Competencies and applicability of the Master of Public Health (MPH) qualification. A qualitative study of graduates from South African Universities

Grace Paidamoyo Gwini

Student Number: GRWGRA001

Submitted in partial fulfilment of the requirements for the degree
MASTER OF PUBLIC HEALTH
(Health Systems Specialisation)
At
UNIVERSITY OF CAPE TOWN
14 February 2025

Supervisors:

1. Associate Professor Maylene Shung-King, School of Public Health, University of Cape Town
2. Professor Takalani Tshitangano, School of Health Care Sciences, University of Limpopo.
3. Dr Janine White, School of Public Health, School of Public Health, University of Witwatersrand

Plagiarism Declaration

I, Grace Paidamoyo Gwini, hereby declare that this work is entirely my own and has not been copied or plagiarized in any way from any source. Any material derived from or quoted from other sources is properly acknowledged and referenced. I understand the consequences of academic dishonesty and affirm my commitment to maintaining the highest standards of integrity in my work.

Signature:	Grace Gwini	Date: 12 February 2025	
Student Name:	Grace Paidamoyo Gwini	Student Number:	GRWGRA001

Acknowledgements

First and foremost, I would like to express my deepest gratitude to God, who gave me the strength to persevere with this thesis even when I felt weak in spirit. He has also helped me through numerous changes in my life, such as moving countries and adapting to a new culture. His guidance and support have been my constant source of strength.

I would like to extend my heartfelt thanks to my supervisor, Maylene Shung-King, who was not only there to teach and supervise but also to show me immense compassion. At times, our sessions felt like therapy, providing much-needed solace. I deeply appreciate her patience, understanding, support, constructive advice, and the confidence she placed in me throughout this journey.

My sincere gratitude goes to my co-supervisors, Janine White and Takalani Tshitangano, for their support and encouragement in helping me navigate the challenges of this thesis. Your guidance has been priceless.

I would also like to acknowledge Virginia Zweigenthal, the principal investigator of the parent study, and the broader project team: Prof Laetitia Rispel, Prof Nicola Christofides, Dr. Thembelihle Dlungwane, Ms. Nikki Schaay, Prof Mathildah Mokgatle, Prof France Matala, Dr. Sean Patrick, and Dr. Abraham Opare. Your collective efforts, guidance, and contributions to the broader project have been instrumental in shaping the foundation upon which this work is built.

Additionally, I am profoundly grateful for the funding support from the South African Medical Research Council, which provided the resources needed for this research. Your support was critical in ensuring the successful completion of this project.

I would also like to extend my thanks to the lecturers who guided me through my coursework, with a special mention to Lucy Gilson. Her passion for Health Systems and Policy ignited my own interest in the field and simplified complex concepts, making them approachable and engaging.

I am profoundly grateful to Melisa Bhebe, whose accountability, untiring support, and advice kept me motivated. Her belief in my ability to complete this thesis gave me the courage to push through.

To my parents, Annah and Paul Gwini, my deepest thanks for allowing me to dream and pursue everything I have ever wanted in life. Your support has been a constant source of inspiration and strength.

This thesis has been a challenging journey, and I am deeply grateful to those who stood by me and provided their support: my dear friends Maria Nakalanda, Ozzy Moyo, Tafadzwa Dzingwe, Tamuka Chekero, and Christabel Kunzekweguta. Your faith in me has been a beacon of light, guiding me forward when times were tough. Thank you all for being part of this journey with me. Your support has been immeasurable, and I am forever grateful.

List of Acronyms

ASPPH	Association of Schools and Programs of Public Health
CEPH	Council on Education for Public Health
HIC	High-Income Country
HRH	Human Resources for Health
HS	Health System
HSS	Health Systems Strengthening
LMIC	Low- and Middle-Income Countries
MPH	Master of Public Health
NDoH	National Department of Health
NGO	Non-Governmental Organisation
NHI	National Health Insurance
PH	Public Health
PHC	Primary Health Care
SDG	Sustainable Development Goals
SOPH	School of Public Health
SSA	Sub Saharan Africa
UHC	Universal Health Coverage

List of Appendices

Abstract

Background: The COVID-19 pandemic underscored the critical role of public health professionals in mitigating the crisis and exposed significant weaknesses in global healthcare systems. Graduates with Master of Public Health (MPH) degrees and other public health qualifications played pivotal roles in pandemic response, contributing to surveillance, policy development, community engagement, and health systems strengthening. This study evaluates the competencies of MPH graduates from South African universities, assesses their preparedness for public health roles, and explores the rationale for integrating qualitative COVID-19 study components to enhance understanding of their contributions.

Methods: This qualitative exploratory study involved in-depth, one-on-one interviews with 40 MPH graduates from eight South African universities. Data were collected between 2021 and 2022 as the qualitative component of a larger mixed-methods study on the competencies and applicability of MPH training in South Africa. Participants were purposively selected to ensure diversity in institutional background, years of graduation (pre-2012 and post-2016), gender, and nationality. Interviews were conducted using a semi-structured guide, audio-recorded with consent, transcribed verbatim, and anonymised. Thematic analysis was conducted using a collaboratively developed codebook to identify key roles, competencies, and training gaps reported by graduates.

Results: MPH graduates have taken up roles in international organizations, NGOs, local governments, and academia. Their MPH degrees facilitated career advancement by equipping them with leadership, management, research, analytical, and communication skills. However, gaps in practical training, advanced data analysis, program management, and emergency preparedness were identified. Graduates emphasized the need for more hands-on training and specialized skills development to align with evolving workplace demands.

Conclusion: The MPH program is integral in preparing graduates for diverse public health roles, enabling them to influence policy and practice while fostering career growth. Addressing identified gaps through enhanced practical training and aligning curricula with employer needs are crucial to ensuring graduates can effectively tackle contemporary public health challenges. These improvements will strengthen health systems and improve population health outcomes, particularly in the face of future public health crises.

Table of Contents

Manuscript

Proposed Journal: *SSM - Health Systems*

Competencies and applicability of Master of Public Health (MPH) programmes: A qualitative study of graduates from South African Universities

Authors: Grace Paidamoyo Gwini, Takalani Tshitangano, Janine White, Maylene Shung-King

---

Abstract

Background: The COVID-19 pandemic underscored the critical role of public health professionals in mitigating the crisis and exposed significant weaknesses in global healthcare systems. Graduates with Master of Public Health (MPH) degrees and other public health qualifications played pivotal roles in pandemic response, contributing to surveillance, policy development, community engagement, and health systems strengthening. This study evaluates the competencies of MPH graduates from South African universities, assesses their preparedness for public health roles, and explores the rationale for integrating qualitative COVID-19 study components to enhance understanding of their contributions.

Methods: This qualitative exploratory study involved in-depth, one-on-one interviews with 40 MPH graduates from eight South African universities. Data were collected between 2021 and 2022 as the qualitative component of a larger mixed-methods study on the competencies and applicability of MPH training in South Africa. Participants were purposively selected to ensure diversity in institutional background, years of graduation (pre-2012 and post-2016), gender, and nationality. Interviews were conducted using a semi-structured guide, audio-recorded with consent, transcribed verbatim, and anonymised. Thematic analysis was conducted using a collaboratively developed codebook to identify key roles, competencies, and training gaps reported by graduates.

Results: MPH graduates have taken up roles in international organizations, NGOs, local governments, and academia. Their MPH degrees facilitated career advancement by equipping them with leadership, management, research, analytical, and communication skills. However, gaps in practical training, advanced data analysis, program management, and emergency preparedness were identified. Graduates emphasized the need for more hands-on training and specialized skills development to align with evolving workplace demands.

Conclusion: The MPH program is integral in preparing graduates for diverse public health roles, enabling them to influence policy and practice while fostering career growth. Addressing identified gaps through enhanced practical training and aligning curricula with employer needs are crucial to ensuring graduates can effectively tackle contemporary public health challenges. These improvements will strengthen health systems and improve population health outcomes, particularly in the face of future public health crises.

1. Introduction

The Public health workforce is critical to any country's health system. Well-trained public health professionals are needed to perform essential public health functions, including health promotion, disease prevention, health protection, and population health assessment (Kumar & Preetha, 2012). The COVID-19 pandemic has highlighted the critical importance of public health, revealing significant shortcomings in healthcare systems worldwide (Burstrom and Tao, 2020; Mendelson et al., 2020; Ozili, 2020; Weintraub, President and Bitton, 2020; Wong et al., 2020; Zhong et al., 2020; McClellan et al., 2021; Frenk et al., 2022). This has underscored the need for global investment in trained public health personnel with the knowledge and skills to strengthen healthcare systems for optimal service delivery, and in particular in times of health crises.

Public health is a unique amalgamation of disciplines, bringing together diverse perspectives and experiences to identify the root causes of health issues and devise innovative, long-term solutions that enhance the quality of life for all (Tulchinsky & Varavikova, 2014). It includes epidemiology, statistics, sociology, health economics, general practice, nutrition, pharmacy, nursing, health policy, health system analysis, and environmental health. Governments, NGOs, multilateral institutions, the private sector, universities, health facilities, ministries of health, professional associations, and health policy institutions carry out public health initiatives. These organizations promote health system responsiveness, equity, and resilience, underscoring the critical importance of public health institutions in achieving health system goals.

The Master of Public Health (MPH), one of the postgraduate public health qualifications, is essential in equipping professionals with multidisciplinary skills to address complex health challenges (Dlungwane et al., 2017a; Dlungwane & Voce, 2020; Zweigenthal et al., 2016). Through training in epidemiology, biostatistics, health policy, and leadership, amongst others, the MPH program fosters the development of leaders capable of designing, implementing, and evaluating public health interventions that are responsive to community needs and adaptable to evolving health landscapes (Galaviz et al., 2016). By bridging theory and practice, the MPH empowers graduates to strengthen health systems, reduce health disparities, and improve population health, playing a crucial role in building resilient and equitable health systems globally.

Public health professionals develop their competencies through a blend of formal academic education most commonly diplomas, master's, and doctoral degrees offered by academic institutions,as well as practical, on-the-job training. Increasingly, workforce development initiatives are placing greater emphasis on experiential learning within health departments and public health agencies (Hemans-Henry et al., 2016a; Mase et al., 2018). Despite the diversification of learning pathways, the Master of Public Health (MPH) continues to be the most globally recognized and prevalent leadership qualification for public health practitioners (Dlungwane et al., 2017a; Dlungwane & Voce, 2020; Zwanikken et al., 2014, 2016). The Master of Public Health (MPH) degree is a key qualification globally, designed to prepare graduates for roles in the health system and beyond (Zweigenthal et al., 2016). However, few evaluations exist on the extent to which

these programmes equip graduates for the roles they are expected to play in the various workplaces in which they find themselves (Brits, 2018; Cheng et al., 2022; Tomlinson, 2012).

2.1 The MPH qualification in South Africa

The Master of Public Health (MPH) serves as both a professional entry point into the field of public health and a pathway to leadership and management roles within health systems. While it offers foundational competencies for aspiring public health practitioners (Dlungwane et al., 2017a; Dlungwane & Voce, 2020; Zwanikken et al., 2014, 2016), it also appeals to professionals seeking to enhance their strategic, managerial, and policy-making capacities in broader health service contexts. Recognising these dual purposes is essential to understanding the MPH's multifaceted role in health workforce development. Master of Public Health graduates bring a population-focused perspective to various employment settings, encompassing public health research and practice roles, including health policy and systems, management, and health service planning (Wright et al., 2008). In a study by Zwanikken on the impact of MPH programs in low- and middle-income countries (LMICs), it was observed that MPH graduates made significant contributions in their workplaces, with some even influencing national-level initiatives (Zwanikken et al., 2014).

The MPH program is vital in building capacity and strengthening evidence-based public health practice due to its significant research component (Diderichsen, 2018; Gebbie et al., 2002). Graduates of the MPH degree further contribute to policy-making and administration across all tiers of public health through their engagement in policy development and advocacy, program evaluation, and implementation of health impact assessments (Hawks & Gast, 2018; Komro et al., 2018; Zwanikken et al., 2016; Zweigenthal et al., 2016). The MPH program further instills an understanding of the socio-ecological determinants of health (Rao et al., 2020),distinguishing it from clinical training. However, given the diverse backgrounds of individuals entering the field, there is a need to develop competencies tailored to the MPH qualification, considering the various sectors in which MPH graduates can be employed.

In South Africa, the MPH degree is viewed as a key program for developing competent professionals who can contribute to strengthening the health system (Dlungwane et al., 2017). This significance stems from the acute need for enhanced leadership, management, and governance capabilities within the public health workforce to improve health outcomes (Coovadia et al., 2009).

The South African Human Resources for Health strategy recommends strengthening public health education to produce competent graduates who can address population needs and advance health systems goals (National Department of Health (NDoH), 2020). However, there is limited insight as limited research has been done on how well MPH graduates are prepared for their roles in the health system through the MPH programs and what MPH graduates' perspectives regarding the appropriateness and applicability of their training to workplace requirements. While eleven universities offer MPH programs, there is a lack of standardization in competencies and outcomes across institutions (Dlungwane et al., 2017b). The list of universities that offer MPH programs in South Africa is given in Appendix 4, a description of courses that are

offered at each institution. Core competencies are essential for evaluating and improving the skills of public health professionals, providing a strategic advantage in the job market, and instilling confidence in employers (Calhoun et al., 2008). Although core competencies have been developed in regions like the US, Canada, Europe, and the UK (Fattahi et al., 2020), there is a need for contextually relevant competencies in low- and middle-income countries (LMICs) due to unique social determinants of health and healthcare challenges (Kaba, Assefa, Yigzaw, kitaw, et al., 2020). Currently, no set of core competencies exists for MPH programs in South Africa, highlighting a gap that could be addressed through region-specific frameworks.

The rationale for this study was to fill a critical gap by exploring the preparedness of MPH graduates from South African universities for their roles in the health system. With participants drawn from South Africa and other African countries, understanding competency gaps and how MPH training can better align with workplace demands offers valuable insights for program reforms that can strengthen struggling African health systems. Beyond addressing immediate needs, such as those revealed during the COVID-19 pandemic, this study contributes to a broader understanding of how MPH training can prepare graduates for a wide range of public health challenges. While the broader project included an opportunity to assess graduates' perceived competencies in relation to the COVID-19 pandemic, this study deliberately focused on alumni perspectives in general to ensure its findings remain relevant across diverse health system contexts. Ultimately, the study contributes to ongoing efforts to develop a core competency framework for Master of Public Health (MPH) programs both within South Africa and potentially adaptable across the African continent thereby enhancing workforce preparedness and strengthening the resilience of public health systems in these contexts.

The study aimed to describe the roles assumed by MPH alumni post-graduation and the competencies required to fulfil their responsibilities. It explored their perspectives on whether their MPH training adequately equipped them for their health system roles, providing insights for strengthening curricula and enhancing workforce preparedness. The specific objectives were: 1) To explore the roles MPH alumni occupy after completing their degree; 2) To describe the preparedness of alumni for their respective jobs/roles; and 3) To identify strengths and gaps in MPH training as highlighted by alumni.

2. Methods

2.1 Approach, design, setting and participants

This qualitative exploratory study utilized in-depth interviews to delve into the experiences of graduates from South African Master of Public Health (MPH) programs. It forms part of a larger project titled "Competencies and Utilities of Master of Public Health (MPH) Learning: A Study of Graduates from South African Universities." The overarching project examines the competencies of MPH graduates and their perspectives on the value and applicability of their training. Data collection for this study commenced during the COVID-19 pandemic, offering a unique opportunity to explore graduates' perceptions of their preparedness and role in public health during a global crisis.

Forty interviews were conducted with alumni who graduated before 2012 or after 2016. This sampling strategy was intentionally crafted in relation to the broader study which surveyed MPH graduates from 2012 to 2016. The decision to exclude the 2012–2016 cohort from the qualitative interviews was both methodological and strategic. The qualitative and quantitative arms were conducted concurrently, and interviewing the same group could have led to respondent fatigue or response contamination. By drawing on graduates from distinct timeframes, the study avoided this overlap, ensured clearer delineation between the datasets, and broadened the range of perspectives captured. Additionally, comparing earlier and more recent graduates provided insight into how MPH training, public health challenges, and policy contexts have evolved over time.

This qualitative component allowed for deeper exploration of the themes identified in the broader project, particularly how graduates perceive the relevance and utility of the MPH in their work settings. Graduates from the pre-2012 and post-2016 cohorts offered rich perspectives on national health reforms, curricular changes, and shifting workforce expectations across different time periods.

The collaborating universities included Sefako Makgatho University, University of Cape Town (UCT), University of KwaZulu-Natal (UKZN), University of Limpopo, University of Pretoria (UP), University of Venda (UNIVEN), University of the Western Cape (UWC), and University of the Witwatersrand (WITS). These universities offer MPH programs designed to address public health challenges in South Africa and Africa.

Participants were purposively recruited to ensure diversity, including representation from different institutions, different study years, and both South African and other African nationals. At least five alumni were recruited per institution. Efforts were made to ensure a gender balance, though the final distribution reflected availability and willingness to participate. If email addresses were unavailable, phone contact was used. Interested participants received an informed consent form outlining the study's objectives, risks, benefits, and permission to record interviews. Participation was voluntary, and participants could withdraw at any time without consequences. Selected participants were willing, responsive, and available for interviews.

2.2 Data Collection

The primary data collection method for this study was in-depth, one-on-one interviews—a qualitative approach that elicits rich, detailed information about participants' behaviours, attitudes, and perspectives. The semi-structured interviews were guided by a themed topic guide (see Appendix

5), allowing interviewers to explore areas relevant to the experiences of MPH graduates while also providing the flexibility to delve into topics raised spontaneously by participants. Each interview lasted between 30 and 75 minutes, depending on the depth of responses and the issues explored, providing ample opportunity to cover the key themes while respecting participants' time and engagement.

The interviews were conducted by a team of experienced qualitative researchers and principal investigators (PIs) affiliated with the participating academic institutions. This approach ensured methodological consistency and rigor across all study sites. Interviews were audio-recorded with participant consent, transcribed verbatim, and anonymised prior to analysis.

I joined the research team after the completion of the data collection phase. As such, I was not involved in conducting the interviews. However, I worked directly with the raw, unanalysed transcripts, contributing to the design and execution of the qualitative analysis. In collaboration with the broader research team, I helped develop the codebook, drawing from both the study objectives and inductively identified themes that emerged from an initial review of the data.

I was responsible for preparing the transcripts for analysis, including data cleaning and organisation. I independently coded the interview transcripts using the finalised codebook and conducted a thematic analysis to identify, group, and interpret recurring patterns across the dataset. I synthesised the findings and drafted the results, and prepared the manuscript which forms the main body of this thesis.

Although I did not participate in the primary data collection, I conducted qualitative analysis and contributed to the synthesis of findings and drafting of the results.

This model of engagement—where students work with primary data collected within a larger research project—is a common and accepted approach within MPH programmes, particularly those involving multi-site studies. My role reflects standard research practice, wherein the analytical component offers significant scope for scholarly contribution and original interpretation.

2.3 Data Analysis

Thematic analysis was used to analyse qualitative data from interviews in the parent study. Audio recordings were transcribed with Otter AI software, and patterns and themes were identified in the transcribed data using a pre-existing codebook for deductive coding.

The steps of thematic analysis followed the guidelines proposed by Braun and Clarke, which encompassed familiarization with the data, code generation, theme generation, theme review, and theme definition and naming (Braun & Clarke, 2006). MS Excel was used to capture and organize the coded data from interview transcripts, enabling efficient sorting and filtering for comparisons across transcripts. The research team initially interpreted the data and developed key messages for each code. A workshop with members from each participating institution further refined the analysis, identifying additional themes that contributed to two empirical papers, including this one.

2.3.1 Analysis Steps

1. **Familiarization with Data**: The research team consisted of experienced researchers from the parent study, including the principal investigator, Virginia Zweigenthal, and the broader project team (Prof. Laetitia Rispel, Prof. Nicola Christofides, Dr. Thembelihle Dlungwane, Ms. Nikki Schaay, Prof. Mathildah Mokgatle, Prof. France Matala, Dr. Sean Patrick, and Dr. Abraham Opare). This team conducted the initial interviews and developed a thematic codebook based on the data. As a researcher working on this thesis, I analyzed data from the parent study with one other student from the University of Witwatersrand, who used the same interview data to investigate MPH graduates' roles during the COVID-19 pandemic. The thematic codebook developed by the research team served as a foundational guide for our analysis. To ensure a comprehensive understanding of the data and themes, I participated in a workshop with the MPH student and research team members. This workshop allowed us to engage collectively with the data, clarify themes, and refine the coding framework. My role specifically involved applying the thematic codebook to analyze the data, contributing insights to the discussion, and incorporating these themes into the analysis presented in this thesis.
2. **Generating Codes and Themes**: The coding process was collaborative. The researcher led initial coding using a deductive approach based on the parent study's codebook while the broader team reviewed and refined the codes. The team also validated new inductively identified codes. Codes were organized and managed using Excel.
3. **Reviewing Themes**: The team reviewed, modified, and developed themes to ensure coherence and accuracy. This involved discussions and workshops, where overlapping data were clustered and themes refined for robustness and alignment with the research objectives.
4. **Defining and Naming Themes**: Finalizing the themes was collaborative, with the team ensuring each theme captured the data's essence. Short data extracts were paired with themes, and all team members provided input to ensure accuracy and relevance.
5. **Producing the Report**: The report was produced through a systematic, collaborative analysis. Excel organized respondent answers, aiding data interpretation and theme development. The wider research team participated in the final stage to ensure interpretations and conclusions aligned with the broader research goals.

2.4 Ethical Considerations

Based on the Declaration of Helsinki, ethics approval for the research was obtained from the Human Research Ethics Committee (HREC) of the University of Cape Town (HREC: 630/2018). The following ethical considerations were carefully addressed in the handling and analysis of previously collected primary data:

1. **Informed Consent and Data Usage Permissions:** The primary data used in this study was collected with informed consent, where original participants were made aware of the potential for their data to be used in future research. The consent process for the primary data collection ensured that participants understood how their information could be reused or reanalysed for research purposes, in line with ethical standards for data reuse. No additional consent was required for this analysis, as permissions were appropriately obtained during the initial data collection.
2. **Confidentiality and Anonymity:** Protecting the confidentiality and anonymity of individuals represented in the dataset was a top priority. The original dataset was de-identified, with all

personal identifiers removed or masked by the primary researchers to prevent re-identification of participants. In this analysis, additional care was taken to avoid presenting any information that might inadvertently reveal participants' identities. Data was only presented in aggregated or anonymized form, ensuring that findings could not be traced back to specific individuals.

