



## OPEN LETTER

# Multimorbidity research in Sub-Saharan Africa: Proceedings of an interdisciplinary workshop [version 1; peer review: awaiting peer review]

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## Abstract

As life expectancies rise globally, the number of people living with multiple chronic health conditions – commonly referred to as ‘multimorbidity’ – is rising. Multimorbidity has been recognised as especially challenging to respond to in countries whose health systems are under-funded, fragmented, and designed primarily for acute care, including in sub-Saharan Africa. A growing body of

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research in sub-Saharan Africa has sought to better understand the particular challenges multimorbidity poses in the region and to develop context-sensitive responses. However, with multimorbidity still crystallising as a subject of enquiry, there remains considerable heterogeneity in conceptualising multimorbidity across disciplines and fields, hindering coordinated action. In June 2022, 60 researchers, practitioners, and stakeholders with regional expertise from nine sub-Saharan African countries gathered in Blantyre, Malawi to discuss ongoing multimorbidity research across the region. Drawing on insights from disciplines including epidemiology, public health, clinical medicine, anthropology, history, and sociology, participants critically considered the meaning, singular potential, and limitations of the concept of multimorbidity in sub-Saharan Africa. The workshop emphasised the need to move beyond a disease-centred concept of multimorbidity to one foregrounding patients' values, needs, and social context; the importance of foregrounding structures and systems rather than behaviour and lifestyles; the value of a flexible (rather than standard) definition of multimorbidity; and the need to leverage local knowledge, expertise, resources, and infrastructure. The workshop further served as a platform for exploring opportunities for training, writing, and ongoing collaboration.

## Keywords

Multimorbidity, sub-Saharan Africa, global health, interdisciplinarity

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## Introduction

As life expectancies rise globally, more people are living with multiple long-term health conditions, a phenomenon increasingly referred to as ‘multimorbidity’. How best to recognise, prevent and manage the diverse range of multimorbidity and to support patients and those involved in their care remains a major challenge. The complexities of responding to multimorbidity in low-resource settings are increasingly recognised. Many health systems in low- and middle-income countries have evolved as a composition of single disease programmes and, beyond certain well-funded chronic disease programmes (notably for human immunodeficiency virus [HIV]), remain primarily designed and funded for acute care<sup>1</sup>, making them ill-prepared to respond to the needs of patients with multiple, intersecting conditions. Moreover, existing concepts, models, and measures of multimorbidity predominantly reflect research in high-income settings and may not directly translate to low-resource settings<sup>2</sup>.

Shortly before the coronavirus disease 2019 (COVID-19) pandemic, a series of high-level priority-setting initiatives aimed to identify key research needs for multimorbidity in a global context<sup>2</sup>, including specifically for sub-Saharan Africa<sup>3</sup>. Cross-cutting these priorities was recognition of the need for research that transcends disciplinary and disease siloes and that draws in perspectives from beyond biomedical fields to better respond to the social, political, and economic context of multimorbidity – a need that has since been underscored by COVID-19, labelled a ‘syndemic’<sup>4</sup>. Considerable high-quality research in sub-Saharan Africa has already started to address different dimensions of the challenge multimorbidity poses in a range of countries and contexts. However, with multimorbidity still crystallising as a concept and as a field, there remains considerable heterogeneity across disciplines in conceptualising ‘multimorbidity’ and understanding its potential (and limitations) as a conceptual lens in different contexts and scenarios. Without a critical mass of researchers with a common conceptualisation and approaches to multimorbidity, an opportunity may be missed to challenge set parameters and knowledge flows, and ultimately maximise benefit to health providers, patients, and marginalised populations.

Responding to the need for a common conceptualisation and approaches to multimorbidity, in June 2022, 60 researchers, practitioners, and key stakeholders gathered for a 3-day interdisciplinary workshop at the Malawi-Liverpool Wellcome Trust Clinical Research Programme in Blantyre, Malawi. Leveraging expertise from a range of disciplines and fields including epidemiology, public health, clinical medicine, anthropology, history, and sociology, the aim of the workshop was to critically explore with contributors the meaning of multimorbidity and its potential and limitations as a conceptual lens for

transforming knowledge and practice within the context of sub-Saharan Africa.

The specific objectives were:

1. To discuss the meaning, potential, and limitations of multimorbidity around four provisional domains:
  - Concepts and framings of multimorbidity
  - Population-level health data
  - Risk, prevention, and sites of intervention
  - Health systems and care models;
2. To identify core themes within and across these domains;
3. To draw together working groups around domains and/or themes for writing outputs for wider circulation;
4. To explore the creation of a network for ongoing collaboration and knowledge exchange, with a view to future events, outputs, and research.

## Workshop design

The workshop organising committee comprised an interdisciplinary group of public health researchers, clinicians, and social scientists (EB, CIRC, JD, RAF, FL, EM, BM). Potential contributors were identified using purposive and snowballing methods, which included a formal search for “multimorbidity” in funder databases, and from key publications in the area (with specific restriction to Africa-based research). Investigators were asked to identify others within their network, and where they were not based in sub-Saharan Africa, to identify counterparts from their networks who were. Additional potential contributors were identified from policy networks, including ministries of health and leading higher educational institutions. Overall, this approach drew together 60 individuals representing regional expertise from Malawi, Zimbabwe, South Africa, Uganda, Kenya, Tanzania, Ghana, Nigeria, and The Gambia, as well as a wide range of disciplinary expertise including epidemiology, public health, clinical medicine (both generalist and specialist fields), anthropology, sociology, and history (see *Extended data*<sup>5</sup> for full contributor list and reflexivity statement produced in line with recent consensus recommendations<sup>6</sup>).

The workshop was designed to maximise time for group discussion. Following opening remarks and a keynote address on day one, the sessions on days two and three began with an ‘ignition’ talk that outlined current knowledge, gaps, and key questions within each provisional domain. Participants then addressed these questions through a combination of smaller focus groups and plenary discussion (see [Table 1](#) for the programme overview). Detailed notes were taken by a team of rapporteurs made up of early-career researchers (GTB, SAS, IGS, SS, NMY), which were subsequently formulated into this manuscript. In the following, we summarise the key points made during each of the sessions.

