Interdisciplinary Consortium on Epidemics Research (ICER)

1st – 3rd October 2024

Munyonyo Commonwealth Resort

Contents

Acronyms and Abbreviations

BSL	Bio Safety Laboratory

CAR	Central African Republic
CDC	Centre for Disease Control
CREID	Centre for Research in Emerging and Infectious Diseases
CEPI	Coalition for Epidemic Preparedness Innovations
DRC	Democratic Republic of Congo
EVD	Ebola Virus Disease
HIV	Human Immuno-Deficiency Virus
ICER	Interdisciplinary Consortium on Epidemics Research
IRB	Institutional Review Board
LMIC	Low- and Middle-Income Countries
MDA	Ministries and Departmental Agencies
MoH	Ministry of Health
MSF	Medicins Sans Frontier (Medicine without Borders)
NDA	National Drug Authority
NIH	National Institute of Health
NHLDS	National Health Laboratory Diagnostics Services
PPE	Personal Protective Gear
PRESIDE	Presidential Initiative on Epidemics
R&D	Research and Development
RCT	Randomized Controlled Trials
RNA	Ribonucleic Acid
RVF	Rift Valley Fever
SAC	Scientific Advisory Committee

STI	Science, Technology and Innovations
STI-OP	Science, Technology and Innovations in the Office of the President
SUDV	Ebola Sudan Virus
UNCST	Uganda National Council of Science and Technology
UNICEF	United Nations Children's Fund
WHO	World Health Organization

Introduction and Background

The world is continually devastated by recurring epidemics and pandemics caused by emerging and re-emerging infectious diseases. These unpredictable and fast-moving public health threats pose substantial challenges to global, regional, and National health security, and to the patients themselves due to poor health outcomes and high case fatality. Unfortunately, limited clinical research infrastructure in low- and middle-income countries (LMICs), where epidemic-prone settings are concentrated, hinders the determination of the clinical presentations, pathophysiology, and outcomes of these infections. This, in turn, limits the development of effective interventions and targeted countermeasures for the prevention, control, and treatment of these pathogens, hence undesirable health outcomes during epidemics. The high burden of infectious disease outbreaks in LMICs and the lack of effective medical countermeasures for some of these diseases, such as the most recent Ebola Sudan (SUDV) outbreak in Uganda, and the current outbreak of Marburg Virus Disease in Rwanda and Tanzania, underscore the urgent need for a systematic clinical research network and related resources to quickly initiate patient-oriented and translational research during an outbreak.

Currently, scientists work in silos driven by independent initiatives, which result in duplication and resource wastage. To address this need for a coordinated response, the Interdisciplinary Consortium for Epidemics Research (ICER) brought together a network of scientists and clinicians with expertise in laboratory sciences, clinical management, product research & development, epidemiology and surveillance, and other key domains relevant to epidemic response. The consortium aimed to overcome the bottlenecks curtailing epidemic research and respond electively and rapidly to current and future global health threats. ICER has assembled a framework to be an institutionalized platform for evidence-based mitigation of outbreaks, epidemics, and pandemics. These activities will include: coordination and mobilizing support and resources towards National epidemics priority research areas from local and International partners/collaborators, strengthening capacity for patient-centered epidemic research in emerging and reemerging diseases in research entities Institutions and Programs, developing pre-approved generic protocols to facilitate the conduct of real-time clinical trials to evaluate candidate medical countermeasures [vaccines, diagnostics, therapeutics], and related priority high-quality multi-site/ country observational research during outbreaks and epidemics. This promotes sustainable community engagement and dissemination of research findings and contributes to the enhancement of National and International frameworks for collaborative and systematic acquisition, storage, access, sharing, use, and disposal of biodata, genomic sequencing data, and bio-specimens from outbreaks and epidemics. In summary, the establishment of ICER is critical in addressing the bottlenecks curtailing epidemic research and strengthening the global response to emerging and re-emerging infectious diseases.

Background

The three-day symposium began with the arrival of guests from various countries. Participants from the Democratic Republic of Congo, Central African Republic (CAR), Gabon, Rwanda, Tanzania, Kenya, Uganda and other countries at Common Wealth Resort Munyonyo. The symposium used a blended approach with various participants online from all over the globe.

Welcome remarks to the second ICER Symposium

The symposium began with welcome remarks from Dr. Winters Muttamba who highlighted the symposium objectives to all the participants. Dr. Muttamba welcomed participants to the Pearl of Africa and the interdisciplinary symposium on Mpox in East and Central Africa. He highlighted that a year ago, we gathered in Munyonyo for the first ICER symposium and noted that even though the time frame is short, there has been some registered impact. As ICER, we have been able to position research as a way to control epidemics. I hope we can use the second symposium to create a better response. The best time to prepare for an outbreak was yesterday. An outbreak was first detected for Mpox in DRC, and we want to create a robust response to this epidemic. We hope that this (symposium) will create some action points after here. He thanked the organizing committee for arranging this symposium on short notice. Our delegates from outside Uganda, welcome to the pearl of Africa. We hope you enjoy your stay and love the Place.

> *As ICER, we have been able to position research as a way to control epidemics. It is my hope that we can use the second symposium to create a better response.*
>
> *Dr. Winters Muttamba*

Symposium Theme, Rationale and Specific Objectives

Mr Mudarshiru Bbuye a research fellow at the Makerere University Lung Institute took participants through the symposium objectives and program for the next two days. He

provided a background to the symposium and mentioned that the symposium is coming from a background of having the DRC as an Epicenter of the Mpox Pandemic with the need to synthesize what is known and to identify what is unknown. He shared the Theme and Rationale of the symposium with the participants and the Main Objectives. **The Theme of the symposium is;** Building partnerships and synergies to support a coordinated Mpox response in East and Central Africa. **The Rationale** behind the symposium is that there is a need to synthesize what is known and what is unknown to identify unanswered research questions or ways to expand the scope of ongoing projects.

> *We must have a clear strategy as we leave this symposium and return two to three years from now and be accountable for the work done.*
>
> *Mr. Bbuye Mudashiru*

The Main objective: To bring together ICER members and other researchers, policymakers, and responders in Mpox-affected countries in East and Central Africa to discuss and map the most effective Mpox research and response strategy.

Specifically;

1. To strengthen the capacity of ICER members and other research institutions in the affected countries to generate and use evidence during epidemics.
2. To provide a platform for discussion and creation of a harmonized Mpox research and response strategy.
3. To define approaches to expedite dissemination including data sharing of research outputs to inform response in near real-time.
4. To identify ways to fill the gaps and solve challenges in the current Mpox response in Africa and beyond.

5. To provide a platform for early- and mid-career epidemic researchers to share their research outputs that could shape a response to the Mpox pandemic
6. To provide a platform for discussion and harmonizing research strategy.

Mode of delivery; Blended symposium both physical and virtual, lectures, abstract presentations, panel discussions and breakout room sessions.

Target participants;

1. ICER individual members and research institutions.
2. Researchers and frontline healthcare workers.
3. Researchers under different research consortia that are implementing Mpox research.
4. Policymakers (ministries of health officials and incident management representatives).
5. Representatives of research institutions, research ethics and medicines/vaccines regulatory bodies.
6. Representatives of International agencies.

Expected symposium outcomes

A communique on a joint strategy for Mpox research to inform response in Africa.

- A brief on the current Mpox research landscape in East and Central Africa.
- A detailed harmonized strategy for research and response to cross borders and within East and Central African countries.
- A report describing the gaps and challenges in Mpox research and response.
- A letter to the editor in chosen journals to disseminate the recommendations from the symposium.
- Project teams meeting reports.

Sub Themes for discussion included;

- Cross-border control
- Research and clinical care
- Access to medical countermeasures (e.g. vaccines and medicines)
- Research financing
- Risk communication and community engagement
- Mpox diagnostics-accuracy, deployment and access
- Data sharing and biospecimen access and use
- Ethics and human rights
- Regulatory landscape-overcoming hurdles to expedite research and response
- Ongoing project update

In his concluding remarks, Mr. Bbuye hoped that this would be a fruitful discussion. Let us all contribute to the discussion in the next couple of days. We must have a clear strategy as we leave this symposium and return two to three years from now and be accountable for the work done. He thanked the participants for coming to Uganda and wished them fruitful deliberations in the symposium.

Session one: ICER's Epidemic Research Scope so far

The first session of the symposium focused on sharing ICER's Epidemic Research Scope so far and the ICER Chair Prof Bruce Kirenga led this. In his remarks, he asked each Project Principal Investigator to give a 4-minute update on their project.

Remarks from ICER/AFRIVAX and Mbarara University of Science & Technology.

The welcome remarks were delivered by Prof. Pauline Byakika Kibwika, the incoming Vice Chancellor of Mbarara. In her opening remarks, she thanked all participants for turning up for the symposium. The organizing committee for this symposium emphasized that we are working on creating a coordinated response to the Mpox outbreak. While we are here, there is an outbreak of Marburg in Rwanda. More than 20 people have been affected. These diseases are here with us and we must fight them ourselves. We must develop a coordinated response to fight future outbreaks and epidemics as they happen because we all know that transmission and exposure occur before patients develop symptoms. Therefore, any of us can be exposed hence the need for us to develop this coordinated response. The bottom line is many of the things that occur to us are due to the underlying poverty in our regions, lack of education and lack of sensitization and this is all part of the coordinated response so as we discuss this, we must reflect on this as well. She mentioned that she was very happy to see an objective on dissemination. She also tasked the people in the room to share where they have published their work or where they are disseminating their work. She highlighted that many of us publish in European and American journals and encouraged publishing so that our populations will get to know our work on diseases and the science behind these epidemics. We must publish in our journals and have this knowledge locally publicized.

One of the editors from the East African Health Research Commission had earlier shared with us here that they are spearheading two journals the East African Journal and the East African

Science Journal. In one of the challenges, he mentioned that when they call for papers, they only get papers from students but the more developed scientists don't submit their papers and this happens to other journals in the African setting. In her concluding remarks, she called upon all of the participants to disseminate our work locally so that our populations get to know what is happening around us. Thank you very much and I hope that you will enjoy your stay in Uganda.

Remarks from the East African Health Research Commission.

Dr Fabian Mashauri; We are grateful to the organizing committee for welcoming us to this important symposium and hope that we will have a good deliberation during the next few days. The East African Health Research Commission is based in Bujumbura, Burundi and it is charged with mobilizing resources and ensuring health research in the region. The consortium is a good one for cross-border preparation and coordination. We are building a surveillance system so that we can respond in real time whenever an epidemic is declared. We want to have regional disease surveillance and response. We have the East African Research Journal and it's indexed on PubMed. The East African Community has eight (8) partner states currently and all the research work from these partner states is accepted. Let us have a fruitful deliberation in the next three days and would like to encourage you to publish in the East African Science journal, which is a free access journal.

Remarks from the National Drug Authority (Uganda)

In the remarks from the National Drug Authority, she expressed the honor of being part of the ICER gathering, building partnerships and synergies, and collaborating to support a coordinated Mpox response in East and Central Africa. Ms. Nakitto thanked the organizing committee for bringing like minds together to enlighten us on what is happening in the region about Mpox and coming together to form partnerships and

synergies. Mpox has emerged as a significant public health challenge in recent years and while we are just learning more about the repercussions of Covid 19, it comes as a reminder that we need to be vigilant and united; this underscores the importance of collaborations and partnerships for us to fight this problem. Just as we are recovering from COVID-19, Ebola and Marburg we are hit with Mpox and many others.

In her remarks, she emphasized three things;

1. The need to strengthen regional surveillance where all member states have to participate.
2. We need to enhance access to vaccine safety and quality, our role as NDA is to ensure that we have safe and quality products as regulators, and we are cognizant of this. We thank ICER for helping us prepare for regulation of these products as regulators across borders because of the number of epidemics with all challenges. We thank ICER, emphasis should also be put on community partnerships with local stakeholders and improving public engagement by being culturally and socially engaging to the people affected most.
3. We would like to use the joint review frameworks and as regulators, we want to reduce the time needed for approvals and clinical trials.

There is a lot of work done on vaccine hesitancy and there is a need to work with communities to increase the chances of having better responses. There is a need for partnerships with the Non-Government Organizations, the religious leaders, and everyone else as stakeholders. Previous lessons show us that working in isolation is not enough. Let us build partnerships and work together to strengthen our response.

Remarks from Coalition for Equitable Research in Low Resource Settings

In the remarks delivered by Dr. Sauman Singh on behalf of the Coalition for Equitable Research in Low Resource Settings. He re-echoed the honor to be part of this symposium and appreciated the tireless effort. This coalition helps our researchers to come together and advance our understanding of Mpox. Sharing knowledge, coming together to find solutions and sharing on all these diseases that affect low-resource settings more.

Remarks from Uganda National Council of Science and Technology (UNCST)

In his remarks to the participants, Dr Ongol commended the participants for taking off time to attend this important symposium. In line with our theme, he commended the researchers, scientists and all those who have worked tirelessly in preventing these diseases. He re-echoed that their work doesn't go in vain, we work with all other regulatory bodies, like the NDA which is crucial in testing, and approving all diagnostics, vaccines and medicines. These must meet international standards. We also do translation of science and technology, monitoring and evaluation and also ensuring Continuous Professional Education. Specifically, UNCST registers and facilitates ethical research in the country.

