlighted the fact that investing in health sector and relevant digital technologies is key for a development that EAC needs to pursue more aggressively as a region. H.E Samia Suluhu Hassan underscored that the need to invest in digital health technology cannot be understated if EAC is to fully implement the sustainable development goals and address all aspects of poverty. She then briefed the audience that Tanzania understands the importance of digital health and has already embarked in digitizing its healthcare system through the Ministry of Health and the several agencies.

She recalled that the approval of the Digital Regional East African Community Health (Digital REACH) strategic plan by the 16th Sectoral Council of Ministers of Health is an important step towards achieving transformation in the sector. She however, reiterated that effective implementation of this regional initiative depends not only on good coordination from the East African Health Research Commission but also on strong commitments of EAC partners states, development partners and every health sector stakeholder in partner states. She called upon EAC development partners to continue their support to the EAHRC, and EAC partner states to implement and coordinate this initiative. She encouraged EAC partner states to support the Digital REACH development and called upon them to work together through digital health technology, reiterating the commitment of the United Republic of Tanzania to

take advantage of digital health technology to improve implementation of health sector interventions, with the aim of accelerating attainment of the universal health coverage and SDGs. She further highlighted the challenge of trained workforce skilled in using digital health solutions and the need for proper governance and funding, among others. To overcome this challenge there is a need to take an interdisciplinary and inter-sectoral approach, bringing together all the main actors in the digital health ecosystem such as international organizations, health service institutions, academia, research centres, and public and private industry. She noted that in addition to the East African Health and Scientific Conference, the East African Health Research Commission has established new platforms meant to share research findings in the region, to build research capacity and to create a better environment for research on health matters. She took the opportunity to congratulate all representatives of EAC partner states in the Commission and the EAHRC Secretariat for these tremendous achievements and encouraged them to keep up the speed and the commitment.

Her Excellency Samia Suluhu Hassan the Vice President of the United Republic of Tanzania concluded by declaring open the 7th EAHSC and lighting up the torch symbolizing the East African Health and Scientific Conference.

Honorable Patrick Ndimubanzi, Minister of State, Ministry of Health of Rwanda, representing Honorable Diane Gashumba, Minister of Health of Rwanda and Chair of the Sectoral Council of Ministers of Health expressed a great pleasure to join the participants for the 7th EAHSC and recalled that the EAHSC, as a regional platform of health and science knowledge sharing, is contributing towards strengthening regional cooperation in health in line with Article 118 of the Treaty forthe Establishment of the East African Community as well as relevant provisions of the EAC Common Market Protocol. He intimated that EAC has joined the rest of the world in committing to the 17 SDGs to eradicate extreme poverty, fight inequality and injustice, and work towards good health and well-being of the people. He noted that research findings are useful only if they are translated into policies and practices implementable at the community level. Coming back to the theme of the 7th EAHSC, he reiterated that digital age is transforming the entire health sector and how healthcare is delivered; ICT and digital health solutions offer the prospect of bringing into reach the targets of SDG 3 for health and well-being making universal health coverage for all a reality by 2030. He further noted that the 19th Ordinary Summit of Heads of EAC partner states held in Kampala in February 2018, committed to invest in digital health technology for better research for health, health services delivery and health outcome, as one of the health sector investment priorities for the region and for the next 10 years. He informed the conference participants that the Sectoral Council was egger to approve the Digital Regional East African Community Health (Digital REACH) 10 years strategic plan during its 17th session held in Kigali on 26th October 2018. He added that it is a responsibility of EAC partner states to implement this strategic plan and achieve the ambitions of EAC Head of states. He also informed that he was pleased to observe that the 1st Forum of East African Government Leaders, Legislators, and Legal Executives' Forum (EAGLES' FORUM) initiated discussions to better align Digital REACH initiative and digital health initiatives in EAC partner states; and on addressing issues of resources mobilization for the Digital REACH initiative. He closed his remarks by calling upon EAC partner states to put in place strategic policies and practical interventions that can help the EAC region to boost faster digital health technology in its health systems.

He urged the 7th EAHSC to propose concrete recommendations to support the implementation of the Digital REACH initiative. He thanked the Government of the United Republic of Tanzania for hosting the conference, the EAC Secretariat through the East African Health Research Commission for having organized and coordinated the conference and all people who contributed to the 7th EAHSC.

Honorable Ummy A. Mwalimu (MP), Minister for Health, Community Development, Gender, Elderly and Children, United Republic of Tanzania expressed gratitude to the Vice President of the United Republic of Tanzania (URT) for accepting to officiate the conference, despite a busy schedule. She informed that the EAHSC brings together Health Researchers and Scientists from East Africa, Africa and beyond, to discuss gains and challenges in the health sector and the contribution of science and technologies to development of the health sector in EAC region and Africa at large. She introduced the Vice President to

all Health Ministers from East African Partner States and their respective delegations who were in Tanzania to attend the EAC Sectoral Council of Health Ministers and the 7th EAHSC. She emphasized the fact that the 7th EAHSC takes place at a time when the region, and Africa, needs a rapid technological transformation especially in digital technologies to support the implementation of health sector interventions and programmes to accelerate the attainment of universal health coverage and SDG 3 in general. It is a critical moment for EAC transformation in digital technologies in ranging from the area of telemedicine, e-radiology, e- health services and many more. She informed that URT has developed various e-platforms that link to DHIS2 and improved hospital information systems and revenue collection system to facilitate patient care. She assured the conference participants that URT is going to provide leadership to ensure more adoption of efficient and cost-effective technologies and innovation for accelerated attainment of global commitment of universal health coverage by 2030. She added that the URT has stepped forward to inspire health workers and health researchers to adopt ICT technologies to ensure the realization of the global commitment of SGDs, including SDG 3, by embracing a paradigm shift from traditional practices to digital driven health services in the day to day practices. She highlighted that URT believes in technologies and therefore appreciates that the theme of the 7th EAHSC, "Technology for health systems transformation and attainment of the UN-Sustainable Development Goals", will motivate scientists to provide proven, practical, ethical and cost-effective solutions to our health challenges. She extended her appreciation to her fellow Ministers from EAC partner states and their country delegates for participating in the 7th EAHSC, and to development partners and members of the diplomatic community for the extended support to health sector in Tanzania. She thanked the EAC Secretary General and the Secretariat, and the Executive Secretary of the EAHRC for a close collaboration that has enabled the 7th EAHSC to take place.

Honorable Thaddee Ndikumana, Minister of Public Health and Fight against HIV &AIDS, Republic of Burundi, took the opportunity to express gratitude to the EAHRC for convening the 7th EAHSC and the United Republic of Tanzania for hosting it. He recalled that the Republic of Burundi was very pleased to

host the 6th EAHSC and International Health Exhibition and Trade Fair. He further recalled that strengthening health research and development for the period of 2018 to 2028 is one among the nine regional health sector investment priorities endorsed by the EAC Head of states. The priority on strengthening health research and development has three sub priorities namely the establishment of an EAC regional health research and development facilitation mechanism, the establishment of an EAC regional observatory on health research and development, and investment in digital health technology for better research for health services. He highlighted the fact that regional coordination in digital health is of benefit to all the EAC partner states. It allows to achieve economic efficiencies through cost savings, economies of scale, and shared digital health resources across the region; it supports improved health systems by enhancing data sharing, policies and standards, access to and continuity of health care, disease surveillance, and

use of data for decision-making; and it yields faster and better implementation by positioning the region as a digital health leader, accelerating implementation progress within and across partner states, supporting use of evidence for decision-making, and sharing best practices. He concluded by thanking the sponsors of the 7th EAHSC and expressing sincere thanks to Her Excellency the Vice President of the United Republic of Tanzania for officiating the opening ceremony of the 7th EAHSC.

Professor Palamagamba Kabudi (MP), Minister for Foreign Affairs and East African Cooperation, United Republic of Tanzania, gave a vote of thanks on the occasion of the 7th EAHSC. He re-emphasized the fact that the 7th EAHSC is a great event which brought together health researchers and scientists from East Africa and beyond to discuss issues on Technology for health systems transformation and attainment of the UN-Sustainable Development Goals. On behalf of the Organizers of the 7th EAHSC and other supporting/sponsoring organizations, special guests in the audience, and on his own behalf, he extended a very hearty vote of thanks to Her Excellency the Vice President of the URT for gracing the event and sharing with participants her time notwithstanding the tight schedule that she has. He observed that the 7th EAHSC has been timely in East Africa because the region requires rapid technological transformation especially in digital technologies. Digitalization of the healthcare system leads to more efficient expenditure, improved service and revenue collection. The eventual impact of digitalization on the health sector is comparable to the impact of industrialization to the economic sector. In order to achieve this goal however, research is needed for innovations and to provide scientific evidence for available digital technologies; thereby promoting the achievement and sustainment of SDG 3. He noted that the 7th EAHSC has attracted more than 700 participants including high-level delegates; some had attended pre-conference meetings or were attending the opening ceremony to further proceed to plenary and parallel sessions through which health researchers and scientists will present findings likely to prove that adoption of efficient and cost-effective technologies and innovation may lead to accelerated attainment of Global Commitment of Universal Health Coverage by 2030. He thanked the team involved in preparatory activities of the 7th EAHSC namely the team from Ministry of Health and its institutions, academic health institutions, the Ministry for Foreign Affairs and East African Cooperation, and particularly the National Institute for Medical Research for coordination of the preparations. He further extended gratitude to all speakers of the 7th EAHSC, on behalf of the conference participant; the presentations of their research findings will enlighten the conference participants on the rich investment in health technologies and its application in the East African region. He appreciated the President of the United Republic of Tanzania and the Vice President for making the health sector one of their highest priorities and for accepting to grace the event.

Honorable Harusi Selemani, Deputy Minister of Health, Zanzibar, on behalf of Honorable Hamad Rashid Mohamed the Minister for Health of Zanzibar, expressed gratitude to the participants and organizers of the 7th EAHSC and informed that she was very happy to get an opportunity to attend the conference. The conference brought together Ministries of health from across EAC region who are responsible for the planning and implementation of health and health related policies to promote health and wellbeing of EAC citizens. She informed the participants that the ministry of health of Zanzibar has been working to ensure the health and safety of citizens by giving priority to vulnerable groups such as women and children. She further informed that the Ministry of health of Zanzibar has been working in close collaboration with development partners, health related NGOs, civil society organizations, individuals and stakeholders to achieve its objectives. This collaboration allowed Zanzibar to draft a plan of innovative technologies and solutions to strengthen Zanzibar health information system. The system helps Zanzibar for better detection and response to diseases and improve health care services delivery in the community. She shared the experience of Zanzibar investing in digital technology mentioning the experience of Zanzibar community health programme, Zanzibar AIDS control, and Zanzibar malaria elimination programme among others.

Engineer Steven Mlote, EAC Deputy Secretary General, representing Ambassador Liberat Mfumukeko, EAC Secretary General, took the opportunity to welcome all participants to the 7th EAHSC and conveyed warm greetings from the EAC Secretariat Headquarters in Arusha, United Republic of Tanzania. He also conveyed EAC gratitude to the United Republic of Tanzania for hosting the 7th EAHSC. The Deputy Secretary General thanked the Government and the people of the URT for the hospitality extended to all participants to the Conference; he also thanked EAC development partners who have contributed and continue supporting for the success of the conference as well as scientists who took time to prepare what to share with their colleagues. He reiterated the commitment of the EAC Secretariat to continue supporting the EAHSC. He highlighted that the EAHSC is convened in the fulfilment of the resolutions of the EAC recommendations and relevant Treaty provisions of the establishment of the EAC (article118) with regards to regional cooperation and integration in the health sector and the resolutions of the 12th Ordinary Session of the EAC Council of Ministers in 2006. The EAHSC enhances the ideals of the EAC, which is free movement of People, Services, and Goods. He further highlighted that by organizing the 7th EAHSC, the EAHRC is complying to the mandate it has been established for, which is a mechanism for making available to the community, advice upon all matters of health and health related research and findings necessary for knowledge generation, technological development, policy formulations, practices

and related matters. He recalled the theme of the 7th EAHSC which is technology for health systems transformation and attainment of the UN-Sustainable Development Goals and noted that during this millennium, the world has witnessed how ICT can revolutionize socio economics matters, and that digital health technologies are increasingly being used in health care to improve health services and delivery. He expressed confidence that research findings carried out in EAC about health technologies will be shared and symposia will be held and all followed by constructive expert discussions; expecting that relevant and realistic recommendations, for the improvement of health care and delivery through application of technologies for the improvement of the health and the well-being of citizens of the Community, will be suggested.

Professor Gibson Kibiki, Executive Secretary of the EAHRC, welcomed all participants to the 7th EAHSC and recalled that the EAHSC is a biennial event hosted on rotational basis by EAC partner states. The conference is convened as part of the regional cooperation in health in line with article 118 of the treaty of establishment of the EAC. EAHSC enhances the ideals of the EAC that are free movement of people, services and goods. He informed that the main theme of the 7th EAHSC is technology for health systems transformation and attainment of the UN-Sustainable Development Goals. The theme has attracted more than 200 relevant abstracts for presentation from the region and outside the region which will be presented and discussed during plenaries, parallel and interactive sessions and during symposia. He highlighted that the relevance of the main theme cannot be over emphasized. It comes at a time when the region has developed various strategies to incorporate digital technology and solutions into health. However, at the same time the region is cognisant of the fact that there is more to be done both at national and regional level if the region is to realise the transformational power of digital health. He observed that the millennium has presented to the world with intensified health threats such as health threats associated with globalisation, climate change, resurgence of deadly disease outbreaks, and change of disease patterns. It is therefore imperative that novel and transformative tools are needed in health. He further observed that the Ebola outbreak in west Africa revealed how weak Africa health system still is, and how vulnerable all of the world is, when there is a disease outbreak at any one place of the universe, but more importantly it revealed the compelling need for regional and global joint approaches and the pivotal role that digital technology can play in real-time for an effective control of disease outbreaks. He noted that the conference therefore is another opportunity to share experiences and review current strategies for scaling uptake and utilisation of digital health in the entire health sector for better health services and outcome. He recalled that the East African Health Research Commission, which became operational in 2015 coordinates the East African Health and Scientific Conferences. The 7th EAHSC is the second conference to be organised by the Commission. He informed the audience that during previous conferences, the Commission launches various health-related initiatives; initiatives which are sustainable and have broader socioeconomic impact to EAC. He informed that seven initiatives will be launched during the 7th EAHSC. He recalled that the EAGLES' Forum was launched on 26th March 2016; the forum allowed government officials, members of parliaments and judiciary system to discuss priority issues in health and gain consensus and collective approach on how to address them. He invited Her Excellency the Vice President to launch three other initiatives: the 10-year Digital REACH Strategic Plan whose mission is to maximise the power of digital

health by ensuring the enabling environment and infrastructure, and by implementing scaled, coordinated, transformative, and innovative approaches in heath; the official launch the EA Web Portal on health, which is the official compendium of health information in East Africa; and also thee launch the Young East African Research Scientists' Forum, which is a forum that mentors the next generation health leaders and scientists. He further informed that later in the evening the EAHRC also will launch a book of abstracts on Digital Health in East Africa, a compilation of research and evidence on use of ICT in health in East Africa; the second EAHRC journal called East Africa Science, a journal that promotes science and innovation in East Africa whose editorial team is formed by the YEARS; and the report of the 6th EAHSC, which is comprehensive and provides the necessary details associated with organisation of the EAHSC in general and will be a useful tool for organising future EAHSC conferences. He took the opportunity to thank all who have contributed in many ways to make the event happen, the host nation, the URT through the Ministry of Foreign Affairs and EAC and through the Ministry of Health, the EAC partner states, the development partners, private sector, sponsors, health professionals and all stakeholders. He finally thanked Her Excellency the Vice President for joining scientists to mark this important regional integration event.

Professor Eligius Lyamuya, Chair of the 7th EAHSC, welcomed the participants to the conference and conveyed a special appreciation to Her Excellency the Vice President of the United Republic of Tanzania for accepting the invitation and sparing her very valuable time, to come and officiate at the opening of the 7th EAHSC. He took the opportunity to welcome all dignitaries, guests and participants to the conference and to Dar es Salaam, the Haven of Peace. He highlighted that the conference whose theme is "technology for health systems transformation and attainment of the United Nations sustainable development goals "has attracted participants from many countries from within and outside the EAC region. He informed that a total of 193 papers were expected to be presented including 5 plenary sessions, 16 parallel sessions and 20 interactive sessions. He added that in addition to these sessions there will be five symposia that are linked to the main theme of the conference where presentations will also be made and discussed. He noted that several experts in the field will discuss the various presentations and generate recommendations that will inform the implementation of the East African Digital Health initiative for better research for health, health services delivery and health outcomes in the region and beyond. The Chair of the 7th EAHSC noted that the event is the culmination of an enormous collective effort, which began in early 2018 when Tanzania was selected to be the host for the 7th EAHSC. Since then, several public and private institutions and individuals have contributed in one form or another towards the organization of the Conference. He therefore took the opportunity, on behalf of the conference organizers, to express appreciation to all who supported the organization of the 7th EAHSC, especially the Government of Tanzania; EAC partner states; the East African Health Research Commission Secretariat; the national and regional steering committees; development partners; public and private institutions and organizations. He thanked all participants and exhibitors for having so generously devoted time to ensure that the preparations for the Conference have been successfully undertaken.