3. **Data Security and Access Control:** As with all sensitive data, secure storage and restricted access were maintained for the dataset. The data was stored on password-protected systems, accessible only to the research team involved in this analysis. These security measures ensured compliance with data protection regulations and the ethical guidelines of the University of Cape Town.
4. **Respect for Original Data Context and Integrity:** In research, it is critical to respect the context and intent of the original data collection. The researchers took care to analyse and interpret the data within the bounds of the primary study's aims and the consented use cases. This approach helped to avoid any misrepresentation of participants' experiences or perspectives, honouring the integrity of the original data and its context.
5. **Transparency and Honesty:** The research team made transparent any limitations inherent to conducting research, particularly regarding the contextual understanding of participants' responses. Any interpretations or conclusions drawn from the data were framed with awareness of these limitations, ensuring that readers are informed of the nature of the analysis.
6. **Researcher Reflexivity:** Although the researcher herself did not have direct interaction with participants, researcher reflexivity was employed to acknowledge and mitigate potential biases. Reflexivity was particularly important in interpreting the data in a way that respected the perspectives represented, without imposing unintended researcher assumptions.

By adhering to these ethical principles, this study aimed to honour the confidentiality, consent, and integrity of the primary data as collected by other members of the research team, while maintaining high ethical standards in data handling and analysis. These measures ensured compliance with ethical guidelines and contributed to responsible research practices in this data analysis.

3. Results

3.1 Participants

A total of 25 women and 15 men participated in the study. A total of thirty-five participants worked in South Africa at the time of the interviews, while the remaining five were in Ghana, Lesotho, Swaziland, Zambia, and Zimbabwe.

3.2 Roles Taken Up by South African MPH Graduates

The study found that South African MPH graduates have secured positions in various sectors, including international organizations, NGOs, local governments, and academia. Figure 1 illustrates the career shift many graduates experienced, for example transitioning from clinical roles (e.g., doctor, nurse) to public health positions (e.g., program manager, epidemiologist) after completing their MPH.

The data in Figure 1 demonstrates notable shifts in employment sectors for South African MPH graduates, reflecting how the MPH qualification has influenced their career trajectories and broadened their roles within the public health field. Before obtaining the MPH, almost half (49%) of the graduates worked in local health service settings, particularly in clinical roles at hospitals or health service providers. This suggests a strong initial presence in frontline healthcare roles, which aligns with the common entry points for those transitioning into public health.

After completing the MPH, however, there is a visible shift towards roles in broader health systems and international platforms. Specifically, only a quarter of graduates now work in local health service providers, showing a decrease from the pre-MPH phase, while sectors such as NGOs/NPOs and international organizations have seen increased representation. Notably, employment within international organizations (e.g., UN agencies) rose from 6% to 14% post-MPH, indicating that the MPH degree may enhance graduates' suitability for roles requiring specialized public health expertise at a global level.

Employment at the municipal and national health agency level increased from 6% before the MPH to 20% after graduation. This shift might suggest an increased interest or capability among MPH graduates to contribute to national health strategies, policy development, and program implementation. About a quarter of MPH graduates who worked in NGOs/NPOs pre-MPH remained in this environment post-MPH, underscoring an ongoing alignment with health initiatives that address societal challenges and often require public health expertise.

These transitions reflect a broader application of public health skills across various sectors. Graduates appear to move beyond clinical and narrowly focused health service roles toward positions that involve policy, planning, and program management, with broader responsibilities that often impact public health at a systemic level. This shift suggests that the MPH degree may serve as a catalyst for career advancement and access to more diverse, impactful roles within health systems and international health landscapes.

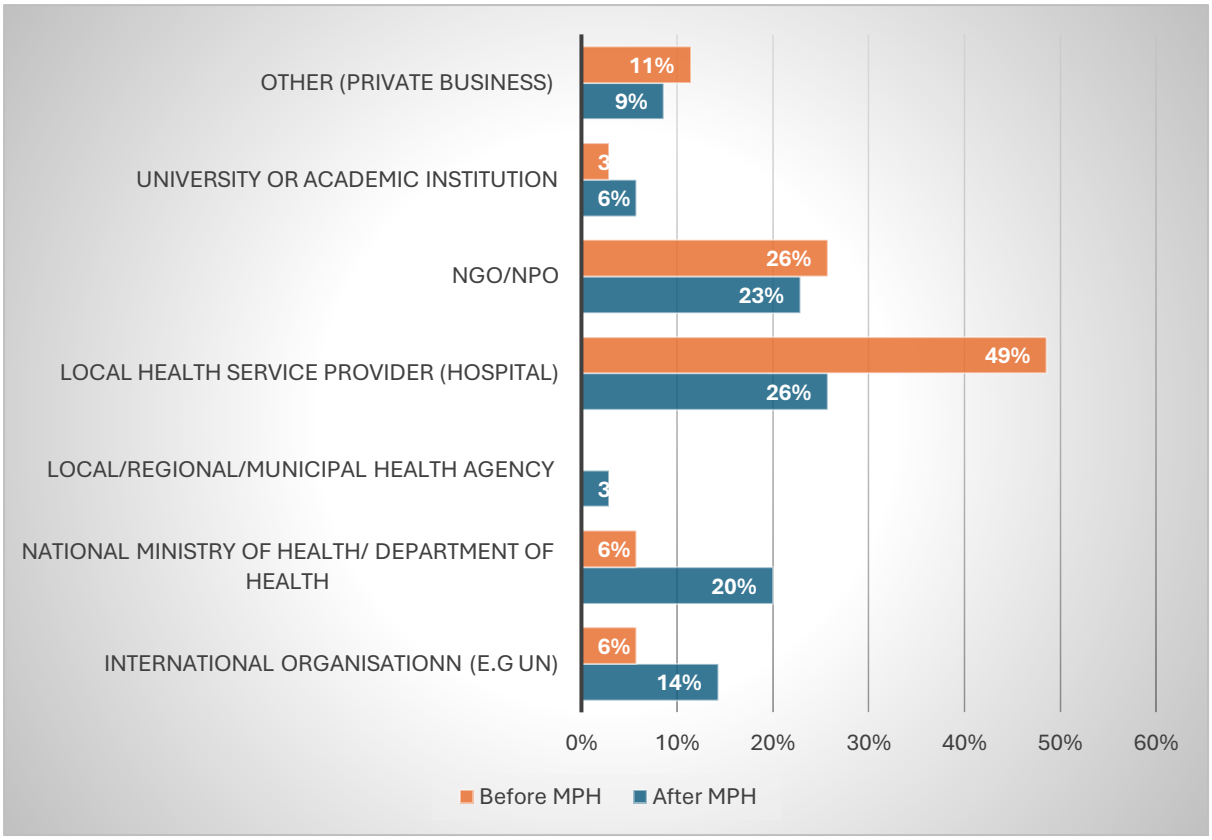

Figure 1: Employment Agencies Before and After Acquiring MPH

3.2.1 International Organizations

Five Participants highlighted their successful transition into roles within prominent international organizations. These roles include positions at United Nations International Children's Emergency Fund (UNICEF), the World Health Organization (WHO), and the United Nations Population Fund (UNFPA), where graduates have utilized their MPH training to influence global health initiatives and policy development.

International Aid Organisation: One participant shared their rapid career progression post-MPH, stating;

"I finished the MPH, I think, in June or July 2015. And, you know, I got a new job in September 2015. So, barely three months later I was able to transition. I joined UNICEF first as a consultant, then as a temporary appointment contract, then as a fixed contract." (Public Health Professional 1)

This suggests that an MPH qualification can play a role in enhancing employability and supporting career advancement for some graduates within international organizations

International Aid Organisation : Another participant, a medical doctor by training, described their shift to public health, facilitated by the MPH degree:

"I'm currently working for WHO as a program officer for HIV and TB after getting the MPH degree. After graduating with the MPH I worked for the Ministry of Health as a national ART treatment coordinator for HIV." (Public Health Professional 2).

International Aid Organisation : A participant described how their MPH specialization in Social and Behaviour Change Communication (SBCC) helped advance their career:

"So that's how I found myself on the MPH course. I was keen to have qualifications in public health, particularly around SBCC. Because SBCC underpins most of the work that I do. And I thought that strengthening my knowledge and confidence in that area would go a long way in improving the work that I do. So, I'm currently working for UNFPA. My current role is Deputy country representative, which is mainly a managerial role. But mainly focusing on program leadership and management." (Public Health Professional 3)

These experiences suggest that an MPH qualification makes graduates desirable for employment with international public health agencies. The assumption is that the MPH program equips graduates with the skills and knowledge needed to take on significant roles in global organizations, influencing public health policy and program implementation.

Some participants also moved from non-governmental agencies to international agencies, again signalling the attractive option of working in non-governmental sectors, whether in a local or international agency:

" After completing my MPH, I got a job at a local NGO in Johannesburg. I initially worked at a clinic in a local community, where I was involved in initiating ARV treatment as part of my clinical duties. After about six months, I was promoted to a Quality Improvement Technical Advisor position in another region. From there, I transitioned to working with an international agency." (Public Health Professional 4)

Despite their career options in non-governmental environments, participants expressed the critical need for competent MPH graduates in government roles.

"I just feel that there are many MPH graduates out there, and the government is not employing competent people to run programs. Many MPH graduates who could be employed in these areas are sitting out there. Many jobs out there are political, and it's hard to believe that district offices can have people employed there who don't have any skills in public health or are not MPH trained." (Public Health Professional 5)

3.3 Career Promotions and Job Opportunities

One participant emphasized the rapid career growth facilitated by the MPH degree:

> *"Yes, I have grown so much from the MPH degree. I mean, I got promoted in my workplace about six months after obtaining the degree, and I think it is a very important degree for any healthcare worker to have."* (Public Health Professional 6)

Another participant described how the MPH degree boosted their confidence and capabilities in monitoring and evaluation roles:

> *"So studying MPH actually gave me more confidence to actually be a better monitoring and evaluation personnel if I can put it that way. Yeah. So currently, I am a project manager where we deal with data analysis, we deal with anything that has to do with monitoring and evaluation."* (Public Health Professional 7)

The influence of MPH graduates in strategic leadership roles was underscored by another participant, who highlighted their capacity to provide technical leadership and advisory services:

> *"I do think MPH graduates are key in terms of influencing policy. They should be in strategic leadership roles where they can provide technical leadership, advisory services, particularly to policymakers, and guide areas that require research."* (Public Health Professional 3)

The study highlighted the influence of the MPH degree on graduates' career advancement and in their respective fields. Graduates reported notable career promotions, job opportunities, and enhanced ability to influence public health policy and leadership.

3.4 Enhancing Current Roles

The MPH degree has proven useful in both facilitating transitions between organizational contexts and enhancing graduates' roles in their current professional environments. Two participants highlighted how the program deepened their understanding of public health systems and improved their capacity to contribute, even though it didn't lead to immediate career advancement. One participant explained:

> *"And I really felt like during Master's in Public Health, it helped me to understand the public sector better, like in terms of the health systems and, you know, the functioning of public health as an entity. And although, like, I didn't really climb up in terms of, how could I say, in terms of, like, my professional development. I've applied for jobs outside of my profession, but I mean, nothing came through. But, like, I still feel that, like, having this qualification in public health has been very satisfying. And I mean, up to today, I still feel like I can apply those principles."* (Public Health Professional 5)

Another participant emphasized the important role that MPH graduates play in epidemiology, illustrating how the training has contributed to public health management and disease control efforts:

"I think the country is now benefiting the rewards of having trained Epidemiologists from all provinces, and it is the MPH graduates that are helping with the control of the COVID 19 pandemic") (Public Health Professional 9)

These accounts suggest that the MPH program enhanced participants' understanding of public health systems. While they didn't always experience immediate career progression, they were satisfied with the qualification's contribution to their professional roles. However, these reflections are based on individual experiences and shouldn't be generalized as definitive evidence of improved public health outcomes or career advancement.

3.5 Research and Analytical Skills

Research and analytical skills featured as key competencies for MPH graduates, enabling them to progress in their professional roles. Four participants emphasized applying these skills in various public health contexts, highlighting the program's impact on their ability to conduct research, analyse data, and address public health issues.

3.5.1 Research Skills

One participant highlighted the direct application of research skills acquired during the MPH program to their current role:

"For my current position, I am responsible for research work and literature review. The same skill set that we were taught during the MPH program is now being applied in my present position." (Public Health Professional 10)

Another participant described how the MPH program facilitated their transition to a research-focused career:

"I focused on research, which would have been impossible without the MPH program. The MPH helped me transition and be relevant in research. It became my focus, and it has been immensely helpful. Without it, I would not be able to accomplish anything." (Public Health Professional 11)

The importance of specific modules within the MPH program was underscored by a participant who benefited from evidence-based healthcare training:

"I had the opportunity of doing the evidence-based healthcare module, where I learned systematic reviews and evidence synthesis methods, and so this skill set, I would say, was very, very useful." (Public Health Professional 8)

Another participant emphasized the practical application of analytical skills in identifying and addressing community health issues:

"And also another thing was that we would get a sense of generally what is happening in the community without just looking at the cases that we are getting. To say this is an issue, and how can we address this one because maybe several people are calling to say we have a 1234 problem. And you check when working on this case, you will say, but if there is a trend here, then, therefore, this can be an issue. And therefore, we need to come up with ways to address this issue." (Public Health Professional 12)

These four accounts demonstrate that the MPH program equips graduates with research and analytical skills, which are essential for conducting public health research, performing data analysis, and developing evidence-based interventions to address public health challenges.

3.6 Communication and Community Engagement

Graduates from different MPH programs reported that the program enhanced their communication and community engagement skills, essential for effective public health practice. Participants shared how these skills were applied, especially during the COVID-19 pandemic. However, these reflections are based on individual experiences and may not reflect all MPH programs.

3.6.1 Risk Communication

One participant described the challenges faced in developing a plan for risk communication and the role of health promotion in addressing these challenges:

"So we had some challenges. How do we move forward? And in terms of ensuring that there's risk communication and community engagement. So health promotion probably played a pivotal role in some skills we learned to say we need a plan. You need a plan of how you're going to reach communities." (Public Health Professional 13)

This account suggests that strategic planning and health promotion were important for effectively communicating risks to communities in this context.

3.6.2 Community Engagement

Another participant from UKZN shared their experience in engaging with community leaders and stakeholders to promote preventive measures during the COVID-19 pandemic:

"So now you could see people that now that they are wearing masks, now that they are taking the preventive measures on their own, besides being used as a public health way to say you need to put on the mask and also the coordination with the different stakeholders was very important. And what was also important was that for the leaders, church leaders, we felt like those were very crucial in our intervention. So, we had a special session where we called all the pastors and their leadership in the different church organizations. So, we had to educate them on what was this COVID thing? And how can they assist their congregants? So, we made them come up with a way forward." (Public Health Professional 5)

3.7 Information Dissemination

Participants described their experiences with effectively communicating public health information, presenting data, and educating various audiences. For example, one participant emphasized the value of transparency and broad dissemination of information, drawing from the training received during their MPH program:

> *"I think that that was important, I think, also the dissemination of information. We've spent quite a lot of time on can't even remember which course it was in, basically, and you know, which module was in the MPH. Still, it was this whole thing of just like information transparency and getting it out to everyone as many people as possible."* (Public Health Professional 14)

Another participant noted the importance of presenting data effectively in their professional role:

> *"But these are the components which you need to add on and say: How can I present this data? In what form - a histogram, or a bar chart, etc..."* (Public Health Professional 13)

A participant described applying their MPH knowledge to educate and advise colleagues in a non-medical setting:

> *"I've had to present a lecture on COVID, the disease where, and how it is transmitted. And then I've also had to advise why the disinfection of offices needed to take place and explain some of the difficult concepts. Because in agriculture, we do not have a nurse or a medical doctor. So I've had to play that additional role. And I was able to do that confidently from having this knowledge that I gained from MPH."* (Public Health Professional 9)

These individual accounts illustrate how some MPH graduates felt equipped with essential skills in information dissemination.

3.8 Health Promotion

MPH programs offering health promotion enhanced graduates' abilities to advocate for health issues, educate communities, and design effective communication strategies. Participants shared experiences applying these skills in their careers. One participant highlighted the practical value of health promotion and education training received during the program:

> *"OK, having learnt health promotion and Health Education in my MPH was very helpful because, you know, as a public health practitioner. Those skills are very important to advocate for health matters in our workplaces. So, I think that the education that I got or the experience*

> *that I got in Health Education and health promotion was very helpful, and that's what I brought to my workplace at the time. So, it also helps that I'm a good public speaker. I guess I'm not very shy about speaking in front of people because we spent a lot of time addressing big groups of people with regards to protective measures against COVID-19 and all of it. Yeah."* (Public Health Professional 6)

Another participant described how the MPH program provided them with the tools to disseminate health information and create health communication materials effectively:

> *"Through my course, I learned how to promote health and disseminate information. The MPH gave me an edge, enabling me to create posters or leaflets and to be creative in conveying messages, such as the importance of vaccination."* (Public Health Professional 15)

These accounts suggest that MPH programs offering health promotion help graduates develop skills in advocating for health issues, educating the public, and creating health communication strategies. While participants found these skills useful in their careers, these reflections are based on specific experiences.

3.9 Leadership and Management Skills

Graduates from different MPH programs emphasized the importance of leadership and management skills. Three participants noted that the program enhanced their leadership abilities, providing flexibility, adaptability, and critical thinking skills essential for public health leadership. However, these reflections are based on individual experiences.

3.9.1 Leadership Skills

One participant highlighted the flexibility and adaptability gained through the MPH program, which helped them navigate various challenges, including those posed by the COVID-19 pandemic:

> *"The skills gained during the MPH program prepare you not necessarily for a pandemic, but they make you flexible and adaptable across different programs and aspects that the pandemic deals with."* (Public Health Professional 9)

Another participant described how the leadership training received during the program boosted their confidence and effectiveness in management settings:

> *"I acquired leadership skills from the MPH program. It helped me understand what I need to do as a leader. I am confident in management settings, able to present myself effectively, and possess the necessary knowledge. The program has significantly enhanced my leadership skills."* (Public Health Professional 16)

A third participant shared how the MPH program helped them manage high-pressure situations, improving their time management and coping mechanisms:

"I think enrolling in the course, I found myself being under a lot of pressure pursuing my master's degree and working for a US-funded NGO and having to manage it. I think when I enrolled, my team was around 70-something. So, I think I was exposed to that pressure, and my coping mechanisms somehow improved. And as a result, when I was exposed [to a] lot of pressure [by COVID] we were placed under a lot of pressure [because of COVID], I was able to cope. Because I was working extended hours and studying again on the site. So, somehow, I found myself different from my colleagues. I was able to manage my time, despite the pressure probed by COVID." (Public Health Professional 13)

These experiences highlight the MPH program's role in developing leadership skills. Three participants noted that its focus on flexibility, adaptability, and leadership training helped them manage complex challenges. However, these reflections are specific and may not apply to all MPH programs or graduates.

3.9.2 Leadership and Communication Skills Development

Participants also highlighted the importance of communication and leadership skills, which they felt were essential for effective management in public health settings. One participant suggested that the MPH program should place more emphasis on these skills:

"The skills that can be emphasized, Well, I think MPH must emphasize the communication and leadership skills because most of the MPH graduates end up being managers, leadership.... how to lead people." (Public Health Professional 17)

Two participants, suggested incorporating modules specifically focused on critical thinking and leadership in public health:

"OK. So, management, I don't know if it's possible to teach people how to think more critically or Yeah, something like that maybe. And because OK, the program itself does make you think deeper, but I don't know if there are any other programs." (Public Health Professional 18)

"Um, I think maybe even just having a module about leadership in public health or something. Like just another little module on leadership itself that focuses on how, you know, a public health graduate can be, like, a leader." (Public Health Professional 19)

These suggestions highlight that while the MPH program built foundational skills, there is a need for more focus on critical thinking and leadership. Participants suggested incorporating dedicated modules on these topics to enhance their ability to manage and lead in public health roles. It's important to note that these perspectives reflect individual experiences.

3.10 Soft Skills

The importance of soft skills, particularly presentation and communication skills, was emphasized by two participants, who suggested that these skills should be included more explicitly in the MPH curriculum. One participant noted the need for these skills to enhance graduates' ability to engage with diverse audiences:

> *"Look what we were taught, I think is sufficient except that you know, maybe some more soft skills like presentation skills. You know. How to engage more with people are some things that we, probably some graduates, didn't gain from their undergraduate studies that we would benefit from because the minute you are in MPH graduate. It means you need to be on a bigger platform. Yes, you will do some one-on-one health education with patients you come across, but I think it is better for us to expand our audience. So, the skills that should be added or that could be added to the content are training skills and communication skills. Maybe even if it's just one module that includes communication, training, and presentation skills, that would also help."* (Public Health Professional 20)

This reflection highlights the perceived gap in soft skills training within the MPH curriculum, as noted by the participant, but it is important to acknowledge that this is based on one graduate's experience.

3.10.1 Emotional Intelligence

Two participants emphasized the crucial role of emotional intelligence in public health leadership, noting the importance of self-awareness, patience, and the ability to manage diverse behaviours. One participant underscored the value of emotional intelligence in managerial roles:

> *"Emotional intelligence is very important. Because you cannot deal with people, if you, if I don't understand myself, if I can't, if I don't have patience, if I'm not able to accept other people's behaviours or characters, it's going to be difficult for me. You cannot be a manager if you do not have managerial skills."* (Public Health Professional 21)

Another participant echoed this sentiment, highlighting the connection between emotional intelligence and effective leadership in public health:

> *"And I feel like a lot of emotional intelligence needs to come into this because public health is about it's, it's about people at the end of the day. And if you don't have that emotional intelligence, I don't know how far you will actually get with, you know, being able to be a good leader or even a project manager or so."* (Public Health Professional 19)

These insights suggest that emotional intelligence is viewed as an essential leadership quality by some graduates, yet this perspective is drawn from a limited number of participants.

3.11 Gaps in the MPH Program

Despite the numerous benefits of the MPH program, participants identified several areas where the program could be improved. These gaps include practical experience, advanced data analytical skills, program and project management, policy and program interventions, and emergency preparedness.

3.11.1 Practical Experience

Several participants highlighted the need for more practical, hands-on training within the MPH program. They noted that while the theoretical training provided a solid foundation, real-world application had a significant gap.

> *"There is room for improvement in the practical aspect of the program. While we received theoretical training, we lacked exposure to real-world facilities."* (Public Health Professional 22)

> *"In the health information track, it would have been helpful if we had practical sessions using systems employed for disease tracking. The theoretical knowledge was projected, but there was no hands-on experience."* (Public Health Professional 23)

> *"My thought was it would be good if, except theory, you also take the students to a real situation when talking about cholera. They must go to practice and see what it is all about. Because sometimes a theory can confuse you when it comes to practice. You end up being confused about what we have been learning in MPH. We learned theory, but now we are in a real outbreak where we are supposed to practice, so it was a bit difficult because we were not exposed to a real environment. So if they can allow students to have that exposure, it can be a bit better."* (Public Health Professional 17)

Participants emphasized that practical sessions with disease tracking systems and exposure to real-world facilities would have improved their learning. They noted that the gap between theoretical knowledge and practical application could cause confusion in real-world public health challenges. Incorporating more practical experience, such as simulations and fieldwork, would better prepare graduates for the complexities of public health practice.