We currently have 35 ethical bodies to oversee. The UNCST developed National guidelines for the control of COVID-19 research teams, including approving research sites for the teams. We also work closely with the Ministry of Health and receive briefs from the Public Health Emergency Centers. This shows the

need for urgency in responding to epidemics. The UNCST has contributed to the response by providing a joint scientific ethical review. The Science Council is a group of organizations that work like the UNCST and these are formed of multi-disciplinary teams. We conduct this work through research committees on animal safety, biosecurity and biosafety committees. These help to optimize the quality of reviewers. We are working with the African Vaccine regulatory framework of the World Health Organization (WHO) to provide regulators with guidelines on the facilitation of fast-tracking the approval of research.
Research is becoming complex for public health practitioners due to the complex approval processes but even with the challenges, the UNCST is committed to ensuring compliance and monitoring.

Session two; What research and innovations do we need to address epidemics in Africa?

Presentation one. Prof. Bruce Kirenga, Chair ICER and Director of Makerere Lung Institute

In his opening remarks, Prof. Kirenga welcomed all participants and was glad to note that he is one of the Researchers who are conducting research during epidemics. He defined what epidemics are and took the symposium participants through reasons why epidemics are mainly considered in the context of an infectious disease even though many conditions would qualify as an epidemic, that is for both communicable and non-communicable diseases. He further emphasized that research brings evidence-based tools to prevent and control epidemics through public health interventions such as lockdowns and diagnostics, vaccines and treatment. Epidemics occur and will continue to occur, tools get obsolete, we develop resistance and this calls for ineffective drugs calling for continued research to make new ones. There have been many viral disease outbreaks in the 21st century such as SARS, Dengue, Rift Valley fever, SARS Cov 2, Ebola and currently Mpox and Marburg in Rwanda.

Epidemics come unexpectedly; we need to plan early enough. Most of these outbreaks occur in Africa, and most of these are driven by Conflict and displacement, rich and preserved flora and fauna that foster wild human life interactions, weak public health systems, poverty and limited access to care, limited indigenous medical countermeasures and science, weak surveillance system and climate change in our environment.

He reiterated that epidemic research is an ecosystem, with discovery research, clinical research, Government and Decision makers, People and communities. He used the analogy of an elephant to describe the need for multidisciplinary research teams to control outbreaks since we see epidemics from different perspectives. Our approach should be to create an ecosystem where we put all these disciplines on the same table. The academia, the policymakers and the community.
There are critical disruptions to research during an epidemic and so many challenges encountered during research when in an epidemic. They include;
Limited understanding of the disease; In the early stages of an epidemic, little may be known about the disease causing the outbreak and this can delay the development of research.

Rapidly evolving situation; Epidemics can spread quickly and change rapidly. This can complicate research due to rapidly changing information about the disease. There is also limited time for research. And usually intermittent feasibility.

Limited resources; Epidemic research often requires significant resources. Research funding mechanisms of most funding organizations follow a pre-specified process- announcement, review award. Epidemics may not or sometimes will not fit in this framework. There is already a degree of inequity in getting these resources.

Ethical considerations; Epidemic research by nature is conducted in situations of heightened psychological and physical distress yet It must be done fast and It occurs in unusual settings such as community. Sometimes Privacy may be compromised.

Access to research evidence and data among others; Researchers may face challenges in increasing data on an outbreak. Particularly if the data is controlled by government agencies to private organizations.

Communication challenges; Epidemic research often involves a large number of stakeholders. Government officials, health care providers, and the general public. Effective communication is crucial to ensure that research findings are accurately conveyed and understood by all parties involved.

Access to investigational products; Intellectual Property Research & Development driven by profit-oriented pharmacies lead to competition which may disrupt and delay trials. Investors can only be tested clinically during an outbreak.

Stiff competition among academic and other **public researchers** for funding;

- Launch of many similar trials affecting accrued powered sample sizes.
- Community misinformation

Although epidemic research is limited, it is much lower in African countries with the United States of America (USA) China, the United Kingdom (UK), Italy, India and other European countries leading in research publication and evidence production. The case of Ebola shows that more of the research that is being published on Ebola is coming from scientists in the UK, USA, China, Germany, and France among others.

Funding for research is mainly coming from the United States Dep't, the National Institute of Health, the Defense Threat Reduction Agency, the National Science Foundation, the National Natural Science Foundation of China, the Center for Disease Control and Prevention, Welcome Trust, Deutsche Forschungsgemeinschaft, World Health Organization and National Institute of General Medical Sciences. Most of the agencies working on epidemic research are foreign and yet we haven't taken a step to start on this. We are glad that this meeting is majorly funded by the Government of Uganda and we are grateful for the initiative to have this done in Kampala. Many organizations are working on epidemics around the world. Some of the major ones include:

- The World Health Organization (WHO) is the leading international organization on public health and is responsible for monitoring and responding to epidemics around the world.
- Centers for Disease Control (CDC) and Prevention- a National public health institute in the United States and is responsible for preventing and controlling infectious disease.
- *Medicins Sans Frontiers* (MSF) provides medical aid to people affected by epidemics and other crises.
- Global health security agenda is a partnership of countries, international organizations and other stakeholders working to strengthen Global health security and prevention of epidemics.
- Coalition for Epidemic Preparedness Innovations (CEPI)- funds the development of vaccines against emerging infectious diseases.
- The Bill and Melinda Gates Foundation- the foundation works to improve global health and reduce the burden of infectious diseases including epidemics, through research and development of new tools and technologies.
- United Nations Children's Fund (UNICEF)- provides emergency support to children and families affected by epidemics.
- The Red Cross- assists people affected by epidemics and other emergencies.
- National institutes of health- Conducts research on infectious diseases and develops new treatments and vaccines.
- The GAVI Alliance- works to improve access to vaccines in low-income countries, including those affected by epidemics.

Prof. Kirenga shared a case study of the impact of epidemic research on Ebola. Even with the hesitancy to take on new vaccines, he cited an example when the Ebola vaccine was developed and used, there was a drop in Mortality among the cases from 80% to 10%. This

was mainly attributed to the availability of vaccines, improved health systems infrastructure and workforce trained in surveillance and response. This shows the need for research to generate evidence. He highlighted that ICER (Interdisciplinary Consortium for Epidemic Research) was conceived in 2022 during the Ebola Sudan (SUDV) outbreak. It was formally launched by the Uganda Minister of Health at a breakfast meeting on 11th November 2022 and it is coordinated by the Makerere University Lung Institute.

The five objectives of ICER are;

1. Mobilize support and resources towards National epidemics priority research areas from local and international partners/ collaborators and coordinate funding proposal submissions on epidemic research from consortium members.
2. Strengthen capacity for patient-centred epidemic response- research in emerging and re-emerging diseases at institutional levels.
3. Support the development of pre-approved generic protocols to facilitate the conduct of real-time clinical trials to evaluate candidate vaccines, diagnostics, therapeutics and related priority research during outbreaks and epidemics.
4. Promote sustainable community engagement and dissemination of research findings and tailored information products to various stakeholders to improve understanding, acceptance, and awareness of research during outbreaks and epidemics.
5. Contribute to facilitating the enhancement of National and International frameworks for collaboration and systematic acquisition, storage, access, sharing, use and disposal of biodata, genomic sequencing data and bio-specimens from outbreaks and epidemics.

Since its inception ICER has facilitated epidemic research in the regions, it has started on about ten (10) publications and with partners, especially the WHO R&D blueprint they have achieved the following;

- The Ring vaccination trial
- Approval of Phase I, II, and III protocols
- Become a Partner of WHO multiple-stage, multi-pathogen, IP protocols
- Therapeutics protocols and compassionate use, mab, convalescent plasma, remdesivir
- Diagnostics assessments-local RDT
- Survivors protocol and MAB collaboration
- Biobank sero survey with ACDC

It initially started with COVID-19 research to Ebola Virus Disease (EVD) research but moved to Mpox, and Rift Valley Fever (RVF) and has henceforth developed a consolidated plan for research in that outbreak. When Mpox was declared in the Democratic Republic of Congo (DRC), we started working as ICER and initiated the SMART trial with Macmaster, Catholic

University in Bukavu and Makerere University. We had to have the south-to-south/North-to-south collaboration. So far, using ICER, we have 6 active grants on Mpox and they are;

1. The DECIPHER project is led by Dr Misaki Wanyengera; it investigates what is driving the Mpox outbreak by looking at the host perspective.
2. SMART; This project is evaluating a vaccine against the Mpox disease.
3. PREGMPOX; the virus has shown vertical transmission, this Mpox is also in pregnant women and we want to see what is happening in the placenta, that is the aim of this study.
4. EPI; This project is studying why people are being infected with the Mpox virus.
5. AFRIVAX; This is investigating vaccines available for use in this outbreak.

We have been able to investigate these studies because the outbreaks found us prepared. We want the Government to add funding for these outbreak responses at least a match-up grant. The Donors have been and can give us money; we would like our government to do more.

Presentation 2: Remarks Prof. Katoto from the Democratic Republic of Congo

In his remarks, Prof. Katoto revealed how much of a privilege it was to be part of the symposium on Mpox. This is because epidemics make it hard to move across borders. With all these outbreaks such as Mpox and Marburg in the neighbourhood (Rwanda). He thanked Prof. Bruce Kirenga for being a mentor, and he was glad to say that he is a mentor from Africa and not Europe. He mentioned that in the quest for knowledge, we have seen all the evidence and some pieces are still missing to solve the puzzle. When you see the published data available, there is no information, especially from Randomized Controlled Trials (RCTs).

As a clinical epidemiologist, when you rely on non-randomized studies, the evidence available is weak. The current situation in the Democratic Republic of Congo, has shown that the outbreaks are coming from small villages, which are rural areas, and these are areas where you need to have vaccines, but you don't even have electricity. He expressed concern over the projects that are being funded, most of the research funding is coming from Europe and this raises concern over sustainability. There is no African funding for this kind of research. He thanked the WHO group that has supported them in having some equipment such as fridges in their area. The team had received some donations from the European Union and the Japanese Government. Despite having received some items, the concern was shifted onto who was more at risk than the other so that they could determine who should get the vaccine. The SMART trial which is currently being conducted will show who will be more at risk and we can have the vaccine given to them. Vaccine hesitancy is high and yet Misinformation is also common in Uganda and DRC. We must look at addressing these challenges all together.

Presentation 3: Remarks Prof. Sam Okware

In his remarks, Prof. Okware indicated that although Mpox started in children, it is moving greatly. It all started as a rumor but as epidemiologists, we must take all rumors seriously and we must take affirmative action. There is a need for a regional policy and strategy which will be in all the regions starting with the East African community. He re-echoed that the need for travel can disrupt the world in a short period therefore Time, Persons and Places must be understood. The location of the outbreaks is very critical since they are occurring near us in DRC and Rwanda. The ICER Symposium presents us with two major challenges;

1. The need to handle issues such as population complacency; if the complacency is not addressed, it will kill our efforts.
2. The need to communicate continuously; People need to know what is going on daily, especially with the outbreaks.

He reassured the participants of the need to put together our resources such as centers of excellence to identify resources that can control the double epidemics of Non-Communicable Diseases (NCDs) and Infectious diseases. Animals and forests are the hub for new infections. He concluded by stating that this meeting is as important as the diseases we aim to control, let us premise it on the need for strategy and program for control, and the need for the community to contribute to control.

Presentation 4: How the World Health Organization's (WHO) Pathogen family strategy informs equitable R&D approaches at National, Regional and Global Levels?

Dr. Anna Maria stated that the constitution of the WHO stipulates that one of its key roles is the promotion, conducting and coordinating research in the health domain Since 2015, the World Health Assembly resolution, the WHO has coordinated a global research strategy, the WHO Research and Development (R&D) Blueprint for epidemics and has embarked on this and has made substantial progress on development of vaccines, therapeutics and diagnostics. It is important to see which pathogen will cause the next pandemic, with the prototype pathogens, the priority pathogens (anticipated to pose a significant public health threat), Pathogen X (This pathogen is not currently a PHEIC threat) and R research across all families. The DNA, RNA and Bacteria have differing degrees of severity. Nonetheless, it must all be taken as severe. There are some candidate therapeutics and vaccines for the priority pathogen. Equitable access to research knowledge, discoveries and manufacturing innovations is critical to addressing local problems before they become global. She also emphasized that Coordination and collaboration are essential to optimize efforts towards pandemic prevention and response. Science and technology can help solve many problems but we need consensus on enhanced global coordination, communication and governance.

A Collaborative open research consortium requires global researchers, developers, and partners to have a scientific approach to pandemic research preparedness. From basic

research to translational research, research infrastructure and R&D during epidemics. To provide rapid support and assessment of candidate MCMs during an integrated outbreak response, we need a collaborative approach to help in prioritization, availability, clinical trials, agreements and funding. By expanding research efforts for all viral and bacterial families, research advances in a decentralized and collaborative way. By developing Global R&D and innovation roadmaps for each family using an open and transparent approach, knowledge gaps and applying a scientific approach for pandemic research preparedness which looks at the following:

- Proactive pathogens discovery and surveillance.
- Basic research-pathogen biology pathogenesis immunology.
- Translational research-antigen design, vaccinology, development of reagents and tools, assays and animal models and advanced manufacturing.
- Family TPPS & MCMs development- MCMs with a broader spectrum addressing multiple or evolving pathogens e.g. priority pathogens and prototype pathogens.
- Research infrastructure focusing on establishing robust clinical trial capabilities and research deployment strategies.
- R&D during epidemics, the prompt initiation of clinical trials is essential for prompt evaluation and distribution of new medical countermeasures during an outbreak.

CORCs support rapid assessment of candidate MCMs during outbreaks integrated into the outbreak response through;

- Prioritization- WHO independent expert process to prioritize candidate MCMs for assessment during an outbreak.
- Availability- Agreement on availability and access to candidate vaccines and therapeutics.
- Clinical trials- CORE protocol pre-approved and platforms to promptly initiate trials/studies.
- Agreements- Prior agreement on legal collaboration, insurance, indemnity and liability.
- Funding- Access to readily available funding through a committed financing mechanism.