Launchings

Her Excellency Samia Suluhu Hassan the Vice President of the United Republic of Tanzania presided over the ceremony of launching the Digital Regional East African Community Health (Digital REACH) Strategic Plan 2019-2028. Digital REACH is a novel and ground-breaking regional initiative that aims at scaling uptake and utilization of digital technology for improvement of healthcare service delivery and health outcomes. The Initiative coordinated by the EAHRC, has been approved for implementation by the EAC Sectoral Council of Ministers of Health, and EAC Council of Ministers. Digital REACH Initiative is endorsed by the Presidents of the EAC Partner States. It is an implementation science-led, that will develop and implement regional health programmes that support economies of scale and regional capacity for socio-economic transformation. The initiative is designed to complement, improve and strengthen country specific work in Digital Health. It aligns with national programmes and priorities. The Digital Regional East African Community Health Strategic Plan is a tool to implement the Digital REACH initiative.

The Young East African Research Scientists (YEARS)' Forum), is an EAHRC initiative aiming to empower EAC young Researchers to be able to shape the future of research for health in the region. The initiative was approved by the 15th EAC Sectoral Council of Ministers of Health as one of the preconference meeting of the East African Health and Scientific Conference. The first meeting of YEARS' Forum was organized in Arusha International Conference Centre from May 30th to June 1st 2018; the second meeting was organized in Uganda Virus Research Institute premises, Entebbe, from 6th to 9th August 2018. The 3rd meeting of YEARS' Forum was organized in Dar es Salaam Tanzania as a preconference meeting of the 7th EAHSC. The YEARS' Forum was launched by Her Excellency Samia Suluhu Hassan the Vice president of the United Republic of Tanzania during the opening ceremony of the 7th EAHSC.

The Vice President launched also the East Africa Web Portal for Health Information which is an EAHRC platform that facilitates the sharing of information necessary to support scientists in the region and beyond. The EA Web Portal is one of the EAHRC tools to promote the exchange and dissemination of health research information through conferences, workshops, publications and other fora. The portal covers all aspects of health about East Africa or that are relevant to East Africa, and the world in general; it also hosts also the East African Health and Scientific Conference and the East African Health Research Commission peer reviewed Journals. The portal provides essential services e.g. search engines,

processing journals (from submission to finished product), interactions (e.g. between readers and authors/administrators, social media), profiles of institutions and linkage, capable of hosting written, audio, and video material, email, etc. It has discussion fora and other interaction features for health across the region, as well as other services or features.

In addition to the launch of the Digital REACH initiative, the East Africa web portal for health information and the Young East African Research Scientists Forum, the East African Health Research Commission also launched the East African Government Leaders, Legislators, and Legal Executives (EAGLES)' Forum on 26th March after the 18th Sectoral Council of Ministers. During the gala dinner, the Commission launched three initiatives namely the book of abstracts on digital health in East Africa, which is a compilation of research and evidence on use of ICT in health in East Africa; the second EAHRC peer reviewed journal called East Africa Science which promotes science and innovation in East Africa and whose editorial team is formed by the Young East African Research Scientists; and the report of the 6th EAHSC which is comprehensive and provides the necessary details associated with organisation of the EAHSC in general.

Keynote address: "Invest in Digital Health to catalyze East Africa to attain the UN-Sustainable Development Goals"

Professor Leon Mutesa of the College of Medicine and Health Sciences, University of Rwanda, as main keynote speaker of the 7th EAHSC, introduced the sessions by a presentation on" investing in Digital Health to catalyze East Africa to attain the UN-Sustainable Development Goals". He noted that Digital health is the convergence of the Digital and Genomic Revolutions with health, healthcare, living, and society. As the world is seeing and experiencing, the global investment in digital health is empowering health systems to better track, manage, and improve family's health; allow more productive lives, and improve society. It is also helping to reduce inefficiencies in healthcare delivery, improve access, reduce costs, increase quality, and make medicine more personalized and precise. He informed that according to the World Health Organization, East African region has major challenges in terms of reducing maternal and child mortality and in the need to continue the fight against transmissible and chronic diseases, including their risk factors. He noted that it is clear that work is still required on water, sanitation and air quality, as well as on continuing to strengthen health systems to achieve universal health coverage. All these challenges were included under the Sustainable Development Goals (SDGs), mainly under the SDG 3: "Ensure healthy

lives and promote well-being for all at all ages". He observed that Digital healthcare initiatives to achieve the SDGs share challenges that go beyond the implementation of technology to include social, cultural and organizational factors. To overcome these barriers, work needs to take an interdisciplinary and inter-sectoral approach, bringing together all the main actors for investing in digital health ecosystem including governments, international organizations, health service institutions, academia, research centres, and public and private industry. He observed that there is no doubt that investment in digital health technological solutions will help achieving the SDGs thus boost the East African economy and lifestyle improvement. He further noted that the 7th EAHSC is a platform opportunity for discussing all digital health solutions such as technology for disease surveillance, improvement of health care service delivery, costing and financing, among others to catalyze East Africa for achieving the UN-SDGs.

Plenary session 1: Summary of presentations and discussions

The following abstracts were presented:

- Blockchain Technology for Universal Healthcare Coverage.
- Information Communication Technology serves as the backbone in driving all sectors of national economy.
- Digital Health Revolution: Health in the context of the 4th industrial revolution.
- Gaps and challenges to address health priorities through Digital Health in East African Community States.
- Identification of Hubs of Disease Spread by using Network Data Analytics.

The first presenter talked about blockchain technology for universal healthcare coverage. Blockchain technology could transform healthcare delivery across the globe but, more crucially, in the resource-challenged countries of the developing world. The presenter outlined how several African and other developing countries across the globe have had ambitions of using technology to realise the goal of universal healthcare through eHealth and telemedicine programmes. Blockchain technology enables the establishment of systems for individual medical record that are affordable, user-friendly, secure and immediately accessible, regardless of geographical location. The technology allows for more innovative healthcare funding mechanisms and holds the potential for reducing healthcare costs for governments, healthcare providers, insurers and individuals by curbing fraud, corruption and inefficiency prevalent in the existing systems. Separately, the technology brings the ability to effectively curb the ever-increasing menace of counterfeit and sub-standard medicines by facilitating a more

effective supply-chain management. The presenter highlighted that the rapidly maturing blockchain technology provides the best template for realising universal healthcare.

The second presenter reported findings of a study to establish the level of ICT related content, context and process dimensions vis- a- vis use of ICT in health care facilities in Nairobi and Machakos counties. The study employed a cross sectional design conducted in levels 4-6 public health facilities. Findings showed that content and process dimensions are the major aspects that are critical for positive up scaling of ICT in public health facilities. The presenter recommended support from the hospital top management team and ensuring the ICT infrastructures are reliable so as to ensure use of ICT at the health facilities.

The third presenter provided an overview of digital transformation of immunization Information system with corresponding contribution and or attribution to immunization program performance in Tanzania from 1975 to 2018. The presenter concluded that digital transformation can be a driver of performance and appropriate user centred design is vital to ensure digital tools adoption and continued usage. To realize full potential of digital tools, well planned decommission of legacy paper based tools should be part and parcel of digital health transformation journey.

The fourth presenter discussed gaps and challenges to address health priorities through digital health in EAC partner states. The presenter reviewed evidence with focus on health priorities and level of implementing mHealth projects in EAC partner states. The presenter concluded that the uptake of mHealth projects is disproportionally distributed across EAC partner states and that mobile health applications are focusing HIV, Maternal and Child Health. Technology literacy, access to network and internet, privacy concerns are still challenges. New mHealth initiatives should focus on the emerging burden of non-communicable diseases, malnutrition and reproductive health to boost the achievement of Sustainable Development Goals. Further effort should focus on friendly and cost-effectiveness mobile applications and user training to overcome encountered challenges.

The last presentation was about identification of hubs of disease spread by using network data analytics. The presenter reported findings of a research conducted to carry out a data-driven identification of regions which play relatively dominant roles in spreading infectious and contagious diseases by using state-of-the-art social network analytics methods so that government and policy makers can utilize these added insights for prioritizing regions for interventions. The study found disease-specific identification of an ordered list of regions playing dominant roles in spreading the disease. The presenter concluded that the use of modern method of network data analytics can help government, policymakers, NGOs, and other healthcare enthusiasts in identifying and prioritizing regions for intervention for utilizing limited available financial resources.

Plenary Session 2: Summary of presentations and discussions

The following abstracts were presented:

- Exploiting digital technology to map the burden and drivers of antibacterial resistance in East Africa.
- Digital Health Platforms for Continuous Medical Education (CME) and Patient Case Management among Low Cadre Health Workers in Uganda; A Retrospective Review Analysis.

- Adherence Counselling and Reminder Text Messaging Improves Uptake of Antiretroviral Therapy in Western Kenya.
- The effectiveness of an interactive message alert system on improving knowledge on obstetric and newborn danger signs, service utilization, birth preparedness and complication readiness among pregnant women in Dodoma municipal: A quasi-experimental study.

The first presenter reported the work of HATUA (Holistic Approach to Unravel Antimicrobial Resistance in East Africa) a consortium initiated by EAHRC that seeks to address the global antibacterial resistance (ABR) crisis through local action in East Africa, mapping the burden and drivers of disease to translate global strategy into local solutions. He explained how HATUA is exploiting digital technology to map the burden and drivers of antibacterial resistance in East Africa.

The second presenter reported the experience of the Medical Concierge Group in using digital health platforms for continuous medical education (CME) and patient case management among low cadre health workers in Uganda. The Medical Concierge Group runs a medical call centre that provides 24/7 access to doctors for consultations. Access is through voice calls, SMS, Facebook, Twitter, WhatsApp, and video calls. A retrospective review of inquiries from health workers was done across voice and social media databases. The assessment allowed to conclude that digital health platforms provide a convenient portal for consultation and resolving medical cases in a setting with very few specialists.

The third presentation was on adherence counselling and reminder text messaging to improve uptake of antiretroviral therapy in Western Kenya. The presenter reported the findings of a study that determined the effect of adherence counselling and reminder text messages on improving patients' adherence to antiretroviral therapy and viral suppression. The study showed evidence of the utility of mobile technology in enhancing HIV care. The presenter concluded that adherence counselling and text message reminders have the potential of improving adherence to HAART which eventually improve the quality of life of people living with HIV/AIDS.

The last presentation was about a study to evaluate effectiveness of the interactive messaging alert system (IMAS) in improving knowledge on obstetric and newborn danger signs, antenatal care service utilization and individual birth preparedness and complication readiness among pregnant women in Dodoma municipal. The study aimed to assess the effectiveness of an IMAS on improving the level of knowledge on obstetric and newborn danger signs among pregnant/postnatal women, to test the effectiveness of IMAS on improving individual birth preparedness and complication readiness among pregnant/postnatal women, and to evaluate the effectiveness of IMAS on improving utilization of the

recommended antenatal care services among pregnant/postnatal women in Dodoma municipal. The findings revealed that Interactive messaging alert system yields better outcome to participants in the intervention group, in the part of health education as compared to conventional antenatal care health education provided in our Antenatal care clinics. The level of knowledge, individual birth preparedness and antenatal care service utilization was higher in the intervention group compared to the control group. The presenter recommended that policy makers and planners in health-related issues, should integrate a two- way communication systems in our antenatal care clinics.

Gala Dinner

On the occasion of the 7th EAHSC, a gala dinner was organized by EAHRC Secretariat and the Ministry of Health, Community Development, Gender and Children of the United Republic of Tanzania. The gala dinner gathered all participants of the 7th EAHSC, including the delegates of EAC Partner States who attended the 18th Sectoral Council of Ministers of Health. The dinner was marked by welcomes remarks by the Chief Medical Officer, representing the Minister of Health, Community Development, Gender and Children of the United Republic of Tanzania; by remarks of a representative of the EAC Secretary General; by three launches by the EAHRC namely the Report of the 6th East African Health and Scientific Conference, the book of abstracts on digital health in East Africa, and the East Africa Science Journal; and by various stars who entertained the participants to the dinner.

Conference Sessions Day 2: 28 March 2019

Plenary session 3

Key note speech: Technologies supporting data for health system decision-making

Professor Leodegal Bazira, School of Medicine, University of Burundi, observed that in the health system, decision-making involving policy-makers, planners, health system managers and practitioners need actionable data to improve the performance of the health system and track progress towards the fixed goal. A well-functioning health information system (HIS) empowers decision-makers to manage and lead more effectively by providing useful evidence at the lowest possible cost. He noted that since the 1990's, the evidence-based approach in health was described as health policy and health practice driven by systematically collected proof on the effects of health related interventions from the social and health sciences. Evidence-based decision-making covers a very broad scope ranging from the individual (evidence-based medicine or practice), the family, the community, the country, the region, and the world.

He further noted that health system activities, including health research and the environment, generate facts and evidence which are processed by the HIS into data, information and knowledge.

He emphasized that innovative technologies are helpful to collect data on the person's structure, functions or interaction with the environment at nanoscale, micro or macro level or at population level; to predict new types of information; to create information, or knowledge or both; to create data and evidence for management and planning; to create giant database (big data); and to create a user friendly interface between the databases and decision-makers. He highlighted that the availability of these technologies, many of which are open and free, has enabled national health information systems to provide decision-makers with abundant, high quality, reliable and varied information. He further highlighted that in many African countries, the main challenge remains the knowledge gap which includes the "health knowledge gap" and the "know-do gap"; that the key to narrowing the knowledge gap and sustaining health and development gains is a long-term commitment to strengthen national health information systems taking advantage of the quick development of health information technology.

Key note speech: Technologies for Disease Surveillance, Disease Outbreak Detection and Response, and Cross border mobility and disease tracking.

Professor Esron Karimuribo from the Southern African for Infectious Disease Surveillance (SACIDS), informed that the SACIDS is collecting real time data on disease outbreak. The data are collected by AfyaData tool. AfyaData is a set of digital tools that eases the collection, analysis, documentation and feedback of public health events. The ongoing systematic collection, analysis, and interpretation of outcome-specific data is used in the planning, implementation, and evaluation of public health practice. The AfyaData tool help to monitor the trend of diseases, to evaluate intervention and monitoring the progress towards control. The SACIDS have been implementing diseases surveillance and control targeting the cross border communities in the EAC Partner States. He informed the participants that through the programme, SACIDS have been able to work across human and animal health sectors to fight disease epidemics; to develop ICT tools to support data capture, reporting and feedback at health facility and within the community (feed into the official national human and animal health information systems); and to strengthen cross border collaboration to fight epidemics in shared ecosystems. He highlighted some of the success stories of SACIDS in outbreaks detection.

Parallel sessions

Parallel session 1: Summary of presentations and discussions

The following abstracts were presented:

- Use of Electronic Medical Records to Improve Accuracy and Timeliness of Viral Load Documentation in a Faith Based HIV Program in Kenya.
- Tools and techniques for Clinical Decision Support: A Case of Tanzania.
- Duality of m-Heath: Enabler or inhibiter of Community Health Workers Empowerment for Maternal and Child Health (Case Study of Rapid SMS in Rwanda.
- Open clinic software appreciation by health staffs at Centre Hospitalo-Universitaire de Kamenge.

The first presenter talked about the use of electronic medical records (EMR) to improve accuracy and timeliness of viral load documentation in a faith based HIV program in Kenya. A study was done to demonstrate improved accuracy, timeliness and completeness of viral load data through the use of IQCare EMR in CHAK-HIV Program. The study found a significant effect of the use of EMR on improving timeliness and accuracy of documentation.

The second presenter talked about tools and techniques for clinical decision support in Tanzania. Several tools and techniques for clinical decision support were identified. However the tools were largely manual despite having computerised health information systems. The presenter showed that the use of data might help in supporting clinical decision making practices and suggested the application of

advanced tools and techniques in transforming data into clinical knowledge that might help improve clinical decision support at the facility level.

The third presenter reported a case study from Rwanda on duality of m-Heath using the case of RapidSMS. The presenter observed that despite the positive contribution of mobile phones to Community Health Workers (CHWs)' programs, there is still little evidence about the extent to which mobile phones contribute to CHWs empowerment in the community they serve. The study explored the use of mobile applications as drivers for grassroots innovations and the contribution these applications can make as enabler or inhibitor in empowering CHWs to address community problems. The presenter informed that this exploration will provide insights into how IT is appropriated in and affords mHeath enabled services, particularly in settings where prompt responsiveness of CHWs and timely supervision and follow-up can be difficult to monitor and implements; and will allow to develop an architecture model to support understanding of CHWs practices and guide action afforded by IT.

The last presenter reported preliminary results of a survey on the use of the patient data and laboratory results transfer platform (Openclinic software) at Kamenge teaching hospital, Bujumbura, and how this platform is appreciated by health professionals. The study conducted concluded that the platform (openclinic) is underutilized and not well appreciated by most of health professionals. The presenter concluded that it would be better to promote openclinic by training, updating it, and avail skilled and sufficient technic plateau.