**Table 1. Programme Overview.**

Item	Speakers	Structured discussion questions
<b>Opening remarks</b>	<i>Dr Jonathan Chiwanda, Malawi Ministry of Health</i>	
<b>Keynote address:</b> What promise does a focus on 'multimorbidity' hold for the transformation of health systems to meet people's needs?	<i>Professor Mosa Moshabela, University of KwaZulu-Natal</i>	
<b>Session 1: Concepts and framings of multimorbidity</b>		
<b>Ignition talk:</b> Perspectives of patients and researchers on multimorbidity in the Malawian context	<i>Dr Christopher Bunn (Malawi Epidemiology and Intervention Research Unit and University of Glasgow) and Dr Edith Chikumbu (Malawi Epidemiology and Intervention Research Unit)</i>	<p><b>Group 1:</b> Is 'multimorbidity' a meaningful or useful idea to all these different groups – patients, providers, researchers, policymakers?</p> <p><b>Group 2:</b> If we had perfect care for individual disorders, what added value does multimorbidity bring?</p> <p><b>Group 3:</b> How should the patient perspective influence our view of multimorbidity?</p> <p><b>Group 4:</b> Thinking about the chronic complications of long COVID (or other long-term consequences of infectious diseases), does that provide a model for thinking about multimorbidity in sub-Saharan Africa?</p>
<b>Session 2: Population-level health data</b>		
<b>Ignition talk:</b> Exploring synergies between the health service and the research ecosystem: pragmatic multimorbidity research design	<i>Professor Nicki Tiffin (South African National Bioinformatics Institute, University of the Western Cape)</i>	<p><b>Group 1:</b> How can the health research ecosystem synergise with and support health services?</p> <p><b>Group 2:</b> How can we address issues of parallel health data ecosystems (research and healthcare) to best improve patient outcomes?</p> <p><b>Group 3:</b> What existing infrastructure/ cohorts/ trials could be used/ adapted to study multimorbidity?</p>
<b>Ignition talk:</b> Piloting the creation of a genotyped virtual cohort	<i>Tsaone Tamuhla (University of Cape Town and South African National Bioinformatics Institute, University of the Western Cape)</i>	
<b>Session 3: Risk, Prevention and Sites of Intervention</b>		
<b>Ignition talk:</b> Converging epidemics of communicable and non-communicable diseases: risk and prevention	<i>Professor Nasheeta Peer and Professor Andre-Pascal Kengne (South African Medical Research Council)</i>	<p><b>Group 1:</b> Should the term multimorbidity make any distinction between infectious and non-communicable disease?</p> <p><b>Group 2:</b> How might common disease origins (biological, social, environmental, etc.) offer an opportunity to address multimorbidity?</p> <p><b>Group 3:</b> Does screening have a role in the process of moving towards a holistic approach to multimorbidity?</p>
<b>Session 4: Health Systems and Care Models</b>		
<b>Ignition talk:</b> Multimorbidity: A New Challenge for Health Systems in sub-Saharan Africa	<i>Dr Edna Bosire (Aga Khan University, University of The Witwatersrand)</i>	<p><b>Group 1:</b> What is designed into the existing systems that might prevent or enable more 'person-centred' approaches to multimorbidity? Focus on: Training systems</p> <p><b>Group 2:</b> What is designed into the existing systems that might prevent or enable more 'person-centred' approaches to multimorbidity? Focus on: Service delivery systems</p> <p><b>Group 3:</b> What is designed into the existing systems that might prevent or enable more 'person-centred' approaches to multimorbidity? Focus on: Health policy</p>
<b>Core and cross-cutting themes</b>		
<b>Next steps</b>		

## Opening remarks: Dr Jonathan Chiwanda, Malawi Ministry of Health

Dr Chiwanda opened the workshop by highlighting that the availability of antiretroviral therapy (ART) in sub-Saharan Africa has resulted in people with the HIV living longer, leading to increased risk of multimorbidity, including non-communicable diseases (NCDs). Most chronic diseases in sub-Saharan African countries, including HIV and tuberculosis (TB), are managed through vertical programmes, posing challenges to the introduction of multimorbidity services in primary healthcare facilities, including in Malawi. This calls for collaborative efforts between researchers, policymakers, clinicians, patients, and communities to brainstorm together possible solutions to improve the quality of care for people living with multimorbidity across sub-Saharan Africa.

## Keynote address: What promise does a focus on 'multimorbidity' hold for the transformation of health systems to meet people's needs?

*Professor Mosa Moshabela, University of KwaZulu-Natal*

*Chairs: Dr Felix Limbani (Malawi-Liverpool-Wellcome Trust Clinical Research Programme), Dr Jamie Rylance (Malawi-Liverpool-Wellcome Trust Clinical Research Programme, Liverpool School of Tropical Medicine)*

Multimorbidity is a complex subject that crosscuts numerous areas of health. It compels a transformation in how health and illness are thought about to centre people, rather than diseases, in the design of health systems. The challenge is that the system we work in does not accommodate this transformation in thinking; it keeps bringing us back to a focus on diseases. Running contrary to his training as a doctor, Prof. Moshabela recounted his challenging journey to move beyond the comfortable notion that the 'doctor knows best' and to embrace patients' values and assets in his approach to health and illness. In this talk, Prof. Moshabela related his experience working across multiple disciplines and fields to highlight some of the issues we must think about when considering multimorbidity and its potential in sub-Saharan Africa.

Prof. Moshabela noted that the global health agenda has long foreground diseases rather than people, and that the framing of multimorbidity has continued to centre diseases. From a disease perspective, multimorbidity foregrounds disease clusters and the need to work across infectious and NCDs. This is exemplified by research in rural South Africa with the Africa Health Research Institute (AHRI), which highlighted the burden and patterning of undiagnosed TB, hypertension, and diabetes (HIV was relatively well diagnosed and treated)<sup>7</sup>. While this work had important implications for specifying met and unmet need, Prof. Moshabela invited the audience to consider whether this is all there is to multimorbidity – a combination of diseases together? If so, this would be straightforward to solve through metrics, biomarkers, slicing, modelling, reaching, etc. To draw out the insufficiency of a disease-centred approach, the

example of long COVID was provided. Ignored by doctors, long COVID was discovered by patients, who are often made to feel their illness is psychological. The pathways of long COVID are extremely complex and involve layers of vulnerability that extend beyond other underlying conditions to intersecting social and economic inequalities. As doctors, we like to keep things simple and focus on what can be controlled, however such an approach leaves behind those at the margins of society.

Prof. Moshabela discussed the implications of multimorbidity for the redesign of health systems. A recent Lancet Global Health Commission argued that redesigning health systems is about creating health systems that are valued and trusted by all people<sup>8</sup>. The Commission articulated four opportunities: redesign service delivery; ignite demand; modernise education; and govern for quality – currently being enacted through ongoing initiatives including the Quality Evidence for Health System Transformation (QuEST) Network and Evidence Led Co-Created Health Systems Interventions for Multiple Long Term Conditions – Multimorbidity – Care (ENHANCE). Prof. Moshabela went on to consider the health system implications of multimorbidity, raising the concept of person-centred care. Patient-centred care means working with patients' beliefs and values, providing holistic care, having a sympathetic presence, adopting shared decision-making processes, and sustaining engagement. While there has been success in the context of HIV, this has not yet been the case in other areas of health (e.g., drug-resistant TB). Such failures reflect the continued prioritisation of clinical perspectives and a failure to consider patients' values and needs. Person-centred care for multimorbidity requires multidisciplinary perspectives, decentralised care models, and recognition of the local context of medical pluralism.

The talk ended with a focus on medical education. Prof. Moshabela argued that medical education has repeatedly failed to honour the social contract between medicine and society to serve the needs of patients, as was exemplified by the case of long COVID. He discussed ways in which medical education prevents patient-centred care, including not only the explicit disease-centred curricula around separate diseases and organ systems but the hidden curriculum that teaches and reproduces hierarchies of knowledge and expertise, in which patients get caught in the middle. There is a need for change in medical education to break down and flatten hierarchies between physicians and non-physician health workers, adopt team-based learning approaches, and to strengthen the feedback loops between medical education and community needs through continuous professional development. This is currently being enacted through educational reform programmes including SWITCH (Strengthening the Workforce to Improve Treatment and Care of HIV).