3.11.2 Advanced-Data Analytical Skills

Participants emphasized the need for more comprehensive training in data analysis and biostatistics:

> *"When you are in the field without a teacher or lecturer to guide you, handling and manipulating data becomes a significant challenge. Data analysis has been one of my struggles."* (Public Health Professional 24)

"As an MPH graduate, you are expected to conduct complex biostatistical analyses, and this is a significant problem in the field. Many individuals lack proficiency in this area." (Public Health Professional 24)

"We only briefly touched upon epidemiology and its role in forecasting diseases and tracking trends. Further emphasis on these topics would have been beneficial." (Public Health Professional 18)

Participants stressed the need for more comprehensive training in data analysis and biostatistics within the MPH program. Many struggled with data analysis, highlighting the importance of proper guidance. The expectation for graduates to conduct complex biostatistical analyses was seen as problematic due to a lack of proficiency. Additionally, participants felt that epidemiology, especially in forecasting diseases and tracking trends, was underemphasized. Enhanced training in these areas would better equip graduates for the analytical demands of public health roles.

3.11.3 Program and Project Management

Several participants noted the importance of program management skills and the need for more focused training in this area:

"I believe we should have received lectures on monitoring and evaluation because it is a critical aspect of most public health interventions or projects. All they need to do is just introduce us to the world of monitoring and evaluation. Everything we do, needs to be monitored. And its not as if Dr. (name withheld) did not mention it. It wasn't emphasized so for the future graduates, monitoring and evaluation must be emphasized." (Public Health Professional 19)

"Employers are primarily looking for project management skills, which is quite broad. Our MPH program focused heavily on research, but outside academia, research is not as prominent. Therefore, program management skills become more important." (Public Health Professional 25)

"Some of the important skills include managing grants, applying for grants, and meeting the donor's specifications. These program management skills are crucial for NGO work." (Public Health Professional 25)

"Monitoring and Evaluation. That area appears to be a very specialized area which needs to be demystified a bit more so that more people feel comfortable with supporting elements of that." (Public Health Professional 1)

Participants further emphasized the importance of lectures on monitoring and evaluation, critical for most public health interventions. They suggested that introducing monitoring and evaluation to future graduates would greatly benefit their understanding of its role in all public health activities.

Furthermore, participants noted that employers value program management skills, which are essential beyond the academic focus of the MPH program. These skills are crucial for managing public health programs. Additionally, training in grant management, applications, and meeting donor specifications is needed for work in NGOs.

Participants noted that monitoring and evaluation need to be simplified to help graduates support these areas in their roles. Enhanced program and project management training would equip MPH graduates with the skills to meet employer expectations and manage public health programs effectively.

3.11.4 Policy and Program Interventions

A gap was identified in the understanding of policy-making processes within the South African context:

> *"Despite having a master's in health systems and policy, I still lack a proper understanding of how policy works in South Africa."* (Public Health Professional 26)
> *Emergency Preparedness*

Participants highlighted the need for more training in emergency response and preparedness:

> *"I think disaster management. It can be done as part of health promotion. Well, I only did one part in the first year of health promotion and don't know about the second year part of health promotion, but in health promotion, they can have components of the different kinds of disaster that may come and the prevention of disaster."* (Public Health Professional 18)

> *"So we needed a set of skills we didn't have around emergency response. And I guess if you do an emergency response course, it will cover the issues of surveillance."* (Public Health Professional 26)

> *"I think the most important thing, which was not coming out in the program was emerging issues in public health. And when you look at emerging issues in public health, it might be pandemics, it might be a lot of things, it encompasses a lot. So I believe it should be some of the things to be included, or it can be a module that is taught to all graduates so that we are well prepared for anything that can happen. It might be what we anticipate. It might be what we never thought might happen, like this pandemic. So if we have to deal with emerging issues accordingly, I believe it has to be part of the programs."* (Public Health Professional 17)

Participants emphasized the need for more emergency response and preparedness training in the MPH program, suggesting that disaster management be integrated into health promotion. One participant noted that while some disaster management training was provided, a more comprehensive approach would be beneficial.

Additionally, participants identified a skills gap in emergency response, particularly in surveillance, and emphasized the need for an emergency response course. They also suggested incorporating modules on emerging public health issues, such as pandemics and unforeseen crises. Strengthening the MPH curriculum with training in emergency preparedness, disaster management, and emerging health issues would better equip graduates for real-world public health crises.

4. Discussion

This study highlights the transformative impact of the MPH degree on graduates' careers, serving as both a credential and a tool for advancement. Graduates thrive in diverse sectors, including WHO, UNICEF, NGOs like Anova Health Institute, local government, and academia. The research is timely amid growing health disparities and emerging disease threats in South Africa, as noted by Mayosi et al. (2012). These challenges highlight the need for an MPH curriculum that balances theoretical standards with practical engagement. By examining the alignment between education and real-world demands, this study offers insights into public health education in South Africa and may support advocacy for curricular reforms to strengthen the public health workforce.

Participants consistently cite the MPH degree as a catalyst for professional growth, with many reporting promotions and expanded roles after completing the program (Hawks & Gast, 2018; Komro et al., 2018; Zwanikken et al., 2016; Zweigenthal et al., 2016). For example, one participant's journey from clinician to WHO program officer underscores the degree's role in bridging clinical expertise with public health leadership. This narrative is supported by evidence such as the study by Ravaghi et al. (2021), which found that MPH training enhances the managerial competencies of health professionals, facilitating their transition into roles that demand complex decision-making and strategic planning (Ravaghi et al., 2021). Leadership development is a critical theme emerging from the participants' accounts, with graduates reporting a strengthened capacity for leadership in their respective fields post-MPH. This finding aligns with the competencies outlined by the Council on Education for Public Health (CEPH), which emphasize leadership skills as a core component of MPH programs (Cioffi, n.d.; Stewart et al., 2010). Studies have also corroborated the necessity of incorporating leadership development into public health curricula, noting the demand for public health professionals capable of guiding teams and influencing policy (Dovey, 2002; van Diggele et al., 2020).

The transition of MPH graduates into policy-making and global health roles is particularly noteworthy, as it suggests the degree's effectiveness in preparing professionals for influential positions that shape public health at macro levels. This assertion is supported by the work of Zwanikken, which highlights the contribution of MPH-trained professionals to policy development and global health initiatives (Zwanikken et al., 2016). The findings from this study reinforce the critical need for Master of Public Health (MPH) graduates to assume leadership roles within the public health sector. The consensus among a significant portion of participants is that MPH alumni are not only prepared but are indeed essential for influencing policy and offering technical leadership, which aligns with the educational objectives set forth by leading public health institutions (“ASPHER’s European List of Core Competences for the Public Health Professional,” 2018). This is further substantiated by the work of Daire and Gilson, who argue that the complex nature of health policy processes demands

professionals who can navigate and shape these landscapes effectively, a role for which MPH graduates are uniquely equipped (Daire & Gilson, 2014).

Nearly half of the study's participants highlighted a gap in employing competent MPH professionals in roles critical to program implementation and management. This sentiment echoes the findings of Gonzales, which suggest that the shortfall in trained public health professionals, particularly in government and district offices, directly impacts the efficiency and success of public health programs (Gonzales et al., 2012). The imperative to employ MPH-trained professionals in these roles is clear; their expertise in public health is vital to the successful operation and oversight of health initiatives and is instrumental in fostering a competent and effective public health workforce.

MPH programs aim to equip students with skills to meet modern public health demands, including strong data analysis for disease surveillance, emergency response, and policy formulation. However, gaps remain in training graduates, particularly in using statistical software and quantitative analysis, as noted among public health professionals in New York (Hemans-Henry et al., 2016). Bridging this gap requires dedicated courses and hands-on software training. Katarzyna highlights the importance of epidemiology and biostatistics skills in managing public health emergencies and meeting the demand for professionals capable of complex data analysis to shape health policy and practices (Czabanowska & Kuhlmann, 2021). Thus, reinforcing these areas within MPH curricula is imperative to prepare graduates for the complexities of their future roles fully.

Communication, as expressed by a number of study paticipants, is a foundational skill in public health education and a core component essential for public health professionals (Mata et al., 2021; Udoudom et al., 2024). Engaging diverse audiences and promoting public health initiatives effectively is crucial for the success of health interventions and maintaining public trust, a sentiment supported by Friedman, who discusses the role of communication in enhancing the visibility and impact of public health policies (*WHO-ASPHER Competency Framework for the Public Health Workforce in the European Region 2020 2*, 2020).

A substantial revision that prioritizes practical knowledge is essential to enhance the efficacy of MPH programs. Studies elsewhere consistently reveal a notable gap between the theoretical training provided by MPH programs and the practical skills demanded in the public health workforce (Hemans-Henry et al., 2016) and this resonated with opinions from the South African graduates. Integrating simulation-based learning, real-world case studies, and practicums into coursework can significantly bridge this gap (Spinello & Fischbach, 2008). Such experiential learning methods, as supported by Dopelt and further demonstrated by recent research at Columbia University, not only enhance practical skills but also prepare students effectively for real-world challenges (Dopelt et al., 2023; Krasna et al., 2021). These studies emphasize the necessity for MPH programs to collaborate with workplace partners, enabling a seamless transfer of practical industry skills to students. Moreover, additional research involving employer partners could provide valuable feedback, ensuring that MPH curricula remain aligned with evolving industry requirements and enhancing graduates' readiness to meet global health challenges.

In assessing the alignment of university offerings with workplace demands, it is crucial to consider the competencies that are deemed essential for public health practitioners. Studies such as Oraison et al. (2019) emphasize the necessity of this alignment for the effective transition of graduates into the workforce (Oraison et al., 2019). Public health challenges are evolving at a rapid pace (Benjamin, 2023), necessitating curricula that are not only responsive to these changes but also reflective of the skills required in practice. Research indicates a disconnect between the perceived preparedness of MPH graduates and the expectations of their roles within the public health sector (Dlungwane et al., 2017a; Dlungwane & Voce, 2020; Zwanikken et al., 2014, 2016). To bridge this gap, feedback from graduates and employers plays a pivotal role. They highlight the need for competencies beyond theoretical knowledge, such as strategic decision-making and operational adaptability, which are often not adequately addressed in academic settings.

Universities face challenges in updating curricula amid resource constraints and diverse graduate roles. Innovative approaches like service-learning and partnerships with public health agencies enhance practical skills. Regular curriculum evaluation, involving diverse stakeholders, ensures MPH programs stay relevant and equip graduates for contemporary public health challenges. Aligning curricula is both an educational and strategic priority to strengthen the public health workforce against emerging global health issues.

South African MPH programs emphasize research, reflecting academic rigor, but practical application remains challenging. While research projects build critical thinking, a more applied approach is needed to align with public health practice. Graduates must generate and apply knowledge within policy and program frameworks. Unpreparedness for program management roles, especially in NPOs, highlights a gap between curricula and employer needs. A broader curriculum incorporating management, financial, and operational skills is crucial for public health programs' success. NPOs, operating under unique constraints, demand a blend of scientific knowledge, agility, innovation, and resourcefulness.

The study highlights leadership and management as key public health competencies. While some alumni successfully applied these skills during COVID-19, others felt unprepared for leadership roles, reflecting varying emphases across public health programs. This suggests a need for standardization. Public health challenges demand adaptive, collaborative leadership capable of guiding diverse teams through complex issues. Effective leadership involves strategic decision-making, advocacy, and steering interdisciplinary teams in health policy and program implementation (Rowitz, 2014). Effective leadership in public health also necessitates understanding political dynamics, as political considerations often influence policies and resource allocation(Gilson & Daire, 2011). MPH programs must, therefore, imbue students with the ability to navigate these complexities and lead change.

5. Strengths and limitations

The study offers qualitative evidence from South Africa on aligning MPH training with employer-valued competencies. However, its generalizability is limited due to its exploratory nature, small participant pool, and reliance on self-reported skills without objective evaluations. Future research

could use competency assessment tools, include employer perspectives, and conduct longitudinal studies on competency development. Despite these limitations, the study provides valuable guidance for improving MPH programs and workforce readiness in South Africa's public health sector.

6. Conclusion

The study highlights the MPH program's impact on graduates' careers, emphasizing its role in developing public health leadership and skills across sectors like NGOs, government, and academia. While the degree supports career growth and essential competencies, areas for improvement include practical training, advanced data analysis, program management, and emergency preparedness. Aligning curricula with workplace demands through feedback can better prepare graduates for public health challenges, enhancing training quality, workforce readiness, and health systems.

7. References

Abner, B., Bartosh, O., Ungerleider, C. S., & Tiffin, R. (2014). *Productivity implications of a shift to competency-based education: An environmental scan and review of the relevant literature*. Higher Education Quality Council of Ontario Toronto, ON.

Academy of Science of South Africa. (2018). *Reconceptualising health professions education in South Africa*. Academy of Science of South Africa (ASSAf).

Agyei, E., & Kumah, E. (2024). Navigating the complex terrain of healthcare systems in Sub-Saharan Africa: challenges and opportunities for progress. *Discover Health Systems*, *3*(1), 39.

Alharahsheh, H. H., & Pius, A. (2020). A review of key paradigms: Positivism VS interpretivism. *Global Academic Journal of Humanities and Social Sciences*, *2*(3), 39–43.

Anyangwe, S. C. E., & Mtonga, C. (2007). Inequities in the global health workforce: the greatest impediment to health in sub-Saharan Africa. *International Journal of Environmental Research and Public Health*, *4*(2), 93–100.

ASPHER's European List of Core Competences for the Public Health Professional. (2018). *Scandinavian Journal of Public Health*, *46*(23), 1–52. https://doi.org/10.1177/1403494818797072

Ayouni, I., Maatoug, J., Dhouib, W., Zammit, N., Fredj, S. Ben, Ghammam, R., & Ghannem, H. (2021). Effective public health measures to mitigate the spread of COVID-19: a systematic review. *BMC Public Health*, *21*(1), 1015.

Baczyńska, A. K., Rowiński, T., & Cybis, N. (2016). Proposed core competencies and empirical validation procedure in competency modeling: confirmation and classification. *Frontiers in Psychology*, *7*, 273.

Basińska-Zych, A., & Springer, A. (2021). Organizational and individual outcomes of health promotion strategies—a review of empirical research. *International Journal of Environmental Research and Public Health*, *18*(2), 383.

Bass, S. B., Guttmacher, S., & Nezami, E. (2008). Who will keep the public healthy? The case for undergraduate public health education: a review of three programs. *Journal of Public Health Management and Practice*, *14*(1), 6–14.

Beaglehole, R., Sanders, D., & Dal Poz, M. (2003). The public health workforce in sub-Saharan Africa. *Ethnicity & Disease*, *13*, 24–30.

Behera, B. K., & Prasad, R. (2022). Primary health-care goal and principles. *Healthcare Strategies and Planning for Social Inclusion and Development*, 221.

Benjamin, G. C. (2023). The Future of Public Health: Ensuring An Adequate Infrastructure. *The Milbank Quarterly*, *101*(Suppl 1), 637.

Bowles, D., Watts, R. D., Fisher, C., & Li, I. W. (2021). *What do public health graduates do and where do they go? An analysis of job destinations and mismatch in australian public health graduates*.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qual. Res. Sport Exerc. Health*, *11*(4), 589–597. https://doi.org/10.1080/2159676x.2019.1628806

Braveman, P. A., Kumanyika, S., Fielding, J., LaVeist, T., Borrell, L. N., Manderscheid, R., & Troutman, A. (2011). Health disparities and health equity: the issue is justice. *American Journal of Public Health*, *101*(S1), S149–S155.

Brits, H. J. (2018). Assessing employer satisfaction: An attempt to enhance graduate employability at an institution of higher learning. *South African Journal of Higher Education*, *32*(5), 39–53.

Brownson, R. C., Burke, T. A., Colditz, G. A., & Samet, J. M. (2020). Reimagining public health in the aftermath of a pandemic. *American Journal of Public Health*, *110*(11), 1605–1610.

Bruchhausen, W. (2020). *Global health in the colonial era: The expansion of European medicine*.

Buekens, P. (2012). From hygiene and tropical medicine to global health. *American Journal of Epidemiology*, *176*(suppl_7), S1–S3.

Burstrom, B., & Tao, W. (2020). Social determinants of health and inequalities in COVID-19. *European Journal of Public Health*, *30*(4), 617–618. https://doi.org/10.1093/eurpub/ckaa095

Busetto, L., Wick, W., & Gumbinger, C. (2020). How to use and assess qualitative research methods. *Neurological Research and Practice*, *2*(1), 14.

Byrne, D. (2022). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality and Quantity*, *56*(3), 1391–1412. https://doi.org/10.1007/S11135-021-01182-Y/FIGURES/D

Calhoun, J. G., Ramiah, K., Weist, E. M., & Shortell, S. M. (2008). Development of a core competency model for the master of public health degree. *American Journal of Public Health*, *98*(9), 1598–1607.

Cannistra, J. (2023). *The Sanitary Lens: A Study of 19th Century Public Health in British Colonial India and Australia*.

Chabrol, F., & David, P.-M. (2023). How resilience affected public health research during COVID-19 and why we should abandon it. *Global Public Health*, *18*(1), 2212750.

Chelak, K., & Chakole, S. (2023). The role of social determinants of health in promoting health equality: A narrative review. *Cureus*, *15*(1).

Cheng, M., Adekola, O., Albia, J., & Cai, S. (2022). Employability in higher education: a review of key stakeholders' perspectives. *Higher Education Evaluation and Development*, *16*(1), 16–31.

Chinyakata, R., Roman, N. V, & Msiza, F. B. (2021). Stakeholders' perspectives on the barriers to accessing health care services in rural settings: A human capabilities approach. *The Open Public Health Journal*, *14*(1).

Cioffi, J. P. (n.d.). *Core Competencies for Public Health Practice-Lessons Learned (USA)*.

Coovadia, H., Jewkes, R., Barron, P., Sanders, D., & McIntyre, D. (2009). The health and health system of South Africa: historical roots of current public health challenges. In *The Lancet* (Vol. 374, Issue 9692, pp. 817–834). Elsevier B.V. https://doi.org/10.1016/S0140-6736(09)60951-X

Cropley, A. J., & Cropley, D. (2009). *Fostering creativity: A diagnostic approach for higher education and organizations*. Hampton Press Cresskill, NJ.

Czabanowska, K., & Kuhlmann, E. (2021). Public health competences through the lens of the COVID-19 pandemic: what matters for health workforce preparedness for global health emergencies. *The International Journal of Health Planning and Management*, *36*(S1), 14–19. https://doi.org/10.1002/HPM.3131

Daire, J., & Gilson, L. (2014). Does identity shape leadership and management practice? Experiences of PHC facility managers in Cape Town, South Africa. *Health Policy and Planning*, *29*(suppl_2), ii82–ii97. https://doi.org/10.1093/HEAPOL/CZU075

Delobelle, P. (2013). The health system in South Africa. Historical perspectives and current challenges. *South Africa in Focus: Economic, Political and Social Issues*, 159–205.

Di Ruggiero, E., Papadopoulos, A., Steinberg, M., Blais, R., Frandsen, N., Valcour, J., & Penney, G. (2020). Strengthening collaborations at the public health system–academic interface: a call to action. *Canadian Journal of Public Health*, *111*, 921–925.

Diderichsen, F. (2018). The relevance of public health research for practice: A 30-year perspective. *Https://Doi.Org/10.1177/1403494818765706*, *46*(22_suppl), 58–66. https://doi.org/10.1177/1403494818765706

Dlungwane, T., & Voce, A. (2020). Exploring student persistence to completion in a Master of Public Health programme in South Africa. *African Journal of Health Professions Education*, *12*(1), 17–21.

Dlungwane, T., Voce, A., Searle, R., & Stevens, F. (2017a). Master of Public Health programmes in South Africa: issues and challenges. *Public Health Reviews*, *38*, 1–13.

Dlungwane, T., Voce, A., Searle, R., & Stevens, F. (2017b). Master of Public Health programmes in South Africa: Issues and challenges. *Public Health Reviews*, *38*(1), 1–13. https://doi.org/10.1186/S40985-017-0052-9/FIGURES/1

Dopelt, K., Shevach, I., Vardimon, O. E., Czabanowska, K., De Nooijer, J., Otok, R., Leighton, L., Bashkin, O., Duplaga, M., & Levine, H. (2023). Simulation as a key training method for inculcating public health leadership skills: a mixed methods study. *Frontiers in Public Health*, *11*, 1202598.

Dovey, K. (2002). Leadership development in a South African health service. *International Journal of Public Sector Management*, *15*(7), 520–533.

Fattahi, H., Abolghasem Gorji, H., & Bayat, M. (2020). Core competencies for health headquarters: a systematic review and meta-synthesis. *BMC Public Health*, *20*, 1–19.

Filip, R., Gheorghita Puscaselu, R., Anchidin-Norocel, L., Dimian, M., & Savage, W. K. (2022). Global challenges to public health care systems during the COVID-19 pandemic: a review of pandemic measures and problems. *Journal of Personalized Medicine*, *12*(8), 1295.

Fineberg, H. V. (2011). Public health and medicine: where the twain shall meet. *American Journal of Preventive Medicine*, *41*(4), S149–S151.

Franzen, S. R. P., Chandler, C., & Lang, T. (2017). Health research capacity development in low and middle income countries: reality or rhetoric? A systematic meta-narrative review of the qualitative literature. *BMJ Open*, *7*(1), e012332.

Frenk, J., Chen, L. C., Chandran, L., Groff, E. O. H., King, R., Meleis, A., & Fineberg, H. V. (2022). Challenges and opportunities for educating health professionals after the COVID-19 pandemic. *The Lancet*, *400*(10362), 1539–1556.

Galaviz, K. I., Narayan, K. M. V., Manders, O., McFarland, D. A., Goenka, S., Torres-Mejía, G., Reddy, K. S., Lozano, P. R., Magaña-Valladares, L., Prabhakaran, D., & Ali, M. K. (2016). The Public Health Leadership and Implementation Academy (PH-LEADER) for Non-Communicable Diseases. *Health Systems & Reform*, *2*(3), 222–228. https://doi.org/10.1080/23288604.2016.1224452

Gebbie, K., Merrill, J., & Tilson, H. H. (2002). The public health workforce. *Health Affairs*, *21*(6), 57–67. https://doi.org/10.1377/HLTHAFF.21.6.57/ASSET/IMAGES/LARGE/057_T2.JPEG

George, As., Campbell, J., & Ghaffar, A. (2018). Advancing the science behind human resources for health: highlights from the Health Policy and Systems Research Reader on Human Resources for Health. *Health Research Policy and Systems*, *16*, 1–8.

Gilson, L., & Daire, J. (2011). Leadership and governance within the South African health system. *South African Health Review*, *2011*(1), 69–80.