Parallel session 2: Summary of presentations and discussions

The following abstracts were presented:

- Regional data sharing policymaking: From Analysis to Action.
- Machine learning methods can be used to demonstrate morbidity patterns and trends in rural Uganda.
- Geographical and behavioral risks associated with Schistosoma haematobium infection in an area of complex transmission.
- Application of detection rats in the diagnosis of TB in children and people living with HIV

The first presenter reported the findings of a desk review of policies on digital health and data sharing using grid analysis to inform policy makers. The presenter informed that the findings were discussed on a regional cross-borders data sharing perspective, but the policy analysis focused in Kenya and Uganda. The key results were a lack of a legal framework and practices for data sharing, data protection and storage; and a lack of patient data confidentiality and privacy. The presenter further informed participants that the policy approach was the best option and IGAD was developing the policy. However, a question arose from participants whether working on the policy approach only would lead to positive results.

The second presenter talked about using machine learning methods to demonstrate morbidity patterns and trends in rural Uganda. The presenter reported a study from Makerere University Centre for Health and Population research which manages Iganga-Mayuge health and demographic surveillance system carrying out data collection that primarily measures the fertility, mortality, and other self-reported health information of an entire population. They studied trends and patterns of diseases using machine learning methods in rural Uganda. The study showed that most malaria diagnoses were among people living in households with the social economic status of the less and least poor and patients of the lower age group between 0 to 12 years most especially the age group of 5 to 12 years. It also showed that more chicken pox cases were reported in the early months of the year January to April and that these chicken pox cases were more pronounced in the poorest households. The presenter concluded that the analysis of data using a nonparametric data-mining technique is a powerful tool, generates easy to interpret results, and helps to rapidly detect unusual events, epidemics or other changes in the health outcomes and hence helpful to plan and set priorities for health policies and programmes at sub national level.

The third presenter reported a study that assessed geographical and behaviour risks associated with Schistosoma haematobium infection in pre- and post-treatment period in school children in Shinyanga region, Tanzania. The study aimed to understand the micro-geographical patterns in transmission of urinary schistosomiasis, and to investigate the combination of school-aged parasitological surveys with malacology surveys, behavioral questionnaires and GPS mapping of household, with the intention of determining their usefulness as tools for identifying transmission hotspots. It found that the prevalence of schistosomiasis infection was higher in boys than girls. The presenter concluded that interaction between malacological surveys with cercarial shedding combined with GPS mapping in endemic settings can help detection of transmission sources even in areas with complex transmission networks.

The last presenter talked about the issue of low detection of TB (smear-based diagnosis) in TB in children and people living with HIV (PLHIV) and the application of detection rats in the diagnosis of TB in children and people living with HIV. The key results of the study are that African giant pouched rats detected more TB cases than conventional TB diagnosis methods in paediatric TB and PLHIV; trained rats are economical (cheap and timely results) than conventional TB diagnosis methods; and detection rat technology is run on humanitarian basis.

Parallel session 3: Summary of presentations and discussions

The following abstracts were presented:

- Using mHealth technology to identify and refer surgical site infections among women who undergo caesarean section in rural Rwanda: A Randomized control trial.
- Utilization of Audio visual medium for conveying sputum collection instructions for tuberculosis diagnosis.
- Primary Health Care (PHC) Digitalization for better quality and continuity of care.

- New frontiers, new technologies for strengthening pharmaceutical systems in palliative care service delivery.
- The performance of OncoE6TM Cervical Test in detecting cervical cancer lesions in HIV-positive women attending an HIV clinic in Bujumbura, Burundi.

The first presenter talked about using mHealth technology to identify and refer surgical site infections (SSI) among women who undergo caesarean section in rural Rwanda. The presenter reported the findings of a randomized control trial whose objective was to evaluate if the use mHealth technology will increase SSI who return to care after c- section procedure. The study found that there was no significant difference between intervention and the control group, however, individuals with higher education were less likely to return to care after c- section procedure. The presenter concluded that mHealth use reduced the time for the patient to receive care and cost and recommended that mHealth technology can be further evaluated for it to be used in the telemedicine approach.

The second presenter talked about the utilization of audio visual medium for conveying sputum collection instructions for tuberculosis diagnosis. The study has compared routine sputum collection and audio-visual method of sputum collection technique. The study found that there was no significant difference between the samples collected in both methods. But there were reports of increase in case detection numbers. In evaluating time (morning and spot sputum sample) and quality of the sputum, there was no significant difference. The study concluded that the audio visual instruction platform can be useful for trained health care workers.

The third presenter explained the development of Tanzania Health Sector Enterprise Architecture (TZHEA) and its scope. The presenter informed that TZHEA will focus on six WHO building blocks which are commodities, service delivery, human resource, health financing, information systems, and leadership and governance. The approach will use the open group architecture framework (TOGAF) to develop health enterprise architecture, to build capacity of government staff who will lead the development of TZHEA. TZHEA is developed with the client centric approach, looking how the technology will support citizen. Each of WHO building block will undergo through phases of architecture

development methodology cycle. The expected outcomes from the implementation of TZHEA among others will be elimination of efforts duplication, common frame of reference, cost savings, and a holistic vision.

The fourth presenter talked about new frontiers and new technologies for strengthening pharmaceutical systems in palliative Care. The presenter reported findings of project that piloted a novel robust mobile technology to support data capture, storage and retrieval for palliative medicines in hospice and hospital settings. The study concluded that digital health intervention improves existing processes for patient record

management, and pharmacy supply chain system for palliative care services. There is a need to identify mechanisms for scaling up such implementations to further strengthen pharmaceutical systems for palliative care in resource limited settings.

The last presenter talked about the findings of study that evaluated the performance of OncoE6^{TM} Cervical Test in detecting cervical cancer lesions in HIV-positive women attending an HIV-clinic in Bujumbura, Burundi. The study found that the sensitivity of OncoE6^{TM} test was low compared to standard techniques however it saves time and if improved can be used in surveillance of cervical cancer. The presenter concluded that OncoE6 Cervical Test is suggested to be a point-of care test in programmatic settings; it may be an option to consider for screening of cervical cancer in low and middle income countries.

Parallel session 4: Summary of presentations and discussions

The following abstracts were presented:

- The Role of Electronic Medical Records Systems on Supporting Routine Health Data Reporting at the Facility Level.
- The impact of medicines registration management information system in regulatory decision making process: experience from Tanzania Food and Drugs Authority.
- Use of Technology in the Fight against Illegal Pharmacies in Kenya: A case of the Health Safety Code.
- Spatial-temporal analysis of tuberculosis incidence in Burundi using Geographical Information System.

The first presenter highlighted the importance of health management information system (HMIS) for improved healthcare service delivery and raised the challenges associated with the collection and reporting of routine health data at the facility level such as the lack of accurate and timely data. The presenter evaluated the contribution of electronic medical records (EMR) systems on collection, aggregation and reporting of routine health data at health facilities. The results showed that EMR is poorly used by physicians due to lack of enough knowledge to use the electronic systems and that leads to inconsistency of data. The presenter also raised challenges of EMR-HMIS reporting, and recommended to improved ICT infrastructure in health facilities and EMR usability in HMIS reporting. A diagram for EMR data flow was proposed.

The second presentation was about the Impact of medicines registration management information system in regulatory decision making process. The presenter highlighted that digital medical regulation is key in ensuring efficiency and timely checking of quality and safety of registered medications. The presenter stated that Tanzania Food and Drug Authority (TFDA) started digital data collection in 2004 but the system was very weak. In 2014 a more robust and sophisticated system was launched. The main aim of the new system was to ensure registration of medicines to improve efficiency, quality, timely

feedback and hence safety to the user. The methodology presented includes the development of medicine registration system, SOP, guidelines and regulations; registration of data forms from 2013/14 and 2017/18; and tracking of timeliness of applications. The presenter narrated that after the introduction of the new system, TFDA managed to process 6000 applications and was able to provide timely feedback to applicants. In addition, it was indicated that the system was able to automatically change status of application of products that have expired registration. Through improved tracking process, retention fees was increased from 119,640 in 2013/14 to over two billion in 2017/18. However, the presenter pointed out that they still have a backlog of applications due to increased number of applications and carrying over effect of previous applications. The presenter concluded that the system allowed Tanzania to improve the management of applications and increased revenue collection.

The third presentation was about the use of technology in the fight against illegal pharmacies in Kenya. The presenter stated that community pharmacies and pharmacies are main provider of primary health care covering both communicable and non-communicable diseases. However, the supply chain is complex allowing people to falsify and deliver sub-standard medicines. The presenter said that Kenya has an insufficient infrastructure and technical expert to regulate and detect criminals. Currently 30% of the drugs in Kenya are counterfeited which contribute significantly to drug resistance, adverse effects and inaccurate reporting. The presenter highlighted that after realizing the challenge, Poison Board in Kenya introduced Health Safety Code (HSC) which allow consumer to use mobile phone to check whether the pharmacy he/she is attending is registered. As part of regular checks, Kenya Medical Research conducted a market surveillance in 315 private pharmacies in the hospital and communities which were purposively selected from 17 sub-counties in Nairobi. HSC was used to check registration status of the pharmacy. The results indicated that 72% of the pharmacies had invalid registration or did not display their HSC, 25% of pharmacies had HSC clearly displayed, 4 pharmacies were not registered and other four were registered but the SMS message showed that their premises were outside Nairobi. The presenter concluded that illegal pharmacies threatens public safety and there is a need to raise awareness on the use of HSC.

The last presentation was on spatial- temporal analysis of TB incidence in Burundi using geographical information system (GIS). The presenter indicated that implementing GIS responds to SGD3. The GIS tool was used to highlight distribution pattern of TB in Burundi. They analyzed data from 2009 to 2017. The average incidence of TB from 2009 to 2017 was 27 to 456/10,000 population where Bujumbura had pulmonary TB ranging from 19-212/10,000 population. The presenter concluded that the GIS helped them to recognize where there is high burden of TB which added to proper allocation of resources for TB management.

Parallel session 5: Summary of presentations and discussions

The following abstracts were presented:

- From data to information: Learning from the Regional Action through Data experience in East and West Africa.
- Guiding healthy decisions using digital tools through the Safer Deliveries program in Zanzibar.
- Strengthening capacity of cross-border health units to use technology for HIV prevention and treatment.
- Usability of Redcap in multi-site clinical trials in Kilimanjaro, Tanzania.
- eHealth Strategy Implementation in Tanzania: Successes, Challenges and Opportunities.

The first presenter reported findings from an applied research conducted in Kenya and Uganda which are among IGAD members. The presentation covered a capacity building initiative on data use for informed decision making and policy in which critical success factors including environment and content were discussed. Both strategic and operational level key informants provided their experiences in data use. The findings indicated that strategic decision making is an interactive and time taking process. Clinical decisions making are done through reports, meetings and workshops. DHIS 2 was reported as main source of data. The presenter concluded that there are inadequate data sharing mechanisms, decision making processes are not properly planned and tools for data collection and sharing are not harmonized. A number of information products for different stakeholders need to be developed and there is a need to improve routine information sharing e.g. prepare information products including financial information.

The second presenter talked about using digital tools through the safer deliveries program to guide health decisions in Zanzibar. The presenter indicated that the use of mobile technologies improved the increase in number of patients in health facilities, the availability of real-time data through dashboards for decision making on safer delivery, the data use by district managers for monitoring of performance; and the interactive communication (SMS) between women and health care volunteer. The presentation highlighted the challenge of high utilization of health facilities not prepared for quality of health of health services.

The third presenter discussed the issue of strengthening capacity of cross-border health units to use technology for HIV prevention and treatment. The presenter highlighted cross border health units issues such as inability to uniquely tracking patients, referrals mechanisms not in place, costs of providing the services difficult to track, lack of digital health solution, and absence of liking with national Health Management Integrated Systems. The presenter discussed recommendations on how to operationalize a cross-border health unit and recommended further studies to properly capture data from mobile population.

The fourth presenter reported on the usability of Redcap in multi-site clinical trials in Kilimanjaro, Tanzania. REDCap was used as mobile data collection tool in two clinical trials. The presenter concluded that the use of REDCap improve efficiency of data collection and query management as well as cost of data collection, storage and sharing and security. Discussions were around the justification of why REDCap is better than other tools used for the same reason, REDCap sustainability, internet connectivity requirements and security issues for REDCap.

The last presenter talked about the implementation of Tanzania eHealth strategy 2013-2018. Achievements, Challenges, opportunities, lessons learnt and recommendations were presented. A number of initiatives have been implemented and there are substantial ongoing initiatives. Issues of digital health governance, foundations, solutions and change and adoption were prioritized in the strategy. The presenter informed that a new digital health strategy is currently being developed.

Parallel session 6: Summary of presentations and discussions

The following abstracts were presented:

- Monitoring of Emergency Obstetrical Care Functioning in Health Facilities by Digital Mapping System in Burundi.
- Hygienic Practices and Prevalence of Foodborne Pathogens from Money and Cellphones among Food Handlers in Food Outlets in Nairobi, Kenya.
- Molecular epidemiology of virulence and antimicrobial resistance determinants in Klebsiella pneumoniae from hospitalised patients in Kilimanjaro, Tanzania.
- Trends of malaria case and foci data in the elimination setting of Zanzibar.

The 1st presentation was about an assessment of availability and accessibility of mode of transports to determine physical access to emergency obstetrical care (EmOC) in geographic areas with high density of population in Burundi. The assessment used a digital mapping system. The presenter concluded that the EmOC functions coverage is not enough; only few of health facilities deliver the total EmOC signal functions. The presenter concluded that there is a need to reinforce the health facilities in area with high density of population in order to lower the global maternal mortality rate and urged the Government and its partners would play a key role.

The Second presentation was on hygienic practices and prevalence of foodborne pathogens from money and cellphones among food handlers in food outlets in Nairobi, Kenya. The presenter highlighted a paucity of data on the role that money and cellphones play to in the transmission of bacterial pathogens. The presenter highlighted the research findings that concluded that most of the money denominations and phones were contaminated with pathogenic microorganisms, hence could be a source of infections to both food handlers and food consumers. The presenter concluded that food

handlers and the general public should be sensitized on the risks involved in handling food after touching money and cellphones.

The third presenter talked about molecular epidemiology of virulence and antimicrobial resistance determinants in Klebsiella pneumoniae from hospitalised patients in Kilimanjaro, Tanzania. The presenter highlighted that E. coli is an important causative agent for diarrheal, neonatal meningitis, and haemolytic uremic syndrome outbreaks. There is a need for robust tools for diagnosis, surveillance and investigations, therefore Next Generation Sequencing (NGS) and bioinformatics present potentials. Referring to molecular epidemiology activities in Kilimanjaro Clinical Research Institute, the presenter concluded NGS is an effective early warning system/tool to detect resistance, virulence and emerging pathogens.

The last presentation discussed about trends of malaria case and foci data in the elimination setting of Zanzibar. In 2017, a total of 35 foci were investigated and classified; 68.6% foci were classified as active and 31.4% foci were classified as non-active residual. In 2018, a total of 185 foci were investigated and classified; 67.1% foci were classified as active and 32.9% foci were classified as non-active residual. The presenter concluded that Zanzibar has started to conduct case and foci investigation aligned with the WHO Elimination Framework since 2017 but only 20-60% cases are classified. The presenter recommended to integrate case classification and foci investigation in existing routine malaria surveillance platform.

Parallel session 7: Summary of presentations and discussions

The following abstracts were presented:

- Towards a tuberculosis free Dar es Salaam with T3: Test, Treat, and Track. First results from digital treatment adherence monitoring.
- Establishment of HIV-1 Next Generation Sequencing and drug resistance testing using Illumina Miseq at Kilimanjaro Christian Medical Centre (KCMC), Moshi, Tanzania.
- Innovative Approaches to Cross-Border Health: Case of Cross-Border Health Unit Model.
- Digital laboratory specimen bio-banking and temperature monitoring systems- sharing experience from NIMR-Mbeya.
- Establishing clinical trials registries in Africa: Tanzania perspective.

The first presentation reported the first results of using eCompliance, a digital solution that supports treatment adherence monitoring, which consists of customized software that runs on tablets, incorruptible finger print verification for monitoring of drug intake, and a data dashboard. The presenter concluded that the results are encouraging, since eCompliance does not replace but support the CHW-visits and enrols all TB patients irrespective of treatment phase and risk factors for loss-to-follow-up.

The second presentation was about the establishment of HIV-1 next generation sequencing and drug resistance testing using iiluminaMiseq at Kilimanjaro Christian Medical Centre, Moshi Tanzania. Based on the results of this study, the presenter concluded that HIV-1 drug resistance testing could facilitate the choice of initial ART for treatment naive individuals and can also show whether the person was initially infected with HIV drug resistant strains. Furthermore, it can help the health care providers to determine which individuals require change on the treatment. It limits unnecessary medication switches which not only increase treatment costs but also limit future treatment options.

The third presenter talked about innovative approaches to cross-border health using the case of cross-border healthy unit model. To address challenges associated with cross border health services delivery, USAID/KEA and EAC mandated the Cross-Border Heath integrated Partnership Project to define, implement, document, and disseminate lessons learned on sustainable models for cross border health service delivery to meet the unique needs of mobile cross-border populations. The presenter concluded that there is a critical need for community and facility-level health structures to be responsive to health service access by mobile cross-border populations as well as need for formal multi-sectoral cross-border health coordination mechanisms and structures at all levels of policy and decision-making.