In summary, multimorbidity means we cannot do business as usual. Multimorbidity is not an end in itself, but an important milestone in the transformation of health systems to meet people's needs. Prof. Moshabela stressed that his aim was not to give definitive answers, but rather to highlight issues to be addressed during the workshop.



## Session 1. Concepts and framings of multimorbidity

*Chair: Professor Alan Silman (University of Oxford)*

The first session on day two set the scene for the rest of the workshop by exploring the meaning and utility of multimorbidity to different stakeholder groups, including patients and families, health workers, researchers, and policy-makers. With existing concepts and models of multimorbidity predominantly emanating from high-income settings in the global north, particular emphasis was placed on interrogating the possibilities and consequences of translocating the concept into lower-resource settings in sub-Saharan Africa. The session began with an ignition talk by Dr Christopher Bunn (Malawi Epidemiology and Intervention Research Unit and University of Glasgow) and Dr Edith Chikumbu (Malawi Epidemiology and Intervention Research Unit), which sought to ground the conversation in an appreciation of lived realities of patients and families in Malawi, the setting of the workshop. Participants then broke into smaller groups to answer several questions raised by the talk.

### Key points raised:

- A standard, 'one-size-fits-all' definition of multimorbidity may be neither possible nor beneficial for sub-Saharan Africa – some ambiguity and flexibility of definition needed for different spaces and situations
- Multimorbidity is more useful as a term for providers, academics, and policymakers, than for patients, for whom it may be less meaningful and perhaps harmful and stigmatising
- We need to move from disease-centred to person-centred framing of multimorbidity emphasising burden, function, and social context, which will be important for developing a common language between health providers and service users
- There is a need to consider families and carers within our models of multimorbidity, particularly in settings where care burdens are distributed among family and community as in many sub-Saharan African contexts
- Chronic complications of long COVID and other infectious diseases may be a useful model for thinking through multimorbidity in sub-Saharan Africa

### Ignition talk: Perspectives of patients and researchers on multimorbidity in the Malawian context

*Dr Christopher Bunn (Malawi Epidemiology and Intervention Research Unit and University of Glasgow) and Dr Edith Chikumbu (Malawi Epidemiology and Intervention Research Unit)*

Drs Bunn and Chikumbu highlighted that the term multimorbidity is predominately a clinical, epidemiological, and academic category. Thus, it is not a common feature of everyday discourse of people living with multiple conditions, neither in the United Kingdom nor in Malawi. At the same time, people living with multiple conditions talk about the multiplicity of illnesses and sometimes reflect on the relationships between their conditions. This is an area that needs more research in Malawi and the wider region.

Based on qualitative research with patients in urban and rural Malawi<sup>9</sup>, the speakers explored sociological concepts that have helped to explain and frame patient experiences of multimorbidity. Concepts explored include:

- 'Biographical disruption'<sup>10</sup>, which emphasises the way (multiple) chronic diseases erode hope, certainty, and sense of self
- 'Narrative reconstruction'<sup>11</sup>, referring to the sense- and self-(re)making that is required to adjust to living with multiple diseases
- Multimorbidity produces a 'treatment burden'<sup>12</sup> that includes navigating multiple providers, family and community support networks, out-of-pocket costs for medicines and care, lifestyle changes, and medicine prescriptions

Drs Chikumbu and Bunn characterise such experiences as the 'burden of lack of treatment'<sup>9</sup>. This may mean that multimorbidity poses a different challenge for patients than in high-income settings, where multimorbidity has been more commonly shown to result in challenges of too much medical intervention, including polypharmacy.

### Group 1: Is 'multimorbidity' a meaningful or useful idea to all these different groups – patients, providers, researchers, policymakers?

The group began by noting that the meaning and utility of multimorbidity may differ across different groups, between different levels of care, and potentially between prevention, diagnosis, and treatment. Some flexibility and ambiguity in concept/definition may therefore be needed for it to be useful for these many different purposes.

For patients and families, multimorbidity may provide a name or label for multiple symptoms experienced and thus provide validation of sickness, a route to improved care, and possibilities for advocacy and improved prioritisation. On the other hand, being labelled as having 'multimorbidity' could stigmatise patients and potentially function to devolve responsibility to them for having become sick and for securing care. What matters most to patients is likely not a label, but rather signs/symptoms, function, and wellbeing. Overall, the group concluded that multimorbidity could be harmful from a patient perspective, but that more research is needed.

In terms of clinicians, it was noted that the meaning and utility of the term may differ between specialists and generalists; particularly for the latter it is likely to be more useful if it emphasises signs, symptoms, burden, and function (e.g., pain, disability, sleep). These are not accounted for in the minimalist definition of multimorbidity as simply the presence of absence of conditions. It was highlighted that in sub-Saharan Africa, the starting point is not general practitioners (GPs) trained to manage multiple conditions with considerable resources, but rather non-physician health workers with more limited training managing large volumes of patients with limited resources. In such a context where doctors are sparse and resources few, multimorbidity is extremely challenging to action.

A concept of multimorbidity is also useful beyond the clinical encounter among academics, public health professionals, policymakers, and funders. It was suggested that well-defined concepts are especially useful in academia, which is needed for mapping and comparing disease clusters and for understanding interactions between conditions and drugs. For public health professionals and policymakers (discussed together), multimorbidity may be useful for reconfiguring services, developing training plans for health workers (e.g., promoting a generalist approach), and managing risks among the population. The concept also has significance for funders, notably for shifting from vertical to horizontal funding models. Overall, it was suggested that the utility of multimorbidity to different groups remains unclear, and we need an evidence-base to understand the advantages and disadvantages of the label among different groups.

#### Group 2: If we had perfect care for individual disorders, what added value does multimorbidity bring?

The consensus was that there is no perfect care for individual disorders. HIV has been the best example in low- and middle-income countries and set very high standards. It was suggested that multimorbidity is useful as a concept because treating diseases in isolation – even if well-treated – can compound the burden. This is because (well-treated) diseases tend to be prioritised at the expense of others, which are less visible and may go untreated. The example given was that in Malawi, at chronic kidney disease clinics, patients may be screened for hypertension but not for diabetes mellitus. Further, it was noted that symptoms rather than disorders are what matter most to patients, which multimorbidity as a concept can be useful for bringing into view. The group thus agreed that a multimorbidity lens adds value particularly where we have good (if not perfect) care for individual conditions.

#### Group 3: How should the patient perspective influence our view of multimorbidity?

The group agreed that patient perspectives are crucial to recognise to move beyond a disease-to a person-centred approach to multimorbidity. It was argued that a common language and indicators should be developed between communities and health systems, which is currently lacking from conversations around multimorbidity.