Gizaw, Z., Astale, T., & Kassie, G. M. (2022). What improves access to primary healthcare services in rural communities? A systematic review. *BMC Primary Care*, *23*(1), 313.

Gkiouleka, A., Wong, G., Sowden, S., Bambra, C., Siersbaek, R., Manji, S., Moseley, A., Harmston, R., Kuhn, I., & Ford, J. (2023). Reducing health inequalities through general practice. *The Lancet Public Health*, *8*(6), e463–e472.

Glette, M. K., Ludlow, K., Wiig, S., Bates, D. W., & Austin, E. E. (2023). Resilience perspective on healthcare professionals' adaptations to changes and challenges resulting from the COVID-19 pandemic: a meta-synthesis. *BMJ Open*, *13*(9), e071828.

Gonzales, R., Handley, M. A., Ackerman, S., & O'sullivan, P. S. (2012). Increasing the Translation of Evidence Into Practice, Policy, and Public Health Improvements: A Framework for Training Health Professionals in Implementation and Dissemination Science. *Acad Med*, *87*(3), 271–278. https://doi.org/10.1097/ACM.0b013e3182449d33

Graham, K. D., Steel, A., & Wardle, J. (2021). Embracing the complexity of primary health care: system-based tools and strategies for researching the case management process. *Journal of Multidisciplinary Healthcare*, 2817–2826.

Gupta, R. K. (2013). *Core Competencies-Concept and Relevance*.

Hawks, S. R., & Gast, J. A. (2018). Design and development of an MPH program for online delivery. *Journal on Empowering Teaching Excellence*, *2*(2), 8.

Health, B. on P., Practice, P. H., & Health, C. on P. H. S. to I. (2012). *For the public's health: investing in a healthier future*.

Hemans-Henry, C., Blake, J., Parton, H., Koppaka, R., & Greene, C. M. (2016a). Preparing master of public health graduates to work in local health departments. *Journal of Public Health Management and Practice*, *22*(2), 194–199.

Hemans-Henry, C., Blake, J., Parton, H., Koppaka, R., & Greene, C. M. (2016b). Preparing Master of Public Health Graduates to Work in Local Health Departments. *Journal of Public Health Management and Practice : JPHMP*, *22*(2), 194–199. https://doi.org/10.1097/PHH.0000000000000232

Hoffman, M., Coetzee, D., Hodes, R., & London, L. (2012). From comprehensive medicine to public health at the University of Cape Town: a 40-year journey: forum-reflections. *South African Medical Journal*, *102*(6), 442–445.

Holst, J. (2020). Global Health–emergence, hegemonic trends and biomedical reductionism. *Globalization and Health*, *16*(1), 42.

Hoogeboom, M. A. M. G., & Wilderom, C. P. M. (2020). A complex adaptive systems approach to real-life team interaction patterns, task context, information sharing, and effectiveness. *Group & Organization Management*, *45*(1), 3–42.

Hoss, A., Menon, A., & Corso, L. (2016). State public health enabling authorities: results of a fundamental activities assessment examining core and essential services. *Journal of Public Health Management and Practice*, *22*(6), 529–536.

Ilangovan, K., Muthappan, S., Govindarajan, K., Vairamani, V., Venkatasamy, V., & Ponnaiah, M. (2022). Transdisciplinarity of India's master's level public health programmes: evidence from admission criteria of the programmes offered since 1995. *Human Resources for Health*, *20*(1), 14.

Jackson, C. S., & Gracia, J. N. (2014). Addressing health and health-care disparities: the role of a diverse workforce and the social determinants of health. *Public Health Reports*, *129*(1_suppl2), 57–61.

Jamshed, S. (2014). Qualitative research method-interviewing and observation. *Journal of Basic and Clinical Pharmacy*, *5*(4), 87.

Jarvis, T., Scott, F., El-Jardali, F., & Alvarez, E. (2020). Defining and classifying public health systems: a critical interpretive synthesis. *Health Research Policy and Systems*, *18*, 1–12.

Jassim, R. K., & Jaber, G. (1998). Competitive advantage through the employees. *Research Paper, University of Auckland New Zealand*.

Kaba, M., Assefa, M., Yigzaw, T., kitaw, yayehyirad, Worku, S., & Bulto, T. (2020). Gaps in public health training in Ethiopia: Insights from a qualitative study. *Ethiopian Journal of Health Development*, *34*(1). https://www.ajol.info/index.php/ejhd/article/view/198775

Kaba, M., Assefa, M., Yigzaw, T., Worku, S., & Bulto, T. (2020). Gaps in public health training in Ethiopia: Insights from a qualitative study. *Ethiopian Journal of Health Development*, *34*(1).

Kalu, F. A., & Bwalya, J. C. (2017). What makes qualitative research good research? An exploratory analysis of critical elements. *International Journal of Social Science Research*, *5*(2), 43–56.

Kemper, S. (2015, June 5). *A public health giant: C-E.A. Winslow, who launched public health at Yale a century ago, still influential today*. Https://Medicine.Yale.Edu/News-Article/a-Public-Health-

Giant-c-Ea-Winslow-Who-Launched-Public-Health-at-Yale-a-Century-Ago-Still-Influential-Today/.

Khan, S., Vandermorris, A., Shepherd, J., Begun, J. W., Lanham, H. J., Uhl-Bien, M., & Berta, W. (2018). Embracing uncertainty, managing complexity: applying complexity thinking principles to transformation efforts in healthcare systems. *BMC Health Services Research*, *18*, 1–8.

Kieny, M. P., Bekedam, H., Dovlo, D., Fitzgerald, J., Habicht, J., Harrison, G., Kluge, H., Lin, V., Menabde, N., & Mirza, Z. (2017). Strengthening health systems for universal health coverage and sustainable development. *Bulletin of the World Health Organization*, *95*(7), 537.

Kim, J., & Jung, H.-S. (2022). The effect of employee competency and organizational culture on employees' perceived stress for better workplace. *International Journal of Environmental Research and Public Health*, *19*(8), 4428.

Kivunja, C., & Kuyini, A. B. (2017). Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education*, *6*(5), 26–41.

Komro, K. A., Lang, D. L., Walker, E. R., & Harper, P. D. (2018). Integrating structural determinants into MPH training of health promotion professionals. In *American journal of public health* (Vol. 108, Issue 4, pp. 477–479). American Public Health Association.

Krasna, H., Kornfeld, J., Cushman, L., Ni, S., Antoniou, P., & March, D. (2021). The new public health workforce: employment outcomes of public health graduate students. *Journal of Public Health Management and Practice*, *27*(1), 12–19.

Kruk, M. E., Gage, A. D., Arsenault, C., Jordan, K., Leslie, H. H., Roder-DeWan, S., Adeyi, O., Barker, P., Daelmans, B., & Doubova, S. V. (2018). High-quality health systems in the Sustainable Development Goals era: time for a revolution. *The Lancet Global Health*, *6*(11), e1196–e1252.

Kumar, S., & Preetha, G. S. (2012). Health promotion: An effective tool for global health. *Indian Journal of Community Medicine*, *37*(1), 5–12. https://doi.org/10.4103/0970-0218.94009

Lamri, J., & Lubart, T. (2023). Reconciling Hard Skills and Soft Skills in a Common Framework: The Generic Skills Component Approach. *Journal of Intelligence*. https://doi.org/10.3390/jintelligence11060107

Légaré, F., Adekpedjou, R., Stacey, D., Turcotte, S., Kryworuchko, J., Graham, I. D., Lyddiatt, A., Politi, M. C., Thomson, R., & Elwyn, G. (2018). Interventions for increasing the use of shared decision making by healthcare professionals. *Cochrane Database of Systematic Reviews*, *7*.

Leider, J. P., Plepys, C. M., Castrucci, B. C., Burke, E. M., & Blakely, C. H. (2018). Trends in the conferral of graduate public health degrees: a triangulated approach. *Public Health Reports*, *133*(6), 729–737.

Leider, J. P., Sellers, K., Bogaert, K., Castrucci, B. C., & Erwin, P. C. (2020). Master's-level education in the governmental public health workforce. *Public Health Reports*, *135*(5), 650–657.

Mabunda, S. A., Angell, B., Yakubu, K., Durbach, A., & Joshi, R. (2020). Reformulation and strengthening of return-of-service (ROS) schemes could change the narrative on global health workforce distribution and shortages in sub-Saharan Africa. *Family Medicine and Community Health*, *8*(4).

MacKay, M., Ford, C., Grant, L. E., Papadopoulos, A., & McWhirter, J. E. (2023). Developing public health competency statements and frameworks: a scoping review and thematic analysis of approaches. *BMC Public Health*, *23*(1), 2240.

MacKay, M., Ford, C., Grant, L. E., Papadopoulos, A., & McWhirter, J. E. (2024). Developing competencies in public health: a scoping review of the literature on developing competency frameworks and student and workforce development. *Frontiers in Public Health*, *12*, 1332412.

Makri, C., & Neely, A. (2021). Grounded theory: A guide for exploratory studies in management research. *International Journal of Qualitative Methods*, *20*, 16094069211013654.

Manyazewal, T. (2017). Using the World Health Organization health system building blocks through survey of healthcare professionals to determine the performance of public healthcare facilities. *Archives of Public Health*, *75*, 1–8.

Mase, W. A., Hansen, A. R., Smallwood, S. W., Shah, G., Peden, A. H., Mulherin, T., & Bender, K. (2018). Disease intervention specialist education for the future: An analysis of public health curricula. *Public Health Reports*, *133*(6), 738–748.

Mata, Á. N. de S., de Azevedo, K. P. M., Braga, L. P., de Medeiros, G. C. B. S., de Oliveira Segundo, V. H., Bezerra, I. N. M., Pimenta, I. D. S. F., Nicolás, I. M., & Piuvezam, G. (2021). Training in communication skills for self-efficacy of health professionals: a systematic review. *Human Resources for Health*, *19*, 1–9.

Matsoso, M. P., & Strachan, B. (2011). Human resources for health for South Africa: HRH strategy for the health sector 2012/13-2016/17. *South African Health Review*, *2011*(1), 49–58.

Mayosi, B. M., Lawn, J. E., Van Niekerk, A., Bradshaw, D., Abdool Karim, S. S., & Coovadia, H. M. (2012). Health in South Africa: changes and challenges since 2009. *Lancet (London, England)*, *380*(9858), 2029–2043. https://doi.org/10.1016/S0140-6736(12)61814-5

Mboera, L. E. G., Rumisha, S. F., Mfinanga, S. G., Karimuribo, E. D., & Sindato, C. (2014). The changing landscape of public health in sub-Saharan Africa: control and prevention of communicable diseases needs rethinking: proceedings. *Onderstepoort Journal of Veterinary Research*, *81*(2), 1–6.

McCartney, G., Dickie, E., Escobar, O., & Collins, C. (2021). Health inequalities, fundamental causes and power: towards the practice of good theory. *Sociology of Health & Illness*, *43*(1), 20–39.

McClellan, M., Rajkumar, R., Couch, M., Holder, D., Pham, M., Long, P., Medows, R., Navathe, A., Sandy, L., & Shrank, W. (2021). Health care payers COVID-19 impact assessment: lessons learned and compelling needs. *NAM Perspectives*, *2021*.

Melariri, H., Freercks, R., van der Merwe, E., Ten Ham-Baloyi, W., Oyedele, O., Murphy, R. A., Claasen, C., Etusim, P. E., Achebe, M. O., & Offiah, S. (2024). The burden of hospital-acquired infections (HAI) in sub-Saharan Africa: a systematic review and meta-analysis. *Eclinicalmedicine*, *71*.

Mendelson, M., Booyens, L., Boutall, A., Cairncross, L., Calligaro, G., Dave, J. A., Dlamini, S., Dyer, S., Eick, B., Fieggen, K., Frankenfeld, P., Hoare, J., Hofmeyr, R., Joska, J., Joubert, I., Krause, R., Kropman, A., Levin, D., Maughan, D., … Wasserman, S. (2020). The mechanics of setting up a COVID-19 response: Experiences of the COVID-19 epidemic from Groote Schuur Hospital, Cape Town, South Africa. *South African Medical Journal*, *110*(10), 968–972. https://doi.org/10.7196/SAMJ.2020.v110i10.15215

Meredith, G. R., Welter, C. R., Risley, K., Seweryn, S. M., Altfeld, S., & Jarpe-Ratner, E. A. (2022). A new baseline: master of public health education shifting to meet public health needs. *Journal of Public Health Management and Practice*, *28*(5), 513–524.

Michel, J., Tediosi, F., Egger, M., Barnighausen, T., McIntyre, D., Tanner, M., & Evans, D. (2020). Universal health coverage financing in South Africa: wishes vs reality. *Journal of Global Health Reports*, *4*, e2020061.

Mohajan, H. K. (2018). Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment and People*, *7*(1), 23–48.

Murray, C. J. L., & Frenk, J. (2000). A framework for assessing the performance of health systems. *Bulletin of the World Health Organization*, *78*, 717–731.

Mutale, W., Bond, V., Mwanamwenge, M. T., Mlewa, S., Balabanova, D., Spicer, N., & Ayles, H. (2013). Systems thinking in practice: the current status of the six WHO building blocks for health system strengthening in three BHOMA intervention districts of Zambia: a baseline qualitative study. *BMC Health Services Research*, *13*, 1–9.

Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2023). A step-by-step process of thematic analysis to develop a conceptual model in qualitative research. *International Journal of Qualitative Methods*, *22*, 16094069231205788.

Naicker, S., Plange-Rhule, J., Tutt, R. C., & Eastwood, J. B. (2009). Shortage of healthcare workers in developing countries—Africa. *Ethnicity & Disease*, *19*, 60–64.

National Collaborating Centre for Methods and Tools. (2023, October 12). *What is known about the implementation and evaluation of core competencies for public health, and what are barriers or facilitators for implementation?* . Https://Nccmt.ca/Pdfs/Res/Core-Competencies.

National Department of Health. (2020). *2030 human resources for health strategy: Investing in the health workforce for universal health coverage*. Government Printers Pretoria.

National Department of Health (NDoH). (2020). *2030 Human Resources for Health Strategy: Investing in the Health Workforce for Universal Health Coverage*.

Ndejjo, R., Ssemugabo, C., Osuret, J., Zziwa, E. B., Fonn, S., Alfvén, T., Mukanga, D., Khayesi, M., & Wanyenze, R. K. (2022). Positioning Africa's public health doctoral students to lead societal transformation and development. *BMJ Global Health*, *7*(2), e007996.

Nguyen, L.-K.-N., Kumar, C., Jiang, B., & Zimmermann, N. (2023). Implementation of systems thinking in public policy: A systematic review. *Systems*, *11*(2), 64.

O'Donovan, R., Buckley, C., Crowley, P., Fulham-McQuillan, H., Gilmore, B., Martin, J., McAuliffe, E., Moore, G., Nicholson, E., & Shé, É. N. (2021). Contact tracing during the COVID-19 outbreak: a protocol for enabling rapid learning from experiences and exploring the psychological impact on contact tracers. *HRB Open Research*, *4*.

Oleribe, O. O., Momoh, J., Uzochukwu, B. S. C., Mbofana, F., Adebiyi, A., Barbera, T., Williams, R., & Taylor-Robinson, S. D. (2019). Identifying key challenges facing healthcare systems in Africa and potential solutions. *International Journal of General Medicine*, 395–403.

Oraison, H., Konjarski, L., & Howe, S. (2019). Does university prepare students for employment?: Alignment between graduate attributes, accreditation requirements and industry employability criteria. *Journal of Teaching and Learning for Graduate Employability*, *10*(1), 173–194.

Organization, W. H. (2018). *Essential public health functions, health systems and health security: developing conceptual clarity and a WHO roadmap for action*.

Ozili, P. K. (2020). COVID-19 in Africa: Socioeconomic Impact, Policy Response and Opportunities. *SSRN Electronic Journal*, *April*. https://doi.org/10.2139/ssrn.3574767

Porter, D. (2005). *Health, civilization and the state: a history of public health from ancient to modern times*. Routledge.

Pype, P., Mertens, F., Helewaut, F., & Krystallidou, D. (2018). Healthcare teams as complex adaptive systems: understanding team behaviour through team members' perception of interpersonal interaction. *BMC Health Services Research*, *18*, 1–13.

Qomariyah, N., Savitri, T., Hadianto, T., & Claramita, M. (2016). Formulating Employability Skills for Graduates of Public Health Study Program. *International Journal of Evaluation and Research in Education*, *5*(1), 22–31.

Rabbani, F., Shipton, L., White, F., Nuwayhid, I., London, L., Ghaffar, A., Ha, B. T. T., Tomson, G., Rimal, R., & Islam, A. (2016). Schools of public health in low and middle-income countries: an imperative investment for improving the health of populations? *BMC Public Health*, *16*, 1–12.

Rao, R., Hawkins, M., Ulrich, T., Gatlin, G., Mabry, G., & Mishra, C. (2020). The Evolving Role of Public Health in Medical Education. *Frontiers in Public Health*, *8*, 251. https://doi.org/10.3389/FPUBH.2020.00251/BIBTEX

Ravaghi, H., Beyranvand, T., Mannion, R., Alijanzadeh, M., Aryankhesal, A., & Belorgeot, V. D. (2021). Effectiveness of training and educational programs for hospital managers: a systematic review. *Health Services Management Research*, *34*(2), 113–126.

Rispel, L. C., Blaauw, D., Ditlopo, P., & White, J. (2018). Human resources for health and universal health coverage: progress, complexities and contestations. *South African Health Review*, *2018*(1), 13–21.

Rowitz, L. (2014). *Public health leadership: Putting principles into practice*. Jones & Bartlett Publishers.

Seifert, C. M., Chapman, L. S., Hart, J. K., & Perez, P. (2012). Enhancing intrinsic motivation in health promotion and wellness. *American Journal of Health Promotion*, *26*(3), 1–12.

Shahzad, M., Upshur, R., Donnelly, P., Bharmal, A., Wei, X., Feng, P., & Brown, A. D. (2019). A population-based approach to integrated healthcare delivery: a scoping review of clinical care and public health collaboration. *BMC Public Health*, *19*, 1–15.

Sharma, K., & Zodpey, S. (2011). Public health education in India: need and demand paradox. *Indian Journal of Community Medicine*, *36*(3), 178–181.

Shephard, R., Uy, J., Otterman, V., Betker, C., Sandhu, H. S., Tjaden, L., Apatu, E., Di Ruggiero, E., Musto, R., & Pawa, J. (2024). The Core Competencies for Public Health in Canada: Opportunities and Recommendations for Modernization. *Journal of Public Health Management and Practice*, *30*(3), 432–441.

Spinello, E. F., & Fischbach, R. (2008). Using a Web-Based Simulation as a Problem-Based Learning Experience: Perceived and Actual Performance of Undergraduate Public Health Students. *Public Health Reports*, *123*.

Stewart, K. E., Halverson, P. K., Rose, A. v., & Walker, S. K. (2010). Public health workforce training: Application of the council on linkages' core competencies. *Journal of Public Health Management and Practice*, *16*(5), 465–469. https://doi.org/10.1097/PHH.0B013E3181CE4F0B

Tan, J., Wen, H. J., & Awad, N. (2005). Health care and services delivery systems as complex adaptive systems. *Communications of the ACM*, *48*(5), 36–44.

Tiwari, R., Negandhi, H., & Zodpey, S. (2018). Current status of master of public health programmes in India: a scoping review. *WHO South-East Asia Journal of Public Health*, *7*(1), 29–35.

Tomlinson, M. (2012). Graduate employability: A review of conceptual and empirical themes. *Higher Education Policy*, *25*, 407–431.

Topp, S. M., Schaaf, M., Sriram, V., Scott, K., Dalglish, S. L., Nelson, E. M., Rajasulochana, S. R., Mishra, A., Asthana, S., & Parashar, R. (2021). Power analysis in health policy and systems research: a guide to research conceptualisation. *BMJ Global Health*, *6*(11), e007268.

Tulchinsky, T. H., & Varavikova, E. A. (2014). A history of public health. *The New Public Health*, 1.

Turner, J. R., & Baker, R. M. (2019). Complexity theory: An overview with potential applications for the social sciences. *Systems*, *7*(1), 4.

Udoudom, U., Igiri, A., George, K., & Aruku, K. J. (2024). Promoting Health Education through Effective Communication for Development. *ALSYSTECH Journal of Education Technology*, *2*(1), 68–88.

van Diggele, C., Burgess, A., Roberts, C., & Mellis, C. (2020). Leadership in healthcare education. *BMC Medical Education*, *20*, 1–6.

Vanderslott, S., Phillips, M. T., Pitzer, V. E., & Kirchhelle, C. (2019). Water and filth: reevaluating the first era of sanitary typhoid intervention (1840–1940). *Clinical Infectious Diseases*, *69*(Supplement_5), S377–S384.

Weinhold, I., & Gurtner, S. (2014). Understanding shortages of sufficient health care in rural areas. *Health Policy*, *118*(2), 201–214.

Weintraub, R., President, C. F. K., & Bitton, A. (2020). *Why primary care can make COVID-19 vaccine distribution more successful*. The Milbank Blog. https://www.milbank.org/2020/12/why-primary-care-can-make-covid-19-vaccine-distribution-more-successful/

White, F. (2013). The imperative of public health education: a global perspective. *Medical Principles and Practice*, *22*(6), 515–529.

WHO Africa. (2022). *Chronic staff shortfalls stifle Africa's health systems: WHO study*. Republic of Congo, Africa: World Health Organization.

WHO-ASPHER Competency Framework for the Public Health Workforce in the European Region 2020 2. (2020). http://www.euro.who.int/pubrequest

Witter, S., Sheikh, K., & Schleiff, M. (2022). Learning health systems in low-income and middle-income countries: exploring evidence and expert insights. *BMJ Global Health*, *7*(Suppl 7), e008115.

Wong, D. K. C., Gendeh, H. S., Thong, H. K., Lum, S. G., Gendeh, B. S., Saim, A., & Husain, S. (2020). A review of smell and taste dysfunction in COVID-19 patients. *Medical Journal of Malaysia*, *75*(5), 574–581.

World Health Organization, (2016. (2016). *Health workforce requirements for universal health coverage and the sustainable development goals.(human resources for health observer, 17)*.

World Health Organization (WHO). (2010). Monitoring the building blocks of health systems. *Geneva, Switzerland: WHO Document Production Services*.

World Health Organization (WHO). (2016). *Global strategy on human resources for health: workforce 2030*.

World Health Organization (WHO). (2018, February 22). *Health inequities and their causes*. Https://Www.Who.Int/News-Room/Facts-in-Pictures/Detail/Health-Inequities-and-Their-Causes.

World Health Organization (WHO). (2020). *WHO-ASPHER competency framework for the public health workforce in the European region*. World Health Organization. Regional Office for Europe.

World Health Organization (WHO). (2023, October 5). *Universal health coverage (UHC)*. Https://Www.Who.Int/News-Room/Fact-Sheets/Detail/Universal-Health-Coverage-(Uhc).