Opening Ceremony statement from the State Minister of Health of the Republic of Uganda

In her remarks to the symposium participants, Hon Margaret Muhanga welcomed all those who had come to Uganda, the pearl of Africa for the important symposium. He reminded them to look out for the beautiful flora and fauna and enjoy the good weather. She additionally reminded the participants that with all the beautiful scenery, we are very susceptible to outbreaks as a country. In the jungles of the tropics, there are so many pathogens that are capable of causing diseases. From the Filoviruses that cause Marburg and Ebola, and the diseases that have come from animals such as monkeys. The pathogens have evolved and moved to humans as hosts. As we continue to witness the lack of global solidarity, we need to have a way to make our vaccines so that we don't find ourselves disadvantaged. We are looking at you as scientists to find solutions. African problems range from disease, poverty, conflict and climate change among others. We have developed priority areas for research and Uganda has contained the Mpox pandemic in 69 days, this is a world record. What is missing is that we need to maintain momentum in the fight against epidemics. I want to thank the Makerere Lung Institute, the Secretariat in the President's office that has funded this meeting and thank everybody for their participation.

Hon Muhanga also thanked the scientists for the tremendous work and researchers for all the work and officially declared the meeting open.

Presentation 5: The Science, Technology and Innovations that Africa needs. Hon. Dr. Monica Musenero, Minister for Science, Technology and Innovations.

In her remarks to the symposium participants on Science, Technology and Innovations (STI) that Uganda needs Science, Technology and Innovations to solve her problems of poverty and underdevelopment. As we reflect on the challenges that you have mentioned to fund research, I want to re-echo that this is all important and that the Government is aware. We have lacked a strong need/push to own science, research and development. She tasked participants to ponder on why the Europeans fund Research so much. Why do you think they are gathering so much data? We need the research but we don't prioritize it. We lack a

strong compelling case for research. She reaffirmed that there is a need for all of us to recognize that to have sustainable and effective STIs, we need a purpose. Many of the decisions for us are made outside our arena. The biggest driver of funding and commitment is the need to be a driver for power and economy. And the economy is the stronger of the two. In her response as to why we need STI, she indicated that it is to solve the problems of poverty. She also re-echoed that poverty can kill you, and we need science to solve the problems of underdevelopment. If we can recognize the link between the scientists in the laboratory and link it to the economy, many of our challenges will be solved.

In the last three years, we have defined criteria for how we should build our research priorities. So how do we choose what to research? The following hierarchy should help;

1. Those with the potential to build our economies i.e. Global Market opportunity, the potential for import substitution, value addition, and the potential to ignite other industries in the economy.

2. National strategic importance, addressing challenges such as public health security and National security.

3. Opportunities presented by global technology and market.

Furthermore, the Minister explained to participants what makes science so expensive.

Products arise from Research: We are buying products that came out as a result of research. We face so many challenges in delivering quality healthcare. This is because all items are being made somewhere. All the Natural resources we have are lying idle, we are not investing in Natural chemotherapeutics. What if we looked at the raw materials in our environment as a source of drugs for our health?

Concern about National Security; Nations are concerned about security, economic security, public health security and National Security. We heard that conflict fuels epidemics because you cannot control movement and science which is prioritizing National security needs. Our research in the country has not looked into our priorities. As ICER, I would like you to look at our priorities and have them on top of the agenda.

The Minister reiterated that having been in the public health space too, she has experienced and felt the frustration too. I have been in the centre of the Ebola epidemic in West Africa but I know that epidemics have two sides, like a head and tail. We look to see what opportunities lie in there. When we see challenges only from the problem side, we miss the opportunity side.

She reaffirmed that If we have Marburg in Rwanda, we need to do something as a continent. Africa needs to stop looking at problems only from one side. Any country's development comes from addressing its problems. The first problem that pushed America to invest in research was the development of a missile that Russia had developed and America didn't have. They didn't sit and wait; they went on to develop a similar machine. That is the kind of attitude that we need as a country.

The first pathogens in Uganda were identified in 1939, but to date, we don't have a single product from these pathogens. We could have developed vaccines, drugs or something more. We need to look at the pathogen economy. Despite this, there are some challenges with the pathogens;

1. Epidemics come and sweep all the resources that would have been used to control other diseases.

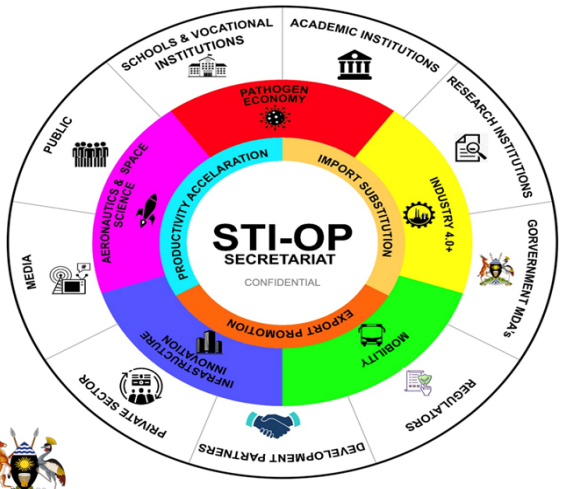
2. We lack data on so many pathogens and this puts us in a precarious situation.

Innovations arise where we have problems. She recommended to all the participants to flip their way of thinking and know that they have an opportunity beforehand. We have problems and they will become bigger. We can make an opportunity.

Progress made so far;

In her presentation, she also highlighted what Uganda has done so far. She mentioned that the president ordered her to mobilize scientists and researchers to think and grow the pathogen economy. This is housed under the STI in the Office of the President (STI-OP). STI-OP's mandate is to mobilize, coordinate, and provide strategic oversight to scientists and stakeholders in Ministries, Departments and Agencies (MDAs), Local Governments, Academic and Research Institutions, the private sector, schools and vocational institutions, regulators, development partners, media, and the public along the prioritized industrial value chains to increase productivity, import substitution and export of knowledge-based products and services. The mission is to enhance productivity, promote import substitution, and boost the export of knowledge-based products and services along a prioritized industrial value chain.

THE NATIONAL SCIENCE, TECHNOLOGY AND INNOVATION SYSTEM



SECRETARIAT MANDATE

To mobilize, coordinate and provide strategic oversight and policy guidance to scientists and stakeholders in MDAs, local governments, academic and research institutions, private sector, schools and vocational Institutions, regulators, development partners, media, and the public along the prioritized industrial value chains to increase productivity, import substitution and export of knowledge-based products and services.

MAKING UGANDA THE BEST

The Minister also highlighted the Science Technology & Innovation in the Office of the President (STI-OP) Ideology which is reflected through its strategy that includes:

1. STI for the Economy: Addressing issues of poverty and underdevelopment.

2. Making Uganda the Best: Developing world-class brands.

3. Specialized Governance for STI: Utilizing a hub-and-spoke system for the National Science, Technology, and Innovation System.

4. STI Human Capital Development: Introducing a structured mentorship scheme to recruit and nurture scientists.

5. Science Institutions: Establishing a network of centers of excellence across Uganda to drive innovation.

6. STI Economy Highway: Driving industrialization and enterprise development through STI.

7. The Loop and Leap Approach: Learning from past experiences while innovating for the future, with a focus on self-reliance in thought and action.

8. Decentralization of STI: Ensuring that STI reaches all corners of the country and leverages the best talent everywhere. The STI-OP gave birth to the Pathogen Economy but was previously an epidemic response referred to as 'PRESIDE' which was the Presidential response on Epidemics.

The Vision is to have Uganda as the Best, most technologically advanced and innovative in the region with a slogan to make "Uganda the Best".

She also provided an update on what has been achieved so far from the STI division. The teams have developed three candidate vaccines against COVID-19 in one year and have candidate vaccine molecules. She also mentioned that they wanted to have a vector vaccine, but this would take time and no company is willing to sell their molecules to us. Despite this, our local scientists have been able to move within the country and obtain raw materials that can be used in developing molecules for the vaccines. Currently, Uganda has four different molecules and they have developed an inactivated vaccine.

She then challenged the participants to get to know more about Mpox, so that they could develop these vaccines. Let us make sure that we are leading in developing vaccines, not for prestige, but for ourselves. We have proved that we can do this since we have developed COVID-19 proficiency panels.

She reaffirmed the commitment of her Ministry in standing with the Researchers and we are mandated to do research, development, technology transfer and commercialization of innovations targeting the economy. The Ministry of Science, Technology and Innovation projects that we can obtain 48 million dollars from the pathogen economy because this is one of the most funded sectors because of the compelling priorities that we have shown. Through the pathogen economy, they have set up a state-of-the-art biobank facility, a Nano-particle Research Center, an in vitro studies research Centre, a biomarker research Center, A Lab animal research Center, clinical trials for natural products platform and the Natural Therapeutics Research Centre.

Through this, we have been able to research the following; Vaccines, Diagnostics, Consumables, Therapeutics, Laboratory and Medical Equipment, and Emerging Technologies. She mentioned their role in the development of the above research which includes; Demolishing Silos, building a critical mass, reducing consumptive science and avoidance of delegating.

The way forward. The Minister stressed the importance of working the way forward as a region. We should harness the power of thinking among African scientists (Think Tanks).

- Focus and look in-depth into the Prioritized value chains.
- Products commercialization enterprises economy and not the published mindset.
- Be sustainability-oriented/focused in Africa and not donor-dependent.
- Alignment of Academics to Industry; needs an Economic contribution.
- Establish supportive policies to make this happen.

Day Two of the symposium

Session chair; Dr. Fabian Mashauro. East African Health Research Commission

Presentation 1; Specimen Bio Banking in Epidemics Executive Director National Health Laboratory Diagnostics Services (NHLDS)

In her remarks about the Diagnostics services available, Dr Suzan Nabadda informed participants that Uganda is one of the countries that have a specimen biobank under the Ministry of Health, responsible for the management and coordination of laboratories and providing specialized testing across the country. The National Specimen Biobank has set up reference labs to support attaining the mandate. The National Tuberculosis (TB) reference laboratory, the Central Public Health Laboratory, Malaria reference labs, the Genomics Lab the National Biorepository, the National Equipment Lab and the National Quality Assurance Lab. This National Biorepository was established in April 2017 and has over one million samples available for researchers to use they can study many diseases that range from Malaria, to sickle cells, HIV and Hepatitis among others. The biorepository is located in Butabika, Kampala and has storage freezers, cold rooms and cryogenic equipment available for shipment of samples.

The strategic objective of the NHLDS is to enhance disease surveillance, evaluation of new and emerging diagnostic methods, operational research, and collaborations. The Bio-bank has developed an information management system that helps keep identifiers of the samples unique and linked to a particular sample. The biorepository has a trained team of human resources and it is working on attaining biobank certification and International accreditation. They have set up the ethics and regulatory framework, standardized protocol and training and competence for their staff. The biorepository is looking at the sustainability of its funding beyond the donors. Among th e benefits of having the BioBank is that the community from which the participant's samples are collected benefits from having the repository and is assured of the anonymity of the data obtained from them. For long-term storage and sustainability, the longer you keep a sample, the more relevant it becomes. There is a cost of storage but at the end of the day, it is useful.

One of the challenges they have currently is that the laboratory currently doesn't store samples from animals. However, the Management of the Bio-Bank encourages other institutions to come up and embrace the one health approach in disease surveillance.

In her presentation, she also highlighted some of the Key achievements registered.

- In Collaboration with the Uganda National Council for Science and Technology (UNCST), NHLDS led the development of the National Biobanking for research.

- They have adopted ISO 20387:2018 Biotechnology- Bio-banking general requirements for Bio-banking.
- Successfully implemented a broad informed consent process for clinical samples collected in routine health programs.
- Supported National genomic surveillance health programmes drug resistance, SARS, COV-2 surveillance and neonatal sickle cell screening programme.
- Store huge numbers of samples of public health interests-supported research in academia, EQA panel production, and evaluation of in-vitro diagnostics.

The speaker also discussed the process of reception of high pathogenesis organisms to ensure that there is no risk for Bio-terrorism, here, she took the symposium participants through their standard procedures and best practices.

- Each package is delivered in the presence of technical personnel.
- The Biobank uses a barcode scanner; here, they scan the barcode and indicate, the package number, source of the package, sample type, number of samples, personal and contact delivering the samples, date and time of delivery and comment. If the package has no barcode, input the printed barcode and scan.
- Immediate transfer of the package to the Bio Safety Laboratory (BSL) level three Lab in case of any sample handling processes.
- All the received samples are stored in the assigned freezers.

For Safety precautions; the Bio-bank also Securely places the cool box with the specimens in an upright position, in a designated space and the staff use appropriate Personal Protective Equipment (PPEs) at all times. In addition, staff are not allowed to open the packages at the sample reception.

She also mentioned the specimen flow for outbreak samples which focuses on three things that include:

1. **Activity:** This includes sample collection and testing, sample archiving and review of specimen approval and retrieval.
2. **Stakeholders:** At sample collection, they include the outbreak treatment unit manager, mobile manager and reference laboratory manager at the stage of sample archival the stakeholders include the Sample Reception manager, Biorepository manager, Laboratory Director and Commissioner Lab services. At the review level, the stakeholders are the Scientific Advisory Committee (SAC), The Ministry of Health, the Institutional Review Board, the Uganda National Council of Science and Technology, the Director General of Health Services and the Commissioner in charge of Laboratory services.

3. **Key roles;** At the sample collection and testing level the roles include: reviewing sample collection requests, assigning specimen collectors, overseeing lab testing and preparations of aliquots and referring remnant specimens to the National repository. The roles of the stakeholders involved include receiving and logging in specimens to the laboratory, receiving and recording specimens into biorepositories, compiling weekly number and volume updates to the commissioner and commissioner sending regular updates to SAC.