The fourth presenter shared the experience from National Institute for Medical Research (NIIMR)-Mbeya on digital laboratory specimen bio-banking and temperature monitoring systems. NIMR-MMRC has undergone evolution of bio-banking from manual to digital system to ensure that archived specimens are of good quality and that specimens (and specimens' information) are stored in a way that can easily be made available when required. The presenter concluded that digital bio-banking system is a major asset for clinical research and public health. Public health service providers should therefore employ digitalized sample storage and temperature monitoring systems to ensure quality of samples and reagents used are at the best quality.

The last presentation discussed the Tanzania perspective in establishing clinical trials registries in Africa. The presenter concluded that establishment of national primary clinical trials registries is of paramount importance in regulatory control of clinical trials and participants recruitment. Registries can be used as a platform for harmonization of regulatory procedures and facilitates easy access of medicines to the public. Registry requires adequate staff, funding, security and commitment to ensure data integrity.

Parallel session 8: Summary of presentations and discussions

The following abstracts were presented:

- Breaking the transmission cycle of parasitic worms: harnessing accurate identification to ensure the success of large-scale public health interventions.

- Point of Care Implementation of Kenya EMR System at Kakamega County General.
- Validation of a phone-based newborn clinical management application – prisms®.

The first presenter reported the findings of an assessment of the implementation and use of point of care EMR in Kakamega County Referral Hospital. EMR was implemented for more efficient and fast capture of information, real time data entry for patient management and referral, and enhancement of privacy and security of patient information. The findings indicated that by January 2016, more than 10,000 clients entered in the EMR, 288 patient reports were generated, retrieval of patient information was easier and faster, the accessibility of patient information at the health facility was total, and more accurate reports were generated. The presenter concluded that EMR can be deployed in any level of the health care delivery system, from large referral hospitals, to district and local primary care facilities. Discussions were around

ensuring quality of data, sustainability and necessity of a more comprehensive EMR system with greater capacity to capture and manage patient information.

The second presenter discussed about deploying biometric identification systems in large scale public health interventions to break the transmission cycle of parasitic worms using the children investment fund foundation (CIFF) case study. CIFF is working to improve health outcomes for children and at-risk populations to reduce the transmission of helminths and other parasitic infections using biometrics identification systems. Biometric identification systems allow health workers to reach individuals at a specific time and location, ensure transparency among health workers and make easier to track and qualify the number of individuals reached, improve operational efficiencies during implementation of the intervention, increase in real coverage of interventions, reduce duplicates, and ultimately lead to a continuum of care. The presenter highlighted that successful deployment of biometric identification systems requires broader framework that must include supportive systems; capacity building; data analytics and reporting; and privacy to ensure safety and security of individual data.

The last presentation talked about PRISMS – Protecting Remote Infants by SMS- which is an interactive learning application to help frontline health workers better manage the treatment of sick newborns.

The platform allows entry of patient vitals and information post examination; primary and secondary information to manage a particular case; and management plan and SOPs tailored to each case or patient based on information provided by the physician/health worker. The presenter reported the findings of a validation study that aimed to test the acceptability and feasibility of PRISMS among paediatricians and to determine acceptability and feasibility of deploying the application in remote health settings. The presenter concluded that using PRIMS reduced mean time completion of patient assessment and development of a comprehensive management plan for newborns, empowered front line health workers to manage cases of sick newborns, allowed decreased number of patient referrals, and health workers to feel more confident in managing cases of sick newborns. There was a high acceptability and rating of PRISMS application among paediatricians.

The session concluded that the deployment of modern IT systems for health care is a growing field. These technologies can be deployed at different levels of the health system from referral hospitals to local primary health facilities, they can also be deployed to coordinate and facilitate the implementation of large-scale interventions.

Interactive sessions

Interactive session 1: Summary of presentations and discussions

The following abstracts were presented:

- Improving the Availability of Evidence for Health Systems Strengthening Using Comprehensive iHRISin Uganda.
- Data quality and use interventions for improved immunization services at primary health care level in Arusha and Tanga regions.
- The Prevalence, distribution of diarrheagenic E.coli Categories using colony PCR and their Antimicrobial Susceptibility Patterns in Cross-Border Counties in Kenya.
- Assessment of Factors Influencing the Adoption of Electronic Health Records in Public Health Facilities in Kisumu County, Kenya.
- Understanding the reasons for the use and non-use of natural contraceptive methods among young unmarried sexually active men in Moshi, Tanzania: A qualitative study using SMS and in-depth interviews.

The first presenter discussed about how integrated human resource information system (iHRIS) can address health worker shortage and improve health service quality timely, accurate evidence for decision-making. Using the case of Uganda, the presenter showed how problems related to the use of paper-based data systems and their severe data quality issues and limited analysis to inform planning and decision-making for human resources for health, were addressed by iHRIS. The presenter concluded that iHRIS has improved timeliness and accuracy of data for evidence-driven policies for health systems strengthening; and that this model can be replicated globally. Future work includes linking iHRIS to health service and outcome data to understand the impact of policies on the population.

The second presenter showed how better immunization data (BID) initiative can improve immunization services at primary health care level. The case of Arusha and Tanga regions in Tanzania demonstrated that that capacity building and use of information technology tools supplemented by peer learning and support can lead to improvements in immunization service delivery. Real time access and visualization of data on key immunization indicators improves both data quality and data driven decision and actions at service delivery point.

The third presenter reported the finding of a study that aimed to determine the prevalence of common circulating enteric bacterial pathogens and their antimicrobial susceptibility patterns to commonly prescribed antimicrobial agents in Kenya. The study found that in general pathogenic *E.coli* was the most prevalent organism isolated from all the sites as indicated and the highest prevalence of antimicrobial resistance was to ampicillin followed by Trimethoprime/sulphamethoxazole and tetracycline. The major concern from the findings is the emerging resistance of enteric pathogens that was observed to flouro-quinolones and 3rd generation Cephalosporin's and Gentamicin. Discussions recommended that a regional surveillance systems and an enhanced laboratory based surveillance systems are needed to assess the real burden of disease due to pathogenic E.coli and their resistance to commonly prescribed antibiotics in EAC region.

The fourth presentation highlighted the fact that Electronic health records (EHRs) are the fundamental building blocks of any national health decision support system. The presenter talked about factors influencing the adoption of electronic health records in public health facilities in Kisumu County. Discussions concluded that technological factors, organizational factors and perceived usability of the system influence the adoption of EHR system but mainly contribute to low rate of EHR adoption in public health facilities. The national government in liaison with the county government should provide adequate financial support by increasing budgetary allocations on EHR project so as to improve the availability and functionality of EHR related infrastructure, training support programs and any other impeding challenge to EHR adoption.

The last presentation was on the reasons for the use and non-use of natural contraceptive methods among young unmarried sexually active men in Moshi, Tanzania. Findings from a qualitative study using SMS and in-depth interviews showed the main reasons for using calendar method which were mentioned by most of the participants. The method doesn't have side effects, no associated cost, doesn't involve purchasing process, and is simple to use. Reasons for no-use of calendar method included forgetfulness, not knowing how to use it, and restrictions on when to have sex. The presenter concluded that natural methods such as calendar are used among majority of young unmarried men in Moshi. They have minimal side effects, however many respondents don't know how to use them correctly.

Interactive session 2: Summary of presentations and discussions

The following abstracts were presented:

- The feasibility and effectiveness of evriMED for enhancing adherence to treatment among TB patients in Kilimanjaro, Tanzania.
- Feasibility of using V-DOT to improve adherence to TB medication, A pilot study among TB patients in Kilimanjaro, Tanzania.
- Whole genome sequencing reveals high clonal diversity of Escherichia coli isolated from patients in tertiary care.
- Feasibility of Using SMS to collect data on Contraceptives Use among Young, Unmarried sexually active Men in Moshi, Tanzania and Addis Ababa, Ethiopia.
- Reporting of MOH 731 Care and Treatment Indicators to DHIS 2 Using Kenya EMR, a case of Mbale Rural Health Training Centre, Vihiga County.

The first presentation was a proposal of a study to be carried out later. The talk was about the new technology to monitor adherence to tuberculosis (TB) treatment. The objective of the study is to determine the feasibility and effectiveness of using evriMED for reminder cues and tailored feedback on adherence to anti-tuberculosis and treatment outcome among TB patients in Kilimanjaro, Tanzania.

After discussion, it was noticed that the study is relevant and could be implemented. The main challenges for the study are the network and acceptability. The research should find ways to overcome them. It was recommended that a follow up of the study will be necessary to monitor its implementation and completeness. As such, if evriMED showed good acceptability, effectiveness and accuracy, it would be scaled up and make it a standard of care for TB patients.

The second presentation was also a research proposal. The presenter wanted to show other means to improve the adherence to TB treatment. The objective of the study is to determine the feasibility of implementing Video-based Direct Observed Therapy (VDOT) to improve adherence among TB patients in Kilimanjaro region, Tanzania.

After discussions, it was noticed that the study is relevant and needed to be implemented. The feasibility of implementing V-DOT on adherence among TB patients in Kilimanjaro would improve the treatment and reduce the emergence of MDRTB. Working with the National Tuberculosis and Leprosy Program (NTLP) to scale up and integrate it into a standard of care for TB patients would be appreciated.

The third presentation discussed about whole genome sequencing that revealed high clonal diversity of *Escherichia coli* isolated from patients in a tertiary care hospital in Moshi, Tanzania. The presenter discussed the possibility to use next generation-based whole genome sequencing (NGS) to determine serotypes, virulence, AMR and molecular relatedness of E. coli basing on a study from patients in a tertiary care hospital. The presenter concluded that there is a high diversity of E. coli isolated from patients admitted to a tertiary care hospital. NGS use for laboratory-based surveillance can be an effective early warning system for emerging (re-emerging) pathogens and resistance in low and middle-income countries. Discussions highlighted the necessity to formulate pragmatic antimicrobial stewardships and infection prevention and control initiatives including routinely screening of all bacterial isolates of clinical importance in tertiary health care facilities.

The fourth presenter reported the findings of a study that investigated the feasibility of SMS to collect data on contraceptive use and needs of sexually active, young, unmarried men in Addis Ababa (Ethiopia)

and Moshi (Tanzania). The presenter concluded that despite some challenges, the SMS system was found feasible in Moshi but not in Addis Ababa, and recommended more research to have a feasible system in different settings that can be scaled up.

The last presenter talked about reporting of MOH 731 Care and Treatment Indicators to DHIS using Kenya EMR. MOH 731 is a monthly report generated by facilities offering HIV care services. Manual compilation and validation process poses a big challenge and may result in data quality issues of incompleteness, inaccuracy and untimeliness. The presenter used the case of Mbale Rural Health Training Centre, Vihiga County. The presenter concluded that Kenya EMR has reduced data quality issues, inaccurate reports and untimeliness reporting to DHIS at the Sub county office.

Interactive session 3: Summary of presentations and discussions
The following abstracts were presented:

- Antimicrobial susceptibility profiles of bacterial isolates from TB smear-negative and retreatment cases in selected high TB prevalence counties in Kenya.
- Spatial distribution, prevalence and potential risk factors of tungiasis in Vihiga County, Kenya.
- SMS to remind pregnant and breastfeeding women living with HIV to take antiretroviral treatment in Kilimanjaro region, Tanzania: a pilot feasibility-study.
- New technology for improvement of maternal, neonatal and child health care, the case of Mutaho Health District in Burundi.
- Molecular characterization of Cryptosporidium and Giardia in children with diarrhoea in slum areas of Nairobi

The first presenter reported the findings of a study that determined bacteriological spectrum of sputum from GeneXpert negative retreatment cases attending selected TB clinics in Mombasa, Nairobi, UasinGishu and Nyanza counties. *Pseudomonas aeruginosa, E. coli, Klebsiella pneumonia* and *Proteus mirabilis* were significant pathogens in TB retreatment patients that could be misdiagnosed as relapse or smear negative. The isolates exhibited multidrug resistance to new generation antibiotics. The presenter highly recommended microbial investigation and monitoring of non-TBbacterial etiologies post-TB treatment before retreatment.

The second presentation was about spatial distribution, prevalence and potential risk factors of tungiasis in VihigaCounty, Kenya. A study made use of geographical information system (GIS) to determine the spatial distribution of tungiasis in the area and assessed the prevalence and factors influencing the disease. The presenter noted that due to GIS, it is easy to visualize and quickly identify areas that need to be prioritized when carrying out intervention measures in the area thereby maximizing treatment and control outcomes in the face of limited resources. The presenter concluded that Tungiasis is an important health problem in Vihiga County. Factors that point to poverty contribute to the occurrence of tungiasis.

The third presentation reported the findings of a pilot study that investigated acceptability, user experience and technical feasibility of sending SMS to remind and monitor medication intake among pregnant and breastfeeding women living with HIV. Ninety-nine percent of SMS being delivered indicates SMS reminders in resource-limited setting are technically feasible. However, concerns regarding privacy were noted, specifically the risk of unwanted disclosure and experiencing stigma. The

presenter highlighted that participants indicated that being made aware of their adherence to medication by reminders motivated them to adhere better. However, personalized and more neutral content of SMS might be a way to improve this type of intervention

The fourth presentation was about the use of new technology for improvement of maternal, neonatal and child health care in a district catchment area in Burundi. The presenter reported the findings of pilot project to assess the impact of the use of RapidSMS on maternal and child health. The presenter concluded that the use of RapidSMS improved maternal and child health outcomes and recommended to scale up the project at national level.

The last presentation talked about molecular characterization of Cryptosporidium and Giardia in children with diarrheal in slum areas of Nairobi. The study investigated the occurrence of *Cryptosporidium* and *Giardia* species, genotypes and subtypes in children living in an informal settlement in Nairobi. The presenter concluded that *C. hominis* is the most common species and with high genetic variability with 22 different subtypes identified, with some of them being reported for the first time, whereas it was low within *C. parvum* with only subtype family IIc identified, thus, suggesting predominance of anthroponotic transmission. For *Giardia spp.* assemblage B was more common than assemblage A, and occurrence of mixed infections between assemblages and sub-assemblages was noted.

Interactive session 4: Summary of presentations and discussions
The following abstracts were presented:
- Can quanti-feron-TB gold (qft-g) kit be used to monitor TB treatment in Kenya?
- Active Reporting of ADRs of ARV drugs among adults PLWHIV in East Africa: a proposal for a pilot study on using SMS.
- Geographic patterns of referral for TB evaluation with introduction of Xpert MTB/RIF at regional referral hospitals in Uganda: Evidence for countrywide roll out.
- The use of CT Scan in Burundian healthcare facilities.
- New algorithm for tuberculosis sepsis diagnosis and early treatment in people living with HIV with life-threatening illness; Tanzania.

The first presenter discussed about using Quanti-FERON-TB Gold (QFT-G) kit to monitor TB treatment in Kenya. Interferon-Gamma Release Assays are whole-blood tests that can aid in diagnosing *Mycobacterium tuberculosis* (MTB) infection. The presenter assessed the use of QFT-G In-Tube® in monitoring treatment outcomes and progress to tuberculosis in TB and TB-HIV patients in Kenya. Compared to baseline, 77.6% cases showed a decline in IFN-γ levels whereas 22.4% showed no change in interferon-gamma (IFN-γ) responses at 2 months. The study observed that QFT-G assessment at 2 months independently and significantly predicted the likelihood of remaining sputum culture-positive at the end of the intensive phase of TB treatment. The results suggest that QFT-G can potentially be used as a tool to monitor the outcome and progress of TB treatment in a high TB-HIV setting.

The second presenter talked about a proposal for a pilot study on using SMS for active reporting of adverse drug reactions (ADRs) of ARV drugs among adults PLWHIV in East Africa. The study will test the feasibility and acceptability of an SMS system to improve reporting ADRs of ARVs among people living with HIV (PLHIV) in Tanzania and Uganda. The suggested interactive system is a first step in creating more awareness focusing towards the individual. If it shows feasibility and acceptability, it can be implemented on a wider scale and more research is warranted on investigating implementation

strategies. Discussions highlighted that the proposed SMS system can improve reporting of ADRs through the existing pharmacovigilance systems.

The third presenter reported the findings of an evaluation of geographic patterns for referral for TB evaluation following introduction of Xpert MTB/RIF at regional referral hospitals in Uganda.

The findings highlighted the need to further decentralize Xpert MTB/RIF testing due to increased demand for the tests from the community and health facilities.

The fourth presentation was on the use of CT scan in Burundian healthcare facilities. The presenter gave an overview of the use, the distribution and accessibility of the CT scan in Burundian healthcare facilities, the improvements that have been observed since it has been introduced as well as the battles and difficulties that are still present. The presenter concluded that more CT machines should be made available on an equal rate in different areas of the country for a better healthcare and that a public policy should be implemented to ease the accessibility by the general population due to the high cost.

The last presenter reported the findings of a study that aimed to assess the implementation of a recommended algorithm for TB diagnosis in HIV population presenting with danger signs. The study showed obvious benefits of the implementation of the new algorithm particularly for HIV patients with life threatening conditions. The presenter recommended a large-scale implementation of the algorithm in different levels of the health system merits to increase the diagnosis of the missing TB cases in PLHIV with danger signs.

Interactive session 5: Summary of presentations and discussions

The following abstracts were presented:
- Detection of RSV and other respiratory viruses using the FTD 33 multiplex PCR in febrile children in Mbeya Region, Tanzania.