World Health Organization (WHO). (2024, July 11). *Health workforce*. Https://Www.Who.Int/Health-Topics/Health-Workforce#tab=tab_1.

Wright, J., Rao, M., & Walker, K. (2008). The UK Public Health Skills and Career Framework—Could it help to make public health the business of every workforce? *Public Health*, *122*(6), 541–544. https://doi.org/10.1016/J.PUHE.2008.03.006

Zekeng, E. (2016). Healthcare systems in Sub-Saharan Africa: focusing on community-based delivery (CBD) of health services and the development of local research institutes. *United Nations Peace Progr*, *3*, 44–49.

Zhang, Y., McDarby, G., Seifeldin, R., Mustafa, S., Dalil, S., Schmets, G., Azzopardi-Muscat, N., Fitzgerald, J., Mataria, A., & Bascolo, E. (2023). Towards applying the essential public health functions for building health systems resilience: a renewed list and key enablers for operationalization. *Frontiers in Public Health*, *10*, 1107192.

Zhong, B.-L., Luo, W., Li, H.-M., Zhang, Q.-Q., Liu, X.-G., Li, W.-T., & Li, Y. (2020). Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. *International Journal of Biological Sciences*, *16*(10), 1745.

Zwanikken, Huong, N. T., Ying, X. H., Alexander, L., Wadidi, M. S. E. A., Magaña-Valladares, L., Gonzalez-Robledo, M. C., Qian, X., Linh, N. N., & Tahir, H. (2014). Outcome and impact of Master of Public Health programs across six countries: education for change. *Human Resources for Health*, *12*, 1–10.

Zwanikken, P. A. C., Alexander, L., & Scherpbier, A. (2016). Impact of MPH programs: contributing to health system strengthening in low-and middle-income countries? *Human Resources for Health*, *14*, 1–19.

Zweigenthal, V. E. M., Marquez, E., & London, L. (2016). 'Why do an MPH?'Motivations and intentions of physicians undertaking postgraduate public health training at the University of Cape Town. *Global Health Action*, *9*(1), 32735.

Appendix 1: Research Protocol

1. Introduction

1.1 What is Public health?

In 1920, Charles Winslow provided the most comprehensive definition of public health, which has endured to this day. He defined it as:

> *"Public Health is the science and the art of preventing disease, prolonging life, and promoting physical health and efficiency through organised community efforts for the sanitation of the environment, the control of community infections, the education of the individual in principles of personal hygiene, the organisation of medical and nursing service for the early diagnosis and preventive treatment of disease, and the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health; organising these benefits in such fashion as to enable every citizen to realise his birthright of health and longevity"* (Kemper, 2015).

From this expansive definition, it became evident that a dedicated workforce was needed to address the public health needs of populations. By the end of the 19th century, Schools of Public Health began to appear in Western nations, including the London School of Hygiene and Tropical Medicine, founded in 1899, and Tulane University School of Hygiene and Tropical Medicine, established in 1912 (Buekens, 2012; White, 2013). However, in Great Britain, public health as a discipline was formally organized earlier than in the rest of the world (Porter, 2005). The establishment of public health in Great Britain was influenced by the health problems posed by pandemics and epidemics of the time, tropical diseases encountered in colonial lands, and the sanitation and hygiene awakening (Bruchhausen, 2020; Cannistra, 2023; Tulchinsky & Varavikova, 2014; Vanderslott et al., 2019).

SOPH-trained public health officers promote health, prevent disease, and empower populations to manage sickness and disability (Seifert et al., 2012). Unlike clinical practice, which treats patients on a one-on-one basis when they are ill, public health practitioners focus on population-level interventions aimed at health promotion and disease prevention to avoid widespread sickness and death (Légaré et al., 2018; Shahzad et al., 2019). Public health uniquely combines study, investigation, and action, uniting diverse experts to identify health issues' root causes and create innovative, long-term solutions to improve everyone's quality of life .

Public health initiatives are mainly led by local and national governments, NGOs, multilateral institutions, the private sector, universities, health facilities, ministries of health, professional associations, and health policy institutions. The activities performed by these organizations are crucial, as they directly and indirectly contribute to health system responsiveness, equity, and resilience. Therefore, developing solid public health institutions is essential for building responsive, equitable, and resilient health systems (Kruk et al., 2018; Zhang et al., 2023).

1.2 The dynamic relationship between Public health and Health Systems

According to the literature, public health and health systems are distinct entities with different aims and functions, yet they often intersect and overlap (Jarvis et al., 2020; Kruk et al., 2018; Organization, 2018; Topp et al., 2021). Various health system frameworks have been developed over time, with a common foundation in the World Health Organization (WHO) health system framework. The WHO health system framework defines health systems as "All organisations, people and actions whose primary intent is to promote, restore or maintain health" (Murray & Frenk, 2000). The WHO further breaks down health systems into six interconnected building blocks: Information Systems, Essential Medicines and Technologies, Finance Structures, Leadership and Governance, Human Resources for Health, and Service Delivery (World Health Organization (WHO), 2010). These building blocks form the foundation of health systems, and their relationships and interconnections define the health system.

Health systems are better understood as Complex Adaptive Systems (CAS) rather than mechanical systems (Graham et al., 2021; Pype et al., 2018; Tan et al., 2005). CAS are characterized by non-linear interactions, reactivity to their context, and considerable unpredictability (Hoogeboom & Wilderom, 2020; Khan et al., 2018; Turner & Baker, 2019). Because the health system building blocks are interconnected, any intervention in one block affects the others. For example, developing strong public health training institutions enhances the health workforce, which in turn improves leadership quality as public health practitioners often assume health system leadership roles, resulting in more efficient service delivery (Manyazewal, 2017; Mutale et al., 2013). Robust health systems are essential for achieving Universal Health Coverage (UHC), a key goal of Sustainable Development Goal (SDG) number 3 (Kieny et al., 2017; World Health Organization (WHO), 2023). The principles of UHC are grounded in equity and social justice, aiming to provide health services without causing financial hardship to recipients (World Health Organization (WHO), 2023).

Figure 1: Conceptual fit of public health systems within current health systems
Source: (Jarvis et al., 2020)

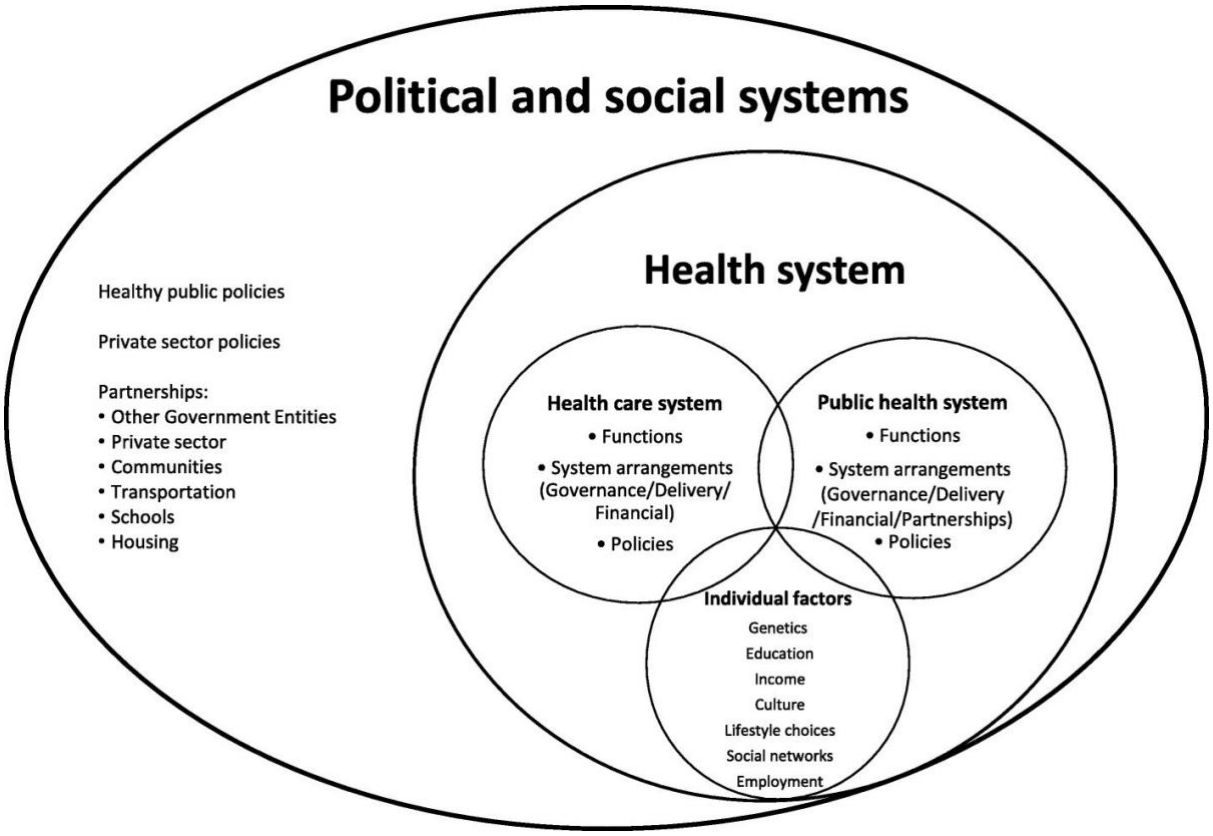

Figure illustrates the conceptual fit of public health systems within current health systems, emphasizing the overlap and interaction between public health functions, health care systems, and the broader political and social systems. It highlights how public health initiatives are intertwined with individual factors and broader societal elements, demonstrating their integral role in health system effectiveness and responsiveness. Public health operates as an integrated ecosystem within the broader health system, promoting a population health approach (Shahzad et al., 2019). The integration of public health with the health system leads to more efficient service delivery and increased responsiveness to the needs of individuals and populations (Jarvis et al., 2020).

The Institute of Medicine (IOM) identifies three core public health functions: monitoring community health, developing health policies with stakeholders, and ensuring access to cost-effective care and prevention programs (Hoss et al., 2016). These functions align perfectly with the health system goals of improving health, enhancing system responsiveness, providing financial risk protection, and

ensuring system efficiency (Manyazewal, 2017). A health system's effectiveness is measured by its ability to improve the health of individuals and populations (Kruk et al., 2018). The success of health systems is linked to the performance of public health systems (Kruk et al., 2018; Mutale et al., 2013).

Pandemics have historically demonstrated the critical role of both health systems and public health in disease prevention and optimizing health outcomes during illness (Brownson et al., 2020). The COVID-19 pandemic, in particular, highlighted the essential role of public health, revealing inadequacies in healthcare systems worldwide and emphasizing the need for trained public health personnel (Filip et al., 2022; McClellan et al., 2021). During the pandemic, public health professionals played crucial roles in case identification, contact tracing, isolation, quarantine, surveillance, and reviewing evidence for measures to limit transmission (Ayouni et al., 2021; O'Donovan et al., 2021). The pandemic underscored the need for public health personnel with the knowledge and skills to strengthen health systems for optimal service provision (Di Ruggiero et al., 2020). It is now more critical than ever to ensure that public health practitioners can respond to global health crises like COVID-19 with the competencies taught in current public health curricula.

1.3 Relevance of the Public Health Workforce to the Health System

According to the World Health Organization, there is a global shortage of about 18 million healthcare workers needed to meet the Sustainable Development Goals (SDGs) and Universal Health Coverage (UHC) goals (World Health Organization (WHO), 2024). There is a significant imbalance between the population's needs and the available public health practitioners in terms of numbers, adequate training, and practical competencies (World Health Organization, 2016). Human resources for health (HRH) are central to any health system (George et al., 2018; Rispel et al., 2018; World Health Organization (WHO), 2016). A health system must have an adequate number of HRH who are competent and motivated to achieve UHC (Rispel et al., 2018).

The public health workforce is a crucial component of HRH, which can be classified into those providing direct care and those offering non-personal health services, with the public health workforce falling into the latter category (World Health Organization (WHO), 2016). Africa faces a significant shortfall in trained public health practitioners despite bearing a heavy disease burden (Oleribe et al., 2019; WHO Africa, 2022). Sub-Saharan Africa (SSA) has only 3% of the world's healthcare workers but bears 24% of the global disease burden (Anyangwe & Mtonga, 2007; Zekeng, 2016). In many African countries, public health and health system strengthening activities are managed by clinicians without formal public health training, leading to poor service provision and inadequate resource allocation (Oleribe et al., 2019). Therefore, it is essential to deploy public health managers skilled in public health matters and to educate individuals from diverse backgrounds to focus on upstream health determinants beyond the clinician's scope.

The 2030 Human Resources for Health Strategy by South Africa's National Department of Health (NDoH) underscores the need to "produce a competent and caring multidisciplinary health workforce through an equity-oriented, socially accountable education and training system" (National Department of Health, 2020). Public health education is a critical component of this strategy.

Historically, the South African health system was "hospital-centric" during apartheid, with minimal focus on population-level health (National Department of Health, 2020). Consequently, there has been no requirement for advanced public health qualifications for district and provincial-level positions in the public sector (Delobelle, 2013; National Department of Health, 2020). The HRH strategy of 2013 recommended employing individuals with MPH degrees for managerial roles in the public sector, but this is not yet in practice (Matsoso & Strachan, 2011).

Public health professionals are needed to strengthen primary health care and promote health in line with the Alma Ata declaration on Primary Health Care (PHC) and the goal of achieving Universal Health Coverage (Behera & Prasad, 2022). The HRH strategy calls for South African academic institutions to train more public health professionals and develop curricula that equip graduates to address population and health system needs (National Department of Health, 2020). Curriculum planning should involve students and other relevant stakeholders, making this research relevant as it aims to understand the roles and competencies of MPH alumni to design programs that meet the South African health system's needs. In line with the move towards UHC, South Africa is rolling out the National Health Insurance (NHI), a health funding scheme that integrates private health services into the state health system (Michel et al., 2020). The success of the NHI depends on the availability of skilled and motivated public health professionals. Therefore, building public health capacity by training competent public health practitioners is crucial.

1.4 The role of an MPH in upskilling public health practitioners

The Master of Public Health (MPH) is a graduate-level academic qualification offered by many universities worldwide and is recognized as a professional entry program into public health (Bass et al., 2008; Leider et al., 2018). MPH graduates bring a population-focused perspective to various employment settings, with roles ranging from public health research and practice to clinical practice, primary health care, health policy and systems, management, and the planning and dissemination of health services (Leider et al., 2020). In a study by Zwanikken on the impact of MPH programs in low- and middle-income countries (LMICs), it was noted that MPH graduates made significant contributions in their workplaces, with some even influencing national-level policies (Zwanikken et al., 2016). The MPH program builds capacity and strengthens evidence-based public health, with research being a significant component of the course (Meredith et al., 2022; Zwanikken et al., 2016). Graduates of the MPH degree significantly contribute to policymaking and management at all levels of public health (Zwanikken et al., 2014).

The MPH program upskills the workforce by making practitioners aware of the socio-ecological determinants of health, distinguishing it from clinical training (Komro et al., 2018). However, there is a need to develop competencies for various MPH qualifications since people with diverse backgrounds now enter the field, and MPH graduates can be employed in different sectors. Historically, the field of public health was primarily reserved for clinicians (Fineberg, 2011; Health et al., 2012). The MPH provides a specialized approach to public health, as programs in many institutions offer different specialization tracks, such as health economics, health policy and systems, epidemiology and biostatistics, social and behavioural health, and health economics (Komro et al., 2018; Zwanikken et

al., 2016). This versatility makes MPH graduates well-equipped to address a wide range of public health challenges.

1.5 Career Pathways and Relevance of MPH Graduates

After graduation, Public Health graduates typically find positions in local or national health departments, NGOs, multilateral development agencies, and academia (Komro et al., 2018; Zwanikken et al., 2016). However, recent trends show that MPH graduates possess transferable skills that are now being utilized in the private and corporate sectors (Bowles et al., 2021; Dlungwane & Voce, 2020; Ndejjo et al., 2022; Qomariyah et al., 2016). This shift necessitates that Schools of Public Health (SOPH) produce graduates who can meet the requirements of various sectors. A study done in India (Ilangovan et al., 2022; Sharma & Zodpey, 2011; Tiwari et al., 2018) and South Africa (Zwanikken et al., 2016) argued that a master's in public health should be a prerequisite for public health practice. The competencies gained in an MPH program, such as disease surveillance, forecasting community needs, and planning, are essential for the day-to-day work of district health managers (Zwanikken et al., 2014, 2016). However, in practice, these regions face challenges.

Positions requiring public health competencies often do not have workers with public health training, and there are few posts specifically for MPH graduates (Komro et al., 2018; Zwanikken et al., 2014, 2016). In Ethiopia, a qualitative study with public health experts in advisory and decision-making roles highlighted the need for SOPHs to create curricula responsive to evolving public health needs (Kaba, Assefa, Yigzaw, Worku, et al., 2020). The study also noted that public health graduates lacked skills in planning, problem-solving research, community engagement, and leadership. Experts called for collaboration between higher education institutions and health sectors to develop curricula that meet employers' needs. A study at a South African university found that medical graduates pursuing an MPH did so to advance their careers, opening opportunities for full-time research or management roles (Zweigenthal et al., 2016). Another study at the University of KwaZulu Natal (UKZN) showed that MPH graduates mostly remained in the public health system, applying their skills in their roles (Dlungwane & Voce, 2020). Despite these studies, there are still local knowledge gaps regarding the career trajectories of MPH graduates and the adequacy of their MPH-acquired skills in their roles.

1.6 The MPH Qualification in South Africa

The Master of Public Health (MPH) degree is offered at the postgraduate level by eleven universities in South Africa, either on a full-time or part-time basis. These universities include the University of Cape Town, University of the Witwatersrand, University of KwaZulu-Natal, University of the Western Cape, University of Venda, Sefako Makgatho University, University of Limpopo, University of Pretoria, University of Johannesburg, Fort Hare University, and the University of South Africa. Many Schools of Public Health originated as extensions of existing medical schools. Over the years, they have evolved from Community Medicine Departments to Community Health Departments, and eventually to Schools of Public Health (Hoffman et al., 2012). The public health curriculum has also progressed from offering a postgraduate diploma to a standalone MPH degree with various tracks (Dlungwane & Voce, 2020).

Initially, the postgraduate qualification was primarily available to individuals with a health sciences background. However, the MPH degree is now accessible to people from diverse backgrounds, bringing a multidisciplinary perspective to the field (Dlungwane et al., 2017a). The MPH programs offered by South African Schools of Public Health emphasize different areas. While most include standard courses such as Epidemiology and Biostatistics, some offer unique tracks based on their capacities, including Health Economics, Social and Behavioural Health, Health Policy and Systems, and Environmental Health (Dlungwane et al., 2017a).

1.7 Definitions and Development of Public Health Competencies

The term "core competency" was introduced by Prahalad as part of modern management theory for businesses (Gupta, 2013). However, it also describes the foundational knowledge, skills, qualities, and abilities that professionals need to succeed in their chosen fields (Baczyńska et al., 2016). Core competencies give individuals a strategic competitive advantage in the job market, providing employers confidence in hiring individuals with specific skills (Jassim & Jaber, 1998). Core competencies in public health ensure graduates can perform essential functions: health promotion, disease prevention, life prolongation, program evaluation, and emergency response (MacKay et al., 2024). These competencies serve as tools to comprehensively assess and enhance public health workers' skills.

The establishment of core competencies in the United States stemmed from the Institute of Medicine's 1988 report on the Future of Public Health, which urged schools to produce graduates capable of addressing public health challenges (Calhoun et al., 2008). In 2010, The Lancet reiterated that health professional education, including public health, had not evolved to address 21st-century challenges adequately, urging the need to produce health leaders and change agents (Academy of Science of South Africa, 2018; Frenk et al., 2022). This led to the formation of the Public Health Faculty Forum, which initiated the development of universal competencies for public health practice. In the USA, the Council on Linkages between Academia and Public Health Practice has been developing and refining public health competencies since the 1990s, with the current set published in 2016 comprising eight domains reflecting the knowledge, attitudes, and skills required at the graduate level (Calhoun et al., 2008).

Similarly, the Public Health Agency of Canada, the Association of Schools of Public Health in the European Region, and England's Department of Health have developed core competencies to standardize MPH education, practice, and research (MacKay et al., 2023; Shephard et al., 2024; World Health Organization (WHO), 2020). These competencies are contextually sensitive to the regions where they were developed but share standard features that can be adapted in low- and middle-income countries (LMICs) (Franzen et al., 2017). These features include proficiencies in programming, policy design, policy analysis, systems thinking, strategic thinking, budgeting, financial management, interprofessional teams, and collaboration and partnership (Nguyen et al., 2023).

Health systems in LMICs face challenges starkly different from those in high-income countries (HICs), necessitating a competency framework sensitive to the social determinants of health (Nguyen et al.,

2023; Witter et al., 2022). LMIC health systems are strained by unfair global trade agreements, rapid urbanization, environmental degradation, mass displacements from conflicts and natural disasters, and limited equitable growth (Rabbani et al., 2016). Consequently, these health systems are fragile and unresponsive to population needs, compounded by a weak public health workforce. Zwanikken et al. (2014) used a Delphi method to develop competencies for LMIC MPH programs, seeking expert opinions through multiple rounds of questions to reach a consensus (Zwanikken et al., 2014). This study highlighted differences in competencies for public health in LMICs compared to those developed by the Council on Linkages, due to varying social determinants and public health contexts. Zwanikken et al.'s work was the first to develop and validate public health competencies in LMICs, consulting with experts and MPH alumni. Core competencies are used by accreditation bodies to assess education and training levels in public health schools, assuring employers that staff are trained to the highest standards (National Collaborating Centre for Methods and Tools, 2023). Chelak and Chakole, (2023).recommend that developing needed competencies involves not only the education and health sectors but also other sectors, given the interconnectedness of social determinants of health that significantly influence public health (Chelak & Chakole, 2023).

1.8 The downside of blind emphasis on Core Competencies

While public health entities seek employees with specific competencies, the ultimate measure of an employee's value is their outputs and the outcomes of public health programs (Basińska-Zych & Springer, 2021; Kim & Jung, 2022). Certain personal attributes, such as creativity, motivation, flair, and drive, are critical for success but cannot be easily measured (Cropley & Cropley, 2009). There is a risk that hiring organizations may focus too heavily on measurable competencies, overlooking employees who possess these essential soft skills (Lamri & Lubart, 2023). Abner et al., (2014) critique the focus on competencies, arguing that an overemphasis on achieving individual competencies may lead to a lack of awareness of their interconnectedness (Abner et al., 2014). In practice, this can hinder the ability to synthesize information and make situation-based judgments in complex and dynamic environments.