It is also important to recognise particularly in sub-Saharan African contexts that family, community, and caretakers are crucial, because they often shoulder as much of the burden of multimorbidity care as patients themselves. It was suggested that those same caretakers affected by the HIV pandemic may also be affected by NCDs themselves, raising the question of who is caring for the carers.

Examples from Uganda and Rwanda were provided that involved treating the family unit as a ‘government’ that had clearly defined roles and responsibilities that were allocated based on individuals’ capacities and the specific needs of the patient. Concerns were raised about the distribution of responsibility and the worry that responsibility for care could be placed on patients, families, and communities when many of the determinants of multimorbidity are found in structural inequalities and systemic factors in the organisation of care.

#### Group 4: Thinking about the chronic complications of long COVID (or other long-term consequences of infectious diseases), does that provide a model for thinking about multimorbidity in sub-Saharan Africa?

The group recognised that long COVID is an apt model for thinking about multimorbidity in sub-Saharan Africa, not only because of its prevalence, but because of its lack of recognition. Long COVID was not recognised as a disease in most of Malawi and other sub-Saharan Africa countries, and as a result its prevalence is unknown, and no interventions were in place to address it. In Malawi, it was treated as an acute/new disease because of a lack of COVID-19 data. This means that long COVID was not part of the community discourse in most countries as was the case in Europe. Similarly, Tanzania denied the presence of COVID-19 in May 2020 and stopped reporting COVID-19 cases to the WHO; consequently, due to missing data on COVID-19 cases, long COVID has not been on the agenda in the country. In summary the issues around reporting, recognition and (in)visibility is precisely why long COVID-19 is an appropriate model for multimorbidity in the region.

### Session 2. Population-level health data

*Chair: Professor Rashida Ferrand (Biomedical Research and Training Institute, London School of Hygiene and Tropical Medicine)*

The next session examined implications of a multimorbidity perspective in the production of population-level health data. With health data in sub-Saharan Africa generally collected along single-disease lines, with a historical bias towards infectious diseases (especially HIV, TB, and malaria), the session asked what types of shifts are needed in research methodologies, surveillance systems and routine information systems to better understand and respond to multimorbidity. The session began with talks by Professor Nicki Tiffin (South African National Bioinformatics Institute, University of the Western Cape) and Ms Tsaone Tamuhla (University of Cape Town, and South African National Bioinformatics Institute, University of the Western Cape) exploring possibilities for pragmatic multimorbidity research design and the establishment of virtual multimorbidity cohorts. Participants then broke into smaller groups to discuss questions raised by the talk.

#### Key points raised:

- The need to move from disease-centric, case-control study designs to longitudinal, person-centred research designs (e.g., population cohort studies)
- Importance of building on/adapting existing infrastructure while moving beyond siloed, disease-centric designs
- Importance of synergistic relationships between research and routine health information systems to avoid parallel research and healthcare data economies and loss of useful data
- Possibilities for building virtual cohorts to expand knowledge of multimorbidity
- Implications of cohort studies for informed consent for sample re-use

### Ignition talk: Exploring synergies between the health service and the research ecosystem: pragmatic multimorbidity research design

*Professor Nicki Tiffin (South African National Bioinformatics Institute, University of the Western Cape)*

In this talk, Prof. Tiffin discussed Africa's engagement with the rapid global advances in precision medicine and genomics research and how such research relates to growing interest in multimorbidity. Drawing on experience from the large-scale Human Heredity and Health in Africa (H3Africa) study, Prof. Tiffin noted that H3Africa has produced excellent data about NCDs and infectious diseases across the continent. Limitations of the case-control approach employed, however, include a focus on limited exposures and outcomes, lack of longitudinal participant data, limited opportunity for secondary use of data/samples for research into phenotypes other than that of the primary analysis, and, as a result, a single disease-centred perspective. Understanding multimorbidity in African populations requires a shift from disease- to patient-centred designs, which also includes understanding of access to care, environmental impacts, complex genomics, and changes over time.

Population cohort studies, while more expensive than case-control designs, can factor in multiple risk factors and outcomes of interest, have a strong temporal component enabling a life-course approach, and open possibilities of wide re-use of samples and data. This makes them particularly apt for multimorbidity research. Health research in population cohorts in an African setting can be facilitated by a synergistic relationship between research and health service delivery. This involves:

- Support for the health service and health care delivery by the research enterprise
- Avoid setting up parallel data ecosystems for research with loss of useful data from health care environment
- Routine health data, with consent of participants, can provide evolving longitudinal phenotype data for research, without costly follow-up visits
- Appropriate consent from participants can facilitate linkage of health data to genotype data

Initiatives seeking to put such pragmatic research designs into practice include The African Population Cohorts Consortium (APCC)<sup>13</sup> and the Western Cape Provincial Health Data Centre (PHDC). Prof. Tiffin described that the PHDC is a good example of leveraging the research ecosystem to build a data platform whose primary goal is patient care and health system strengthening, with some secondary use for academic purposes. While comparatively well-resourced, the PHDC demonstrates what may be possible in lower-resources settings across the continent.

### Ignition talk: Piloting the creation of a genotyped virtual cohort

*Tsaone Tamuhla (University of Cape Town and South African National Bioinformatics Institute, University of the Western Cape)*

Ms Tamuhla presented a feasibility study piloting the creation of a virtual cohort based on data from the Western Cape PHDC<sup>14</sup>. The study deployed a REDCap-based for tiered consent process<sup>15</sup>, which enabled standardisation of data capture tools in the survey format, fostered more collaborative research and data sharing, easier identification of the consent choices of participants and consequently more ethical onward use of specimens/data. Ms Tamuhla went on to show how longitudinal health data from PHDC can be used to study relations between diseases by integrating demographic, laboratory, pharmacy, and facility encounters, providing a more accurate picture of disease interactions in a population than through other research designs (e.g., case-control).

### Group 1: How can the health research ecosystem synergise with and support health services?

The first point raised was that it is important to ensure that research does not negatively impact health system functioning, which it has often done through drawing away time and resources from routine care and creating parallel structures. The group then identified key gaps that need to be bridged to synergise research and routine care:

- Knowledge-translation gap
- Policy-implementation gap
- Research-implementation gap

Structures are needed to enable and support the translation of multimorbidity research into policy and practice, with emphasis on reducing these three gaps. There was recognition that in some cases research may directly lead to changes in practice, and service evaluation may directly lead to changes in policy. Therefore, we need a system in place to support dialogue at all levels.

Key concepts raised within the discussion were co-creation, co-delivery, and co-evaluation of interventions between researchers, policymakers, providers, and families/communities. There needs to be space for the co-creation of research questions (rather than research questions being driven by researchers following literature reviews). Evaluation of services should be an inclusive, reflective space, in which data are available to all stakeholders including patients/families. This should bring data and people together across disciplines. Relating this back to the cross-disciplinary nature of multimorbidity, all components of the research, policy, practice, evaluation cycle requires teams – multidisciplinary teams at all levels, e.g., research teams, policy teams, practice teams, evaluation teams.