- Improved HIV patients care through proper implementation of EMR; case of Iyabe hospital.

- Does mobile phone ownership improve access to early infant diagnosis services in the southern highlands of Tanzania?

- A cohort on HIV transmission rates in relation to specific ARVs uptake among infants born to HIV infected mothers.

- Molecular Characterization of Mycotoxigenic Aspergillus species from Kenyan cereals

The study on RSV confirmed the circulation of the virus in Mbeya region, Tanzania. It was observed that RSV is a key pathogen of acute respiratory infections in children. It was recommended to carry out a similar study with a bigger sample size and to perform a genotypic analysis of RSV and other respiratory viruses. The retrospective case study of Iyabe Hospital, Kenya demonstrated how implementation of electronic medical records (EMR) lead to improved care for HIV patients. It was observed that data quality was enhanced through real validation. Constant power supply was observed to be a key barrier in the implementation of EMR. Integration of the system with other service points was recommended. The study on early infant diagnosis (EID) showed that cell phones could be used to improve access to EID services throughout the EID care continuum. This eHealth intervention was lauded as a potential game changer in improving uptake of healthcare services. It was concluded that this intervention was timely

considering the high penetration of cell phones even in the remote settings of sub Saharan Africa. The research on mother-to-child HIV transmission revealed that HIV decreased among infants with subsequent years of provision of specific drugs to their mothers. The study showed that AZT+3TC + EFV seemed to provide greater impact in the reductions in HIV transmission compared to AZT+3TC+ NVP and SdNVP. It was recommended that the research should also incorporate a component of drug resistance surveillance. The investigation on mycotoxigenic fungi isolates demonstrated a substantial presence of mycotoxins in cereals sold in consumer outlets Kenya particularly aflatoxin and fumonisin. The findings raised a lot of concerns. It was recommended that measures to protect the public from the health hazards associated with chronic mycotoxin exposure need to be put in place. Further research including molecular characterization of the mycotoxins was also recommended.

Interactive session 6: Summary of presentations and discussions

The following abstracts were presented:
- LC-MS technics in Drug Discovery.
- The Impact of Viral Load Samples Management System on Improving Healthcare of HIV Patients in Rwanda: Reduction of Total Turnaround Time of viral load results.
- Perceptions of the E-learning programs in the Burundi Health System: an online survey conducted with health personnel.
- Use of Mobile Health Technologies to improve compliance to appointments and retention in care among HIV+ clients on Antiretroviral (ART) Therapy

The first presentation was about Liquid chromatography mass spectrometry (LC–MS)in Drug Discovery. LC–MS is a combination of liquid chromatography and mass spectrometry which is a powerful analytical tool. The use of LC-MS is increasing and has proven to be useful in many areas of drug discovery like identification of lead molecule, identification of impurities and study of pharmacokinetic and metabolism profiles. LC-MS technics is also used in accelerated drug discovery experimental known us high-throughput screening. The presenter reported the performance of LC-MS technics and concluded that LC-MS technique quickens the process of drug discovery and therefore recommended for use in pharmacokinetic and especially for clinical trial.

The second presenter talked about the impact of viral load samples management system on healthcare of HIV patients. The presenter reported the results of a study that analyzed the if there was a significant reduction of the total turnaround time of viral load results and decrease of customers complains after implementation of viral load samples management systems (VLSMS) at the points of care in Rwanda.

The study showed that the installation of VLSMS has significantly reduced the turnaround time from the mean of 30 days before to 5 days after the installation and the customer complaints have been decreased from 10% to 2%. The presenter concluded that the introduction of VLSMS has improved access to healthcare and should be extended to other analysis not only for viral load samples.

The third presenter reported the findings of a study that aimed at collecting perceptions of health personnel on E-learning program development within Burundi Health System. The study showed that the majority of the health personnel are aware of E-learning programs even if respondents have never been involved with such devices. The presenter concluded that E-learning programs development could help the Ministry of Public Health and the fight against AIDS in Burundi to overcome problems related to

underqualified staff according to our survey. The presenter recommended to the Ministry of Health to adopt E-learning programs for capacity building.

The last presenter discussed the use of mobile health technologies to improve compliance to appointments and retention in care among HIV+ clients on antiretroviral therapy (ART). The presenter investigated if mobile health interventions improve compliance to clinic appointments and retention in care at 12 months among HIV positive clients in care. The study observed that overall retention of HIV+ clients at 12 months improved as well as attendance at scheduled health facility appointments among clients supported by the mHealth platform. The presenter concluded that interactive SMS reminders and follow up voice calls help ART clients to comply with their health facility appointment visit dates and supports retention in care.

Interactive session 7: Summary of presentations and discussions

The following abstracts were presented:
- Free access to e-health information in Iringa, Tanzania: Development, provision and testing the effect of digital health messages to rural communities.
- A Digitally-enabled Pay-For-Performance and Supervision Scheme for Managing Community Health Volunteers in Zanzibar.
- Medical East African young researchers and technology usage.

The first presenter discussed about development, provision and testing the effect of digital health messages to rural communities of Iringa, Tanzania. The presenter highlighted that the spread of digital technologies and global interconnectedness has a significant potential to accelerate progress towards achieving the health-related Sustainable Development Goals 3 at a global level, which includes access to free health education. The presenter is developing digital health messages to address prevalence, transmission, symptoms, treatment and prevention for HIV/AIDS, tuberculosis and *Taeniasolium*cysticercosis/taeniosis as well as a digital platform, providing the communities with free access to digital health messages, via own mobile phones and devices, and devices (screens) available in the local information kiosk. The presenter anticipates that providing health message in a digital format will increase health related knowledge, which ultimately will lead to an adaptation of health seeking behaviour. The digitalisation of health information may contribute to the strengthening of health systems, especially in resource poor settings.

The second presentation was about pay-for-performance and supervision scheme for managing community health volunteers (CHV) in Zanzibar. The presenter explained how a well-managed system of incentives and supervision, using a facility-based supervision structure and mobile pay-for-performance (P4P) to manage the CHV program and promote CHV performance, was crucial for driving and sustaining CHV performance and achieving universal health coverage. The system allowed that 70% of the 400 CHVs met or nearly met the maximum performance stipend each month; they registered 1,831 new pregnant women per month, on average. The system also increased the average home visits during pregnancy and postpartum through their participation in the program. The experience suggests that digitally-enabled performance-based incentive structures and supervision systems embedded in existing health systems are effective to promote CHV performance.

The last presenter talked about medical East African young researchers and technology usage. The presenter evaluated how East African researchers and young medical are using digital systems to

acquire scientific information for their research. The findings showed that 90% of medical students have access to internet using a smartphone and 8% a computer.

Interactive session 8: Summary of presentations and discussions

The following abstracts were presented:
- Development of Tanzania Health Sector Enterprise Architecture.
- Harmonization and digitalization of facility supervision processes and tools.
- Experience on the use of "Damu-Sasa" as a digital blood service information system to improve service delivery at Kenyatta National Hospital.
- Teachers' perceptions on the level of integration of ICTs in health sciences education in Bujumbura.
- eHealth Initiatives and Systems Inventory for better eHealth coordination.
- Interactive voice response calling to increase the knowledge and accessibility of fertility and family planning methods: A case study of the Maasai living in Esilalei, Monduli District, Arusha Region, Tanzania.

The first presenter talked about the development of Tanzania Health Sector Enterprise Architecture. The presenter highlighted the achievements of Tanzania in eHealth such as the government of Tanzania hospital management system (GoTHoMIS), electronic medical records (EMR), and an electronic immunization registry (EIR). The presenter described the data use partnership (DUP) which is a Tanzanian government-led initiative that is working to connect and harmonize data systems, including developing enterprise architecture for the health sector. The DUP initiative is developing Tanzania health enterprise architecture (TZHEA) which will include governance, guidelines and standards for interoperability. The presenter concluded that when the TZHEA is completed, it will provide a framework to guide digital health investments in the health sector by creating a common understanding among stakeholders. It will also establish a way forward for governance structures to facilitate interoperability, health information exchange, and monitor compliance and alignment with priorities in Tanzania's national eHealth strategy.

The second presentation was on harmonization and digitalization of facility supervision processes and tools in Tanzania. The presenter informed how the data use partnership (DUP) led by the Ministry of Health, Community Development, Gender, Elderly and Children (MOHCDGEC) and President's Office – Regional Administration and Local Government (PO-RALG), applied the collaborative requirements development methodology (CRDM) to develop a shared vision and roadmap for the integration and digitalization of facility supervision processes in Tanzania. Developed by the Public Health Informatics Institute, and adapted by PATH for use in public health, CRDM enables public health managers to define and document their requirements in a standardized and collaborative way. The CRDM process showed digitalization can be used at the health facility level to improve supportive supervision business processes and quality improvement by enhancing coordination of visit scheduling; prioritizing data needs and enhancing data use during preparation of supervision visits; linking and adapting various supervision checklists to each health facility; and facilitating implementation of recommendations linked to health facility planning and budgeting tools.   The presenter concluded that digitalization has the potential to transform the current fragmented supervision processes by empowering and motivating health workers and managers to apply comprehensive and coherent supportive supervision tools that encourage clear and evidence-based actions for improved quality of care.

The third presenter shared the experience on the use of "Damu-Sasa" as a digital blood service information system to improve service delivery at Kenyatta national hospital. The presenter showed how an innovative cloud-based blood information management addressed challenges associated with manual blood services management system. Embracing technological innovations in blood management processes has led to reduced errors, improved patient safety and efficiency in healthcare delivery at KNH. The presenter concluded that the use of '*Damu-Sasa*' as a new innovation should be adopted by all medical facilities to assist in management of blood services.

The fourth presenter reported the findings of study that assessed trainers' perceptions of ICT integration in health science education in Burundi. The study showed that a wide range of tools and ICT-based education methods are available though they are poorly exploited in Burundi while the opportunities for their use are present in teaching. Teachers perceived that ICTs are less integrated into the teaching of the health sciences.

The presenter concluded that the benefits of integrating ICT into education are already observable even with limited use and highlighted the need for awareness and implementation of strategies to use ICTs in learning process.

The fifth presentation discussed about coordination of eHealth Initiatives and Systems in Tanzania. The presenter highlighted the fact that the Government currently faces challenges in gathering, updating and tracking information about eHealth initiatives and systems. To overcome this, the Government put in place the data use partnership (DUP), a Tanzanian government-led initiative which is developing an online, accessible and continually updated eHealth inventory to gather, update and track information about eHealth initiatives and systems in Tanzania.
The presenter concluded Tanzania eHealth Initiatives and Systems Inventory is expected to facilitate better coordination and governance of eHealth, highlight opportunities for collaboration, and contribute to the development of the Tanzania Health Enterprise Architecture.

The last presenter discussed a planned case study of the Maasai living in Esilalei, Monduli District, Arusha Region, Tanzania aiming to demonstrate how interactive voice response calling (IVRC) can increase the knowledge and accessibility of fertility and family planning methods. The presenter will investigate to what extent IVRC improves knowledge and use of FP methods among Maasai in Esilalei. Current ideas about traditions of Maasai hinder open dialogue between healthcare staff and Maasai on FP. The presenter hopes that this mhealth system might improve the dialogue and increase knowledge about FP among Maasai and about traditions among healthcare staff.

Interactive session 9: Summary of presentations and discussions
The following abstracts were presented:
- Towards A Health Workforce Common Market: Standardization of Processes and Systems in the Regulation of Health Care Workers in the East African Community.
- Indoor Residual Spraying in Northern Tanzania; its implication against malaria.
- Adaptation of the DHIS 2 to Manage Program Data on Most Vulnerable Children in Tanzania.
- Vijana-SMART: Piloting a WhatsApp-based support group for youth living with HIV in Nairobi, Kenya.
- The impact of missing data on estimating HIV prevalence, incidence and causal effects for demographic sentinel surveys.

The first presentation discussed about standardization of processes and systems in the regulation of health care workers in the EAC. The presenter noted that the use of technology can enhance standardization of health regulatory processes and facilitate a health workforce common market in the EAC though it remains untapped. The presenter reported the outcomes of the Africa Health Workforce Project in Kenya which deployed a regulatory Human Resource Information System (rHRIS), targeting the nursing, medical and dental, clinical officers, lab, pharmacy, nutrition, public health and radiography cadres using a harmonized and standardized approach. The project showed that having an electronic rHRIS greatly improved the functioning of the regulatory agencies. In addition, having a common set of requirements/standards/business functions for all health regulatory agencies has allowed for effective regulation of HW in both countries. The presenter concluded that adoption of these best practices by the EAC will ensure standardization of health care workers regulation, enabling the free movement of health workers in the community.

The second presentation discussed about indoor residual spraying (IRS) in northern Tanzania and its implication against malaria. The presenter highlighted that following IRS there has been changes in vectorial compositions, with shifts in the density of local vectors of IRS districts for instance. These subtle changes could potentially be a hub for unstable malaria transmissions, which may in turn set back years of efforts for malaria elimination in areas, which currently have higher transmission rates. He concluded that understanding these behavioral nuances could be key in prevention of Malaria endemic areas.

The third presenter discussed about DHIS 2 and the management of program data on most vulnerable children in Tanzania. Most vulnerable children (MVC) are defined in Tanzania as children under the age of 18 years living under extreme conditions, characterized by severe deprivation that endangers health, well-being, and long-term development. Developing appropriate responses to assist MVC requires information on their numbers as well as reach, coverage, and effectiveness of existing services. The presenter described a module that was created within the District Health Information Software -version 2 (DHIS 2) for managing MVC program data. The test of this module showed that the primary data collection tools—MVC registration, MVC monthly service tracking, and referral forms—could be used effectively by community volunteers. However, summary reporting forms, which required manual aggregation from individual records, challenged the community volunteers. The presenter concluded that the use of standardized data collection and reporting tools and the development of a special DHIS 2 module for data management has enhanced the availability and use of data, reduced fragmented efforts, and ensured efficiency and consistency in MVC program M&E.

The fourth presenter reported the preliminary findings of a study that piloted a WhatsApp-based support group for youth living with HIV (YLWH) in Nairobi, Kenya. Mobile technology has promise to improve outcomes, but studies in youth have been limited. The Vijana-SMART study seeks to characterize the function and reach of this approach, and pilot a reproducible *WhatsApp* support group. Based on the results of the study, the presenter concluded that mobile social media offer an accessible and acceptable platform to support HIV treatment in Kenyan YLWH.

The last presenter discussed the impact of missing data on estimating HIV prevalence, incidence and causal effects for demographic sentinel surveys. The presenter proposed to conduct an evaluation of the impact of missing data on estimating HIV prevalence, incidence and causal effects in a demographic surveillance system in Tanzania, and the methodology that will be used. The presenter concluded that

through this work it will be able to explore and apply different statistical methods of analysing data with missing values that can result into a less biased and precise prevalence and incidence estimates. It will also be able to determine causal effects which are a major challenge in observational studies.

Interactive session 10: Summary of presentations and discussions

The following abstracts were presented:

- Impact of Population History on the Reliability of Mosquito DNA Barcoding for Species Identification.
- Validation of Bio-radGeenius Qualitative Assay for Confirmation and Differentiation of HIV-1/2 At Mbeya, Tanzania.
- Diagnostic comparison of urine and sputum XpertMTB/RIF Assay for detection of TB in HIV infected patients, Mbeya, Tanzania.
- The use of post marketing surveillance management information system in streamlining regulatory decision-making process: Tanzania experience.
- Improve reporting of Adverse Drugs Reaction in Tanzania: The Use of Electronic Reporting System.

The first presenter talked about the impact of population history on the reliability of mosquito DNA barcoding for species identification. The presenter discussed about *Aedesafricanus* mosquitoes which are important vectors of yellow fever, chikungunya, Zika and Rift Valley fever viruses. Since the vectorial capacity and ecological characteristics among *Aedes* species may differ, distinguishing species is paramount for effective vector control. The presenter reported the findings of a study that estimated the number of taxa within*Ae. Africanus*and highlighted that given the evidence from all the nuclear markers, *Ae. Africanus*is most likely a single species but the divergence of the mtDNA clades appears to be exceptionally high. The presenter concluded that the findings of the study highlighted the importance of using multiple and appropriate markers in species delimitation.

The second presenter talked about validation of Bio-radGeenius qualitative assay for confirmation and differentiation of HIV-1/2 at Mbeya, Tanzania. The presenter highlighted that optimization and validation of any method is crucial in orders to insight functional, accuracy and precision of assay before being implemented in diagnosis and research purposes. The presenter reported findings of study conducted at Mbeya that revealed that accuracy testing for Bio-radGeenius HIV -1/2 and Western Blot was acceptable and comparable with known true results. The presenter concluded that the optimization and validation of method, which was performed with four different well-trained laboratory personnel was acceptable according to FDA and ISO 15189 standards. Therefore, the method was optimized for confirmation and differentiation of HIV-1/2 by using glycoproteins and proteins bands contrary with other assays which unable to differentiate it.

The third presentation was about the diagnostic comparison of urine and sputum XpertMTB/RIF Assay for detection of TB in HIV infected patients in Mbeya, Tanzania. The presenter reported the findings of a study that compared the diagnostic capability of Xpert MTB/RIF assay for detection of TB in urine and sputum samples of HIV positive patients. Findings showed that sputum based Xpert MTB/RIF Assay performs better than urine based Xpert MTB/RIF Assay. However, many Xpert failures were seen in sputum respiratory specimens compared to urine specimen. The presenter concluded that for patients

with advanced HIV infections and children who cannot produce adequate sputum, urine Xpert MTB RIF assay may be recommended as an alternative method.