2. Problem Statement

Global health policy currently emphasizes the importance of improving health, social and economic development, and human rights (Holst, 2020; Kruk et al., 2018). However, a growing body of evidence highlights that addressing underlying causes of health inequalities is essential to improving health outcomes for all people (Braveman et al., 2011; Gkiouleka et al., 2023; Jackson & Gracia, 2014; McCartney et al., 2021; World Health Organization (WHO), 2018). The Master of Public Health (MPH) program plays a critical role in training public health professionals who are equipped to tackle these challenges. Despite the importance of skilled public health professionals, many countries, particularly in sub-Saharan Africa, face significant shortages and disparities in the distribution of the public health workforce (Beaglehole et al., 2003; Mabunda et al., 2020; Naicker et al., 2009).

In sub-Saharan Africa, the burden of disease is disproportionately high compared to the availability of healthcare workers (Agyei & Kumah, 2024; Mboera et al., 2014; Melariri et al., 2024). The region has only 3% of the world's healthcare workers but bears 24% of the global disease burden (Anyangwe &

Mtonga, 2007; Zekeng, 2016). This shortage is particularly severe in rural areas, where access to healthcare services, including public health interventions, is limited (Chinyakata et al., 2021; Gizaw et al., 2022; Weinhold & Gurtner, 2014). The disparity in the distribution of public health professionals exacerbates health inequalities, as those with the greatest need for health services often have the least access. The public health workforce is a crucial component of health systems, yet many public health and health system strengthening activities in sub-Saharan Africa are managed by clinicians without formal public health training. This results in suboptimal service provision and inefficient use of resources (Oleribe et al., 2019). There is an urgent need for trained public health professionals who can address the unique health challenges of the region and contribute to building resilient health systems.

The 2030 Human Resources for Health Strategy by South Africa's National Department of Health underscores the need to produce a competent and caring multidisciplinary health workforce through an equity-oriented, socially accountable education and training system (National Department of Health, 2020). Despite this emphasis, current MPH programs may not fully align with the needs of the South African health system, particularly in addressing the socio-ecological determinants of health. This research is particularly relevant as there is currently no framework of competencies for MPH programs in the South African context. Existing frameworks are tailored to high-income countries and do not address the unique challenges of the African context. The National Plan for Higher Education in South Africa mandates that tertiary institutions train graduates with skills and competencies to work globally. There is also a shortage of proficient workers in research, and according to the competencies framework developed by ASPH, MPH graduates must be highly skilled in conducting research. Addressing the competency gaps in public health training is crucial for building a responsive, equitable, and resilient health system in South Africa and beyond. By evaluating the current state of MPH programs and identifying areas for improvement, this study aims to contribute to the development of a well-trained public health workforce capable of addressing the health needs of all populations, particularly the most vulnerable.

3. Rationale of Study

The COVID-19 pandemic has exposed weaknesses in health systems worldwide but also demonstrated our capacity for adaptation and innovation in managing health systems (Glette et al., 2023). The pandemic has highlighted the need for agility and resilience in public health (Chabrol & David, 2023). Considering the critical role played by public health practitioners during the pandemic, higher education institutions now have an opportunity to evaluate whether their training programs effectively prepare these professionals for diverse health system requirements. Specifically, they can assess whether the formal training in foundational public health competencies enables practitioners to be ‘fit-for-purpose’ in their various roles.

This study explored the experiences of MPH graduates from South African higher education institutions. It mapped out the roles that MPH graduates took on since completing their programs and examined the extent to which their MPH training had equipped them to fulfil these roles. The goal was to determine the breadth of graduates' abilities and their value in their work contexts. Additionally, the study investigated whether their training provided them with the necessary

competencies for their various roles and assess their readiness to cope with the requirements of the COVID-19 pandemic.

Currently, public health curricula across the 11 South African universities offering MPH programs are discipline-based, with no baseline standard outputs (Dlungwane et al., 2017a; Dlungwane & Voce, 2020). Course delivery primarily focuses on theory, with little emphasis on real-life experiences (Dlungwane et al., 2017a). Previous studies have shown that this type of education often fails to prepare public health professionals for leadership positions and stakeholder engagement roles (Hawks & Gast, 2018). Compared to clinical health education, public health education in South Africa appears to be lagging in meeting international standards for public health practitioners (Dlungwane et al., 2017a; Dlungwane & Voce, 2020; Zwanikken et al., 2016; Zweigenthal et al., 2016). Therefore, Schools of Public Health in South Africa must develop a common framework of expected competencies. This paper aims to initiate this process by seeking the perspectives of MPH graduates in their respective roles. Previous research has primarily focused on expert opinions regarding the competencies that public health graduates should possess. There is a lack of literature on whether the MPH degree has contributed to the career advancement of alumni or if the competencies they have gained are applied in their roles (Zwanikken et al., 2014, 2016).

4. Positionality of the Researcher

4.1 The inspiration behind the study topic

This research is a sub-study within a larger project titled "Competencies and Utilities of Master of Public Health (MPH) Learning: A Study of Graduates from South African Universities." This multi-institutional project aims to determine the competencies of MPH graduates from South African universities and gather their perspectives on the advantages of obtaining an MPH qualification. It also seeks to understand whether the skills acquired from the MPH program have been beneficial in the workplace and society. The parent study consists of three phases, each employing different study methodologies.

4.2 The Three Phases are

4.2.1 Qualitative Study and Pilot of the Cross-Sectional Study

- Conducting one-on-one interviews with MPH graduates from all institutions to explore the applicability of the MPH degree and identify gaps in MPH training.
- A pilot survey with cohorts not included in the qualitative study population.

4.2.2 Cross-Sectional Analytical Study

- A questionnaire-based survey will be conducted among MPH graduates from various programs to determine the competencies and applicability of the MPH qualification. This phase will be inspired by the results from the first phase.

4.2.3 In-Depth Interviews with Prospective Employers

- Conducting interviews with potential employers of MPH graduates, including national, provincial, and district services, NGOs, and academic institutions. During this stage, a database will be established to track the career progression of MPH graduates.

This research focused on the first phase of the parent study. The findings from the various phases are anticipated to inform the development of core competencies for MPH programs in South Africa. Strengthening MPH institutions to produce competent graduates capable of contributing to health system strengthening is especially crucial in the post-COVID-19 era to achieve Universal Health Coverage.

This sub-study performed an analysis of data from interviews with MPH alumni from South African Schools of Public Health (SOPH) to understand their job market experiences after acquiring the MPH degree. This research is significant to the researcher, who is currently an MPH student at one of the institutions under study, pursuing the Health Systems Track. The researcher was interested in assessing whether the coursework learned over the past three semesters will adequately prepare them for a career in public health and broaden their understanding of potential career trajectories.

The researcher's decision to pursue an MPH was initially driven by a desire to contribute to health system strengthening. With a background in medicine, the researcher experienced frustration with the shortcomings and unresponsiveness of the health system during their internship and community service. By embarking on this course, the researcher aimed to gain a deeper understanding of health system functioning and policymaking. Contributing to the strengthening of public health workers through this research aligns with the researcher’s goals and aspirations.

5. Research Question

- To what extent do South African master's in public health programs prepare graduates to handle their jobs as public health practitioners?

5.2 Sub questions

- What roles have MPH alumni from South African MPH programmes filled in the health system since graduation?
- How did the MPH program equip them for these roles? How the curriculum equipped them for the roles?

5.3 AIM of this study

To explore how well MPH curricula prepared graduates from South African universities who completed their degrees before 2012 or after 2016 to perform their professional roles.

5.3.1 Objectives

- To identify the roles, Master of Public Health alumni (pre-2012 and post-2016 cohorts) have occupied after completing their degree.

- To investigate the preparedness of public health Alumni in their respective jobs/roles.
- To identify the strengths and gaps in their training
- Make recommendations for how competencies gaps can be filled through current training programmes.

6. Study Design

6.1 Explorative Study Design

This study adopted an exploratory research design aimed at developing ideas in an under-researched field, making it well-suited for gaining initial insights and familiarity for subsequent phases of the parent research (Makri & Neely, 2021). The research paradigm follows an interpretivist approach, which assumes that knowledge and meaning are social constructs grounded in experiences (Alharahsheh & Pius, 2020; Kivunja & Kuyini, 2017). An interpretivist approach enables the researcher to ask questions such as "what," "how," and "why" to gain a deeper understanding and explore influencing factors (Kivunja & Kuyini, 2017). It focuses on accessing the internal reality of participants' subjective experiences, aiming to provide first-hand exposition and detailed descriptions of discoveries made during the inquiry.

6.2 Study Methodology

This study employed a qualitative exploratory approach, which is effective for researching complex subjects such as human behaviour (Kalu & Bwalya, 2017). Qualitative research allows for a deeper understanding of social phenomena by drawing on participants' perspectives and experiences, helping to investigate, analyse, and comprehend social processes (Busetto et al., 2020). Qualitative research encompasses methods that deeply explore and interpret the social world by examining people's conditions, experiences, perceptions, and histories (Mohajan, 2018). Methodologies used in qualitative research included in-depth interviews, focus groups, observation, and documentary analysis (Jamshed, 2014). The choice of method depends on several factors, such as the research topic, practical considerations like ease of access, the relevance of the social context, the depth of individual perspective required, and the sensitivity of the subject under review. While quantitative studies address "how many" or "how much," qualitative studies generally explore "what," "how," or "why" phenomena occur. This study used one-on-one in-depth interviews, with the content subjected to qualitative analysis methods. The researcher aimed to construct a complex, holistic picture, analyze language, and provide extensive informant perspectives.

7. The Research Context

7.1 The Larger Study Methodology

Participants For the purposes of the larger multi-institutional study, Master of Public Health (MPH) graduates were categorized into three distinct cohorts based on their year of graduation:

- Cohort A: Graduated before 2012
- Cohort B: Graduated between 2012 and 2016

- Cohort C: Graduated after 2016

This sub-study focused exclusively on Cohorts A and C, meaning it included MPH alumni who graduated before 2012 or after 2016. Graduates from Cohort B (2012–2016) were intentionally excluded from this qualitative component, as they were already the subject of a separate quantitative survey phase within the broader parent study. The inclusion of Cohorts A and C allowed for the exploration of perspectives from graduates trained under potentially different programmatic and policy contexts before the 2012 curriculum reforms and after more recent program developments.

Participants for this qualitative phase were drawn from eight South African universities offering MPH programs: University of Cape Town (UCT), University of the Witwatersrand (WITS), University of KwaZulu-Natal (UKZN), University of the Western Cape (UWC), University of Venda (UNIVEN), Sefako Makgatho University (SMU), University of Limpopo, and University of Pretoria (UP). A purposive sampling strategy was used to recruit between two to five participants per institution. Recruitment was conducted via email where possible, or by phone when email contact details were unavailable. All interested alumni were provided with an informed consent form detailing the study's objectives, potential risks, and benefits. This form also included a request for permission to audio record the interviews and clarified participants' right to voluntarily withdraw at any point without any consequence.

In-depth, one-on-one interviews were conducted with eligible MPH graduates. These qualitative interviews aimed to elicit rich, detailed accounts of the graduates' roles post-MPH, their experiences in applying acquired competencies, and perceived gaps in their training. While the parent study incorporated both qualitative and quantitative elements (including surveys and interviews), this sub-study focused solely on the qualitative interview data. Interviewers used a semi-structured guide to allow for consistency in themes while also enabling flexibility to follow emerging areas of interest raised by participants. This approach was particularly suited to exploring the diverse experiences and career trajectories of MPH graduates across institutions.

7.2 Data analysis methods

This study employed thematic analysis to analyse a set of raw, primary qualitative interview transcripts collected as part of a broader, multi-institutional research project. Although the data were not personally collected by the researcher, they remained unprocessed and in their original form, thus qualifying as archival primary data. The use of thematic analysis was appropriate for identifying, analysing, and reporting recurring patterns and meaning across this rich, qualitative dataset. The analysis was deductive in its initial approach, guided by a pre-developed codebook from the parent study. However, the process was also flexible enough to accommodate inductive coding, allowing new themes to emerge from the data where relevant to the specific objectives of this sub-study.

The thematic analysis followed Braun and Clarke's six-phase framework:

- *Familiarization with the Data*: The researcher listened to interview audio recordings and repeatedly read the transcripts to immerse themselves in the content and begin identifying potential patterns.
- *Generating Initial Codes*: Using the parent study's codebook as a foundation, initial deductive codes were applied manually. Emerging ideas not captured by the existing codebook were recorded as new inductive codes.
- *Searching for Themes*: Related codes were grouped to form broader analytical themes. Themes were aligned with the research questions and objectives of this study.
- *Reviewing Themes*: The themes were reviewed for coherence and refined through discussion with a peer researcher who had worked on a related sub-study using the same dataset.
- *Defining and Naming Themes*: Clear definitions were established for each theme to ensure that they captured the essence of the participants' perspectives, with supporting quotations identified from the data.
- *Producing the Report*: Final themes were synthesized and contextualized within the broader literature, informing the findings and discussion presented in this thesis.

7.2.1 Thematic Data Analysis Steps

Familiarisation with data

In this study, the researcher analysed data that had been previously collected and transcribed by other members of the parent project. To immerse themselves in the dataset, the researcher first listened to the original audio recordings and then read and re-read the transcripts (Byrne, 2022). Notes were taken throughout this process to promote critical engagement and ensure a deeper understanding of the material. This familiarisation step allowed the researcher to begin identifying content relevant to the research objectives.

Generating Codes and Generating Themes

The next phase involved reducing the raw transcripts to their fundamental elements while preserving their meaning (Naeem et al., 2023). A pre-existing codebook developed in the parent study served as the basis for a deductive coding approach. In this approach, the researcher applied predefined concepts and categories to the data (Braun & Clarke, 2006). However, when data points emerged that were not accounted for in the original codebook, inductive coding was introduced. This allowed new themes to be generated based on the researcher's interpretive analysis, including cues from non-verbal elements such as tone and context (Braun & Clarke, 2019). The codebook had been developed in Microsoft Excel, and the researcher used it to manually apply both deductive and emergent inductive codes. Excel was also used to organize codes across participant responses and to facilitate the comparison of patterns.

According to Braun and Clarke (2006), a theme captures something meaningful in the data related to the research questions and objectives. At this stage, the researcher reviewed both the pre-existing and newly generated codes, clustering overlapping or related codes into broader themes. These

themes represented the underlying patterns within the data and were aligned with the study's analytical aims.

The deductive themes drawn from the parent codebook and included in this study were:

- Content Implications of the MPH: Specific subject matter alumni believed should have been included in the curriculum.
- Skill Set Implications: Practical skills that alumni felt were necessary for professional effectiveness but were insufficiently covered.
- General Gaps in the MPH Program: Broader areas of knowledge that were not addressed but deemed essential for public health practice.
- Improvements to MPH Training: Alumni recommendations for enhancing the curriculum based on real-world challenges.

Reviewing Themes

This step involved assessing and refining the preliminary themes generated in the previous stage. The researcher examined whether the themes accurately captured the intended meanings and whether the data supporting each theme were sufficient (Braun & Clarke, 2006). Inconsistencies or thematic overlaps were evaluated, and themes were either modified, collapsed, or expanded based on their coherence within the context of the entire dataset.

7.2.2 Defining and naming themes

This stage involved a final refinement of the identified themes to "identify the essence of what the theme is about" (Braun & Clarke, 2006). The focus was on understanding what each theme communicated and ensuring that any sub-themes still related to the central theme. At this stage, a short extract of data was paired with its corresponding theme.

8. How data was be analysed

A manual systematic analysis was conducted using MS Excel to organize respondent answers. The resultant codes were applied throughout the entire coding process. The researcher then interpreted the data to derive key analytical themes, which were used for the final write-up.

9. Ethics Consideration

The first part of the primary study, involving qualitative research, received ethics approval from the Human Research Ethics Committee (HREC) at the University of Cape Town (UCT), the lead investigator's home institution. Ethics approval is crucial for demonstrating that the researcher practiced integrity and dependability in their study. Before beginning data analysis, the researcher obtained ethical permission from UCT's HREC.

10. Risks and Benefits

This study posed no risks to the interview participants, as the interview recordings and transcripts were cleaned of all identifiers, and due diligence was observed during the interviews. The study is considered low risk since participants were not asked for further input.

11. Study Limitations

A limitation of the primary study was that the researcher conducting the data analysis did not collect the primary data. This could result in misinterpretation of the transcribed data, as the researcher may not have noted nonverbal cues made by the interview participants.

12. Budget and Costs

The study was desk-based, eliminating costs for travel or accommodation. The researcher incurred minimal expenses for printing and stationery.

Table 1: Budget

Category	**Item**	**Cost**
Stationery	Pens	R100
	Notebooks	R200
Printing	Dissertation	R500
Contingency 10%		R80
Total		**R880**

13. Dissemination

The findings from the study will be distributed as a thesis and as a manuscript available in the UCT Library. Additionally, a published article in the form of a journal will result from this research. The dissemination aims to contribute to the discussion on establishing key competencies for MPH graduates from South Africa and other countries in the region.

14. References

Abner, B., Bartosh, O., Ungerleider, C. S., & Tiffin, R. (2014). *Productivity implications of a shift to competency-based education: An environmental scan and review of the relevant literature*. Higher Education Quality Council of Ontario Toronto, ON.

Academy of Science of South Africa. (2018). *Reconceptualising health professions education in South Africa*. Academy of Science of South Africa (ASSAf).

Agyei, E., & Kumah, E. (2024). Navigating the complex terrain of healthcare systems in Sub-Saharan Africa: challenges and opportunities for progress. *Discover Health Systems*, *3*(1), 39.

Alharahsheh, H. H., & Pius, A. (2020). A review of key paradigms: Positivism VS interpretivism. *Global Academic Journal of Humanities and Social Sciences*, *2*(3), 39–43.

Anyangwe, S. C. E., & Mtonga, C. (2007). Inequities in the global health workforce: the greatest impediment to health in sub-Saharan Africa. *International Journal of Environmental Research and Public Health*, *4*(2), 93–100.

ASPHER's European List of Core Competences for the Public Health Professional. (2018). *Scandinavian Journal of Public Health*, *46*(23), 1–52. https://doi.org/10.1177/1403494818797072

Ayouni, I., Maatoug, J., Dhouib, W., Zammit, N., Fredj, S. Ben, Ghammam, R., & Ghannem, H. (2021). Effective public health measures to mitigate the spread of COVID-19: a systematic review. *BMC Public Health*, *21*(1), 1015.

Baczyńska, A. K., Rowiński, T., & Cybis, N. (2016). Proposed core competencies and empirical validation procedure in competency modeling: confirmation and classification. *Frontiers in Psychology*, *7*, 273.

Basińska-Zych, A., & Springer, A. (2021). Organizational and individual outcomes of health promotion strategies—a review of empirical research. *International Journal of Environmental Research and Public Health*, *18*(2), 383.

Bass, S. B., Guttmacher, S., & Nezami, E. (2008). Who will keep the public healthy? The case for undergraduate public health education: a review of three programs. *Journal of Public Health Management and Practice*, *14*(1), 6–14.

Beaglehole, R., Sanders, D., & Dal Poz, M. (2003). The public health workforce in sub-Saharan Africa. *Ethnicity & Disease*, *13*, 24–30.

Behera, B. K., & Prasad, R. (2022). Primary health-care goal and principles. *Healthcare Strategies and Planning for Social Inclusion and Development*, 221.

Benjamin, G. C. (2023). The Future of Public Health: Ensuring An Adequate Infrastructure. *The Milbank Quarterly*, *101*(Suppl 1), 637.

Bowles, D., Watts, R. D., Fisher, C., & Li, I. W. (2021). *What do public health graduates do and where do they go? An analysis of job destinations and mismatch in australian public health graduates*.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qual. Res. Sport Exerc. Health*, *11*(4), 589–597. https://doi.org/10.1080/2159676x.2019.1628806

Braveman, P. A., Kumanyika, S., Fielding, J., LaVeist, T., Borrell, L. N., Manderscheid, R., & Troutman, A. (2011). Health disparities and health equity: the issue is justice. *American Journal of Public Health*, *101*(S1), S149–S155.

Brits, H. J. (2018). Assessing employer satisfaction: An attempt to enhance graduate employability at an institution of higher learning. *South African Journal of Higher Education*, *32*(5), 39–53.

Brownson, R. C., Burke, T. A., Colditz, G. A., & Samet, J. M. (2020). Reimagining public health in the aftermath of a pandemic. *American Journal of Public Health*, *110*(11), 1605–1610.

Bruchhausen, W. (2020). *Global health in the colonial era: The expansion of European medicine*.

Buekens, P. (2012). From hygiene and tropical medicine to global health. *American Journal of Epidemiology*, *176*(suppl_7), S1–S3.

Burstrom, B., & Tao, W. (2020). Social determinants of health and inequalities in COVID-19. *European Journal of Public Health*, *30*(4), 617–618. https://doi.org/10.1093/eurpub/ckaa095

Busetto, L., Wick, W., & Gumbinger, C. (2020). How to use and assess qualitative research methods. *Neurological Research and Practice*, *2*(1), 14.

Byrne, D. (2022). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality and Quantity*, *56*(3), 1391–1412. https://doi.org/10.1007/S11135-021-01182-Y/FIGURES/D

Calhoun, J. G., Ramiah, K., Weist, E. M., & Shortell, S. M. (2008). Development of a core competency model for the master of public health degree. *American Journal of Public Health*, *98*(9), 1598–1607.

Cannistra, J. (2023). *The Sanitary Lens: A Study of 19th Century Public Health in British Colonial India and Australia*.

Chabrol, F., & David, P.-M. (2023). How resilience affected public health research during COVID-19 and why we should abandon it. *Global Public Health*, *18*(1), 2212750.

Chelak, K., & Chakole, S. (2023). The role of social determinants of health in promoting health equality: A narrative review. *Cureus*, *15*(1).

Cheng, M., Adekola, O., Albia, J., & Cai, S. (2022). Employability in higher education: a review of key stakeholders' perspectives. *Higher Education Evaluation and Development*, *16*(1), 16–31.

Chinyakata, R., Roman, N. V, & Msiza, F. B. (2021). Stakeholders' perspectives on the barriers to accessing health care services in rural settings: A human capabilities approach. *The Open Public Health Journal*, *14*(1).

Cioffi, J. P. (n.d.). *Core Competencies for Public Health Practice-Lessons Learned (USA)*.

Coovadia, H., Jewkes, R., Barron, P., Sanders, D., & McIntyre, D. (2009). The health and health system of South Africa: historical roots of current public health challenges. In *The Lancet* (Vol. 374, Issue 9692, pp. 817–834). Elsevier B.V. https://doi.org/10.1016/S0140-6736(09)60951-X

Cropley, A. J., & Cropley, D. (2009). *Fostering creativity: A diagnostic approach for higher education and organizations*. Hampton Press Cresskill, NJ.