   She also shared some of the publications that have arisen they include;

1. Burden of sickle cell trait and disease in the Uganda Sickle surveillance study(US3): A cross-sectional study doi: 10.1016/S2214-109X(15)00288-0.
2. Emergence and spread of a SARS-CoV-2 Lineage A variant (A.23.1) with altered spike protein in Uganda doi: 10.1038/s41564-021-00933-9.
3. The Epidemiology of antibiotic-resistant clinical pathogens in Uganda doi: 10.7189/jogh.14.04184.

Presentation 2: Biosecurity in inter- & intra- Epidemic periods

In his presentation to the symposium participants, Dr. Peter Babigumira re-echoed the various factors responsible for Uganda's vulnerability to outbreaks. He stated that Uganda is in the Meningitis belt, in the Yellow fever belt, the Rift Valley and hosts a very high number of refugees. His presentation later focused on the issue of Biosecurity in the context of Mpox. Biosecurity includes preventive measures taken to safeguard Human, animal and Environmental health from the risks of infectious agents. The presentation indulged the participants into the relevance of biosecurity during epidemics, and the personal cost of compromised biosecurity. He emphasized that, amid an Mpox outbreak, biosecurity shouldn't remain abstract and gave examples of the Anthrax outbreak in the USA in 2001 which was not a terror attack and the Rajneeshee Bioterror attacks in 1984 that led to over 700 morbidities.

He further alluded to the Ebola outbreak in West Africa which was fueled by public distrust (2014-2016). During the Ebola outbreak in West Africa, the communities believed that healthcare workers were intentionally spreading the virus, leading to attacks on aid workers. This epidemic had over 10,000 deaths and numerous assaults on healthcare teams. The delay in effective epidemic control is due to distrust and misinformation. This misinformation during outbreaks can fuel violence and hinder public health efforts, emphasizing the importance of communication and trust.

He mentioned some of the possible risks and prevention of accidental release of Mpox which can be used as we prepare to respond to Mpox outbreak in our countries and they include but are not limited to;

- Laboratory safety standards with strict adherence to biosafety levels to prevent accidental exposure in research labs.
- Risk of zoonotic spillover- Mpox's natural reservoirs in wildlife make accidental transmission of humans a real concern. Continuous surveillance and animal health monitoring are essential.
- Containment Protocols by ensuring that high containment labs handling Mpox strains employ stringent containment measures to prevent leaks to breaches

He emphasized that biosecurity failures can lead to a loss of public trust in our research and also a loss of partnerships and collaborations. It also risks zoonotic spillovers. It is possible to Bioengineer Mpox and cause International Global Health insecurity. We must participate in biological safety weapons. Ensure transparency and build confidence.

He also shared some of the Intra-epidemic biosecurity measures which include:

- Real-time surveillance, focusing on early detection systems and pathogen tracking for active outbreaks.
- Containment protocols implementing quarantine, isolation and movement restrictions to control spread.
- Healthcare capacity for ensuring the preparedness of healthcare systems for surges in patient care, diagnostic testing and case management.
- Vaccine and therapeutic deployment, focusing on the rapid distribution of vaccines and treatments coupled with monitoring for any misuse or gaps in security.

Stakeholders include academia and researchers, policymakers, local community among others. To prevent Mpox weaponization we need surveillance and early warning systems, and Regulatory oversight and International collaboration. Some ethical and legal frameworks exist for biosecurity. Challenges include limited resources. Political and logistical barriers and technological risks. Right now, we are also concerned with the use of Artificial Intelligence (AI) in biosecurity.

Presentation 3: Centre for Research in Emerging and Infectious Diseases from Dr. Kariuki Njenga (CREID)

Dr. Kariuki shared that the overall goal of the CREID is to support outbreak response in the EAC region and conduct research on zoonotic transmission of RVF and MERS-COV. Our specific aims are; to characterize the profile of Rift Valley Fever Virus infections during inter-epidemic periods, to investigate the burden of MERS-CoV Clade C infections and disease in humans and to build a sustainable Research Center through training, capacity building and networking. He re-echoed that as of December 2023, 84 cases of Mpox had been declared globally. Mpox is currently in South Kivu, DRC and has so far caused two deaths, of these, 32% of the cases are sex workers and what is seen is that transmission is mainly occurring

through sexual contact. Most of the cases are coming from Kamitunga, in DRC which is a cosmopolitan town with limited bush meat consumption *(Previous cases of Mpox have been linked to consumption of Bush Meat)* and a high population of sex workers. He re-echoed the importance of surveillance including genomic surveillance. We can sequence them rapidly and have genomic data in real-time. As of September 30th 2024, there have been no new cases of Mpox in Kenya but there are 8 positive cases and 200 contacts identified. He asked all participants to freely discuss during this symposium, especially on ways to control the pandemic in our region.

Presentation 4: Building resilient surveying systems for early epidemic detection and control, and patient-centered outbreak research in resource-limited settings.

During her remarks on behalf of Africa CDC, the representative expressed her excitement about joining fellow research scientists. She re-emphasized that the East African region is disproportionately affected by outbreaks. We recognize that it's impossible to meet our challenges without African solutions to tackle African climate change. The United States of America launched a strategy with three goals, 1) to build partnerships, 2) to catalyze economic partnerships and 3) to build health security to maximize impact. We have a core mandate to protect health and save lives. The US CDC's partnership with Uganda's MoH spans 30 years and has fought diseases such as malaria, HIV and TB. We have also had a focus on Biosecurity and Biosafety. The partnerships with Makerere University School of Public Health have been on the front line working with hospitals as front-line workers. Uganda runs its own Public Health Emergency operations systems. We are very proud of that relationship. There has been enhanced capacity of cross border surveillance and this has helped to curb the Mpox outbreak just like so many others. Today's meeting of building partnerships is timely, the US has provided over five thousand diagnostics and this is all part of our contribution to curb this disease.

We are aiming to;

I. Increase knowledge of the Mpox disease
II. Strengthen vaccine research
III. Advancing knowledge of vaccine therapeutics
IV. Advancing strategy for surveillance

The agenda for the three-day meeting is important to us and we value equity in the quest for solutions. We must acknowledge the institutional power that we have and the knowledge of the communities that have the lived experience. The US community stands with you and this meeting is a result of the deliberate efforts and collaborations.

Countries specific updates on the status of Mpox as of October 2024

Update from the Democratic Republic of Congo

The presentation focused on findings of Mpox in South Kivu, where they have had more than 8000 cases tested in the field, 2000 cases tested in the laboratory and 45 deaths. We have had 1136 cases of Mpox active at the moment. We started following the Mpox pandemic in 2023. We have registered at least most of these cases in South Kivu. DRC has seen an evolution in the number of cases and we had 954 cases and two (2) deaths in South Kivu. There are 54 health centres in this region of South Kivu and 22 of these health centres have reported at least a case. Mpox doesn't discriminate against age so we have age groups of 0-59 months and even children of 5-8 years. We have noted that there are more children above 15 years affected, we think that this is because they may be more sexually active. Nonetheless, the other groups are not spared. We have some elderly persons affected. In terms of gender, women are more exposed and are suffering more from the disease. This may be attributed to the sexual workers who are prevalent in this area. For the new-borne, the disease evolves differently. With women, there has been a higher prevalence of vaginal infections. The symptoms in South Kivu are different from what is known. We have had cases where symptoms are affecting the external genitalia. When we take samples, they confirm Mpox. The presentations are differing but the laboratory findings are all leading to confirmation of Mpox.

The risk factors include promiscuity. In the towns, there is high transmission, especially in the community. We have considered this as our hypothesis. This area has mining activity and the disease is spreading fast due to external and internal movement. We have had some serious cases and the pox-like swellings in the body may manifest both internally and in the external body parts.

We think and believe that Mpox is a risk for all the countries around the DRC. We haven't had enough vaccines for the people in our community. We are interested in trying out whatever treatment is available. We don't have enough test kits for all the suspected and diseased persons. We also think that we have a reservoir, it's very important for us to identify this through research. In the beginning, it was spreading from monkeys but it's now more common among humans and this is puzzling us.

Update from the Republic of Burundi

In his update on behalf of Burundi, Dr Roger Ciza, the head of the Department of Public Health. He mentioned that the country is the second most affected by Mpox in the East African Region. The first case was detected on 25th July 2024. They have moved from 1 case to 854 cases in a period of close to three months. There is a high positivity rate of 40%. There have been no deaths but there are 2265 suspected cases and 92 new contacts. 38 of the 49 (77%) districts

of Burundi are affected. Most of the cases are concentrated in the capital Bujumbura representing 50% of cases. Unlike Democratic Republic of Congo, Males are more affected than females in Burundi.

The key achievements made so far include; developing and validating the Mpox response plan and training frontline lab scientists and health workers. The Government was able to commit only almost one million dollars to support the response plan, relying on International development partners to pledge the remaining funds. Lastly, efforts have been made to enhance the capacity of the National laboratory to identify different Mpox strains, including the Clade 1b variant.

The challenges include that the resources deployed are limited, potentially significantly underreporting the cases in Burundi are increasing at a higher rate compared to DRC, which suggests alarming scenarios. Ongoing research includes Knowledge, Attitude and Practices on the disease so that they can have targeted sensitization and also epidemiological investigations to elucidate transmission patterns, and incubation to other subclades with a focus on children.

Update from the United Republic of Tanzania

On behalf of the Ministry of Health, we haven't been notified of Marburg or Mpox disease. We continue to intensify surveillance on all border points. We are surrounded by 8 countries including Malawi and Mozambique. We have strengthened our workforce and continue to conduct health education to the communities so that if there is any disease in the country, we are easily notified.

Update from the Republic of Kenya

In Kenya, we have seen this as an evolving situation, and the outbreak was first declared on 31st July 2024. We have 9 cases and they are mainly imported from neighboring countries. The confirmed cases are from areas bordering our neighbours Uganda and Tanzania. We have a coordination team and a surveillance team. We are using this to coordinate responses, for data and information sharing with the Republic of Tanzania, and these documents are in the first stages of endorsement. We have also had case management, risk communication and community engagement, and training of health workers.

We have put in place the following public health interventions:

1. Coordination
    - The National Public Health Emergency Operations Center(PHEOC) has been activated.
    - The National Incident Management System(IMS) constituted to coordinate response to the outbreak

- The National Mpox Preparedness and Response Plan developed

2. Surveillance
    - National Rapid Response Team deployed to countries with confirmed cases
    - Enhanced disease surveillance in all counties, and all points of entry (1,031,499 travellers screened)
    - Mpox case definition guideline and line-list template developed and shared
    - Sixty-one contacts to the confirmed cases have been traced and followed up with only one testing positive.
3. Laboratory
    - Sample testing is being done at the National Public Health Laboratory, KEMRI, Walter Reed and CDC laboratories
    - Mpox diagnostic kits are being sought to enhance the testing capacity of National laboratories.
    - Mpox clinical specimen collection and processing guidelines updated and disseminated.
4. Case management/Infection Prevention and Control
    - Symptomatic management of confirmed cases
    - case management guidelines developed
    - health facility and community IPC guidelines developed
5. Risk communication and community engagement (RCCE)
    - The MOH continues to issue Mpox advisories to healthcare workers and members of the public
    - Regular press releases, Mpox articles, key messages and media talk shows
    - Health promotion talks at health facilities and community settings on Mpox
    - Pledges from UNICEF, AMREF and CBCC for radio and TV spots and CE
6. Training
    - More than 1500 Health community workers sensitized to Mpox
    - Virtual sensitization of truck drivers on 27th September 2024
    - Mpox Training needs assessment has been conducted
    - The National training plan is being finalized

We have the following Unmet needs

- Low perception of risk by the public on Mpox, coupled with info-dumps
- Limited knowledge of healthcare workers on Mpox identification and case management
- Inadequate isolation facilities at POEs
- Unavailability of Mpox vaccines and antiviral drugs
- limited laboratories capacity to test for Mpox
- Inadequate financial resources for Mpox response.

The next steps include coordination, enhanced active case search and contact tracing, building capacity among all healthcare workers and communicating Mpox risk to the entire populations at risk and communities.

Update from the Central African Republic

The situation of Mpox in the Central African Republic is unique. We noticed that we have had more than 40 registered cases and most of the cases are rural. Many more cases are in the town of Bangui. The MoH has created a working group to respond to the epidemic. As mentioned earlier, accumulation of the cases as of today is 55 cases and the case fatality is 1.8%. The most affected regions are near the Congo border. We have had more cases detected in the region of Bangui due to the active case findings. We have had some deaths registered. We had a seven-year-old, the patient's father was a hunter and the person died within six days of catching the disease.

We have had a coordinated response with weekly meetings, communication, and research on the active cases. We want to have more tests on persons reported in Bangui, which is the capital. We are also improving on surveillance, training has been done for the medical personnel. There has been difficulty in taking care of the patients. The psychological effects of the disease, transportation of the cases to hospitals from the rural areas and the kits available are not sufficient. We hope to set up a working group that can help in this work. We want to increase the disciplines in our working group so that we can do better and more.

Update from the Republic of Uganda

In his remarks, Dr. Atek Kagirita mentioned that Uganda has had 41 cumulative cases and no deaths. The Mpox is extremely catastrophic. We have 20 cases still under isolation and 21 confirmed recoveries. We are mounting some responses and have about 11 districts affected. One district at the moment has 40% of the cases. These are concentrated around a fishing community. The disease mainly affects males in Uganda, and the age group affected is 22-49 years which is the active group. The most affected districts are Nakasongola, Nakaseke, Amuru, Kasese, and Kagadi. These are concentrated around fishing communities, areas with highly active nightlife and bars. We are currently gathering knowledge on Mpox, such a platform to help us to share more. The situation in DRC has shown us a lot of what is going on.