The group finally considered issues of resourcing and feasibility. There is need for a consensus view among different actors within the research-policy-implementation framework of what is and what is not feasible in terms of research and multimorbidity system interventions in different contexts (e.g., rural/remote vs urban). Further, there is need to consider what existing infrastructure could be used/adapted to study multimorbidity to optimise the use of available resources.

#### Group 2: How can we address issues of parallel health data ecosystems (research and healthcare) to best improve patient outcomes?

The group focused discussion on health information systems (HIS) and the importance of accuracy, continuity, and completeness of data for multimorbidity research and care. Unique patient identification is crucial, however this is a challenge in primary facilities which run different HIS from different programmes that are not interoperable. The Western Cape's HIS is such that patients have a unique health identification number where their information is readily available in government-run facilities. However, challenges for the Province's HIS include:

- Gaps in continuity of data between public and private sector, due to legislation that prohibits the sharing of data between responsible parties without the informed consent of health care clients
- Missing or incomplete data resulting from inconsistent digital platforms in different facilities and high mobility of the health care client population in and out of the Province, without linkages across provinces.
- A lack of capacity in public facilities for real-time analysis, which constrains up-to-date information to inform evidence-based care. It was noted that one of the roles of the Provincial Health Data Centre is the synthesis of data to form an evidence base for health systems planning and improved patient care
- Diseases are not well defined within the system due to limited ICD10 coding, making it difficult for others to search and use data

The group discussed in greater detail the challenge of defining diseases within the system to better recognise and respond to multimorbidity. There was a suggestion of using medicines to classify multimorbidity to simplify data collection in facilities for diseases that share the same drugs, such as hypertension and heart failure. However, given the diverse nature of multimorbidity conditions such as arthritis and chronic obstructive pulmonary disease (COPD), no consensus was reached among group members on which multimorbidities to combine in HIS.

Overall, it was agreed that to succeed in implementing multimorbidity care in sub-Saharan African countries, we need to address lacking or inadequate resources for accurate, consistent data collection in the health service. Furthermore, like group 1, the group agreed on the need to ask patients and healthcare

providers what multimorbidity disease outcomes are important to them before designing data collection tools. Finally, the group suggested that there is the need for researchers to translate research data into actionable solutions to inform and allow clinicians and other healthcare providers to make informed decisions from such research data.

#### Group 3: What existing infrastructure/ cohorts/ trials could be used/ adapted to study multimorbidity?

The group identified several initiatives that could be used/ adapted for multimorbidity science, including the APCC, Health and Demographic Surveillance Sites (HDSS), H3Africa, and the Age Through Africa cohort. It was proposed that smartphone-based data collection could be important in surveillance of multimorbidity moving forward. Limitations and challenges relating to existing infrastructure included: routine health data currently not fit for purpose; cohort studies difficult to access; parallel data systems weaken sustainability; and that Big Data is still a new concept with potentials yet to be realised.

### Session 3. Risk, Prevention, and Sites of Intervention

*Chair: Professor Clare Chandler (London School of Hygiene and Tropical Medicine)*

This session examined how multimorbidity inflects understandings of risk and its implications for disease prevention and sites of intervention. Motivating the session was the possible limitations of single exposure-outcome approaches that have traditionally been used to map diseases onto risks. The session asked whether multimorbidity might imply more multidimensional, non-linear causal models of pathogenesis and broaden possibilities for preventative interventions. The session began with an ignition talk by Prof. Nasheeta Peer and Prof. Andre-Pascal Kengne (South African Medical Research Council). Participants then divided into breakout groups to answer several questions raised by the ignition talk.

#### Key points raised:

- Need to move from 'modifiable risk factors' to broader structural and systemic determinants of health including the 'syndemics' framework
- Need to consider life course and intergenerational approach for primary and secondary intervention
- The concept of multimorbidity may not need to draw a distinction between 'communicable' and 'non-communicable' disease
- Screening approaches need improving for detection of multimorbidity including moving from 'yes/no' to more holistic nor person-centred inputs

#### Ignition talk: Converging epidemics of communicable and non-communicable diseases: risk and prevention

*Professor Nasheeta Peer and Professor Andre-Pascal Kengne (South African Medical Research Council)*

In this talk, Prof. Peer and Prof. Kengne discussed the challenge that converging epidemics of NCDs and infectious diseases poses, and its implications for risk and prevention. NCDs are a leading cause of death and disability worldwide, sharing underlying social and environmental determinants of health as well as modifiable and non-modifiable risk factors<sup>16</sup>. In the sub-Saharan African context, there are sharp rises in NCDs and associated risk factors, which are intersecting noxiously with the ‘unfinished agenda’ of infectious diseases.

There are strong associations between chronic infectious diseases (notably HIV and TB) and between chronic infectious diseases and NCDs. Fuelled by poverty and unhealthy lifestyles, the relationship is bidirectional, with the development of one condition influencing the development of the other – TB and HIV increase the risk of NCDs, and vice versa. The successful rollout of ART has dramatically increased life expectancy among people living with HIV, but has also led to new public health problems, including cardiovascular disease, diabetes, kidney and liver diseases, cancers, and mental illness. Cardiovascular disease is now the leading cause of death among people living with HIV. The pathways for cardiovascular disease involve ‘traditional’ risk factors and age-related changes, long-term infection by HIV itself, and ART toxicities. TB also has strong bi-directional risks with NCDs and NCD risk factors.

Prof. Peer and Prof. Kengne went on to discuss public health challenges to integrated care. TB and HIV clinics are already overburdened, and NCD clinics are not geared towards infectious disease care and are reluctant to screen for infectious diseases. Currently, there is a dearth of research on implementation strategies and the benefits of integrated services, and a need for research on optimal strategies for bi-directional screening and integrated management. There is a need for country-specific strategies for integrated services. These could involve pooled resources and coordination of care, which would lead to early case detection and improved treatment outcomes.

#### Group 1: Should the term multimorbidity make any distinction between infectious and non-communicable disease?

The group first discussed factors to consider when deliberating whether such a communicable/NCD distinction is useful or not for multimorbidity. These included: infectious agents often cause ‘non-communicable’ diseases and multimorbidity (e.g., viral hepatitis cirrhosis; schistosomiasis bladder ca/liver fibrosis), and vice versa; the extent to which any such distinction would matter to patients/families; and that the idea of ‘chronic’ that brings together diseases across the infectious/NCD divide within the definition of multimorbidity is commonly misunderstood – ‘long term conditions’ may be better. The group then debated when the distinction matters and when it does not, and when it could be harmful:

When the distinction matters:

- Understanding disease aetiology
- If infectious, knowing whether patients can pass it on

- If non-communicable, if there are lifestyle implications
- Understanding different treatment options
- The category of ‘non-communicable’ has had an advocacy role (although the distinction is itself part of why NCDs have been historically under-funded)

When it does not matter:

- From the patient’s perspective, a distinction may not always be relevant (e.g., function, wellbeing may be more important to patients)
- Similarly, from a clinical/public health perspective: when trying to understand overall multimorbidity impact (e.g., function/wellbeing).
- Distinction is not important for data management (or data storage)

When it might be harmful:

- The distinction is artificial and promotes the siloing of research and treatment when this does not reflect the intersecting nature of disease
- It creates a grading of diseases which must be addressed at different care levels (i.e., specialist care for NCDs only provided at hospital level)
- ‘Non-communicable’ is especially problematic as a category as it promotes a narrow focus on individuals and their lifestyles
- A focus on lifestyles in turn can lead to patient shaming and stigmatisation

Overall, the group concluded that the severity of multimorbidity is important rather than making a distinction between infectious and non-infectious disease. Similarly, the chronicity of multimorbidity is more important than making a distinction. The breakout group voted that multimorbidity should not draw a distinction between the two. Further, following reporting back to the wider participant group, the whole group also voted by a large majority against drawing a distinction in our concepts and understanding of multimorbidity.