Czabanowska, K., & Kuhlmann, E. (2021). Public health competences through the lens of the COVID-19 pandemic: what matters for health workforce preparedness for global health emergencies. *The International Journal of Health Planning and Management*, *36*(S1), 14–19. https://doi.org/10.1002/HPM.3131

Daire, J., & Gilson, L. (2014). Does identity shape leadership and management practice? Experiences of PHC facility managers in Cape Town, South Africa. *Health Policy and Planning*, *29*(suppl_2), ii82–ii97. https://doi.org/10.1093/HEAPOL/CZU075

Delobelle, P. (2013). The health system in South Africa. Historical perspectives and current challenges. *South Africa in Focus: Economic, Political and Social Issues*, 159–205.

Di Ruggiero, E., Papadopoulos, A., Steinberg, M., Blais, R., Frandsen, N., Valcour, J., & Penney, G. (2020). Strengthening collaborations at the public health system–academic interface: a call to action. *Canadian Journal of Public Health*, *111*, 921–925.

Diderichsen, F. (2018). The relevance of public health research for practice: A 30-year perspective. *Https://Doi.Org/10.1177/1403494818765706*, *46*(22_suppl), 58–66. https://doi.org/10.1177/1403494818765706

Dlungwane, T., & Voce, A. (2020). Exploring student persistence to completion in a Master of Public Health programme in South Africa. *African Journal of Health Professions Education*, *12*(1), 17–21.

Dlungwane, T., Voce, A., Searle, R., & Stevens, F. (2017a). Master of Public Health programmes in South Africa: issues and challenges. *Public Health Reviews*, *38*, 1–13.

Dlungwane, T., Voce, A., Searle, R., & Stevens, F. (2017b). Master of Public Health programmes in South Africa: Issues and challenges. *Public Health Reviews*, *38*(1), 1–13. https://doi.org/10.1186/S40985-017-0052-9/FIGURES/1

Dopelt, K., Shevach, I., Vardimon, O. E., Czabanowska, K., De Nooijer, J., Otok, R., Leighton, L., Bashkin, O., Duplaga, M., & Levine, H. (2023). Simulation as a key training method for inculcating public health leadership skills: a mixed methods study. *Frontiers in Public Health*, *11*, 1202598.

Dovey, K. (2002). Leadership development in a South African health service. *International Journal of Public Sector Management*, *15*(7), 520–533.

Fattahi, H., Abolghasem Gorji, H., & Bayat, M. (2020). Core competencies for health headquarters: a systematic review and meta-synthesis. *BMC Public Health*, *20*, 1–19.

Filip, R., Gheorghita Puscaselu, R., Anchidin-Norocel, L., Dimian, M., & Savage, W. K. (2022). Global challenges to public health care systems during the COVID-19 pandemic: a review of pandemic measures and problems. *Journal of Personalized Medicine*, *12*(8), 1295.

Fineberg, H. V. (2011). Public health and medicine: where the twain shall meet. *American Journal of Preventive Medicine*, *41*(4), S149–S151.

Franzen, S. R. P., Chandler, C., & Lang, T. (2017). Health research capacity development in low and middle income countries: reality or rhetoric? A systematic meta-narrative review of the qualitative literature. *BMJ Open*, *7*(1), e012332.

Frenk, J., Chen, L. C., Chandran, L., Groff, E. O. H., King, R., Meleis, A., & Fineberg, H. V. (2022). Challenges and opportunities for educating health professionals after the COVID-19 pandemic. *The Lancet*, *400*(10362), 1539–1556.

Galaviz, K. I., Narayan, K. M. V., Manders, O., McFarland, D. A., Goenka, S., Torres-Mejía, G., Reddy, K. S., Lozano, P. R., Magaña-Valladares, L., Prabhakaran, D., & Ali, M. K. (2016). The Public Health Leadership and Implementation Academy (PH-LEADER) for Non-Communicable Diseases. *Health Systems & Reform*, *2*(3), 222–228. https://doi.org/10.1080/23288604.2016.1224452

Gebbie, K., Merrill, J., & Tilson, H. H. (2002). The public health workforce. *Health Affairs*, *21*(6), 57–67. https://doi.org/10.1377/HLTHAFF.21.6.57/ASSET/IMAGES/LARGE/057_T2.JPEG

George, As., Campbell, J., & Ghaffar, A. (2018). Advancing the science behind human resources for health: highlights from the Health Policy and Systems Research Reader on Human Resources for Health. *Health Research Policy and Systems*, *16*, 1–8.

Gilson, L., & Daire, J. (2011). Leadership and governance within the South African health system. *South African Health Review*, *2011*(1), 69–80.

Gizaw, Z., Astale, T., & Kassie, G. M. (2022). What improves access to primary healthcare services in rural communities? A systematic review. *BMC Primary Care*, *23*(1), 313.

Gkiouleka, A., Wong, G., Sowden, S., Bambra, C., Siersbaek, R., Manji, S., Moseley, A., Harmston, R., Kuhn, I., & Ford, J. (2023). Reducing health inequalities through general practice. *The Lancet Public Health*, *8*(6), e463–e472.

Glette, M. K., Ludlow, K., Wiig, S., Bates, D. W., & Austin, E. E. (2023). Resilience perspective on healthcare professionals' adaptations to changes and challenges resulting from the COVID-19 pandemic: a meta-synthesis. *BMJ Open*, *13*(9), e071828.

Gonzales, R., Handley, M. A., Ackerman, S., & O'sullivan, P. S. (2012). Increasing the Translation of Evidence Into Practice, Policy, and Public Health Improvements: A Framework for Training Health Professionals in Implementation and Dissemination Science. *Acad Med*, *87*(3), 271–278. https://doi.org/10.1097/ACM.0b013e3182449d33

Graham, K. D., Steel, A., & Wardle, J. (2021). Embracing the complexity of primary health care: system-based tools and strategies for researching the case management process. *Journal of Multidisciplinary Healthcare*, 2817–2826.

Gupta, R. K. (2013). *Core Competencies-Concept and Relevance*.

Hawks, S. R., & Gast, J. A. (2018). Design and development of an MPH program for online delivery. *Journal on Empowering Teaching Excellence*, *2*(2), 8.

Health, B. on P., Practice, P. H., & Health, C. on P. H. S. to I. (2012). *For the public's health: investing in a healthier future*.

Hemans-Henry, C., Blake, J., Parton, H., Koppaka, R., & Greene, C. M. (2016a). Preparing master of public health graduates to work in local health departments. *Journal of Public Health Management and Practice*, *22*(2), 194–199.

Hemans-Henry, C., Blake, J., Parton, H., Koppaka, R., & Greene, C. M. (2016b). Preparing Master of Public Health Graduates to Work in Local Health Departments. *Journal of Public Health*

Management and Practice : JPHMP, *22*(2), 194–199. https://doi.org/10.1097/PHH.0000000000000232

Hoffman, M., Coetzee, D., Hodes, R., & London, L. (2012). From comprehensive medicine to public health at the University of Cape Town: a 40-year journey: forum-reflections. *South African Medical Journal*, *102*(6), 442–445.

Holst, J. (2020). Global Health–emergence, hegemonic trends and biomedical reductionism. *Globalization and Health*, *16*(1), 42.

Hoogeboom, M. A. M. G., & Wilderom, C. P. M. (2020). A complex adaptive systems approach to real-life team interaction patterns, task context, information sharing, and effectiveness. *Group & Organization Management*, *45*(1), 3–42.

Hoss, A., Menon, A., & Corso, L. (2016). State public health enabling authorities: results of a fundamental activities assessment examining core and essential services. *Journal of Public Health Management and Practice*, *22*(6), 529–536.

Ilangovan, K., Muthappan, S., Govindarajan, K., Vairamani, V., Venkatasamy, V., & Ponnaiah, M. (2022). Transdisciplinarity of India's master's level public health programmes: evidence from admission criteria of the programmes offered since 1995. *Human Resources for Health*, *20*(1), 14.

Jackson, C. S., & Gracia, J. N. (2014). Addressing health and health-care disparities: the role of a diverse workforce and the social determinants of health. *Public Health Reports*, *129*(1_suppl2), 57–61.

Jamshed, S. (2014). Qualitative research method-interviewing and observation. *Journal of Basic and Clinical Pharmacy*, *5*(4), 87.

Jarvis, T., Scott, F., El-Jardali, F., & Alvarez, E. (2020). Defining and classifying public health systems: a critical interpretive synthesis. *Health Research Policy and Systems*, *18*, 1–12.

Jassim, R. K., & Jaber, G. (1998). Competitive advantage through the employees. *Research Paper, University of Auckland New Zealand*.

Kaba, M., Assefa, M., Yigzaw, T., kitaw, yayehyirad, Worku, S., & Bulto, T. (2020). Gaps in public health training in Ethiopia: Insights from a qualitative study. *Ethiopian Journal of Health Development*, *34*(1). https://www.ajol.info/index.php/ejhd/article/view/198775

Kaba, M., Assefa, M., Yigzaw, T., Worku, S., & Bulto, T. (2020). Gaps in public health training in Ethiopia: Insights from a qualitative study. *Ethiopian Journal of Health Development*, *34*(1).

Kalu, F. A., & Bwalya, J. C. (2017). What makes qualitative research good research? An exploratory analysis of critical elements. *International Journal of Social Science Research*, *5*(2), 43–56.

Kemper, S. (2015, June 5). *A public health giant: C-E.A. Winslow, who launched public health at Yale a century ago, still influential today*. Https://Medicine.Yale.Edu/News-Article/a-Public-Health-Giant-c-Ea-Winslow-Who-Launched-Public-Health-at-Yale-a-Century-Ago-Still-Influential-Today/.

Khan, S., Vandermorris, A., Shepherd, J., Begun, J. W., Lanham, H. J., Uhl-Bien, M., & Berta, W. (2018). Embracing uncertainty, managing complexity: applying complexity thinking principles to transformation efforts in healthcare systems. *BMC Health Services Research*, *18*, 1–8.

Kieny, M. P., Bekedam, H., Dovlo, D., Fitzgerald, J., Habicht, J., Harrison, G., Kluge, H., Lin, V., Menabde, N., & Mirza, Z. (2017). Strengthening health systems for universal health coverage and sustainable development. *Bulletin of the World Health Organization*, *95*(7), 537.

Kim, J., & Jung, H.-S. (2022). The effect of employee competency and organizational culture on employees' perceived stress for better workplace. *International Journal of Environmental Research and Public Health*, *19*(8), 4428.

Kivunja, C., & Kuyini, A. B. (2017). Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education*, *6*(5), 26–41.

Komro, K. A., Lang, D. L., Walker, E. R., & Harper, P. D. (2018). Integrating structural determinants into MPH training of health promotion professionals. In *American journal of public health* (Vol. 108, Issue 4, pp. 477–479). American Public Health Association.

Krasna, H., Kornfeld, J., Cushman, L., Ni, S., Antoniou, P., & March, D. (2021). The new public health workforce: employment outcomes of public health graduate students. *Journal of Public Health Management and Practice*, *27*(1), 12–19.

Kruk, M. E., Gage, A. D., Arsenault, C., Jordan, K., Leslie, H. H., Roder-DeWan, S., Adeyi, O., Barker, P., Daelmans, B., & Doubova, S. V. (2018). High-quality health systems in the Sustainable Development Goals era: time for a revolution. *The Lancet Global Health*, *6*(11), e1196–e1252.

Kumar, S., & Preetha, G. S. (2012). Health promotion: An effective tool for global health. *Indian Journal of Community Medicine*, *37*(1), 5–12. https://doi.org/10.4103/0970-0218.94009

Lamri, J., & Lubart, T. (2023). Reconciling Hard Skills and Soft Skills in a Common Framework: The Generic Skills Component Approach. *Journal of Intelligence*. https://doi.org/10.3390/jintelligence11060107

Légaré, F., Adekpedjou, R., Stacey, D., Turcotte, S., Kryworuchko, J., Graham, I. D., Lyddiatt, A., Politi, M. C., Thomson, R., & Elwyn, G. (2018). Interventions for increasing the use of shared decision making by healthcare professionals. *Cochrane Database of Systematic Reviews*, *7*.

Leider, J. P., Plepys, C. M., Castrucci, B. C., Burke, E. M., & Blakely, C. H. (2018). Trends in the conferral of graduate public health degrees: a triangulated approach. *Public Health Reports*, *133*(6), 729–737.

Leider, J. P., Sellers, K., Bogaert, K., Castrucci, B. C., & Erwin, P. C. (2020). Master's-level education in the governmental public health workforce. *Public Health Reports*, *135*(5), 650–657.

Mabunda, S. A., Angell, B., Yakubu, K., Durbach, A., & Joshi, R. (2020). Reformulation and strengthening of return-of-service (ROS) schemes could change the narrative on global health workforce distribution and shortages in sub-Saharan Africa. *Family Medicine and Community Health*, *8*(4).

MacKay, M., Ford, C., Grant, L. E., Papadopoulos, A., & McWhirter, J. E. (2023). Developing public health competency statements and frameworks: a scoping review and thematic analysis of approaches. *BMC Public Health*, *23*(1), 2240.

MacKay, M., Ford, C., Grant, L. E., Papadopoulos, A., & McWhirter, J. E. (2024). Developing competencies in public health: a scoping review of the literature on developing competency frameworks and student and workforce development. *Frontiers in Public Health*, *12*, 1332412.

Makri, C., & Neely, A. (2021). Grounded theory: A guide for exploratory studies in management research. *International Journal of Qualitative Methods*, *20*, 16094069211013654.

Manyazewal, T. (2017). Using the World Health Organization health system building blocks through survey of healthcare professionals to determine the performance of public healthcare facilities. *Archives of Public Health*, *75*, 1–8.

Mase, W. A., Hansen, A. R., Smallwood, S. W., Shah, G., Peden, A. H., Mulherin, T., & Bender, K. (2018). Disease intervention specialist education for the future: An analysis of public health curricula. *Public Health Reports*, *133*(6), 738–748.

Mata, Á. N. de S., de Azevedo, K. P. M., Braga, L. P., de Medeiros, G. C. B. S., de Oliveira Segundo, V. H., Bezerra, I. N. M., Pimenta, I. D. S. F., Nicolás, I. M., & Piuvezam, G. (2021). Training in communication skills for self-efficacy of health professionals: a systematic review. *Human Resources for Health*, *19*, 1–9.

Matsoso, M. P., & Strachan, B. (2011). Human resources for health for South Africa: HRH strategy for the health sector 2012/13-2016/17. *South African Health Review*, *2011*(1), 49–58.

Mayosi, B. M., Lawn, J. E., Van Niekerk, A., Bradshaw, D., Abdool Karim, S. S., & Coovadia, H. M. (2012). Health in South Africa: changes and challenges since 2009. *Lancet (London, England)*, *380*(9858), 2029–2043. https://doi.org/10.1016/S0140-6736(12)61814-5

Mboera, L. E. G., Rumisha, S. F., Mfinanga, S. G., Karimuribo, E. D., & Sindato, C. (2014). The changing landscape of public health in sub-Saharan Africa: control and prevention of communicable diseases needs rethinking: proceedings. *Onderstepoort Journal of Veterinary Research*, *81*(2), 1–6.

McCartney, G., Dickie, E., Escobar, O., & Collins, C. (2021). Health inequalities, fundamental causes and power: towards the practice of good theory. *Sociology of Health & Illness*, *43*(1), 20–39.

McClellan, M., Rajkumar, R., Couch, M., Holder, D., Pham, M., Long, P., Medows, R., Navathe, A., Sandy, L., & Shrank, W. (2021). Health care payers COVID-19 impact assessment: lessons learned and compelling needs. *NAM Perspectives*, *2021*.

Melariri, H., Freercks, R., van der Merwe, E., Ten Ham-Baloyi, W., Oyedele, O., Murphy, R. A., Claasen, C., Etusim, P. E., Achebe, M. O., & Offiah, S. (2024). The burden of hospital-acquired infections (HAI) in sub-Saharan Africa: a systematic review and meta-analysis. *Eclinicalmedicine*, *71*.

Mendelson, M., Booyens, L., Boutall, A., Cairncross, L., Calligaro, G., Dave, J. A., Dlamini, S., Dyer, S., Eick, B., Fieggen, K., Frankenfeld, P., Hoare, J., Hofmeyr, R., Joska, J., Joubert, I., Krause, R., Kropman, A., Levin, D., Maughan, D., … Wasserman, S. (2020). The mechanics of setting up a COVID-19 response: Experiences of the COVID-19 epidemic from Groote Schuur Hospital, Cape Town, South Africa. *South African Medical Journal*, *110*(10), 968–972. https://doi.org/10.7196/SAMJ.2020.v110i10.15215

Meredith, G. R., Welter, C. R., Risley, K., Seweryn, S. M., Altfeld, S., & Jarpe-Ratner, E. A. (2022). A new baseline: master of public health education shifting to meet public health needs. *Journal of Public Health Management and Practice*, *28*(5), 513–524.

Michel, J., Tediosi, F., Egger, M., Barnighausen, T., McIntyre, D., Tanner, M., & Evans, D. (2020). Universal health coverage financing in South Africa: wishes vs reality. *Journal of Global Health Reports*, *4*, e2020061.

Mohajan, H. K. (2018). Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment and People*, *7*(1), 23–48.

Murray, C. J. L., & Frenk, J. (2000). A framework for assessing the performance of health systems. *Bulletin of the World Health Organization*, *78*, 717–731.

Mutale, W., Bond, V., Mwanamwenge, M. T., Mlewa, S., Balabanova, D., Spicer, N., & Ayles, H. (2013). Systems thinking in practice: the current status of the six WHO building blocks for health system strengthening in three BHOMA intervention districts of Zambia: a baseline qualitative study. *BMC Health Services Research*, *13*, 1–9.

Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2023). A step-by-step process of thematic analysis to develop a conceptual model in qualitative research. *International Journal of Qualitative Methods*, *22*, 16094069231205788.

Naicker, S., Plange-Rhule, J., Tutt, R. C., & Eastwood, J. B. (2009). Shortage of healthcare workers in developing countries—Africa. *Ethnicity & Disease*, *19*, 60–64.

National Collaborating Centre for Methods and Tools. (2023, October 12). *What is known about the implementation and evaluation of core competencies for public health, and what are barriers or facilitators for implementation?* . Https://Nccmt.ca/Pdfs/Res/Core-Competencies.

National Department of Health. (2020). *2030 human resources for health strategy: Investing in the health workforce for universal health coverage*. Government Printers Pretoria.

National Department of Health (NDoH). (2020). *2030 Human Resources for Health Strategy: Investing in the Health Workforce for Universal Health Coverage*.

Ndejjo, R., Ssemugabo, C., Osuret, J., Zziwa, E. B., Fonn, S., Alfvén, T., Mukanga, D., Khayesi, M., & Wanyenze, R. K. (2022). Positioning Africa's public health doctoral students to lead societal transformation and development. *BMJ Global Health*, *7*(2), e007996.

Nguyen, L.-K.-N., Kumar, C., Jiang, B., & Zimmermann, N. (2023). Implementation of systems thinking in public policy: A systematic review. *Systems*, *11*(2), 64.

O'Donovan, R., Buckley, C., Crowley, P., Fulham-McQuillan, H., Gilmore, B., Martin, J., McAuliffe, E., Moore, G., Nicholson, E., & Shé, É. N. (2021). Contact tracing during the COVID-19 outbreak: a protocol for enabling rapid learning from experiences and exploring the psychological impact on contact tracers. *HRB Open Research*, *4*.

Oleribe, O. O., Momoh, J., Uzochukwu, B. S. C., Mbofana, F., Adebiyi, A., Barbera, T., Williams, R., & Taylor-Robinson, S. D. (2019). Identifying key challenges facing healthcare systems in Africa and potential solutions. *International Journal of General Medicine*, 395–403.

Oraison, H., Konjarski, L., & Howe, S. (2019). Does university prepare students for employment?: Alignment between graduate attributes, accreditation requirements and industry employability criteria. *Journal of Teaching and Learning for Graduate Employability*, *10*(1), 173–194.

Organization, W. H. (2018). *Essential public health functions, health systems and health security: developing conceptual clarity and a WHO roadmap for action*.

Ozili, P. K. (2020). COVID-19 in Africa: Socioeconomic Impact, Policy Response and Opportunities. *SSRN Electronic Journal*, *April*. https://doi.org/10.2139/ssrn.3574767

Porter, D. (2005). *Health, civilization and the state: a history of public health from ancient to modern times*. Routledge.

Pype, P., Mertens, F., Helewaut, F., & Krystallidou, D. (2018). Healthcare teams as complex adaptive systems: understanding team behaviour through team members' perception of interpersonal interaction. *BMC Health Services Research*, *18*, 1–13.

Qomariyah, N., Savitri, T., Hadianto, T., & Claramita, M. (2016). Formulating Employability Skills for Graduates of Public Health Study Program. *International Journal of Evaluation and Research in Education*, *5*(1), 22–31.

Rabbani, F., Shipton, L., White, F., Nuwayhid, I., London, L., Ghaffar, A., Ha, B. T. T., Tomson, G., Rimal, R., & Islam, A. (2016). Schools of public health in low and middle-income countries: an imperative investment for improving the health of populations? *BMC Public Health*, *16*, 1–12.

Rao, R., Hawkins, M., Ulrich, T., Gatlin, G., Mabry, G., & Mishra, C. (2020). The Evolving Role of Public Health in Medical Education. *Frontiers in Public Health*, *8*, 251. https://doi.org/10.3389/FPUBH.2020.00251/BIBTEX

Ravaghi, H., Beyranvand, T., Mannion, R., Alijanzadeh, M., Aryankhesal, A., & Belorgeot, V. D. (2021). Effectiveness of training and educational programs for hospital managers: a systematic review. *Health Services Management Research*, *34*(2), 113–126.

Rispel, L. C., Blaauw, D., Ditlopo, P., & White, J. (2018). Human resources for health and universal health coverage: progress, complexities and contestations. *South African Health Review*, *2018*(1), 13–21.

Rowitz, L. (2014). *Public health leadership: Putting principles into practice*. Jones & Bartlett Publishers.

Seifert, C. M., Chapman, L. S., Hart, J. K., & Perez, P. (2012). Enhancing intrinsic motivation in health promotion and wellness. *American Journal of Health Promotion*, *26*(3), 1–12.

Shahzad, M., Upshur, R., Donnelly, P., Bharmal, A., Wei, X., Feng, P., & Brown, A. D. (2019). A population-based approach to integrated healthcare delivery: a scoping review of clinical care and public health collaboration. *BMC Public Health*, *19*, 1–15.

Sharma, K., & Zodpey, S. (2011). Public health education in India: need and demand paradox. *Indian Journal of Community Medicine*, *36*(3), 178–181.

Shephard, R., Uy, J., Otterman, V., Betker, C., Sandhu, H. S., Tjaden, L., Apatu, E., Di Ruggiero, E., Musto, R., & Pawa, J. (2024). The Core Competencies for Public Health in Canada: Opportunities and Recommendations for Modernization. *Journal of Public Health Management and Practice*, *30*(3), 432–441.

Spinello, E. F., & Fischbach, R. (2008). Using a Web-Based Simulation as a Problem-Based Learning Experience: Perceived and Actual Performance of Undergraduate Public Health Students. *Public Health Reports*, *123*.