Update from Gabon

Dr Paul, the head of surveillance in Gabon provided an update on the country and highlighted that they have a small population of 2.5 million people neighbouring Cameroon and Congo. He mentioned that the first suspected case was reported on the 27th of August, 2024. The response team was activated within two (2) hours, the team was on the ground to investigate and take the sample to the laboratory. The case in Gabon had travelled from Uganda and was

presenting symptoms of Mpox. We confirmed the case as positive and tracked the contacts who had been in the emergency ward with him in the hospital. The country was placed on high alert. He also mentioned that they have had limited testing materials and collection materials for the samples from patients. He called on institutions to be able to make a regional network that is ready to respond and make some of the diagnostics for these diseases.

Update from Zambia

Dr. Chanda reported that there is no case of Mpox in Zambia, however, they are trying to have networks of research in the region so that they share knowledge. We have set up protocols for research, set up to see which is the higher-risk group. We accumulated knowledge very fast and pushed this to advance our understanding of epidemics. Through this collaboration, we are better prepared to respond to any new epidemic. Our role as infectious disease consultants is to ensure we have an effective characterization of the disease. During the first phase of Covid 19, we had a case that was admitted to the ICU. This gentleman passed on after 3 days, he had seven contacts, 5 were sexual contacts and they were also tested. The information was so unclear even then, and it was a learning point. We have the power to have our solutions from amongst us.

Presentation 4; Mpox in the One Health Context.

In his opening remarks, Dr. Masika emphasized that One Health is an integrated, unifying approach that aims to sustainably balance and optimize health for people, animals and ecosystems. The Pox viruses are very diverse and we have so many genera. The hosts range from butterflies, and moths, to fish, birds, camels and horses, pigs, and mules among others. Monkeypox was first identified in Denmark in 1958 from an animal source and in 2022, it seems to be maintaining itself in humans. The cases we have seen are from human-to-human transmission and this shows that the disease has maintained a presence and is in urban centres. Human beings are now the known reservoirs.

The first cases of Mpox outbreak were also seen in Rotterdam Zoo in 1964, they were first seen in South American giant anteaters 12 days after arrival. Suspected exposure from previous contact with monkeys elsewhere. Several other species also became infected such as African gorillas, chimpanzees, African owl-faced monkeys, Asian Orangutans, South American squirrels and monkeys and South American marmoset monkeys. One of the questions we have is are the outbreaks occurring without us knowing? What is the reservoir and what are the other hosts?

What we know now is that 4 mammalian reservoirs host the Mpox. In the genetic evolution of Mpox, we can see that Human to Human transmission is now more efficient than it was in Pre-2022, Mpox mutations suggest that the virus is adapting to the human host, and many mutations are driven by the APOBEC3, an enzyme that is part of the intrinsic immune defence

against viruses. Key mutations of host-range and host response modifiers proteins, Homologous recombination of co-infecting poxvirus strains. We see more human-to-human transmission making one health very relevant right now.

The One Health approach proposes communication, collaboration, coordination and capacity building. The relevance of this approach is it helps with the detection of infection, prediction of risk for infection following exposure, prediction of risk for severe or fetal outcomes, monitoring of progression, and other associated risks e.g. HIV, Malnutrition and monitoring risk for other complications.

Presentation on State-of-the-art Mpox research (Emerging evidence and practices)

In this presentation, Dr. Misaki Wayengera encouraged participants to look at some options for diagnostics and to differentiate between Mpox and chicken pox. He also tasked participants to expand a little bit further away from just having to detect the pathogen so that they could focus on monitoring disease progression and predicting outcomes, particularly in terms of severe and partial outcomes. There are different things we have seen epidemiologically in terms of the saturation of Mpox and chicken pox so one wonders whether we need some diagnostics which can differentiate between chickenpox and monkeypox, the two different viruses from different vectors. We shall look at the relevance in terms of the detection of infection, and prediction of disease outcomes in terms of severe risk for infection, and fatal outcomes.

We need to look at how the virus manifests and then understand the sequences that happen in terms of the host response and look at how potentially we can exploit these to understand why some people are susceptible to disease differently. We need to look at what is available, and what is possible because we are trying to look at the diagnostic needs. In terms of science, we mustn't focus on the available prototypes. We need to look at prediction and exposure, it's one thing to be exposed and another to have an established infection. Research has shown that there are people who can be potentially resistant to some of these exposures but also there is a need for ways of predicting the risk for disease outcome and monitoring of disease progression and risk for other complications. One of the things we need to establish is the prevalence of HIV especially among the young people in the exposed population. One of the observations made during a visit to the epicentres in Kivu was that the children are malnourished and one of the malnutrition centers was made a monkeypox treatment center. We need to understand whether we need biomarkers for the evaluation of malnutrition as well.

Mpox has complications a lot of which are neurological and so we need to find out how to predict some of the infections, especially from the lesions in the eye, we have some with acute

delirium, and psychosis because of encephalitis from Mpox. We should specifically target the virus to get strategies for immune invasion and try to understand.

The Mpox virus exists in different forms, the most common is the extracellular enveloped virus but following infection attachment to the cell we get intracellular enveloped virus which matures into intracellular mature virus so the question is what stage we should be targeting transmission, infection, what pathogens and focus on diagnostic test development. In the diagnostics, we want to look at the levels of the viruses targeted, the host-specific responses, immune evasion and underlying host idiosyncrasies.

Many changes happen following exposure, the virus is capable of evading host immune responses and one of the questions we are asking is the sudden human-to-human transmissions, we are seeing a lot of emerging mutations in the genes that interact with non-human primates and human primates have developed defences at the innate level driven by molecules. One of them is APOBEC3 but we notice a lot of human mutations interact with the human APOBEC3 and we suspect that it is the cause of the human-to-human transmission. We also look at what happens after infection in terms of the immune response and the clinical signs we see, and the key questions asked is that we need to form diagnostic biomarkers but all these will need different tests.

We have seen the symptoms ranging from skin lesions to sepsis, to thymitis and tonsillitis, splenic injury, pneumonia, diffuse myeloid hyperplasia and lymphadenopathy. It's important to understand why all patients also respond differently. Is it because of the different stages of the disease? There is a challenge with what we are seeing in DRC where the positivity rate is very low compared to what we would wish it to be. Looking at the prevalence rate with probable cases that match the clinical definition we are not getting a positive on testing. In terms of optimizing the testing with the tests showing a lower positivity rate than what the clinical signs are manifesting, we need to do the following;

- We need tests to show IgM that shows antibodies in a host following previous exposure.
- We need to be cognizant of the fact that we have all these fancy machines and the areas in which we are operating don't have these in their context.
- We need to have simple tests for screening in these areas and bring these testing kits nearer to the people as much as possible, so priority should be on the Point of care testing.
- What is needed is High-end reference facilities, reference level testing, facility-based testing and Point of care testing.

The determinants for severe disease vary, we have seen this in the Clade 1 patients and those with advanced age and low viral suppression tend to suffer more. The plasma from patients who received the Smallpox vaccine has been shown to help in treatment. How can we make

use of the survivors to advance treatment for the new cases? We need good diagnostics, and plasma that could have potential benefits. We have many platforms and we can go for the antigens or the antibodies. We can have immunodiagnostics such as lateral flow and dipsticks, NAAT, FISH, PCR, Next Generation Sequencing (NGS), microscopy histopathology and culture.

We also need to look at the many survivors. In DRC, for a disease like this, we are getting many fatal cases and also many recoveries. So how can we make use of the survivors to help in the convalescent plasma vaccine which was developed during Covid and was successful? This can help in diagnostics, especially using plasma, antigens or antibodies.

For a long time, we have seen Mpox stuck in DRC, the outbreaks come and don't stay in Humans for long but with the New Clade variant, we may argue that the virus has a longer staged immunity in humans. One can argue that we need a percentage of the population to suffer from the disease so that we develop immunity or find an alternative way to obtain it. Some of the other questions with us may be at what point do we pick the samples to maximize chances of picking the virus for laboratory analysis.

Presentation on vaccination to prevent Mpox infection (MPOX-VAX) Study.

Dr. Andrew Obuku shared insights on this work that is being done in conjunction with different institutions in Africa and Europe and some in the United States of America. The consortium usually comes together to agree on the work to be done. Our partner institutions are in Uganda, Tanzania, DRC, Ireland and the United Kingdom. The Republic of Ireland will do a lot of technology transfer to the Southern partners in the following ways

1. They aim to provide Rapid clinical trial solutions to key challenges
2. Research and knowledge directly related to the most affected populations
3. Knowledge and Technology transfer for enhanced response
4. Building on vaccine clinical trials infrastructure and expertise in Africa

The study is a multi-site, prospective, clinical trial of individuals about to receive or recently received MVA for the prevention of Mpox. The study will assess the rate of change and factors associated with MVA-specific antibodies at W48 post-vaccination with MVA. it will further address the following secondary objectives;

- Development of OVA-specific antibodies at W6 after the first dose.
- Neutralizing the capacity of vaccine-induced immune response for Mpox virus in vitro culture at W6 and W 48.
- Prevalence of active asymptomatic Mpox infection

- Prevalence of active STIs at inclusion and prevalence of participants with chronic HIV infections, HBV, HCV
- Incidence of STIs at weeks 6,12 and 48

The vaccine will be administered as part of standard care, 330 participants will be recruited and will include those above 18 years, understand the study procedures, be able to comply with the procedures and voluntarily agree to participate by giving informed consent and must be eligible for 1 or 2 doses of MVA for Mpox prevention as per NIAC guidelines or have received the first dose of MVA <28 days previously for Mpox prevention. But will exclude pregnant and breastfeeding women, participants under 18 years and everyone enrolled will have to consent, have a contraindication to MVA vaccination, have a documented, pre-existing allergy to any component of the vaccine and have a clinical diagnosis of Mpox before recruitment. They will be put on a treatment duration of 1-2 doses for 4 weeks and will be followed up over 48 weeks at 5 visits following the first MVA. The study drug will be Modified vaccinia Ankara, IMVANEX suspension for injection smallpox and monkeypox vaccine (live Modified vaccinia virus Ankara) or JYNNEOS (smallpox and monkeypox vaccine live, non-replicating)

The study will assess research gaps in Mpox vaccines in vulnerable populations, develop a quantitative companion diagnostic assay capable of measuring IgG response, distinguish positive from negative samples, differentiate post-infection from post-vaccination samples and also study IgG levels in vaccinated participants versus post-infections and how the IgG levels reduce over time post-vaccination.

Panel discussion: Regulatory landscape for protocol approval

What measures have regulators put in place to expedite approval of research protocols during epidemics?

Panelists; Dr. Martin Ongol: Uganda National Council of Science and Technology

During epidemics, approvals are usually expedited, the guidelines that we have include the National guidelines for research, the joint ethical reviews for proposals and what the WHO recommends. The National Drug Authority and Research and Ethics Committee (RECs), including social and behavioural scientists. The UNCST has some guidelines that were developed during Covid 19 together with the Ministry of Health board. The team at UNCST sometimes sits with the Ministry of Health together and expedites some of these approvals. They have set up an information management system, to reduce time spent in review of protocols. Furthermore, 36 ethical review committees are accredited in Uganda and the plan is to have some hospitals have Ethics committees so they can approve some studies. They have set up procedures for fast-tracking ethical reviews and there is a provision for flexible consent and data collection procedures.

Plans include making improvements on the verbal and digital consenting process, looking at public and stakeholder engagement even before you start writing the protocol, having preliminary discussions and mapping the way forward together with Principal Investigators to prevent a lot of back and forth which causes more delays.

Panelist; Dr. Diana Nakito, Uganda National Drug Authority- Head of clinical trials unit.

Our mission as NDA is to promote and protect human and animal health through the effective use of drugs. The regulators have been coming together and jointly approving studies for at least 10 days. This helped to address the gap, make clear the guidelines and have revisions of statutory instruments, there has been an option of fast-tracking studies. NDA has released statutory regulation 29 where a section of fast track was added and it was to specifically address the gap concerning public health emergencies in the previous regulations.

Panelist; Dr. Nyanda, Tanzania

We have a clinical trial technical committee that is responsible for approval of these urgent studies and it is also responsible for monitoring. We have several mechanisms and where need be, we can convene a group of experts for this work that requires expedited review. We have several Memoranda of Understanding as a country with Rwanda, Botswana and Indonesia so that if we have clinical trials with them, we have a guiding document. The review process can take at least 15 days, this is quite fast in the case of an epidemic.

Panelsit; Hajji Juma, Zanzibar

The procedure for approval includes guidelines for approval of research and also clinical trials. Clinical trials are approved in 20 working days compared to 60 working days for other trials. We are reviewing the applications and have an online system for ethical approval of the Zanzibar Health Research Ethical Committee. At the end of it all, the decisions are completed at the same time and approval is granted.

What is the average time to submit protocols and what are the challenges experienced?

UNCST; It has been five working days but the challenges include a lack of compliance of the research team with data safety issues. In this case, they gave an example of a natural product that was submitted for approval but found out that the production system was too low for the number of participants enrolled. The second challenge is the multi-country trials; we don't know the way to equate our regulatory approvals to those of other countries. There is the issue of multi-location trials and the complexity of the diseases occurring in the most rural places. The capacity to manage a large trial in multiple locations is a big issue.

NDA; Previous trials were being done haphazardly, as the regulator, we ensure patient safety and quality of data. If we are introducing a new drug or product, provide us with data that this

is safe for all to use. One of the things that has worked is collaboration. If the regulators come together, we can have an expedited approval process. The regulator is the in between the participant/patient and the researcher. If we can get responses to these concerns, the approval process should be smooth. It is important to have a generic protocol ready and on standby for any epidemics.