#### Group 2: How might common disease origins (biological, social, environmental, etc.) offer an opportunity to address multimorbidity?

The group focused discussion on what could be tackled indirectly or earlier on to reduce the burden of multimorbidity. Discussion began with the observation that labelling some of the conditions related to multimorbidity such as hypertension and diabetes as ‘lifestyle’ diseases creates stigma and leads to patient shaming. Thus, we need to change the narrative of NCDs from being lifestyle-related to being dictated by life circumstances and built environments that cause conditions. It was argued that we need to be political about public health, however the group noted the challenges of systematically engaging with the political system. Concepts including

syndemics<sup>17</sup> as well as social determinants of health<sup>18</sup> can provide frameworks to understand and politicise common disease origins in the lived/built environment and shift the framing of NCDs/multimorbidity beyond individual behaviour.

Discussion drew on examples from different disease contexts. It was noted that in the context of TB, food insecurity, biological predisposition, and access to care have been used to identify patients/potential patients. The group also stressed the need to learn from the experiences during the COVID-19 pandemic of engaging with other sectors beyond public health, which could be adopted to address multimorbidity management in sub-Saharan countries.

Also debated was the role of public health messages about risk factors for multimorbidity. Social marketing approaches were discussed, including advertisement and use of marketing strategies to promote public health approaches and ideas. It was suggested that if we encourage people to understand impacts, slowly involve them using realistic approaches and language they can understand/relate to, this may enable them to see themselves in the pathways of illnesses. At the same time, it was recognised that many education/awareness campaigns tend to use a ‘fight fire with fire’ method, that often involves counter-productively shaming people into doing what is ‘best’ for them (e.g., breastfeeding – notable example of triggering people to do what we think they should do). We need to be mindful of wider context associated with what we propose.

**Group 3: Does screening have a role in the process of moving towards a holistic approach to multimorbidity?**  
The discussion began with the suggestion that the answer is certainly “yes”; the question should be about “how”. It was agreed that in the context of multimorbidity, screening needs to be comprehensive and integrated if it is to be holistic/person-centred. However, in low-resource settings, given limited resources, there is a need to prioritise what to screen for and at what point, considering optimal points along the life course for primary and secondary prevention. To avoid repetitive screening and wasting of time and resources, results should be shared among different providers (the example of communication of HIV results was given).

Current screening approaches are often sub-standard and need to be improved for the prevention of multimorbidity. Screening often involves symptom-based ‘yes/no’ inputs which results in missing the underlying causes/diseases and is in this sense neither holistic nor person-centred. As a way of assisting practitioners to make decisions around multimorbidity, the role of electronic decision support tools was then discussed. The Integrated Care for Older People Approach (ICOPE) app was identified as user-friendly app which generates an automatic care plan and is feasible to implement in low-resources settings. It was noted, however, that any protocolised linkage to care leaves a grey area requiring practitioners to think of the art as well as the science of medicine.

The group finally discussed the trade-offs of screening for multimorbidity. Most notably, there need to be sufficient

resources to screen and link patients to care. The group noted that the following are needed:

- Lab facilities, testing equipment, medication, availability of services
- Communication and key record-keeping
- Dissemination of information so that screening isn’t unnecessarily repeated

## Session 4. Health systems and care models

*Chair: Dr Felix Limbani (Malawi-Liverpool-Wellcome Trust Clinical Research Programme)*

The final session examined the implications of multimorbidity for the design of health systems and care models. The session began from the recognition that health systems in many sub-Saharan African countries have evolved as a composition of ‘vertically’ organised disease programmes, with a bias towards acute reactive care. The session asked how, when and by whom care should be delivered for more effective, equitable, and ‘person-centred’ multimorbidity care. It also asked what is currently designed into existing structures at local, national, and transnational levels that prevent or enable the realisation of such reforms to care. The session began with an ignition talk by Dr Edna Bosire (Aga Khan University, University of Witwatersrand) before the group divided into breakout groups to discuss questions raised by the talk.

### Key points raised:

- Care systems currently built around siloes of expertise based on single diseases, perpetuated by vertical funding models
- Disproportionate influence of northern interests in deciding health priorities
- Exclusion of patients/communities from the conceptualisation and design of healthcare
- Need for generalism, cultural and structural competence in medical training and continuous professional development
- Multimorbidity requires decentralised and person-centred care models – but these will not work unless the underlying structural/systemic challenges are addressed
- Greater inclusivity in policymaking, implementation and evaluation needed

### Ignition talk: Multimorbidity: A New Challenge for Health Systems in sub-Saharan Africa

*Dr Edna Bosire (Aga Khan University, University of The Witwatersrand)*

Dr Bosire commenced her talk by describing the context of multimorbidity in sub-Saharan Africa and how current systems of care in the region are poorly prepared to manage multimorbidity. She described how the systems are vastly under-resourced and are disease-oriented, with care built around siloes of expertise based on single medical conditions. She also

pointed out how community awareness of multimorbidity is low, which is compounded by the limited infrastructure, diagnostic capacity, and chronic shortages of trained healthcare personnel who can screen for comorbidities. This then means that often diseases are diagnosed late, leading to complications, hospitalisations, sub-optimal management of conditions and higher costs. While the primary care level is widely recognised as important for disease prevention, health promotion as well as self-management support initiatives, this level is largely underutilized due to systemic problems within the health system, already discussed. This then pushes patients with multimorbidities to higher levels of care – at secondary or tertiary levels – where care is more specialised. This is quite unnecessary and adds an economic burden to healthcare system, especially for patients who have already initiated treatment, those who do not need specialized care or those who can be easily supported for self-management at primary care levels.

The talk then turned to Dr Bosire's ethnographic work at a tertiary hospital in Soweto, South Africa<sup>19</sup>. Following increasing global recognition of the need for integrated care models, in 2011 South Africa introduced an integrated chronic disease management system (ICDM)<sup>20</sup>, which was piloted in several facilities across the country including the hospital in which Dr Bosire worked. This model aimed to improve operational efficiency, quality of care, and 'activate' patient to self-manage conditions. However, the programme aspirations were undercut by the same systemic challenges that have long fragmented and undermined care. The referral system did not work as expected, with patients who could be managed at community level receiving specialist care. Those at the hospital received fragmented and uncoordinated care involving multiple appointments at different clinics, with a considerable pill burden and conflicting information.