The fourth presenter talked about the use of post-marketing surveillance management information system in streamlining regulatory decision-making process. Using the experience of Tanzania Food and Drug Authority (TFDA) that has been using Information Management Integrated System (IMIS) since 2014 to process and manage data for some regulatory functions namely; registration of medicines, medical devices, cosmetics and food; registration of premises and clinical trials; good manufacturing practices, inspection and import and export control. TFDA extended the use of system in other regulatory functions including post marketing surveillance (PMS) to facilitate the flow and processing of information from collection of samples, screening, and laboratory analysis, evaluation of results and generation of reports. The presenter concluded that the system is well developed and functioning to store, manage and report surveillance data and enhance regulatory decision-making processes.

The last presenter talked about the use of electronic reporting system to improve reporting of adverse drugs reaction in Tanzania. The presenter aimed to illustrate the use of mobile electronic app for reporting adverse drugs reaction in Tanzania from October 2016 to November 2018. The presenter reported that the application has remarkably shortened time for data entry into the Vigiflow as it allows exporting of electronic files. Discussions led to the conclusion that the e-system is easier to use, countries should adopt the system and intensify structured community education programmes on electronic reporting of adverse drugs reaction.

Interactive session 11: Summary of presentations and discussions
The following abstracts were presented:
- Objective real-time feedback improves quality of manual bag and mask ventilation.
- A paperless system for quality provision of maternal and child healthcare in Tanzanian health facilities.
- The Emergency Transport System: Leveraging the sharing economy to reduce mortality.
- The Policy Environment for Cross-Border Health Service Delivery: A Case Study of East African Community (EAC) Border Areas.
- Systematic review and meta-analysis, a technology tool for disease surveillance: A case study of selected acute viral respiratory infections in East Africa community.
- Impact of the 2016-2017 healthcare worker strikes on facility delivery in Kenya.

The first presentation discussed the findings of an evaluation of the effect of providing real-time-feedback from the Augmented Infant Resuscitator (AIR) device on the time to, and the duration of effective ventilation in a multi-centre randomized controlled study on trained providers in Uganda and the United States (USA) during 120 second ventilation sessions. The study showed that providers who ventilated mannequins with real-time feedback achieved effective ventilation 50% faster compared to control. Duration of effective ventilation was significantly longer in the intervention compared to control. The presenter concluded that real-time feedback from the AIR device significantly improves quality of bag mask ventilation and recommended consideration of routine AIR device use for ventilation training and skills maintenance in health care.

The second presenter discussed how a paperless system can improve the quality provision of maternal, neonatal and child healthcare (MNCH) in Tanzanian health facilities. A digital health solution focusing on

maternal and child healthcare was developed to close gaps in the maternal, neonatal, and child health continuum of care. The solution includes a point-of-care decision-support mobile app that integrates national protocols for provision of antenatal, postnatal, child, and PMTCT care, which supports facility health workers to provide quality MNCH care; and a dashboard that supplies real-time data and automates government reports. A four-year period test of the solution showed that it improved the quality of maternal and child healthcare delivery outcomes in health facilities where it has been tested.

The third presentation highlighted the importance of an emergency transport system to reduce maternal and neonatal mortality by minimizing delays in reaching care. The presenter described a system used in some health facilities of Shinyanga and Mwanza, Tanzania that leverages the sharing economy. The presenter reported that the system has proven to be effective and scalable that they are scaling up to entire Shinyanga region in close collaboration with the government.

The fourth presenter discussed the policy environment for cross-border health service delivery using the case study of East African Community (EAC) border areas. The presenter highlighted the unicity of cross-border health areas characterized by a mobility of people which is a factor for increased health-related vulnerability and risk, and affects health seeking behaviour, including access and uptake of health services by mobile and cross-border populations. The presenter shared the lessons learnt from USAID/KEA and EAC cross-border health integrated project partnership (CB-HIPP). The need for a responsive regional service delivery framework for health service access by mobile and cross-border populations was highlighted. The presenter concluded that learning from CB-HIPP can inform national and regional health policy and regulatory considerations, and assist regional intergovernmental organizations, national ministries of health and local health management teams in border areas to create and/or adapt approaches and strategies for cross-border communication and collaboration.

The fifth presenter talked about systematic review and meta-analysis as a technology tool for diseases surveillance using a case study of selected acute viral respiratory infections in East Africa community. A systematic review and meta-analysis was used to identify the prevalence of human respiratory syncytial virus (HRSV), parainfluenza virus (HPIV) and adenoviruses (HAdVs) infections in EAC. The findings showed that unlike what is generally accepted, HAdVs are more prevalent in those >5 years. HRSV and HPIV showed similar prevalence across all age groups. The presenter concluded that public health institutions and diseases surveillance programs in EAC should consider meta-analysis approach as an additional tool to generate concise evidence for decision making.

The last presentation discussed the impact of the 2016-2017 healthcare worker strikes on facility delivery in Kenya. During these strikes, maternity services at public healthcare facilities were severely limited, while private facilities remained open. The results of an evaluation of the impact of the strikes suggested that the 2016-2017 Kenya nurse strike impaired women's access to facility delivery.

Plenary session 4

Keynote Speech: Enhancing Digital Health in EAC through Human Capital Development

Dr David Tumusiime, Deputy Director Regional Centre of Excellence for Biomedical Engineering and eHealth, College of Medicine and Health Sciences, University of Rwanda, talked about the Centre of Excellence in Biomedical Engineering and eHealth (CEBE). The CEBE constitutes a fully integrated part

of a network of Centres of Excellence (CoEs) in biomedical sciences and engineering. The goal of CEBE is to build a critical mass of qualified workforce in priority areas such as biomedical engineering and e-Health with the aim of meeting East African Community immediate and long-term labour market needs in the health sector. The vision is to be able to make a direct socioeconomic impact on the population as regards biomedical engineering, rehabilitation and mobility and e-health services in the East African region.

He informed that the CEBE strategy was to adopt the Triple Helix Model as a way to foster productive and mutually beneficial partnerships between university-industry and government. CEBE strategic objectives are to enhance technology integration in the biomedical sector for efficient and cost-effective healthcare service delivery in the region; to create an enabling environment for CEBE to become an anchor for linking biomedical sector industry development and regional economic transformation; to build a critical mass of labour-intensive support personnel through the development of both hands-on and R&D skills; and to create conditions for attracting local investment & FDI to grow and sustain a regional industry/business in the areas of biomedical engineering and e-health.

CEBE provides professional training in biomedical engineering, e-health and rehabilitation & mobility sciences. Several capacity building programs for staff have been put in place to ensure sufficient human capacity is mobilized.

He highlighted that R&D is a key sustainability strategy for the centre where faculty researchers are able to grow in their careers and be recognized professionally through engaging in important research work, and also be able to augment their income directly through their research and technical expertise; and through rank promotions.

Keynote Speech: Health knowledge management through digital technologies and solutions in East Africa: health research, training, and care

The presenter talked about health knowledge management (KM) through digital technologies and solutions in East Africa focusing on health research, training and care.

He explained the concept of KM which is a systematic process by which knowledge needed for an organization to succeed is created, captured, shared and leveraged. He highlighted that in the field of health and development, knowledge is an asset most valuable when shared. To reach health and development goals, there is need to continually identify knowledge, capture it, synthesize it, share it with various counterparts, help them to use it, and help to collect and share the new knowledge generated by that experience. The presenter highlighted also the benefits of knowledge management; public health organizations that adopt KM strategies and practices can improve performance of health care workers and programs and contribute to reaching the end goal of improving health outcomes among communities. Using KM, public health programs can promote collaboration and learning; inform policy and advocacy; improve programs, practice, and research; and enhance health training and education programs. The presenter noted the importance of KM in the health sector explaining why KM is needed and highlighting the risks encountered in health care delivery as a result to lack of KM. He further discussed about the strength for

KM in EAC and highlighted the existence of political will by the government of EA community to advocate healthcare reform and the use of ICT to improve the efficiency and efficacy of the healthcare system; existence of medical and ICT training institutions; existence of a national ICT policy promoting the use of ICT throughout all sectors of the countries; existence of national e-Government strategy that recognizes eHealth as a priority area; the existence of disease surveillance systems at national/hospital/ health facility level reporting to national programs; coordination and participation of partners in public-private partnerships in promoting ICT in the health sector; availability of national fibre backbone to support data and communications across EA; donor funding for ICT initiatives; and availability of research agencies and institutions to spearhead development and innovation. He concluded by showing strategic and policy implication such as prioritizing resources, coordination and leadership, sharing knowledge experiences, harnessing synergies of research institutions, and building enabling environments and a knowledge friendly culture.

Parallel sessions

Parallel session 9: Summary of presentations and discussions

The following abstracts were presented:

- Routine Health Information Systems and Universal Health Coverage Monitoring.
- Teachers' perceptions on the level of integration of ICTs in health sciences education in Bujumbura-Burundi.
- Real Time Consultations Through Call Centers Can Improve HIV/AIDS And TB management; Case of Baylor-Uganda call centre.
- Internet access and ICT use by medical students and health professional at Kamenge Teaching Hospital.

The first presentation discussed about routine health information systems and universal health coverage monitoring in Tanzania. The presenter defined universal health coverage and its monitoring framework that consists in health services coverage, financial protection coverage, and equity in coverage. The presenter further defined the routine health information system as any system of data collection, distribution and use that provides information at regular intervals and that is produced through routine mechanisms to address predictable health information needs. He showed the trends of service coverage tracer indicators of Tanzania for the period 2014-2018. He also discussed the challenges to routine health information system which are technical, behavioural and organizational. The presenter recommended to continue strengthening routine health information systems' capacity, to promote use of the data collected at all levels from the service delivery to policy maker levels, and to harness the potential of digital technologies for data collection and management.

The second presenter reported the results of study that aimed to assess the trainers' perceptions of ICT integration in health science education in Burundi. Trainers perceived CT as a major contributor to education. They noted that ICT enriches the lesson content, allows greater interactivity in the class-room and faster transmission of knowledge, as well as better understanding. They however noted weaknesses such as increased passivity of students, flood risk through uncontrolled information, increased time for lesson preparation, and risk of cheating on exams thanks to the smartphone. The study identified main obstacles to the quick development of ICTs in education in Burundi that include the low and expensive connectivity, insufficient equipment and maintenance, high cost of ICT equipment, lack of training in the

use of ICTs, and instability of the power supply. The presenter concluded that a wide range of tools and ICT-based education methods are available and their benefits are obvious. However they are poorly exploited in Burundi while the opportunities for their use are present in teaching.

The third presenter used the case of Baylor-Uganda to discuss how real time consultations through call centres improve HIV/AIDS and TB management. Baylor-Uganda established the toll free national paediatric and adolescent HIV and TB call centre (NAPAC) to enable that low care health workers especially in the rural areas have knowledge on management and treatment of HIV/AIDS and TB. It is a 24/7 hour toll free consultation line/platform for low cadre health workers. The presenter reported the findings of a study that sought to find out if the call centre offers real time information solutions to enable frontline healthcare workers deliver quality Paediatric HIV/AIDS & TB treatment. It was learnt from the study that health call centres have contributed in reducing mobility and mortality rates by increasing the knowledge of health workers especially the lower level cadres in the remote areas and also bridging the knowledge gap in paediatric HIV. NAPAC has immensely helped ease the work of health workers especially in the lower level health facilities where specialist are hard to find. The presenter highlighted that NAPAC as a portal for real-time knowledge transfer to health workers should be given funding priority to make treatments and care of HIV/TB easier, and that health call centres can help in increasing the knowledge of health workers especially the lower level cadres in the remote areas.

The last presenter reported the findings of a study to assess access and use of the Internet, computer and other ICT tools among medical students and health professionals at Kamenge Teaching Hospital in Burundi. The study found that the majority of medical students and health professionals had used mobile bundles as the way to access internet but few had access to computers so that only 29.0% of medical students and 41.3% of health professional possess their own computer; connection to internet was low. The presenter concluded that access to the internet and other ICT tools usage by medical students and health professionals was low at Kamenge Teaching Hospital. Free access available websites for health information were underutilized. The presenter recommended to promote and training in ICT to optimize use of digital resources.

Parallel session 10: Summary of presentations and discussions
The following abstracts were presented:

- Challenges of Introducing Integrated Community Based Health Insurance (CBHI) System in Rwanda.
- Short-term effects of the computerization project on the resources management: Case of the Prince Louis Rwagasore Clinic in Bujumbura.
- Community-based program performance improvement with motivational pay for performance strategies.
- Finding every mother: Improving maternal healthcare outcomes in BRAC Manoshi with biometrics.

The first presenter talked about challenges of introducing integrated community based health insurance (CBHI) System in Rwanda. CBHI was established to enable health service affordability and expand accessible health services to achieve universal health coverage. CBHI members' validation process and service delivery involves different institutions including Rwanda online, a web-based and mobile access

to e-government services and payment process. He highlighted that involved partners need an integrated CBHI system to be able to aggregate records and share data between separate databases in order to increase the efficiency of membership management, reduce membership administrative burdens, data consolidation, and reduce fraud. The presenter reported the findings of a study that examined the specific challenges that arose when introducing Rwanda Integrated CBHI system. Challenges were related to linking data from different databases due to technical and administrative barriers, limited legislation/regulatory framework, limited collaboration and cooperation between all partners on matter of planning and policy making, and sometimes limited connectivity and access, in particular rural areas.

The second presenter reported the findings of an evaluation of short-term effects of the computerization project of the resources management in the Prince Louis Rwagasore Clinic in Bujumbura. The study evaluated the contributions of computerization to financial resource management, the adherence of service providers to the use of the computerized system, the problems encountered in the implementation process, and lessons learned and perspectives. Considering the findings of the study, the presenter concluded that the effects of the computerization on the management of financial and human resources at the hospital was effective. The presenter however noted challenges such as the low use of data to make decision; internet connection problem; and maintenance of computer kits, networks, servers the challenges remain.

The third presenter reported a case study on implementation of pay for performance model in community-based family planning program in Tanzania. CHW performance increased after the introduction of mobile Family Planning application and pay for performance scheme in Shinyanga and in Kigoma, Katavi, Arusha and Manyara. The presenter observed the challenges of the model such as the involvement of different stakeholders with different conflicting perspectives on performance targets, and the gaming of the system by CHWs e.g. manipulating performance targets and fabricating data. The presenter highlighted the importance of listening to different perspectives and reach a consensus that's reasonable and feasible on ground, developing a data integrity and quality assurance plan to identify suspicious data, and implementing regular planned follow up visits with CHWs. The presenter concluded that a strong design process is key to a successful Pay for Performance model.

The last presenter discussed the benefits of healthcare outcomes through the use of biometrics, and the challenges and opportunities of scaling this digital solution. The presenter reported what BRAC Manoshi programme has achieved in piloting biometrics to improve maternal neonatal and child health. Manoshi has piloted biometrics within their mHealth system to uniquely identify patients and link every medical record to a fingerprint, and thereby improve efficiency and effectiveness of maternal healthcare delivery. Antenatal care visits were increased, more new borns received care by trained providers. The presenter highlighted that findings from this project could translate/apply to the East African context.

Parallel session 11: Summary of presentations and discussions

The following abstracts were presented:

- Development of National Health Client Registry within a health sector as step toward enhancing continuity of care: Experience from Tanzania.
- Digitisation of Immunohistochemistry Records Management System at the Moi Teaching and Referral Hospital, Kenya.

- Mobile WACh NEO: Engagement of pregnant and postpartum women with a two-way SMS service to improve neonatal outcomes.
- Review of Data Quality of an Electronic Tuberculosis Surveillance System for Case-based Reporting in Bumula sub-County, Bungoma County, Kenya.
- A template-based mHealth approach to digital record keeping from paper documentation for Sickle Cell Disease.

The first presenter talked about the experience of Tanzania to develop a national health client registry within a health sector as step toward enhancing continuity of care. The presentation covered progress made in implementation of the registry. It also covered the consequences of not having the registry, benefits to be gained, what will be covered in the registry and its linkages with other system is utmost priority.

The second presenter spoke about digitalisation of immunohistochemistry records management system at the Moi teaching and referral hospital, Kenya. The presenter indicated steps they used to develop a low-cost MS excel based data records of cancer patients for improved record management. The solution needs only a computer, however, it is difficult to ensure adequate security and enhanced mechanisms for data exchange among systems. The presenter highlighted the true value of maintaining digitised records even in resource-limited settings; even basic spreadsheet software such as in this case are able to maintain structured records where limitation to invest in specialised health management software systems. The presenter further highlighted the ease of integration into central health facility/national health data management software once in place.