UNCST; During Covid 19 outbreak, we had guidelines to fast-track protocol, we are hoping to update this, in this document, we had guidelines to develop a generic protocol. The challenge comes with the study design. We are however cognizant of the compensation of participants, and the requirements necessary for their safety and this is where we want to counter-check. We want to avoid legal suits and also have the credibility of our data.

Tanzania; Dr. Nyanda shared the experience of having led a study that took a year to be approved. As a country, they agreed that this should never happen again and shaped them to think of digital approval of research studies. During emergencies, the normal ethics and regulatory bodies cannot work like it is business as usual. The country is looking to develop guidelines for therapeutic approval and is also looking at mapping health data and how it is handled during emergencies. We want to provide a framework on how to build data and materials. Functional health committees are important for providing quality products. Over the years, I have seen that the understanding of the health committees is not always guaranteed. Support for those along the value chain is also important.

Presentation from Makerere University Walter Reed Program(MUWRP)

This presentation focused on Mpox Sero-prevalence and what has been done among individuals from Makerere University Walter Reed Program (MUWRP) by Dr. Proscovia Naluyima Sekiziyivu. MUWRP is a Nonprofit biomedical research organization established in 2002 to develop the capability for HIV vaccine testing. We have major programs namely; Clinical Research, Emerging Infectious Diseases Program, ACESO-Uganda (JMEDICC) and PEPFAR. Under the infectious disease program, we do a lot of surveillance and focus on both infectious and non-infectious diseases like HIV, Ebola, Marburg, sepsis, Schistosomiasis, and cervical cancer.

Under the clinical research program, the team has conducted more than 12 vaccine clinical trials and is currently working on four of them focusing on Marburg, SUDV, HIV, Schistosomiasis and the first Ebola trial in Africa. They have ongoing cohort studies on HIV (disease progression, viral reservoir studies), surveillance of influenza-like illnesses, coronaviruses and other potential zoonotic pathogens in animals and birds. As MUWRP we have twenty years of vaccine research experience such as;

- Safety tests (CBC, Clinical chemistry, urinalysis)
- Parasitology
- Molecular and serological diagnostics
- Virology
- Immunology (flow cytometry)
- PBMC sample processing
- Bio-repository (-80C and LN2)

In Uganda Mpox clade 1b was reported on July 24th 2024, MUWRP conducted surveillance in existing cohorts in 2023-2024 because people living with HIV are particularly vulnerable to severe forms of the Mpox disease. Focusing on the Mpox virus seroprevalence, the recently collected serum/plasma specimens from participants identified as vulnerable to Mpox per their study enrolment questionnaire;

- MSM and transgender women who have sex with men aged 18 years or older
- At least one of the following; HIV pre-exposure prophylaxis use in the prior 6 months, transactional sex in the past 12 months, sexual activity under the influence of drugs in the past six months and sexually transmitted infections in the past month.

Prototype ortho-pox virus, Meso Scale Discovery (MSD) Multi-Spot system and MSD ortho-pox virus serology panels;

- Serum specimens from participants without HIV from AFRICOM with low Mpox vulnerability as negative controls
- Serum specimens from people in the U.S with Mpox during the 2022-2024 outbreak as a positive control
- Birthdate pre/post-1972 as a surrogate for smallpox vaccination status

Out of the 197 Ugandan AFRICOS participants identified as vulnerable to Mpox, two seropositive, both PLWH none reported behaviors associated with Mpo.x Vulnerability in their most recent study questionnaire. Sero-positivity in these participants with low Mpox vulnerability per their recent behaviour data suggests prior infection with other Ortho-poxviruses or cross-reacting immune responses to vaccinia virus vaccination may be a contributor. However, results could also indicate previously unrecognized human Mpox in Uganda and highlight the need for expanded seroprevalence studies and prospective surveillance to address the knowledge gap in Mpox epidemiology in Uganda. Existing research cohorts can be utilized for surveillance of emerging infections looking at the seroprevalence, and incidence and finally private partnerships are the future of global health security through data sharing and leverage infrastructure.

Day Three

On the last day of the symposium, the participants held four Break-out discussion groups in different categories of Epidemiology and Behavior change, Vaccines, Therapeutics and Diagnostics. The various groups had to discuss what they know about the current Mpox epidemic, what is unknown, what is the way forward and any recommendations to make. The discussion raised so many questions on what is known, and what is unknown.

Group One; Vaccines

Background; The discussion had three main objectives including stating what we know, what we don't know, and the way forward.

What we know; Mpox is escalating especially in the Democratic Republic of Congo, and the children are more affected given that most of the new cases at health facilities are mainly children. However, the disease is vaccine-preventable but most of the available vaccines are age-specific, mainly for individuals above 18 years of age, while other disease vaccines are not specific to age. Notably, the outbreak is an emergency and developing a new vaccine takes time, thus we need to repurpose existing vaccines. Existing vaccines licensed for Mpox include; MVA_BN, LC16, ACAM2000, Orthopoxvac, some from China, and Investigational drugs –mRNA.

MVA_BN is given in 2 doses -4 weeks apart, and one dose costs USD 145. Therefore, it is available but costly. Initial animal studies assessed efficacy against smallpox and licensing for Mpox was based on studies in animals against Mpox which showed 100% vaccine efficacy with 2 doses of MVA_BN and 67% efficacy with only 1 dose of MVA_BN). During the global Mpox outbreak in 2022, this vaccine was also used in America among Men who have Sex with Men and it proved to be effective and several observational studies were published.

Systematic reviews also estimated vaccine effectiveness for Single SC MVA BN to be at 76% across 12 studies, and 2 doses at 82% (72-92%) across 6 studies.

Notably, MVA-BN is mainly recommended for persons at high risk of exposure to Mpox in an outbreak setting;

- Based on local epidemiology, members of a geographically defined area or community, including children, with a documented high risk of exposure to persons with Mpox
- Sex workers, other individuals with multiple sexual partners
- Health workers at risk of repeated exposure; performing diagnostics, care, outbreak response team members
- Contacts of persons with Mpox, ideally within 4 days of first exposure

What are some of the other vaccine recommendations?

1. *Immunocompetent non-pregnant adult individuals:*

- Non-replicating vaccine (MVA BN), minimally replicating vaccines (LC16m8), replicating vaccines (ACAM 2000)

2. *Special populations*
   - Infants, children, and adolescents –MVA BN, LC16m8; chn –off-label use
   - Pregnancy –MVA BN, off-label use
   - Immunocompromised individuals, including persons living with HIV –MVA BN

What we do not know about the available vaccines.

1. What is the immunogenicity, efficacy and safety of Mpox vaccines such as MVA BN in children?
2. Are the current vaccines efficacious against Clade 1b? We may need to conduct molecular characterization/ genomic sequencing of Mpox variants.
3. How long does vaccine immunity last?
4. What is the effect of vaccines on different populations especially those with co-infections such as malaria, HIV, and worm infestations
5. What is the willingness to uptake the Pox vaccine in affected communities?
6. Are vaccine hesitancy levels rising and what are the factors driving it?
7. What is the feasibility of targeted vaccination? Can we look at;
   I. Sexual contacts –adults
   II. Household contacts – children
   III. Understanding the epidemiology of the disease
8. What is the efficacy of one dose versus two doses in our population?
9. what are the correlates of protection?
10. What are the short-term and long-term vaccines in our setting?
11. How best do we deliver the vaccines in LMICs based on cold chain challenges?
12. what are the isolates to evaluate the vaccines? Should we use Assays?
13. Consider vaccine development in Africa –could it reduce vaccine hesitancy?
14. Can we use convalescent plasma to treat patients?
15. Are there intra-host mutations happening?
16. What is the reservoir of Mpox virus?

Way forward:

1. Create robust community engagement and risk communication to enhance vaccine uptake.
2. Strengthen cold chain facilities to ensure the integrity of vaccine is not affected –safety and efficacy.
3. The Development of new vaccines may take time; hence need to prioritize existing vaccines
4. Partnerships with manufacturers in the global North to manufacture locally to enhance local confidence.

General comments from the discussion

1. We might need to consider researching fractional dozing, to establish effectiveness.
2. We need to understand the dynamics of the virus.

3. We need to get multiple differentials for related illnesses, to allow diagnosis. Ie has clear case definitions so that the health worker can differentiate between different diseases that present the same way, i.e. if it is not Mpox, then it is chicken pox.

Group Two: Therapeutics

In this group, the participants focused on looking at the spectrum of patient clinical presentation of Mpox: these range from the exposed, asymptomatic, mild to severe presentation with complications. The discussion revolved around keeping in mind special groups of patients that include the immune-compromised, patients with pre-existing skin diseases, pregnant women and children (especially the ones with malnutrition and immune deficiencies) We have to answer the following three *questions;*

What do we know?

Currently what we know about the management of patients with Mpox;

- The available Supportive/Conservative management
- Management of co-infections
- Skin management or lesion management
- Antiviral treatment with Tecovirimat
- Nutritional support
- Post-acute infection supportive treatment, and skin care.
- Psychotherapy
- Tecovirimat animal studies proved efficacy
- Tecovirimat has not worked with class Ib, studies in DRC
- Tecovirimat Lowered efficacy with mutations
- Lesson learned from COVID-19, Ebola etc

What we do not know?

- Patient characterisation: immune markers, haematological markers, virological markers, how the patient's phenotypic characteristics, co-infections with HIV/TB both present and past, comorbidities like hypertension and diabetes impact the treatment outcome
- Correlation of clinical presentation with viral load, immunological response, Definition of cases to be started on antiviral treatment:

  - Given to patients with mild disease to prevent progression

  -Given to patients with severe illness as treatment

- Antiviral treatment: Currently available data on Tecovirimat is on Clade II; will efficacy be similar with Clade I Mpox with a severe presentation, would findings of the efficacy of Tecovirimat in animal studies translate similarly to humans with the active disease--à Human Efficacy Studies
- TECOVIRIMAT as Post-Exposure Prophylaxis and Pre-Exposure Prophylaxis for the immune-compromised
- The role of convalescent plasma
- The role of immune-boosters
- The role of natural therapeutics
- Looking into Vaccination as therapeutics?
- Management of Complications: Survivor program, multidisciplinary approach, post-treatment care-skin care
- Should we be doing lumbar punctures, is there a role of intrathecal antiviral treatment in patients with Central Nervous Systems involvement

What is our priority?

- Enhance supportive management with a multi-disciplinary approach (nutritionists, psychotherapy
- Management of complications, mitigating the severity of the disease
- Utility and the role of convalescent plasma and go on to identify monoclonal and polyclonal antibodies
- Natural therapeutics
- The role of immune boosters
- Anti-inflammatory drugs and anti-viral in supporting viremia depression
- From the systemic we also need to consider the topical:

What research should we conduct? Use of various research designs like observational, RCT etc.

- Currently with TECOVIRIMAT –an Observational study, trials on treatment outcomes.
- Patient's characterization studies: immune markers, haematological markers, patient phenotype (need for O2 supplementation), Co-infections with HIV/TB present and past, Hypertension.
- Role of monotherapy (brincidofovir, cidofovir) and viral combined therapy, viral shedding, duration of illness and treatment outcomes including short and long-term sequelae.
- Role of immune-modulators/boosters in patients who are immunocompromised and the role of steroids, and dexamethasone.
- Evaluate the role of natural therapeutics: how do we adapt these in the context of research?
- Convalescent plasma as treatment; use donor blood as long as it is characterized by how many neutralizing antibodies it has.

Group 3: Diagnostics

The team comprised 15 members (Uganda, Kenya, Tanzania, Gabon, DRC, UK & China).

–Immunologists, virologists, infectious disease specialists, molecular diagnostics, molecular epidemiology and microbiology)

–Biomedical engineers

–Biotech companies/suppliers of Mpox (Inqaba biotech etc.)

The group answered the following questions

- What do we know about Mpox diagnostics?
- What is unknown about Mpox diagnostics?
- How do we tackle the unknowns?
- Way forward

What do we know about Mpox?

- CDC Africa and WHO approved various molecular diagnostics for Mpox -Point of care qualitative Xpert Assay, PCR and Sequencing
- Xpert is a current POC test (DRC experience); Able to detect Orth poxviruses in 15 minutes and costs around 20 US dollars, less sensitive compared to PCR tests this is Discordant results with PCR and limited to Clade II and Clade I is the most circulating virus in central and east Africa
- PCR-based tests, more sensitive and differentiate Clade I and II; More useful for many samples (high throughput)
- Surveillance work (Gabon experience)

    I. Optimizing protocols for rapid and emergency detection within 2 hours of suspecting a case
    II. Kits recommended by WHO/CDC are not readily available when needed due to low production and importation challenges
    III. Promoting locally designed/validated in-house PCR assays to sustain the country's needs
    IV. KEMRI (Kenya) and SA can synthesise the primers/probes

What is unknown about Mpox diagnostics?

- The severity of the disease and clinical presentation of patients with Clade I/II co-infections.
- Antigen-based rapid tests for surveillance and early detection

- Access to Mpox controls when validating local/in-house tests through improved access to National /country-specific test validation guidelines for local test developers/Scientists
- How do we tackle new mutations of the viruses when developing the tests? They should speed up regional genomic capabilities to respond to new mutations/ variants to guide in-house PCR development
- Use of alternative specimens like urine for Mpox diagnosis considering that the virus mostly affects the genital areas that have not yet been explored.
- Sewage systems, can be also helpful in diagnosing Mpox.
- Immunological tests can help in understanding the state of disease and test development. ELISA and serological tests
- The disease manifestation, point of infections and pathogenesis in different populations
- Genomic studies, how do we understand the origin of Mpox infections; Do we have good or collect epidemiological information? Country/regional harmonization of sequencing protocols to overcome method variability.