The challenge Dr Bosire commented is that the system defines people by their diseases (biomedical) without recognising the complexity of their socio-economic and cultural needs and circumstances. There is a need to move beyond such disease-centric approaches to person-centred care, which was defined as an approach where health care consciously works around patients' needs, responding to individual preferences and trying to ensure that patient values guide clinical decisions. As work in Soweto showed, this cannot be achieved when, on the one hand, the system is struggling with staff shortages, lack of resources etc., and on the other, patients can't afford transport or recommended diets by clinicians, and may also be struggling with an array of socio-cultural beliefs and perceptions towards their illnesses.

Dr Bosire went on to articulate the different areas to be addressed to enable patients to self-manage conditions, which is a core aspect of patient centred care:

- Patient empowerment and activation for self-management
- Patient involvement – patients and their families/caregivers must be part of treatment plans
- Recognising patients' context – socio-economic, cultural beliefs, literacy levels etc.

- Training clinicians in cultural and structural competence skills
- Strengthening primary health care to improve early screening and timely diagnosis
- Improve providers' working conditions – sufficient equipment, proper patient record systems, developing multimorbidity guidelines, improving human resource for health etc.
- Care for multimorbidity should be coordinated, with multidisciplinary teams working together and engaging in shared decision making

To actualise this in practice, Dr Bosire highlighted that a holistic complex of interventions is needed, combining clinical interventions (collaborative, coordinated and patient centred care), upstream solutions (food and tobacco policies, school food programmes, housing, security, etc.), downstream solutions (community support groups, eating healthy, physical activities), and community interventions (awareness, peer support groups). Such cross-sectoral efforts require considerable political will and greater prioritisation of multimorbidity.

#### Group 1: What is designed into the existing systems that might prevent or enable more 'person-centred' approaches to multimorbidity? Focus on: Training systems

The group discussed several dimensions of changes in medical training that are needed to respond to multimorbidity. Siloed training in medical institutions was noted as a particular barrier. It was noted that there is a gap in interdisciplinarity in medical training in most sub-Saharan African countries, as was also raised during Prof. Moshabela's keynote presentation. It was suggested that in the short-medium term, we may need to approach multimorbidity training through continuous professional development trainings of healthcare providers to create a shared vision and common grounds of multimorbidity patient care. Longer-term solutions will need to incorporate multidisciplinary training and greater emphasis on generalism in medical teaching institutions to meaningfully disrupt siloed training. It was however observed that this could be challenging given the pressures that students/universities/governments face to emulate specialism/super-specialism, which is the norm in high-income nations.

The group further argued for the need to expand the focus of discussions around multimorbidity training beyond physicians to nurses and community health workers, who provide the majority of care in sub-Saharan Africa. Regarding community health workers, it was argued that there is need to consider formalising, recognising, and building capacity among this group as they are burdened with a considerable amount of under-recognised care work and spend most of their time with patients in the community. Capacitating health workers to manage multimorbidity at lower levels of care could have both beneficial financial implications and further promote a move towards person-centred care by building in greater responsiveness to patient needs and cultural context. However, taking patients away from facilities may not be well accepted



by specialists, as was the case with shifts in patient care responsibilities in the context of HIV. This connects to points raised in earlier sessions about the need to contest siloes and hierarchies of expertise.

### Group 2: What is designed into the existing systems that might prevent or enable more 'person-centred' approaches to multimorbidity? Focus on: Service delivery systems

The group's discussion focused on four interconnected aspects of service delivery systems that need to be addressed to bring about more 'person-centred' systems: medical training, diagnosis/screening, resource limitations, and the influence of the global north. Similar to the first group's discussion, the need for generalist training was emphasised: health workers' training needs extend beyond specialist care and include in-depth training in managing diseases associated with certain symptoms and presentations. A focus on acute disease as well as a "lack of joined up thinking" was emphasised, relating particularly to the challenges of diagnosis/screening for conditions that share overlapping symptoms. It was suggested that health workers need to be trained to see beyond one acute disease and make inferences for other possible diagnoses related to the presentation of the patient.

However, the group recognised that resource limitations and unbalanced prioritisations currently prevent this. Human resources are overwhelmed, and there are insufficient resources in low-resource settings to screen for all possible diagnoses at primary level. The disproportionate influence of northern-based funders and non-governmental organisations was noted as a particular challenge. Certain conditions are prioritised by the funders, who get to decide the channels and the priorities for funding, with often little/no plan for sustainability. It was asked, if resources can be made available for HIV, why not other conditions? The priorities of non-governmental organisations (NGOs) often do not align with government priorities, yet the former take precedence since policy is overwhelmingly stacked towards the priorities/interests of the global north. There is a need for harmonisation between different actors and priorities if we are to develop a patient centred system.

### Group 3: What is designed into the existing systems that might prevent or enable more 'person-centred' approaches to multimorbidity? Focus on: Health policy

Much of the discussion focused on the need for more collaborative, inclusive and equitable policy making. Current challenges include:

- Policymaking tends to occur at a high level and implementation at lower level, but insufficient communication exists between levels
- Lack of links between policymakers and bedside providers
- Policy is not taught well in medical training, fuelling a disconnect between researchers, healthcare providers and policy makers

- Lack of inclusion of community perspectives in policy frameworks
- Lack of advocacy from civil society organisations

Based on these challenges, members of the group proposed a need for inclusive, multilevel consultation and involvement in policymaking and its implementation. This process could be facilitated by identifying and adapting policy frameworks/models which have been successful in the context of similar settings and health challenges.

### Cross-cutting themes

During the penultimate session of the workshop, participants were invited to identify and further refine core themes that emerged within and across the workshop's sessions. This was conducted in breakout groups, followed by plenary discussion. [Table 2](#) summarises the core and cross-cutting themes drawn by the participants.

### Next steps

In the workshop's final session, participants discussed what they would like to see moving forward, building on the insights, collaboration, and shared learning generated by the workshop. These fell under three categories: writing, training opportunities, and network creation and ongoing collaboration.

### Writing

- *Workshop Report.* A workshop report led by the rapporteurs that could serve as a legacy document of discussions held during the meeting
- *Special issue / collection.* The groups self-organised into different working groups to explore possibilities for writing papers based different themes emerging from the discussions that could form a special issue/collection. It was agreed that the drafting of these papers should be led by early career researchers, supported/mentored by more senior colleagues
- *Editorial or commentary.* A commentary piece in The Conversation could also be used to promote the special issue / collection for a wider audience.

### Training opportunities

- *PhD projects.* Numerous research needs and questions were identified during the workshop. These could form the basis of PhD/research degree projects.
- *Mentorship.* With participants including many prominent multimorbidity researchers across the region, mentoring opportunities for students / early career researchers were identified.