The third presenter talked about engagement of pregnant and postpartum women with a two-way SMS service to improve neonatal outcomes using Mobile WACh NEO (MWN) communication platform. The presentation covered the use of that mobile application for improving communication with women on their health and health of their babies. Personalized messages focusing on improving health outcomes are sent to pregnant and postpartum women. The presenter concluded that results suggest that women are highly engaged with MWN particularly pregnancy and infant consultations. MWN two-way SMS communication is an acceptable, feasible and efficient way to provide information and tailor advice. The approach is a low-cost innovation that may impact maternal and neonatal outcomes

The fourth presentation was about an electronic tuberculosis surveillance system reporting in Bumula sub-County, Bungoma County, Kenya. The presenter reported the findings of a review of data captured by treatment information from basic unit (TIBU) by analyzing concordance between source documents at TB facilities and TIBU and the completeness of data from TB register to TIBU. The findings allowed to conclude that the use of the electronic system has drastically reduced dependency on several paper-based tools, data in TB facility registers had higher concordance with TIBU than TB treatment cards, and that the national programme has been enabled to collect timely and accurate data.

The last presentation was on template-based mHealth approach to digital record keeping from paper documentation for sickle cell disease. The presenter indicated the processes used to create an innovative but simple approach for collecting data for decision making at the point of care thus improving access to quality data for supporting clinical decision. The presenter concluded that templates can be used as checklists to improve evidence-based documentation in chronic diseases like sickle cell disease. Combined with mobile technology templates, they offer a simple tool for digitization from

paper. The intervention can be integrated into existing workflows and adapted to context. He further concluded that offline-first technology reduces technical barriers caused by poor connectivity.

Parallel session 12: Summary of presentations and discussions

The following abstracts were presented:

- Cross-analysis of teachers and students' perceptions on the benefits of ICT integration in health sciences education in Bujumbura.
- From Passive to Active Learning and E-Learning Implementation: Experience from medical schools and health facilities in Rwanda.
- Smartphone use among trainees and consultant Surgeon within the Panafric and Academy of Christian Surgeon.
- Web-based database is essential for HIV AND AIDS program management.
- Building District Health Managers' Capacity to Utilize Data for Decision-Making: A Case Study from Zanzibar.

The first presentation was about cross- analysis of teachers' and students' perception on the benefit of ICT in health science education in Bujumbura. The presenter reported that over 70% of teachers and students said that the use of ICT in teaching is beneficial. The benefits mentioned were a better pass rate, a better understanding, easier memories and a good transformation of knowledge. Students and teachers mentioned some challenges related to ICT use including flooding of uncontrolled information, lack of knowledge on ICT use, instability of power, high costs of ICT, poor maintenance and resistance to change. The author emphasized the need to create awareness on the use of ICT use in schools and the need to have filtered information for children.

The second presentation was about a study on active learning strategies and e-learning platforms. The study aimed to explore attitudes and views on active learning strategies and e-learning platform in medical schools and district hospitals. The presenter stated that students enjoyed active learning and assignment score increased from 37% to 89%. The reason related to a high score included an increased interest in the course and engagement on materials when active learning using a smartphone in the class was used. The presenter emphasised that besides technology and other skills, e-learning is highly dependent on the good support from the government and the user's perception and readiness to use e-learning. The presenter recommended adaption of the technology to other countries and scaling up to university medical schools and others.

The third presentation highlighted that the use of mobile technology is leading in the teaching arena. The presenter reported the results of a study that assessed the trends in smartphones usage among residents, fellows and professionals attending surgeons who work and train in Africa. The study found that over 97% of trainees and attending surgeons used smartphones for varied educational and clinical purposes. Trainees used Smartphone as a 1st contact when they have a question and WhatsApp was the common method used. There was a positive impact on patient care, learning activities interactions amongst trainees. Although both could easily buy credit to re-charge their phones, their willingness to pay for medical services was low. The presenter stated that interviewees reported that Wi-Fi connection was the greatest challenge when wanting to use the phone to search for the information.

The last presentation was about building district health managers' capacity to utilize data for decision-making". The presenter highlighted that 99% of pregnant women in Zanzibar attend at least one antenatal care (ANC) visit, but only 53% make at least four ANC visits and only 64% of women delivered at the health facility. Among those who deliver in the health facility, only 38% received postnatal checkups within first two days after birth. The presenter showed that building the capacity of the district health management team to utilize program data to inform specific follow-up actions resulted in measurable improvements in healthcare delivery, antenatal care in particular. The presenter recommended that data collected through digital technology efforts should be relevant and actionable; and that digital health program implementers should pair the deployment of technologies supporting data for decision-making with capacity building plans to ensure that decision-makers have the skills needed to utilize data effectively and achieve improved outcomes.

Parallel session 13: Summary of presentations and discussions

The following abstracts were presented:

- mHealth in Kenya: Why are we not feeling the impact as a country?
- Quality of Routine Health Management Information System Data in Tanzania: a case for outpatient and antenatal care data.
- Use of mobile technology in data collection: a case study of the KEMRI bold app.
- Creating an Enabling Environment for Data Systems and Use with Governance and Policies.

The 1st presenter summarized how mHealth operates in Kenya. The presenter highlighted that mHealth forms a good platform to improve primary health care because of its cost efficiencies and possibility to reach rural areas with various services across the patient healthcare pathway and health systems. Major challenges of the mHealth include lack of collaboration between stakeholders, duplication of mHealth services and products, lack of understanding of the market and its needs, lack of awareness of the available mHealth services, low knowledge of what mHealth initiatives that are happening within the country.

The 2nd presenter discussed the use of mobile technology in data collection. The presenter shared the experience of the KEMRI BOLD App which is a generic version of the ODK-based data collection app. It applies form logic, entry constraints, and repeating sub-structures and also supports geo locations which helps in identifying the clusters. A BOLD pilot study showed that the App was portable, time saving and ensured that all variables were captured. The timely relay data captured from the field was ensured which is important for real time quality control.

The third presenter was about the quality of routine health management information system data in Tanzania. The presenter showed the challenges and performance of routine health management information system (HMIS) in Tanzania. The presenter observed HMIS is an effective tool although the persisting challenges need attention. The presenter recommended the availability electronic tools for receiving reports at the district level, SOPs for the management of routine health information, job aids with simple instructions to be developed and utilized, and a culture of use of evidence for decision making should be emphasized at all levels of the health system.

The last presenter summarised the importance of creating the conducive environment for data systems and use with government policies in Tanzania. The presenter highlighted the importance of stakeholder's collaborations in terms of data sharing to minimize the duplications of effort as well as

increasing the performance of mHealth in Tanzania. The role of Government policy and guidelines on creating the better environment for data systems and use of Data in Tanzania was also highlighted.

Parallel session 14: Summary of presentations and discussions

The following abstracts were presented:

- Cross-Border, Epidemic-Prone Disease Threat Management in West Africa.
- Molecular Characterization and Phylogenetic analysis of *Wuchereriabancrofti* in human blood samples from Malindi and Tana River Delta endemic areas in Kenya.
- Malaria vector species composition and entomological indices following several years of indoor residual spraying in regions bordering Lake Victoria, Tanzania.

The first presentation talked about how the Regional Action through Data (RAD) project supports regional governments, and member states, in effort to extract value from data to enable evidence-informed decision-making. The presenter discussed how RAD project might enable the West African Health Organization (WAHO) better support member states in their efforts to reduce the epidemic-prone disease burden throughout the region. The presenter concluded that the BroadReach team leveraged their technical resources to develop a cross-border disease threat alert mechanism on the Vantage Platform, to work in conjunction with the WAHO regional data platform. In its early release format, it includes a country-specific interactive dashboard with a map, district-specific alerts, epi-curves and automated email capabilities. The solution is conceived to ultimately support the timely identification of emerging cross-border epidemic threats and sharing relevant information across international borders, and coordination of recommended WHO responses between member states.

The second presenter talked about *Wuchereriabancrofti* genetic diversity in Kenya. The findings of a molecular Characterization and phylogenetic analysis of *Wuchereriabancrofti* in human blood samples from Malindi and Tana River Delta endemic areas indicated high genetic variations of *W. bancrofti* in Kenya. This variation may be attributed to prolonged use of the mass drug administration and the long period of parasite circulation in the population. The study provided information on population diversity and structure of *W. bancrofti* in Kenya. Knowledge of the population structure and genetic differentiation of this parasite provides important insights into patterns of transmission, disease outcome, drug resistance, and influence the design and implementation of public health interventions. The presenter recommended that more studies on genetic diversity be carried out to all endemic regions in Kenya.

The last presentation was about an entomological monitoring around Lake Victoria regions to assess residual efficacy of sprayed Actellic 300CS and its effectiveness on malaria vectors, mainly on their composition, infectivity rate and seasonality from 2015 to 2017.

The study found that the residual efficacy significantly of Actellic 300CS decreased with months post-spraying. The presenter concluded that although *An. funestuss.s* had the highest sporozoite rate in unsprayed regions, *An. arabiensis* was highly abundant in most endemic regions. In door spraying was effective against malaria vectors control.

The session concluded that use of technology such as electronic devices and genetic sequencing is important in improving drug administration and prevention of diseases. It recommended guidelines on data sharing between cross borders of the country.

Parallel session 15: Summary of presentations and discussions

The following abstracts were presented:

- Molecular Bacterial Load Assay as A Marker for Treatment Response late during Treatment.
- Using whole genome sequencing to identify antibiotic resistance genes and predict antimicrobial resistance phenotypes in multidrug-resistant Acinetobacter baumannii in Tanzania.
- Using Mobile Phones for Behavioral Change Communication in HIV Prevention; Learnings from a Mobile Phone based Stepping Stones approach in Uganda.

The first presentation was about the evaluation of the molecular bacterial load assay (MBLA) for its potential use as a marker to determine treatment success. The findings of the evaluation allowed to conclude that MBLA has potential to determine the response of patients to antituberculosis therapy that could contribute in routine care and trial setting in search for new TB drug regimen. However, further evaluation on its role as predictor of long-term clinical outcome is required and there is a need to understand what the higher rate of positivity at week 26 implies.

The second presenter talked about using whole genome sequencing to identify antibiotic resistance genes and predict antimicrobial resistance phenotypes in multidrug-resistant *Acinetobacter baumannii*. The researcher aimed to study diversity, resistance determinants, predict and compare resistance patternsfrom WGS data of *Acinetobacter baumanii*(*A. baumannii*) with phenotypic results from classical microbiological testing at a tertiary care hospital in Tanzania. The study concluded that the validity of the use of WGS in prediction of phenotypic resistance can be appreciated without excluding the role of conventional antimicrobial susceptibility testing.

The last presentation was about an assessment of the feasibility of using mobile phone based Behavioral change communication as a means of mitigating HIV/AIDS. Based on the experience of a mobile phone based steppingstones approach in Uganda, the presenter concluded that with mobile phone ownership growing in Uganda, leveraging on mobile SMS for information dissemination on HIV/AIDS prevention reaches a wider audience with likely positive behavioural change effect.

Parallel session 16: Summary of presentations and discussions

The following abstracts were presented:

- Pharmacy refill counts and self-reported adherence overestimate adherence to antiretroviral treatment among people living with HIV in Kilimanjaro, Tanzania.
- Utilization of Molecular Bacterial Load Assay for the Detection of 16S M.tb ribosomal RNA in sputum sample and monitoring treatment response to the TB patients by reverse transcription quantitative PCR technique.

- Evaluation of cytokines in peripheral blood mononuclear cell supernatants for the diagnosis of TB.
- PHARMLINKS Medicines Retailing Solution.

The first presenter talked about Pharmacy refill counts and self-reported adherence to estimate adherence to antiretroviral treatment among people living with HIV in Kilimanjaro, Tanzania. The presenter investigated pharmacy-refill counts and self-reported adherence in relation to real time medication monitoring (RTMM) of ARVs in Kilimanjaro, Tanzania. The findings showed that pharmacy-refill counts overestimate adherence and it might be caused by sharing of pills, pills getting lost or not taking pills back to the clinic for a count. The presenter concluded that self-reported and pharmacy-refill adherence overestimate adherence to treatment as compared with RTMM. More robust means are needed to measure adherence by PLHIV.

The second presentation was about utilization of the molecular bacterial load assay for the detection of 16s M.tbrRNA in sputum sample and monitoring treatment response to the TB patients by PCR. The presenter reported the findings from a study that validated the new diagnostic technique that can be able to timely detect mycobacterium tuberculosis and monitor treatment response to the TB patients who are under medical care and to compare time to results between MBL assay and conventional diagnosis methods. The presenter concluded that MBL assay can be used to monitor treatment response to patients who are under medical treatment following its sensitivity and ability to identify viable M.tb. It has ability to detect viable-non culturable mycobacterium tuberculosis (mycobacterium tuberculosis in dormancy state). MBL assay is a novel molecular test useful for viability testing of mycobacterium tuberculosis following on technical advantages over culture methods.

The third presenter reported the findings of a study aiming to evaluate individual cytokine responses and combine them with the Antibody in Lymphocyte Supernatant (ALS) results to identify a biosignature to distinguish TB cases from controls. The results of the study suggested that IL-1ra, IL-1β, and GM-CSF might be used as diagnostic biomarkers to distinguish between TB cases and non-TB cases. The presenter noted that they could not identify a combination of cytokines that outperformed the diagnostic accuracy of the ALS alone. The presenter concluded that most of the cytokines were low in TB cases compare to the hospitalized controls and that ALS continue to show a significant power in diagnosis over cytokine when used in combination or single.

The last presenter discussed about using PharmLinks, a platform for ordering drugs from wholesalers. The presenter reported the findings of a focus group market research to pharmacy retail shops, accredited drug dispensing outlet shops and 3 wholesalers in 3 districts of Dar es Salaam. The study showed that many of the pharmacies already use tech- based solutions to aid procurements. Phone call method is the most common used method and was considered as a method of ordering drugs less satisfactory. They reported challenges during procurement through their method such as wrong or delayed deliveries, time wastage, extra costs and expired products. The majority of the pharmacies visited had an internet connection. These pharmacies are able to get online either via smartphones or desktop computers. The presenter observed that results show how easy it will be to adapt an online platform for ordering drugs. Most of the pharmacies visited were ready to use PharmLinks as their platform for ordering drugs from wholesalers. PharmLinks has the potential to solve the problems that exists in the process of ordering drugs. The presenter concluded that e-Pharmacy model will diversify to provide solutions to other problems in the Pharmacy sector such as e- Prescription, e- Dispensing, Locating a pharmacy and its stock, Drug monitoring and Drug reminders& Online Consultation.

Conference Sessions Day 3: 29 March 2019

Symposia: Key conclusions

Symposium 1

Role of Government in providing a robust enabling ecosystem for scaling uptake and utilization of technologies in health: leadership, policies, regulation, and enabling environment for digital technology and solutions in health.

The symposium was introduced by four speakers on the topic of providing a robust enabling ecosystem for scaling uptake and utilization of technologies in health. All the speakers' highlighted need to include the government and get their support in the implementation of technology. They concluded that there is need for government policies to improve technology; digital technology can be used to improve disease surveillance in community and cross border; and that early diagnosis and comprehensive care can be achieved through newborn screening and use Tanzania immunization registry to track and manage children under five. Internet should be provided for everyone to enhance access to digital health. The symposium noted that there is little funding and limited resources in government budgets that fund implementation of different technologies and recommended that for implementation of technology to be effective, governments have to be involved and to be ready to take the technology forward. The symposium further recommended to make digital technologies affordable and make sure government systems in the countries talk to each other, to ensure transparency in decision making and access of technology to everyone in the region. The government should be the key to implementation and sustainability of technology.

Symposium 2

Status and gaps in Digital Health in the region: readiness of the health sector to transition to digital health sector, and health workforce to embrace technology. Capacity for data analytics, and responsible data practice

The symposium observed that digital health is key in improving health delivery, patient management, reduce workload to the health care providers, equity access to care, and availability of real time data for policy makers and improve supply chain. The symposium discussed the advantages of the adopting the technologies. Digital health help in providing comprehensive information on the health care workforce of different cadre available at different level of health care system. The database helps the ministry of health in lobbing for financial support during recruitment and training more health care workforce when gaps identified. Digital health measures accurate, time and cost effectiveness of the recorded data. These data are useful for policy maker in budgeting purpose and equal distribution of resources, workforce provider, and quality of care delivery as well measuring the achievement of MDGs goal. Also, these data can be used by the investors to fill in the gaps / needs identified by these information.

The symposium further discussed challenges to the adoption of the technologies in the public health systems. Those challenges range from user satisfaction on the digital health since some don't fit to their need; absence of sustainability strategies on the adopted tools; lack of finance support from the government; most eHealth are project based; unskilled personnel due to continuous changing of technologies, inadequate infrastructure; unmotivated workforce underpaid, overloaded with their

duties and digital illiteracy; lack of retention strategies to health care workforce; to too many e-Health system which are not connected each other.

The symposium recommended to create a system to assess uptake of the technology by the health care workers; to design the tools for and with the users and involve both consumers of the e-Health (the tools should fit local needs with simple user guide to utilize them but should allow flexibility for easy implementation); to understand the existing ecosystem; adopt the existing tools to fit the local needs to guarantee sustainability (engage the government from the beginning in the project based e-Health programme for easy uptake and sustain the digital health within the health care system); to motivate health care workforce through capacity building, retention strategies; to utilize "Digital atlas" where different tools will be visible and allow interconnection; to customize the eHealth tools in the EAC.

Symposium 3

Regional role: harmonization, standardization, interoperability, responsible data practice, privacy, security, investment in technology for health, scaling uptake and utilization of technologies, and regional digital health implementation initiatives.