Way forward

- Fast tract development and validation of rapid diagnostic tests to quicken early detection and surveillance
- Accelerate validation of in-house PCR assays to sustain the country's needs
- Strengthen country diagnostics capacity for early detection of Mpox infection
- Optimize country-specific protocol for rapid detection of Mpox as an emergency
- Harmonize regional genomics infrastructure and protocols to overcome method variabilities

Group 4; Epidemiology and Behavior change

What do we know?

Epidemiology:

1. Transmission mechanisms:
    - It's not a new virus, 2-3 years change in transmissibility for clade 1, clade 2 not so transmissible and no severe disease, animal to human jump happened, current human-to-human transmission
    - Need to understand the mechanisms of human-to-human transmission
    - There is an aspect of contact from mother to child, or caregiver
    - Sexual transmission -is there enough evidence for this? There is some evidence but not concrete enough to be separated from contact transmission. Asymptomatic people transmitting the disease sexually are a concern
    - Evidence of human-to-animal transmission?

- What is the source of the transmission?

2. Disease morbidity and mortality
    - Severe morbidity potential: More severe in children especially infants, is this true? If so why? What about the elderly >60 years? Is this the same?
    - Differential mortality and its drivers?
3. Long-term clinical picture and Outcomes much is known
    - Need follow-up cohorts of people with severe disease
    - Severe disease involving internal organs?

Response Strategies

Cases since 2000, resulted from living near forests but it has now come near cities forcing an awakening among politicians to put up guidelines.

Established response team with activities including:

1. Communication in high-risk groups
2. Communication and education on presentation and need to go to hospital, registration
3. Treatment with ddtmt??? The tests converted quickly among those who took…
4. Encouraged people to use medical treatment in place of or alongside herbal concoctions
5. Patients return home in the evening after being taken care of at the facility. Visitation cannot be prevented. Need to educate the population because not enough mechanisms for medical care. Need the caretakers involved in case management so isolation of cases is difficult
6. Needed to allow about 5 weeks to start seeing a change but needed behavioural change

Socio-behavioral aspects and mental effects

- Very few studies anchor into the social, behavioral, and mental paradigms in the literature.
- Usually, the last to be addressed unfortunately because we need to understand the reality, causes etc.
- Need to understand what communities think about the disease, its severity
- Need community engagement through existing structures
- Need to do rapid assessments in the hotspots
- Do people in communities know how it's spread? Sexual contact etc? They can't prevent it if they don't understand its spread. Need help finding the sexual networks. We are currently relating to previous infectious diseases.
- Health-seeking behavior is affected by stigma as evidenced by other infectious diseases of the same sort.
- Social, psychological and mental effects: At risk because a lot is not known causing stigma, self-stigma and blame, stigma and discrimination from community members
- Need a community engagement plan using available structures
- The usual practice is home remedies, then traditional healers, and finally biomedical care. Need to support the communities instead of waiting for them to present to facilities

Messages on awareness are not getting to the grassroots. The community is not involved from the start so we do more case management than prevention and control

Socio-behavioral aspects have been ignored, border control is weak etc. because of ignorance

What don't we know?

- More severe in children especially infants, is this true? If so why? What about the elderly? Is this the same?
- Differential mortality and its drivers?
- Sexual transmission -is there enough evidence for this? Can asymptomatic people transmit the disease sexually?
- Evidence of human-to-animal transmission?
- Need to understand what communities think about the disease, its severity
- Do people in communities know how it's spread?
- More severe in children especially infants, is this true? If so why? What about the elderly? Is this the same?
- Need a community engagement plan using available structures
- Usual practice is home remedies, then traditional healers, and finally biomedical care. Need to support the communities instead of waiting for them to present to facilities
- Why are commercial sexual workers more at risk?
- Are sexual practices increasing risk?
- Should we be doing PCR on sexual fluids?
- Transplacental transmission of the virus? Or is it also contact with lesions?
- Should mental assessment be part of morbidity screening and made part of acute management?
- Establish cohorts to understand the long-term effects of the disease
- Need to start by understanding community aspects first before the leaps and bounds on the biomedical side because the disease has been present for decades. We must find out what's known!
- What is the actual source of the virus that needs to be controlled to curtail transmission?
- Clade 1a is not a threat?
- Is 1b more virulent and transmissible than 1a and why?

How do we get to know what we don't know? What are the Priorities and Timelines?

Epidemiology

1. Socio-behavioral aspects of the disease
2. Confirm age-associated differential morbidity
3. Conduct studies to confirm transmission and associated factors
4. Continue genomic surveillance to understand viral virulence
5. Long-term clinical implications-cohort across Central and East Africa

Preparedness and Response

1. Strengthen screening at entry points into the different countries
2. Rapid sensitization of the population to foster collaboration
3. Emphasize the need for isolation of the sick to protect others

Community level interventions

1. Awareness creation around the disease, causes, spread, prevention and control

2. Use different communication channels
3. Social-behavioral study that includes mental health aspects, mixed methods, including lived experiences of patients and their caretakers
4. Rapid ethnographic studies to help us understand what is happening to use in the development of policies and development of community interventions
5. Multifactorial information giving for accurate information and using trusted channels
6. Rapid social-behavioral assessment
7. Use effective structures for community engagement

ICER Conceptual and The Five-Year Strategic Plan

Dr. Bakamutumaho Barnabas

Despite being a hotspot for high-consequence pathogens and recurring infectious disease outbreaks and epidemics, resources focused on Research and Development R&D for effective countermeasures are limited in Sub-Saharan Africa. The underdeveloped healthcare system in the region is overwhelmed, hence exacerbating poor health outcomes of these outbreaks *[Mahmoud Elmahdawye et al. 2017, Science Direct]*. Whereas WHO & UN developed International Health Regulations (IHR) to promote health security and enable rapid detection and response to emergencies, [WHO-led Joint External Evaluations (JEE)], however, epidemic research is lacking/not integrated. There is a need for a sustainable preparedness and research framework to contribute to response strategies for rapid detection, containment, and control of ongoing and future epidemics due to pathogens. Research and Development (R&D) ecosystems [research groups, public health institutions, funders, & pharmaceutical companies] each pursue their objectives, not necessarily in harmony toward shared public health goals *[Piero Olliaro et al: Molecular Therapy Vol. 30 No 5 May 2022].*

Challenges of Epidemic Research in Sub-Saharan Africa

- Limited understanding of the disease.
- Rapidly evolving situation
- Limited resources
- Ethical considerations
- Access to research evidence and data
- Communication challenges
- Access to investigational products
- Competition among academic and other public researchers

Overcoming epidemic research bottlenecks in Africa

In light of recurrent epidemics of emerging and re-emerging infectious diseases, establishment of interdisciplinary research networks to mobilize - coordinate related financing mechanisms is essential. The ICER consortium is bringing stakeholders (academia, policy,

R&D players, regulators) to the table to plan executive and utilize research evidence, to enhance joint resource mobilization before epidemics including from at-risk governments and invest in R&D to facilitate the implementation of high-quality studies before and during epidemics.

The conceptualization of ICER

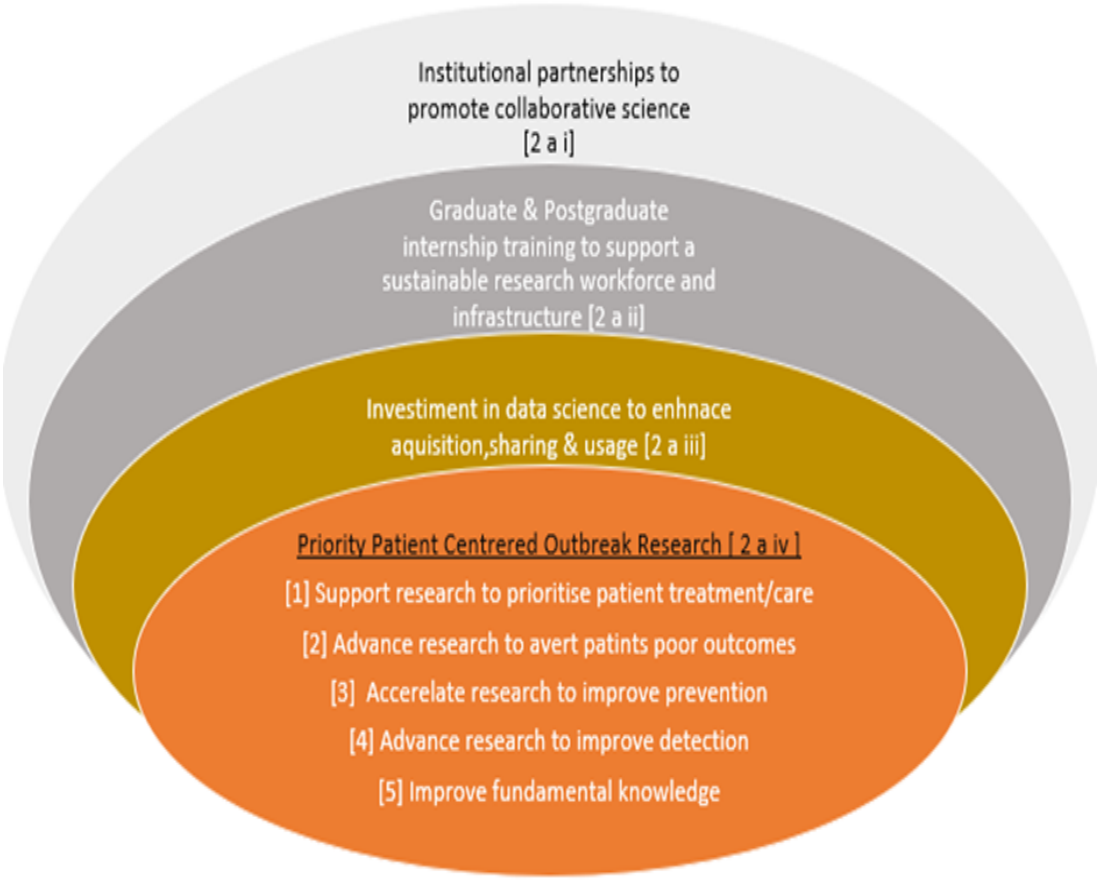
ICER should be consistent with recommendations to build capacity for future epidemiological (EPI)/social and behavioral science work in epidemic contexts and the gaps in International Health Regulations (IHR) in the process of responding to COVID-19 and improvement measures to improve its effectiveness. We developed and are implementing ICER. It draws on knowledge from different disciplines but stays within their boundaries, Interdisciplinary analyses, and synthesizes-harmonizes links between disciplines into a coordinated & coherent whole.

ICER's Vision is to position research as an integral part of outbreaks and epidemic preparedness and response, with a mission to support research institutions, agencies, and governments to maintain, improve and sustain the health of the people through the development of evidence-based countermeasures for rapid prevention, detection and response of emerging and re-emerging diseases with epidemic pandemic potential with a main goal of fostering interdisciplinary research collaboration to enable rapid infectious diseases epidemic detection, containment and optimized clinical care delivery that will inform policies to improve health outcomes.

ICER's Objectives as a platform for evidence-based mitigation of outbreaks, epidemics and pandemics are:

- Mobilize support and resources towards National epidemics priority research areas from local and International partners/collaborators, and coordinate funding proposal submissions on epidemics research from consortium members
- Strengthen capacity for patient-centred epidemic response research for emerging and re-emerging diseases at institutional levels.
- Develop pre-approved generic protocols to facilitate the conduct of real-time clinical trials to evaluate candidate vaccines, diagnostics, therapeutics and related priority research during outbreaks and epidemics.
- Promote sustainable community engagement and dissemination of research findings and tailored information products to various stakeholders for improved understanding, acceptance, and awareness of research during outbreaks and epidemics.
- Contribute to and facilitate the enhancement of National and International frameworks for collaborative and systematic acquisition, storage, access, sharing, use, and disposal of biodata, genomic sequencing data, and bio-specimens from outbreaks and epidemics.

ICER's 5-Year Strategic Implementation Approaches Since September 2023-2028



Closing ceremony.

The last two days have had serious deliberations on different subjects that are needed to address the current Mpox epidemic but are also applicable to other epidemics. Hon. Musenero challenged us to create practical steps to ensure that we have outputs at the end of the symposium. This morning, we had 4 discussion groups that spent 2 hours discussing what we know, what we don't know and what we can do about it. The practical steps that we can take to solve them and tailor them to the next steps.

Every solution we get will be translated into a product. So these will not be free and will contribute to the economy. He recapped previous sessions that looked at curbing the spread of Mpox and also addressing other epidemics. He emphasized that we should look at epidemics as opportunities for improvement. He then invited presenters from Congo to present their work and case reports about the Mpox outbreak in Congo.

Closing remarks with a presentation from the Democratic Republic of Congo

The case of Mpox in the DRC is different from what is manifesting here. The children are affected severely. Mpox affects the eyes and the patients lose sight, some individuals get sores in the mouths, and some get skin eruptions all over the body even under the feet. Sex workers who came from Rwanda have been affected too but the clinical manifestation may differ across all age groups. He showed visual aids of typically infected people and highlighted the fact that others have also contemplated suicide due to the effect of the disease on mental health.