### Network creation and ongoing collaboration

- *Network.* The group expressed support for the creation of a multimorbidity network for facilitating ongoing

**Table 2. Core and cross-cutting themes.**

Domain	Core Themes	Cross-cutting
<b>Concepts and framings of multimorbidity</b>	<p>Definition of multimorbidity as ‘two or more chronic conditions’ is limited and perpetuates a narrow, disease-centric approach focused</p> <p>Models of multimorbidity need to be sensitive to what matters and is meaningful to patients/families – symptoms, needs, function, quality of life, social context</p> <p>Multimorbidity may be more and less useful in different spaces, e.g.</p> <ul style="list-style-type: none"> <li>• Policy level – could help with pushing for reconfiguration of services</li> <li>• Health care level – could help manage symptoms and function</li> <li>• Patient level – may not be so useful and potentially harmful / stigmatizing <ul style="list-style-type: none"> <li>◦ Important to distinguish medical and patient models; medical framings often translate poorly into lay terminology</li> </ul> </li> </ul> <p>Some flexibility / ambiguity in definition – or multiple definitions – may be needed</p> <ul style="list-style-type: none"> <li>• Part of the ‘art’ of multimorbidity may be centring diseases, people, and systems at different times and in different places and situations</li> </ul> <p>Multimorbidity lens useful for moving the conversation upstream from healthcare to the social determinants of health and the need for community-led advocacy / agenda-setting</p> <p>Multimorbidity allows us to see things that are amplified through it but are problems more generally</p> <p>Multimorbidity helps to avoid artificial distinctions, e.g., ‘communicable’ and ‘noncommunicable’</p> <p>Proposed working definition of multimorbidity: <u>“Clustering of needs and conditions that need to be addressed holistically rather than in isolation”</u></p>	<ul style="list-style-type: none"> <li>• <i>From universal definition to flexible, context-specific definitions</i></li> <li>• <i>From disease-centred to person- and family-centred approach across the spectrum of policy, research, training, and care</i></li> <li>• <i>Reframing of multimorbidity determinants from ‘modifiable lifestyle factors’ to social and structural determinants</i></li> </ul>
<b>Population health data</b>	<p>Need to move from disease-centric, cross-sectional study designs to longitudinal, person-centred research designs (e.g., population cohort studies)</p> <p>Need to leverage existing resources and infrastructure that can be reframed and used with a multimorbidity lens</p> <p>What is counted determines what will be known and what will remain invisible – caution needed in designing inclusion criteria and outcome measures</p> <p>Importance of synergistic relationships between research and routine health information systems to avoid parallel data economies and loss of useful data</p> <p>Design of databases/tools</p> <ul style="list-style-type: none"> <li>• Data siloes an artefact of the way databases have been designed around diseases/episodes rather than the patient</li> <li>• Databases / tools need to be integrated and designed according to end user needs</li> </ul> <p>Data should be held / accessible by patients, and they should be included in discussions in what happens to their data</p> <p>Multimorbidity calls for different ways of knowing – not only through maps and stats, but known through lived experiences of nurses, clinicians and patients and families. Need to consider how this can be incorporated into how we think about data</p>	<ul style="list-style-type: none"> <li>• <i>From cross-sectional /case-control research to life course / longitudinal data</i></li> <li>• <i>Leveraging existing resources and infrastructure rather than creating parallel structures / overhauling the system</i></li> </ul>

<b>Risk, prevention, and sites of intervention</b>	<p>From lifestyles to lived and built environment:</p> <ul style="list-style-type: none"> <li>• Need to avoid the trap of blaming individuals for their behaviours and 'lifestyles'</li> <li>• Instead need to point to societal drivers, living conditions, and built environment.</li> <li>• Data that could help advocate for changes to the lived / built environment include health economics data and sub-Saharan African specific patient-reported outcome measures (PROMs) and multimorbidity treatment burden questionnaires</li> <li>• Identify policies that make it easier to be healthier and more affordable such as taxes whilst avoiding authoritarianism</li> </ul> <p>Consider what we are trying to achieve – high quality of life up to its end, rather than a gradual decline</p> <ul style="list-style-type: none"> <li>• Maintain optimal functionality within multimorbidity</li> <li>• Address vulnerability from the determinants of multimorbidity</li> <li>• Overlap with broader goals for sustainable development goals and achieving human rights</li> </ul> <p>Life-course approach</p> <ul style="list-style-type: none"> <li>• Apply a life-course approach to maximise quality of life and maintain it from infancy to adolescence to adulthood – as well as intergenerational risk assessment</li> <li>• Need to work together to reduce risk – and increase ability to get care – which is entangled in the multigenerational relations that define life environments</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Promoting a synergistic relationship between research and routine care ecosystems</i></li> <li>• <i>Challenging of hierarchies and siloes of knowledge and expertise</i></li> <li>• <i>Strengthening generalism and cultural / structural competency in medical training</i></li> </ul>
<b>Health systems and care models</b>	<p>Health systems made up of siloes of expertise built on single conditions, driven by disease-centric outcomes of vertical programmes</p> <p>Need for patient- and family-centred care</p> <ul style="list-style-type: none"> <li>• Improving strength of referral systems (shorter term) and upskilling at primary and community-level to manage multimorbidity (longer term)</li> <li>• Strengthening generalism in medical training as well as cultural and structural competency <ul style="list-style-type: none"> <li>• Patient-centred care needed, but also recognising the shared burden on families/carers, who need to be involved in the process</li> </ul> </li> </ul> <p>Breaking down siloes and hierarchies of expertise</p> <ul style="list-style-type: none"> <li>• Need for specialists to relinquish 'ownership' over diseases (especially within the '-ologies')</li> <li>• Legitimacy of patient/family knowledge/expertise</li> <li>• Co-creation, co-delivery, and co-evaluation of interventions between researchers, policymakers, health workers and patients/families</li> </ul> <p>Opportunities to leverage existing services / models</p> <ul style="list-style-type: none"> <li>• HIV prommmmmgramme could be a model to horizontalize e.g., screening</li> <li>• Some things could happen before overhaul of the system e.g., picking up depression alongside other conditions if expectations are set for multiple things to be addressed within consultations</li> <li>• Risks of destabilizing a programme that is currently working well (e.g., HIV)</li> <li>• Danger however of crude transplantation e.g., from HIV to multimorbidity</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Advocacy, co-creation, and exhaustive stakeholder engagement</i></li> <li>• <i>Resources limitations and economic considerations- what is viable in a resource-limited setting</i></li> <li>• <i>Challenging northern dominance in shaping priorities, policy, and practice</i></li> </ul>

collaboration among the group and expanding membership further. The idea of mobilising as an alliance was proposed.

- *Website/listserv*. A website and/or email listserv was proposed as a platform for the network/alliance, for which additional funding could be sought
- *Funding/grants*. The workshop/network could be used as a platform for future research, training, and capacity development grants
- *Events*. Workshop/network could further lead to more events e.g., conferences and symposia, which could be especially useful towards the end of the funding cycle.

## Data availability

### Underlying data

No data is associated with this article.

### Extended data

Harvard Dataverse: Multimorbidity Research in Sub-Saharan Africa: An Interdisciplinary Workshop: Supporting Documents. <https://doi.org/10.7910/DVN/YVO7SW5>.

Data are available under the terms of the [Creative Commons Zero "No rights reserved" data waiver](#) (CC0 1.0 Public domain dedication).

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