The symposium highlighted the role of Digital REACH in advancing health in the region in epidemics surveillance, transfer of medical data, sharing expertise and informed decision making is invaluable. Policies should be put into practice regarding data security and role of the government and private sector in improving health through technology. The symposium also highlighted that EAHRC should play a role in the management of data including ownership, creation, delivery and expression of data despite challenges related to scaling up data security from a national levels to a regional level. The symposium noted that there is a great importance of policy implementation after the development of Digital REACH which should be governed at national levels as well as the regional level. The engagement of the key stakeholders in policy development is important to avoid confusion and improve implementation. Challenges on legislation include the differences in laws between member countries, lack of tools for implementation, lack of quality assurance legislature for technology, technical know-how of the end users of the technology and political red tape.

The symposium further discussed about resource mobilization and raised some challenges faced in resource mobilization that include funding of individual work scheme in the REACH initiative, availability of loans for large scale funding, and engagement of individual countries in resource mobilization.

Breakout groups discussed important questions related to policies and standards that can improve data security within a national health system, stakeholder's engagement models that can accelerate national health system digitization, and practices that should be prioritized to strengthen leadership, legislation, policy and improve compliance.

The symposium recommended:

- Data ownership, access and use should be clearly identified;
- Data sharing limits should be clearly outlined within the region for individual government involvement focusing on them;
- Capacity building on the use of newer technology, simpler more efficient systems should be addressed so as to improve compliance of health care workers in the use of the technology;

Improved quality assessment standards and certification is required for all new digital health solutions prior to their application in society.

Symposium 4

Public Private Partnership (PPP): role of private sector and development partners; investment opportunities and a prototype win-win investment case; cooperation between health and ICT sectors; enabling ecosystem for investment. Utilization of locally available minerals, raw materials, and other resources for digital health industrialization.

The symposium focused on role of the private sector and development partners; investment opportunities and a prototype win-win investment case; cooperation between health and ICT sectors, and enabling ecosystem for investment. The utilization of locally available resources for digital health industrialization was also explored. Discussions were introduced by speakers with prerequisite knowledge and experience on five topics:

- ✓ Overview of PPPs in healthcare; models, lessons and trends for the future.
- ✓ Technologies supporting data for health system decision-making
- ✓ Technologies for Disease Surveillance, Disease Outbreak Detection and Response, and Cross border mobility and disease tracking
- ✓ Innovative technologies and solutions for application in, and improvement of healthcare service delivery and health outcomes
- ✓ Health knowledge management through digital technologies and solutions in East Africa: health research, training, and care.

The Symposium resolved recommendations that shall provide useful insight to players in the health sector when making decisions in regard to viable PPP projects and use of ICT to improve service delivery for better health outcomes.

Symposium 5

Epidemiology of Cross Border Diseases in the Era of Technological Innovations – Experiences of EAIDSNet

The symposium was introduced by a presentation on EAIDSNet objectives that include to enhance cross country and cross institutional collaboration on disease prevention and control ; to promote and exchange dissemination of information on integrated disease and surveillance; to harmonize disease surveillance systems, development of eHealth policies and awareness; to provide e-communication linkages between EAC and ministries of health; and to develop and implement EAC regional eHealth strategy and DHIS2 data warehouse. The EAIDSNet has adopted the One Health approach in guiding its response. The main challenges of EAIDSNet in implementing cross border surveillance strategy are related to data security, national sovereignty and data sharing; confidentiality and sustainability; staff turnover; synchronizing priorities between 2 or more countries; and financial resources for operations.

The symposium was made of presentations on surveillance strategies of Africa CDC; a case study on sample and results tracking through an innovation in outbreak management and response; and technological advancements for strengthening One Health.

Discussions raised recommendations that information management is key in disease surveillance; EAC partner states should track the adoption and implementation of event-based surveillance; dissemination of lessons learnt and challenges, and how they've addressed them is needed; enhancing collaborations between regional networks and teams.

As future of surveillance systems, the symposium highlighted the need to address ambient needs in human, animal and environmental domains; to enhance participation of community inland and cross border ecosystems – community based surveillance systems for cross border system; to use digital technology and social media as an opportunity or threat; to fully use of surveillance information in preparing different actors to take action before health emergencies strike; and to integrate early warning and alert systems in national and sub national surveillance systems . The symposium emphasized the necessity of clear message on the need to strengthen and enhance partnerships in order to leverage of capacity and resources available to improve response; the role of engaging communities as people who really matter and reach out to people who would be integral to the successful adoption of these interventions; consideration of ethical aspects associated with the sharing of personal health information and importance of ethical guidelines and best practices – especially in sharing patient information through various platforms; and linking different platforms with national systems to avoid fragmentation and to ensure regional integration of information systems.

Plenary session 5

The session considered the outline of recommendations form the 7th EAHSC as proposed by the team of rapporteurs of the conference. The outline is a synthesis of all recommendations emanating from all sessions and symposia of the conference. The session agreed on a final outline of recommendations to be presented during the closing ceremony and to serve as reference during post conference activities meant to synthesize and implement those recommendations. The session also received information on the evaluation of the conference and final communications related to the conference.

Closing session

Recommendations of the 7th EAHSC

The closing session was marked by the communication of the recommendations of the 7th EAHSC by the chair of the National Steering Committee, United Republic of Tanzania.

Awards

The 7th EAHSC recognized and awarded the best presenters, symposia organisers, best exhibitors and the URT National Steering Committee.

Best Presenters

- Subtheme I: Frank Arabi - PHARMLINKS Medicines Retailing Solution. Tanzania
- Subtheme II: Dorothy Muroki - Innovative Approaches to Cross-Border Health: Case of Cross-Border Health Unit Model. Kenya
- Subtheme III: Anita Kusaasira - Validation of a phone-based Newborn clinical management application – prisms®. Uganda
- Subtheme IV: Louis Sibomana - Challenges of introducing integrated community-based Health Insurance System in Rwanda
- Subtheme V: No winner

Symposia Organisers:

- The National Medical Research Institute (NIMR), Tanzania
- The Ihangane Project (TP), Rwanda
- PATH
- Kenya Medical Research Institute (KEMRI)
- ECSA Health Community

- Ministry of Health, Community Development, Gender, Elderly and Children, Tanzania
- Kenya Medical Research Institute
- University of Rwanda

Closing speeches

Professor Palamagamba Kabudi (MP), Minister for Foreign Affairs and East African Cooperation, United Republic of Tanzania expressed his appreciation to be invited to do the closing remarks after what has been the most successful conference. He thanked all the participants to the 7th EAHSC for the spirit of cooperation and solidarity they have shown in the lead up to this conference. He added that they had three momentous days where they discussed, shared and learned about the evidence and responses needed to achieve better health for all people through digital health technologies. He also expressed

deep thanks to the Government of United Republic of Tanzania for hosting the landmark event, and to the event organizers and participants that made the event very vibrant for all three days. Such scientific conference where researchers with vast experiences come gives great hope that EAC is more likely than ever before to succeed in realizing the vision of health for all especially now when EAC is discussing issues of digital health. He noted that it was his hope that together, EAC partner states have

endorsed recommendations that give a clear path, with clear commitments on digital Health. While working on the meeting recommendations and resolutions EAC should keep in mind that digital health is a typical feature of the healthcare system.

Professor Palamagamba observed that EAC has reaffirmed that Digitalization on the health sector is comparable to the impact of industrialization to the economic sector. With such affirmation vibrant,

strong and sustainable primary health care is essential if EAC is to achieve universal health coverage and the Sustainable Development Goals. He recalled that in the opening remarks, Her Excellency the Vice President of the United Republic of Tanzania insisted on the need to align digital health approaches and solutions with the specific needs of the country's health system and that of EAC region and beyond; and to define and implement digital health strategic plans which consider governance mechanisms in digital health. He highlighted that EAC as a regional block make sure that it has national strategies and policies to illustrate possible forms of intersectoral cooperation involving healthcare professionals right from the start, seeking sources of necessary funding, and adapting academic curricula to the changes associated with introducing ICTs. EAC should not let the strategies to remain strategies, it must make sure to translate these strategies into actions that should lead into better health for all people.

Professor Palamagamba appreciated efforts that led to the Digital REACH 10 year strategic plan. He congratulated such initiative which is very crucial for partner states to develop and implement their ambitions and strategies. He further highlighted what should be done as partner states in expanding access to medicines, vaccines, diagnostics by using digital technologies; using electronic health records to ensure continuity of care; building health information systems to enable health systems to be responsive to changing needs; using digital technologies to improve access to, and the quality of, health information and services; harnessing the power of science and evidence; harnessing the power of health workers through the use

Honorable Patrick Ndimubanzi, Minister of State, Ministry of Health of Rwanda, expressed sincere thanks to all the persons who have been involved in the 7th EAHSC. He thanked all the participants for their personal commitment to finding lasting solutions to the challenges of the health sector within the East African Community, and for their significant contribution during the 3 days of intensive work.

He observed that there have been many interesting and fruitful presentations during the three days of the 7th EAHSC both in plenary, parallel and interactive sessions and that many good experiences have been shared and lessons learnt. He highlighted that participants to the 7th EAHSC have learnt that a lot of good work has been done in the area of digital health technology in EAC region and presentations demonstrated good practical activities and experience.

He thanked all participants for their active participation and for the quality of the discussions and exchanges, which enabled to highlight the various relevant recommendations that have been made about using health technologies for the transformation of the health systems and attainment of the UN-Sustainable development Goals.

Honorable Patrick Ndimubanzi noted that the conference allowed participants to be informed about the status and the magnitude of use of the health technologies as a tool of strengthening national health systems, and that the conference pointed out the discrepancies that exist within EAC Partner States in the use of health technologies. Evidence has shown that Digital health has been proven as one of the enablers of Sustainable Development Goals in developed countries and a lot of pilot projects all over the world are confirming the same to be the case in low- and middle-income country settings.

He recalled that at the beginning of the conference, the Vice President of the Republic launched the Digital REACH strategic plan which is an EAC strategy to implement digital health in the region. Digital REACH is an important step towards achieving digital transformation in the health sector.

He informed that as Chair of the EAC Council of Ministers he committed to encourage the EAC Partner States to support the new development and called upon the region to work together through digital health technology to improve implementation of health sector interventions, with the aim of accelerating attainment of the Universal Health Coverage and SDGs.

Hon. Ummy A. Mwalimu (MP), Minister for Health, Community Development, Gender, Elderly and Children, United Republic of Tanzania took the opportunity to thank the Minister for Foreign Affairs and East African Cooperation, United Republic of Tanzania for accepting to officiate the closing ceremony of the 7th EAHSC. She thanked the Ministers of Health and Partners States delegations; the Organizing Committee, the Chair of the Conference, Presenters, Exhibitors and all participants for a very successful Conference.

On behalf of the Government of the United Republic of Tanzania, she expressed her gratitude for the collaboration extended to her Ministry by the EAHRC and EAC Secretariat to since the conference started to be organized. She noted that work has been done as a team and that the collaboration accorded to the Ministry of Health will be extended to the Host of the next Conference, the Republic of Kenya.

She informed that they were very pleased by the participants for the active participation in various presentations and plenary discussions and expressed the hope that the resolutions of the 7th EAHSC will take EAC health sector to the next level of health technologies and the implementation of various health

interventions.

She concluded by thanking everyone who contributed to the success, and wished that similar efforts be replicated to the Republic of Kenya, host country of the forthcoming 8th East African Health and Scientific Conference in Nairobi, 2021.

The Representative of the Minister of Health of Kenya expressed that it was a privilege for the Republic of Kenya to have been requested to give a vote of thanks during the closing ceremony of the 7th EAHSC as host of the upcoming 8th EAHSC.

He noted that the theme of the conference was of an unprecedented interest as it was about Technology for Health System transformation and attainment of the UN-SDG.

On behalf of the Minister of Health of Republic of Kenya and all EAC Partner States, he sincerely thanked the Government of the United Republic of Tanzania, all EAC Partner States, the EAC Secretariat, and the East African Health Research Commission for the achieved success of the 7th EAHSC.

He extended a sincere vote of thanks to all presenters who spent their valuable time to prepare scientific materials to share during the conference and noted the relevance and quality of the topics and the master of confidence during the presentations.

He further thanked the organizers of the symposia who gave opportunity the participants to know more about activities on investment in digital health in the East Africa region.
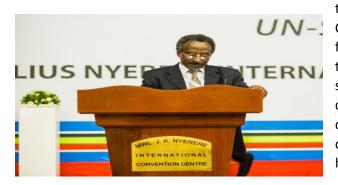
He congratulated the East African Health Research Commission (EAHRC) for all launches held during the conference focusing on the launch of 10-Years Digital Regional East African Community Health strategic plan, the East Africa web portal for health information and the launch of the Young East African Research Scientists Forum (YEARS Forum).

He recalled that the 18th Sectoral Council of Ministers of Health, held here in Dar es Salaam on 26th March 2019, resolved that, based on the rotational basis, the 8th East African Health and Scientific Conference will be held in March 2019 in the Republic of Kenya. The same Sectoral Council directed the Republic of Kenya and the EAHRC to commence mobilization of the necessary resources for the convening of 8th EAHSC.

He informed that the Republic of Kenya was privileged for the honour to hold the Conference and will do all in her powers to ensure that the 8th EAHSC will be a success.

He took the opportunity to invite all EAC Partner States to the 8th EAHSC. He highlighted that EAC Scientists are the main resources for the convening of this conference and thus they are invited to be involved in the preparations of the 8th EAHSC.

Professor Lyamuya, chair of the 7th EAHSC, started by thanking the Minister of Foreign Affairs and EAC Cooperation for accepting the invitation to come and officiate at the closing ceremony of the 7th EAHSC. He noted that it is an indication of how much the Minister of EAC Cooperation values the affairs of the East African Community. He informed the participants that more than 700 participants and 22 exhibitors attended the 7th EAHSC to share research findings and experiences on matters pertaining to the application of technology to promote transformation of health systems aiming at enabling the EAC Partner states attain the United Nations Sustainable Development Goals. He expressed the hope that

the experiences shared and views during the Conference made it possible to strategize for the future direction of the Digital Health Initiative in the East African Region; and that the Conference served not only as a platform for constructive dialogue, consensus-building and forging collaborations but also as an avenue to open up doors to new horizons in digital technology for health.

He observed that the 7th EAHSC has been an outstanding example and informed that generally the plenary and parallel presentations were very well delivered and the symposia sessions were also very well conducted. He thanked all presenters who shared their knowledge, ideas, experiences and expertise during the conference. Their presentations were very stimulating and thought provoking and laid ground for further research in the respective areas discussed in order to get solutions to un-answered questions. He also thanked the Chairs and rapporteurs of the various sessions for efficiently moderating the sessions, evaluating the quality of presentations and documenting the key issues discussed. Their deliverables will be instrumental in generating the conference report. He further thanked the conference organisers for their hard work and impressive performance during preparations for the Conference and during its implementation with a special thanks to the East African Health Research Commission Secretariat for overseeing the whole conference organization process and

providing close guidance and assistance throughout. He reiterated appreciation to the various institutions, organizations and individuals who contributed in sponsoring the 7th EAHSC who include the Government of Tanzania; the partner States; the East African Health Research Commission Secretariat; the national and regional conference organizing committees; development partners; public and private institutions and organizations. The chair of the 7th EAHSC concluded by inviting everybody to continue the Digital REACH dialogue through e-communication and continue conducting studies that will help us identify solutions for existing digital health challenges.

Exhibition showcase

The Conference also offered a venue for participants to exhibit their activities, projects and programmes, infrastructures, wider initiatives and demonstrations. The exhibitions gained interest with 21 booths from organizations and companies based in EAC region.

Exhibitors of the 7th EAHSC: African Palliative Care Association – Uganda, Alliance Global East Africa – Kenya, CRDB Bank Ltd – Tanzania, East African Centre of Excellence for Cardiovascular Diseases - Muhimbili University of Health and Allied Sciences, East African Community, East African Health Research Commission, Institut National de Santé Publique – Burundi, Kenya Medical Research Institute, Kenya Medical Training College, Kilimanjaro Clinical Research Institute, KOTRA (Korea Trade-Investment Promotion Agency), Mbarara University – Uganda, Ministry of Health, Community Development, Gender, Elderly and Children – Tanzania, National Health Insurance Fund –Tanzania, National Institute for Medical Research – Tanzania, PATH, Tanzania Food and Drugs Authority, Tanzania Health Summit, The Aga Khan University Hospital – Kenya, The Ihangane Project – Rwanda, University of Rwanda

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Regional Steering Committee: Jean Baptise Ngomirakiza, Isaac Minani, Dora Simbare, Charles Nzioka, Evans Amukoye, James Kariuki Ngumo, Jeannine U. Condo, Parfait Uwaliraye, Clarisse Musanabaganwa, Ndekya Oriyo, Fadhil Abdallah, Doreen Mloka, Pauline Byakika, Isaac Kadowa, Harriet Nabudere.

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National Focal Points: Institut National de Santé Publique- Burundi, Kenya Medical Research Institute, Rwanda Biomedical Centre, National Institute for Medical Research-Tanzania, Uganda National Health Research Organization.

National Focal Points Coordinators: Dionizi Nizigiyimana, Evans Amukoye, Pacifique Ndishimye, Paul Kazyoba, Harriet Nabudere.

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