Some clinical manifestations are different from the normal general body eruptions as some men and women may get swellings only around the genitals, others look like burns, and others are very asymptomatic in that you don't see the big swellings around the body yet they are positive. Some sexual workers had a few swellings of Mpox, but they continued to have sexual relations with men, more than 100 of them. One of the men identified was a policeman who was found with swellings around the genital area. Some people looked like they had been burned but when samples were taken it was found to be Mpox, one of the cases I knew just passed on. The internal and external organs are all affected. A pregnant woman is capable of losing the fetus. The intestines are capable of showing the lesions. However, the cases that were treated and healed will never get rid of the scars until they die. The transmission from humans to animals may be possible and we have seen animals with similar lesions. We urge the cattle keepers to test the animals, if you see any unusual death, don't touch it until confirmed. Mpox is a new disease, it is important to understand the clinical signs from all angles.

Closing remarks; Prof. Kirenga Bruce

He thanked the delegates and the ministers for attending the symposium. Taking time off to ensure that they attend this symposium. Prof. Kirenga read the communique to the Ministers and participants in the room.

Closing Address by the Rt. Hon Prime Minister of Uganda and Signing of the communique.

Minister of Science Technology and Innovations; Hon Musenero Masanza

She thanked the delegates from different countries and representatives from different organizations from around the region for the work well done in this symposium. The Third Deputy Prime Minister Rt. Hon. Justine Kasule Lumumba. I want to thank you for taking time to be here. We have been managing epidemics for so long but when Mpox had just come, we thought it wasn't that serious, but from what we are seeing, there is a big problem at hand. We came here and partnered with this consortium. In our region, we recognize problems and alert them because we need others to help. But we Africans must take responsibility now. Nobody rushes anymore when we get epidemics. They are threats everywhere. What we see now is a result of the damage and scare that Covid gave us. Before Covid, we were complacent, but during Covid we became helpless, and we realized we had to do something. It was during Covid that we started to mobilize ourselves. We want to thank the Government of Uganda, and the Ministry of Finance, it is the funds that they gave us that made us start doing this work.

This Mpox has been in DRC for so long, but if we had given it attention, we wouldn't have reached where we are now. We need to mobilize ourselves and come together to think together with scientists and come up with practical solutions to address this issue. I am sure some of these cases have become severe because we took a long time to identify and manage them.

When it comes to the issue of research, we need to identify the actual problems and solutions. Epidemics have happened for so long and there is never enough time. I want to thank the organizers and the guests from all over the continent. When we come together, we begin to think and this is what I challenged them to do. The consortium in collaboration with the Ministry of Health came together to push this agenda forward because it's about leadership. However, we are not going to be able to sustain research if we don't have outputs. The Uganda Council of Science and Technology has funded this symposium as a seed. When I look at the discussions that are going on, we need to understand that this is in the spirit of Pan-Africanism. Many times we look at problems like this. We don't want to make money because we feel like we are benefiting from people's suffering, but we must change the mindset. It's a challenge to us as Africans but we must change because the inputs are bought with money.

As we come to ask for money from the Cabinet, we ask the Government to come and help out more. People need to understand what Mpox is. We must appreciate it. I welcome you Hon. Christine Lumumba to address us and close the meeting.

Remarks from Hon Kasule Lumumba

The Hon Minister, representatives of the development partners, WHO, regional Health Ministries, scientists and Researchers, Ladies and Gentlemen. I bring you greetings from HE Yoweri Kaguta Museveni and the Prime Minister of the Republic of Uganda who is having her time in Parliament to respond to issues of National Importance.

I have come to learn that I knew nothing about Mpox and now I have learnt a lot in the few hours that I have been here. It is upon you the scientists to make us the policy makers aware of what is happening. It is when we know that we as policy makers can allocate resources. If you want the message to sink into the minds, you must do a lot of sensitization. We must use visuals.

I want to request the minister that I join you to go to the vice president to show the visual aid to stress the magnitude of the problem and make a contribution. Let us make sure that we have this presented before the cabinet. This must be shown to the ministers. Let us go to the speaker of parliament and show this visual aid to them too and the message will sink. Let us organize beyond the scientists, and speak to the other ministries such as the Ministry of Agriculture. The Ministry of Agriculture must be part of us in the fight against the disease because animals are also affected. To the general public, it's a blessing in disguise, the men are the decision-makers, and yet they are also affected. This message must be packaged in a very good way to show them how they will be affected at the household level, and they will lead the campaign to tell people what they should do to avoid disease.

The Leadership of Uganda has fought for pan-Africanism for a very long time. The president has been instrumental in solving Africa's health problems, the fight against HIV, and the COVID-19 pandemic and he was recently recognized in July 2024. The President was also involved in the formation of the African CDC, for Member states to strengthen the capacity of countries to respond to and control pandemics. He has always said that local solutions to local problems. A secretariat was formed in the office of the president to address the issues. The

creation of the pathogen economy that was recently appreciated led to more funds being allocated to research.

Having an outbreak anywhere is a potential outbreak everywhere hence we must respond everywhere. Mpox was only in the DRC, and it's now everywhere in the whole region. Learning about the negative impact of health emergencies on individual livelihoods, and economies, we must be better prepared. We can also do home-based solutions like what we did in Covid 19 like selling sanitizers. African countries should start investing in research and epidemic response rather than waiting for Western countries to do it for us. We must stop the mentality of waiting for solutions to come from elsewhere. The government is committed to supporting initiatives like these because we believe they will be very impactful at the community level. Uganda is a signatory to the IHR. We have an action plan for health security that was implemented in 2019. A joint external evaluation mechanism evaluated the nineteen parameters for the capacity to detect and respond to epidemics. We scored 56% in the last assessment which is way below the target of 70%. We need to do better. We can only use local research to solve our problems. During Covid 19, we had locally made PPE, sanitisers etc that showed the potential to have some solutions amongst us.

Economically speaking, those companies that made vaccines such as Moderna and PFIZER made a killing from the sales, but also shows the need for African countries to do the same. Our science, research and innovation must bring us together while remaining alive to the spirit of Ubuntu. The Government has committed to supporting ICER and acknowledges the need for the solutions. We have a missing link in that we don't have a research agenda for Uganda. The government has given money to Universities for Research, but without an agenda, it becomes quite complex. There is no collaboration between us, the policymakers, and you who do the research. We don't have a chance to meet and discuss the solutions and research outcomes of research to inform the policy. Thank you all for participating and I now officially close the symposium.

Prof. Byakika's vote of thanks.

In her vote of thanks, Prof. Byakika thanked Dr. Musenero for living by example, and for helping the team to find the money. The scientists in this room want to thank you very much for leading us by example secondly for instructing us on what to do and thirdly for finding us the money to do what it takes. Hon. Lumumba we as scientists are responding positively and working very hard to contribute to the economy. Hon Musenero has stopped us from working in SILOs and in this interdisciplinary consortium we are working together not only as scientists in Uganda but scientists in the region, and therefore we look forward to the future with a lot of hope. I also, thank Dr Christine Lumumba for accepting to come and honor the symposium. Being that she has practically seen the burden of the problem, she will be our ambassador in the parliament as we lobby for money.

Annex 1: COMMUNIQUE

We, researchers, scientists, policymakers, and frontline responders in Mpox-affected countries in East and Central Africa under the umbrella of the Interdisciplinary Consortium for Epidemics Research (ICER) held a symposium in Kampala-Uganda from 1st to 3rd October 2024 at Speke Resort Munyonyo.

SUMMARY OF ICER PROCEEDINGS

The symposium was organized under the theme: "Building partnerships and synergies to support a coordinated Mpox response in East and Central Africa" (The reason we did this is not that we don't recognize the help we get from colleagues of WHO, Africa CDC and all the other organizations. What we are saying is that while they help us let us do something small and that is why we are here. It's not that we want to disorganize the system but just supplementing the support).

Below is a summary of the proceedings;

- Epidemics come unexpectedly, so we must plan early enough. They are mainly occurring in Africa, and are driven by conflict and displacement, rich and preserved flora and fauna that foster wildlife and human life interactions, weak public health systems, poverty and limited access to health care systems, limited indigenous medical countermeasures and scientific evidence generation.
- In the past two day's discussion, the ICER consortium has stressed the need for local responses to epidemics and highlighted the importance of coordinated efforts in response and publishing research findings locally to raise awareness within the community.
- The consortium is another step forward in having good cross-border preparation and coordination, strengthening regional surveillance which all member states have to participate in.
- It has also highlighted the need for faster regulatory approvals for clinical trials during epidemics and called for collaboration with various stakeholders to ensure the safety of medical products and address vaccine hesitancy since Population complacency could antagonize gains registered previously.
- East and Central Africa are vulnerable to numerous outbreaks due to their location in the flora and fauna-rich Congo basin and the Lake Victoria basin. There is a need to strongly emphasize the cost of breach of or compromised biosecurity which includes the loss of existing partnerships and collaboration.
- A regional strategy for epidemic-responsive research endorsed by all countries is key.
- Pathogens are a driver of power and economy and should be looked at as an opportunity to support pathogen-driven economies in the region.

ICER STRATEGY FOR EPIDEMIC RESEARCH

A. ICER's COMPONENT POLITICAL AND POLICY SUPPORT PARTNERSHIPS

1. COLLABORATIONS

- Collaboration and community engagement
- Collaborations with healthcare practising professionals
- Resource mobilization, financing and accountability.
- Policy and regulation on fast-tracking outbreak-epidemics research protocol approvals
- Leadership: Secretariat to coordinate day-to-day operations

2. CAPACITY BUILDING

A Sustainable health professionals' training program to enhance workforce capacity eg graduate and non-graduate internship, peer mentorship program, epidemic research curriculum, on job mentorship among others

B. ICER'S COMPONENT ON TECHNICAL STRATEGIES TO GENERATE EVIDENCE THROUGH PRIORITY PATIENT-CENTERED INTEGRATED EPIDEMIC RESEARCH

Coordinate the implementation of research to generate and disseminate clinical evidence whenever and wherever outbreak-prone infectious diseases occur to:

1. Evaluate new or repurpose existing therapies/vaccines and define implementation strategies
2. Characterize clinical immunology of disease progression, outcomes and recovery
3. Advance pathogen genomics for enhanced early and accurate diagnosis and variant tracking
4. Accelerate research and develop implementation models to prevent transmission
5. Prevent and redress undesirable outcomes in health disparity and vulnerable populations

ACKNOWLEDGING

1. The East and Central African region is *prone to frequent epidemics*
2. There is *limited evidence generation research*, knowledge gaps in transmission dynamics, clinical care management, limited diagnostic capacities and difficulties in accessing and assessing medical countermeasures
3. *Limited data and knowledge* sharing among the few research groups engaged in epidemics research in the region
4. *Funding challenges* for epidemic-responsive research.

5. *Interdisciplinarity in research* helps transcend the limitations of individual disciplines and fosters collaboration and innovation

Collectively, and working through our governments and institutions, we commit to the following:

1. **A coordinated regional research response strategy**

- Leverage the ICER platform to bring together Ministries of Health, responders and other stakeholders for an interdisciplinary and harmonised regional response to epidemics/pandemics
- Cross-border preparation and coordination among evidence-generating entities and research scientists of the countries in East and Central Africa
- Develop a regional epidemic response research strategy endorsed by all countries in East and Central Africa
- Put in place platforms in support of equitable access to research knowledge and data sharing
- Create a regional disease surveillance system to support early detection and response while answering many unknowns about the transmission dynamics of clade 1b MPXV
- Put in place cross-country ethical and regulatory frameworks in support of expedited research protocol approvals

2. **Resource mobilization**

- Admonish affected nations and their governments to commit funding to support evidence-generation activities and sustain the ICER operations in East and Central Africa. We need an African Research Fund for epidemics
- Request Governments to work with evidence-generating entities such as research institutions, academia, communities and industries to mobilize annual funding in support of epidemic-responsive research to help overcome the bottlenecks curtailing epidemic research and respond electively and rapidly to current and future global health threats

3. **Build the R&D efforts in the countries**

- As part of efforts to build self-reliance economies through the pathogen economies, the Government should support scientists to develop tools and technologies to respond to epidemics
- Set aside capacity-building grants for researchers to create a critical mass of scientists for epidemic-responsive Research and Development
- Institute policies to support and easy implementation of research and development activities such as tax waivers on research consumables and diagnostics.

- Contribute to facilitating the enhancement of National and International frameworks for collaboration and systematic acquisition, storage, access, sharing, use and disposal of biodata, genomic sequencing data and bio-specimens from outbreaks and epidemics

4. Call for coordinated regional action for peace in the DRC and the bigger Great Lakes Region

- To bring to an end the suffering of many persons trapped in conflict zones and internally displaced camps in the DRC
- Seek the deliberate creation of corridors to enable supply and access to basic components of primary health care, humanitarian aid and food to address the poor health, living conditions and nutrition of the many women and children in these affected regions.

ANNEX 2: PICTORIAL

The Third Deputy Prime Minister and Minister without Portfolio, Hon Justine Kasule Lumumba listened to a presentation from DRC during the ICER Symposium.

A cross-section of participants during the symposium at Speke Resort Munyonyo

A delegate from the Democratic Republic of Congo makes his presentation on Mpox in the country.

Mr. Emmanuel Kansiime from the ICER Secretariat makes some remarks to the symposium participants.

Dr Damalie Nalwanga from Makerere University Lung Institute during the breakaway session that focused on the epidemiology of Mpox

Prof. Sabiti from the University of St Andrews makes his remarks to the participants on Mpox.

Part of the ICER Secretariat during the symposium

The ICER Chairperson, Prof. Bruce Kirenga shares a light moment with a colleague during the symposium.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THE SCIENCE, TECHNOLOGY AND INNOVATION (STI) THAT AFRICA NEEDS
Building Partnerships and collaborations to support a coordinated Mpox response in East and Central Africa.
iCER
Interdisciplinary Consortium for Epidemic Research


Collaboration to access candidate MCMs doses for research during outbreaks
MOHs and researchers in at-risk countries are in the driving seat and research is integrated into outbreak response.
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PHILIPS