Stewart, K. E., Halverson, P. K., Rose, A. v., & Walker, S. K. (2010). Public health workforce training: Application of the council on linkages' core competencies. *Journal of Public Health Management and Practice*, *16*(5), 465–469. https://doi.org/10.1097/PHH.0B013E3181CE4F0B

Tan, J., Wen, H. J., & Awad, N. (2005). Health care and services delivery systems as complex adaptive systems. *Communications of the ACM*, *48*(5), 36–44.

Tiwari, R., Negandhi, H., & Zodpey, S. (2018). Current status of master of public health programmes in India: a scoping review. *WHO South-East Asia Journal of Public Health*, *7*(1), 29–35.

Tomlinson, M. (2012). Graduate employability: A review of conceptual and empirical themes. *Higher Education Policy*, *25*, 407–431.

Topp, S. M., Schaaf, M., Sriram, V., Scott, K., Dalglish, S. L., Nelson, E. M., Rajasulochana, S. R., Mishra, A., Asthana, S., & Parashar, R. (2021). Power analysis in health policy and systems research: a guide to research conceptualisation. *BMJ Global Health*, *6*(11), e007268.

Tulchinsky, T. H., & Varavikova, E. A. (2014). A history of public health. *The New Public Health*, 1.

Turner, J. R., & Baker, R. M. (2019). Complexity theory: An overview with potential applications for the social sciences. *Systems*, *7*(1), 4.

Udoudom, U., Igiri, A., George, K., & Aruku, K. J. (2024). Promoting Health Education through Effective Communication for Development. *ALSYSTECH Journal of Education Technology*, *2*(1), 68–88.

van Diggele, C., Burgess, A., Roberts, C., & Mellis, C. (2020). Leadership in healthcare education. *BMC Medical Education*, *20*, 1–6.

Vanderslott, S., Phillips, M. T., Pitzer, V. E., & Kirchhelle, C. (2019). Water and filth: reevaluating the first era of sanitary typhoid intervention (1840–1940). *Clinical Infectious Diseases*, *69*(Supplement_5), S377–S384.

Weinhold, I., & Gurtner, S. (2014). Understanding shortages of sufficient health care in rural areas. *Health Policy*, *118*(2), 201–214.

Weintraub, R., President, C. F. K., & Bitton, A. (2020). *Why primary care can make COVID-19 vaccine distribution more successful*. The Milbank Blog. https://www.milbank.org/2020/12/why-primary-care-can-make-covid-19-vaccine-distribution-more-successful/

White, F. (2013). The imperative of public health education: a global perspective. *Medical Principles and Practice*, *22*(6), 515–529.

WHO Africa. (2022). *Chronic staff shortfalls stifle Africa's health systems: WHO study*. Republic of Congo, Africa: World Health Organization.

WHO-ASPHER Competency Framework for the Public Health Workforce in the European Region 2020 2. (2020). http://www.euro.who.int/pubrequest

Witter, S., Sheikh, K., & Schleiff, M. (2022). Learning health systems in low-income and middle-income countries: exploring evidence and expert insights. *BMJ Global Health*, *7*(Suppl 7), e008115.

Wong, D. K. C., Gendeh, H. S., Thong, H. K., Lum, S. G., Gendeh, B. S., Saim, A., & Husain, S. (2020). A review of smell and taste dysfunction in COVID-19 patients. *Medical Journal of Malaysia*, *75*(5), 574–581.

World Health Organization, (2016. (2016). *Health workforce requirements for universal health coverage and the sustainable development goals.(human resources for health observer, 17)*.

World Health Organization (WHO). (2010). Monitoring the building blocks of health systems. *Geneva, Switzerland: WHO Document Production Services*.

World Health Organization (WHO). (2016). *Global strategy on human resources for health: workforce 2030*.

World Health Organization (WHO). (2018, February 22). *Health inequities and their causes*. Https://Www.Who.Int/News-Room/Facts-in-Pictures/Detail/Health-Inequities-and-Their-Causes.

World Health Organization (WHO). (2020). *WHO-ASPHER competency framework for the public health workforce in the European region*. World Health Organization. Regional Office for Europe.

World Health Organization (WHO). (2023, October 5). *Universal health coverage (UHC)*. Https://Www.Who.Int/News-Room/Fact-Sheets/Detail/Universal-Health-Coverage-(Uhc).

World Health Organization (WHO). (2024, July 11). *Health workforce*. Https://Www.Who.Int/Health-Topics/Health-Workforce#tab=tab_1.

Wright, J., Rao, M., & Walker, K. (2008). The UK Public Health Skills and Career Framework—Could it help to make public health the business of every workforce? *Public Health*, *122*(6), 541–544. https://doi.org/10.1016/J.PUHE.2008.03.006

Zekeng, E. (2016). Healthcare systems in Sub-Saharan Africa: focusing on community-based delivery (CBD) of health services and the development of local research institutes. *United Nations Peace Progr*, *3*, 44–49.

Zhang, Y., McDarby, G., Seifeldin, R., Mustafa, S., Dalil, S., Schmets, G., Azzopardi-Muscat, N., Fitzgerald, J., Mataria, A., & Bascolo, E. (2023). Towards applying the essential public health functions for building health systems resilience: a renewed list and key enablers for operationalization. *Frontiers in Public Health*, *10*, 1107192.

Zhong, B.-L., Luo, W., Li, H.-M., Zhang, Q.-Q., Liu, X.-G., Li, W.-T., & Li, Y. (2020). Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey. *International Journal of Biological Sciences*, *16*(10), 1745.

Zwanikken, Huong, N. T., Ying, X. H., Alexander, L., Wadidi, M. S. E. A., Magaña-Valladares, L., Gonzalez-Robledo, M. C., Qian, X., Linh, N. N., & Tahir, H. (2014). Outcome and impact of Master of Public Health programs across six countries: education for change. *Human Resources for Health*, *12*, 1–10.

Zwanikken, P. A. C., Alexander, L., & Scherpbier, A. (2016). Impact of MPH programs: contributing to health system strengthening in low-and middle-income countries? *Human Resources for Health*, *14*, 1–19.

Zweigenthal, V. E. M., Marquez, E., & London, L. (2016). 'Why do an MPH?'Motivations and intentions of physicians undertaking postgraduate public health training at the University of Cape Town. *Global Health Action*, *9*(1), 32735.

Appendix 2: Table of Participant Characteristics

Participant Identifier	**University Identifier**	**Gender**	**Age**

1	1 (WITS)	M	
2	1	F	
3	1	F	
4	1	F	
5	1	M	
6	2 (UKZN)	F	<40
7	2	M	>40
8	2	F	>40
9	2	F	>40
10	2	F	<40
11	3 (UL)	F	
12	3	M	
13	3	F	
14	3	F	
15	3	M	
16	4 (SMU)	F	
17	4	F	
18	4	F	
19	4	F	
20	4	F	
21	5 (UP)	M	32
22	5	M	45
23	5	F	62
24	5	F	26
25	5	F	43
26	5	M	35
27	5	M	36
28	6 (UNIVEN)	M	< 40 years
29	6	F	<40years
30	6	M	>40years
31	6	M	>40 years
32	6	M	>40years
33	7 (UCT)	F	
34	7	F	
35	7	F	
36	7	M	
37	8 (UWC)	F	
38	8	M	
39	8	F	
40	8	F	

University

1- WITS - University of the Witwatersrand
2- UKZN – University of KwaZulu Natal
3- UL – University of Limpopo
4- SMU – Sefako Makgatho Health Sciences University
5- UP – University of Pretoria
6- UNIVEN – University of Venda
7- UCT – University of Cape Town
8- UWC – University of the Western Cape

Countries where participants are currently working in

1- South Africa
2- Zambia
3- Zimbabwe
4- Ghana
5- Lesotho
6- Swaziland

Gender	
Female	25
Male	15

Appendix 3: Interview Questions/Guide

1. Can you give an overview of your role during the Covid-19 pandemic.
Probe:

- How your role relates to your employment?
- How it changed as the epidemic unfolded?
- Who did you report to about your involvement? Did this differ compared to your usual accountability?

2. What are your reflections about your role in terms of:
Probe:

- The skills that you brought to bear on the work, and
- Where you acquired these skills (MPH-can you specify the skills, other-can you specify the skills)
- How prepared you felt about your responsibilities?
- What your sense of your value-add to the health system response to the epidemic?
- The skills gaps you were conscious of at the time and now in retrospect.

3. What are your reflections of the wider public health response to the Covid19 pandemic , guiding/driving initiatives in terms of the:

- Health system
    - Service preparedness
    - Case and contact tracing
    - Occupational health
    - Health promotion
    - Health information systems
    - Engagement with Civil Society
    - Changing the way districts relate to the provinces and to each other
    - Relationships with national health
    - Relationships between provinces
- Other government sectors (education; transport, other)
- National government

4**. What do you think the implications of the response to Covid-19 is for:**

- Non-Covid health conditions
- The health workforce
    - Roles of managers; doctors, nurses, CHWs, ward based teams (or COPC);
    - Relationships with NGOs and new civil society formations (e.g. CANS)
    - Relationships between provincial and district team
- National health
- Health financing
- NHI and UHC

- Personnel with post-graduate public health training

5. What do you think the implications of the Covid-19 disaster mean for public health:

- MPH graduates' possible roles?
- Public health's location in the health system

6. What do you think the implications of the Covid-19 disaster means for what is taught in MPH degrees?

- What content needs to be taught?
- What skillsets need to be emphasised?
- What could fall away from courses?

7. Any other thoughts you want to raise?

Appendix 4: MPH curricula

Institution	Core/Compulsory Courses	Specialization/Electives
University of Venda Link	• Introduction to Public Health • Research Methodology • Introduction to Epidemiology, Demography and Biostatistics • Mini-dissertation research project	Health Measurement • Advanced Biostatistics and Epidemiology • Health Informatics Health Policy and Management • Health system management and strategic planning • Health resources management Occupational and Environmental health • Occupational health • Environmental health Health Education and Health Promotion • Health Education • Health Promotion Communication and Non-Communicable disease control • Communicable diseases control • Non-communicable diseases control
University of KwaZulu-Natal Link 1 Link to Handbook Link to Occupational Health	• Public Health Principles and Practice • Qualitative Research methods • Health Measurement (Descriptive) • Health Measurement (Analytic) • Research methods and Bioethics • Research Project (Master of Public Health)	Occupational • Hygiene Evaluation of Occupational Hazards • Introductory principles of occupational hygiene • Introduction to occupational and environmental health • Control of occupational hazards • Recognition of Occupational Hazards Occupational and Environmental Medicine • Principles of Toxicology • Introductory principles of occupational hygiene • Introduction to occupational and environmental health • Occupational and environmental diseases • Occupational and environmental respiratory disorders Elective Modules

		• Intermediate Epidemiology • Health Systems and Policy • Maternal and reproductive health • Child and Adolescent Health • Health Economics and Financing • Health Service Management
University of Pretoria Link to Handbook	• Global health governance and diplomacy • Scientific writing • Learning in Public health • Applied research methodology. • Mini dissertation	Disease Control • Principles of Communicable Disease control • Seminars in Tropical Health (Agent, Environment, Host) • Infectious Diseases Epidemiology • Disease Surveillance • Outbreak Investigation and Control • Principles of Chronis Disease Epidemiology Environmental and Occupational Health • Health Risk Assessment • Methods in Exposure Assessment • Introduction to Toxicology • Environmental Epidemiology • Conducting Surveys Environmental and Occupation Health – Occupational Hygiene • Methods in Exposure Assessment • Postgraduate studies in occupational hygiene I • Postgraduate studies in occupational hygiene II • Health Risk Assessment • Introduction to Toxicology • Individual studies in occupational hygiene • Environmental Epidemiology • Managing Occupational Health Services • Occupational Health Law • Conducting Surveys Health Policy and Management

		• Principles of Human Resource Management • Financial Management in the Public Health Sector • Health Policy and Systems • Intro to Monitoring and Evaluation for Health Managers • Principles of Human Resource Management • Health Systems Operations Management • Project Management for the Health Sector • Principles of Quality Assurance Health Promotion • Health Promotion (Foundations of Health Promotion) • Qualitative Research Methods • Communication in Health • Health Promotion in Practice (Health Promotion Planning) • Human Nutrition and Public Health • Sexual and Reproductive Health
University of the Western Cape Link 1 Link to Handbook	• Population Health and Development: A Primary Health Care Approach II • Measuring Health and Disease II • Management Strategies for the Public Health Services II • Health Promotion for Public Health II • Qualitative Research Methods • Quantitative Research Methods • Public Health Research (PHR)	Health Promotion Health Information Systems Health Research • Monitoring and Evaluation in Health and Development Programs • Health Information Systems Nutrition • Micronutrient Malnutrition • Public Health Nutritional Policy and Programming • Epidemiology of Non-Communicable Diseases Pharmaceutical Public Health • Rational Medicined Use • Pharmaceutical Policy Management

	• Managing and Supporting Health Workers • Mini Thesis	Other Electives • Globalization and Health • Applied Health Economics for community health systems. • Introduction to Complex Health Systems
University of Cape Town Link to Handbook	• Public Health and Society • Introduction to Epidemiology • Biostatistics I • Quantitative Research Methods • Mini Thesis	Epidemiology & Biostatistics • Advanced Epidemiology • Biostatics II • Biostatistics III • Seminars in Epidemiology and Biostatics Health Systems • Health Policy and Planning • Introduction to Health Systems Evaluation • Health Systems Research and Evaluation • The Economics of Health Systems Social & Behavioural Sciences • Qualitative Research Methods • Public Health and Human Rights • Gender and, Sexual and Reproductive Health • Qualitative Data Analysis Health Economics • Theory and Application of Economic Evaluation in Health Care • Microeconomic for the health sector • Quantitative methods for health economists • The Economics of health systems Community Eye Health • Community Eye Health 1 – Planning and Managing Eye Care Services • Community Eye Health 2 – Epidemiology for Eye Health

		Environmental Health) • Environmental Health Policy • Climate chance, pollution and health • Children's Environmental health Other • Cancer Prevention and Control • Fundamentals of Global Surgery • Evidence-Based health care • Epidemiology of Infections Diseases • Practicum in Public Health • Epidemiology of Non-communicable diseases
University of Limpopo Link to Prospectus		Health Measurement Health Policy and Management Environmental and Occupational Health Social and behavior Sciences in Public Health
University of the Witwatersrand		Health Systems and Policy Social and Behavior Change Communication Occupation Hygiene Rural Health Maternal and Child Health Health Economics
Sefako Makhatho Health Sciences		

Appendix 5: Themed topic guide

PARENT NODE (THEME)	CHILD NODE (SUBTHEME)	DEFINITION
Participant's Descriptors		Any description of participant's professional background, educational/training background, work history etc.
Work before COVID-19	Role before COVID-19, Role after MPH	Any description of what participant's roles were in their job before COVID-19
Work during COVID-19		Any description of what participant's roles were in their job during COVID-19
	Changes in work roles (Before versus during COVID-19)	Any description of changes in participant's work roles from what it used to be before the COVID-19 pandemic (E.g. "Before COVID-19, I was involved in administrative work but during the COVID-19 pandemic, I had to do more of clinical work due to the influx of patients with COVID-19") *How* *Changing how to deliver the service*
	Changes in roles as pandemic unfolded	Mention of any changes in roles from the beginning of the pandemic till now (e.g. " At the beginning of the pandemic, I was involved in contact tracing from home but as the pandemic unfolded and we moved to lower lockdown levels, this changed to home visits of patients")
	Additional roles during COVID-19	Mention/description of any additional roles aside usual work roles taken on by participants during COVID-19 (e.g. "Aside from my usual work roles as a researcher, I volunteered to join the contact tracing team")
	Changes in reporting structure during COVID-19	Who did you report to about your involvement? Did this differ compared to your usual accountability? Any changes in Leadership structure at your workplace
Reflection about MPH skills that informed the COVID-19 roles		Any reflections/descriptions of the skills that were utilized by participants in performing Covid-19 roles

	How skills were acquired	Any mention/description of where the skills that informed COVID-19 roles were acquired (eg. From MPH program, from other training/courses before, during or after MPH, from work settings etc.)
	How MPH prepared graduates to apply the skills they utilized in their COVID-19 roles	Any reflections on how participants felts the MPH prepared them to apply the skills that were used in performing their COVID-19 roles.
	Skills gaps in MPH training	Any description of skills gap participants became aware of while they were performing their COVID-19 roles and as they reflected on their roles later.
	Graduates' perspectives on their value-add to the COVID-19 response	Mentions/descriptions of any values participants felt they added to the COVID-19 response.
Where MPH graduates can be employed in light of a pandemic like COVID-19		Any description of where participants believe MPH graduates would better be suited to work during a pandemic like COVID-19
	Subtheme1: Areas where MPH Graduates should be employed	Any description of organizations that can benefit from having MPH graduates.
Roles of MPH graduates in light of a pandemic like COVID-19		Any mention/description of some of the roles participants believe MPH graduates could be assigned to during a pandemic like COVID-19
	Subtheme1: Roles of MPH Graduates	Description of roles that should be assigned to MPH graduates in the workplace.
	Subtheme2: Roles of MPH graduates in a pandemic	Description of where MPH students should be situated or placed in a pandemic

Implications of pandemics like COVID-19 for what is taught in the MPH program		Any mentions of what participants believe a pandemic like COVID-19 means for what is taught in the MPH program (E.g. "A pandemic like COVID-19 bring out the need to have courses like outbreak management, Health promotion etc. as part of MPH programs in South Africa"
	Content implications	Any mention/description of specific contents that needs to be taught under the various courses in the MPH program to make them more responsive to pandemics like COVID-19.
	Skills set implications	Any mentions/description of specific skills that needs to be taught in the MPH program to make them more responsive to pandemics like COVID-19
	Other skills acquired from MPH not related to COVID	Any comments or statements on skills acquired from the MPH that are not related to the COVID-19 pandemic
	General gaps in the MPH training not related to the COVID-19 pandemic	Any mentions/description of specific skills not taught in the MPH program that are important in their work or for public health in general
	Underutilization of MPH graduate's skills in the response to the COVID-19 pandemic	Any comments or statements on alluding to MPH graduates' skills being underutilized in the response to the COVID-19 response
	Improvement to the training in the MPH program	Any comments or statements aspect of the MPH program that needs to be changed or improved (e.g. Making the program less 'academia inclined', less theoretical and more practical etc.)
MPH graduates' Reflections on the wider public health response to the COVID-19 pandemic		Any comments or statements on what participants think of the public heath response to the COVID-19 pandemic (e.g. "It has been appropriate so far", there is still a lot more to be done, it has been lacking" etc.)

	Other comments on COVID RESPONSE at the graduate local level	Any comments or statements on what the participants think of the how the response to COVID-19 at the local level (within their district, country etc.) has been. This can include comments on whether the response has been appropriate, backed by evidence, lacking etc.
	Vaccine hesitancy	Any comments or statements on what participants think are reasons for the public hesitancy in taking the COVID-19 vaccine

Appendix 6: Journal Guidelines

About the journal

Aims and scope

SSM - Health Systems specialises in publishing interdisciplinary social science research that focuses on improving health systems and resources, broadly defined to include health systems and social care and support systems that impact on health and well-being of populations around the world.

SSM - Health Systems shares the same general approach to manuscripts as its companion title, Social Science & Medicine. The journal takes a broad view of its subject matter, welcoming all submissions that make important, original contributions to our understanding of how policy, practice and resource allocation can be used to improve person-centred approaches and performance, responsiveness, equity and inclusiveness of health systems. We are especially interested in publishing papers that cross disciplinary boundaries within the social sciences, drawing on perspectives that span multiple fields, including economics, political science, sociology, anthropology, psychology, and organisation studies. We impose no constraints on the methodological approaches we are willing to consider - papers employing quantitative, qualitative, participatory and mixed methods will all be welcome. Finally, we will have a special interest in publishing papers from under-represented researchers and papers concerning health systems in low- and middle-income countries (LMICs) from LMIC researchers.

SSM Health Systems welcomes submissions of research articles (up to 9000 words), short communications (between 2000 – 4000 words), systematic/scoping reviews (up to 9000 words), and commentaries (up to 3000 words). Please visit the Guide for Authors for more information.

SSM - Health Systems will cover:

Comparative Health Systems

Health Systems in fragile and conflict affected settings

Health systems in rural and urban contexts

Resource allocation and health financing within Health Systems

Governance, leadership and management of Health Systems

Information systems and decision making in Health Systems

Medicines in Health Systems

Social Science Approaches for Research and Engagement in Health Policy & Systems

Private Sector in Health

Health workforce, including the role of Community Health Workers in Health System Development

Quality in Universal Health and Health Care

Access and barriers to health services

Teaching and Learning Health Policy and Systems Research

Intersectoral action for health systems strengthening

Ethics and safeguarding in Health Systems Research

Gender, equity, disability and/or intersectionality in Health Systems Research

Eldercare systems

Person-centred approaches to health systems strengthening

Compassion and participation in health systems design and development

Article types
Peer-reviewed articles
Original research articles and critical and analytical reviews. These papers may be up to 9000 words including abstract, tables, figures, references and (printed) appendices as well as the main text. Papers below this limit are preferred.

Short communications
SSM - Health systems will consider short communications of between 2000 and 4000 words, where a brief focused dissemination of topical research findings is warranted, and the scope and design of the research is appropriate for a shorter report.

Systematic/scoping reviews
Systematic/scoping review of up to 9000 words including abstracts, tables, figures, references and (printed) appendices as well as the main text. Systematic/scoping reviews must be reported according to PRISMA guidelines (see below for more details). Please note that systematic/scoping reviews in excess of 9000 words may be considered by the Editors, with prior agreement. Please contact the Editors to discuss before submission.

Commentaries
SSM Health Systems also considers submitted or invited commentaries and responses debating, and published alongside, selected articles. These can be up to 3000 words.

Peer review

This journal follows a double anonymized review process. Your submission will initially be assessed by our editors to determine suitability for publication in this journal. If your submission is deemed suitable, it will typically be sent to a minimum of two reviewers for an independent expert assessment of the scientific quality. The decision as to whether your article is accepted or rejected will be taken by our editors. Authors who wish to appeal the editorial decision for their manuscript may submit a formal appeal request in accordance with the procedure outlined in Elsevier's Appeal Policy. Only one appeal per submission will be considered and the appeal decision will be final.

Read more about peer review.

Our editors are not involved in making decisions about papers which:

they have written themselves.

have been written by family members or colleagues.

relate to products or services in which they have an interest.

Any such submissions will be subject to the journal's usual procedures and peer review will be handled independently of the editor involved and their research group. Read more about editor duties.

Special issues and article collections

The peer review process for special issues and article collections follows the same process as outlined above for regular submissions, except, a guest editor will send the submissions out to the reviewers and may recommend a decision to the journal editor. The journal editor oversees the peer review process of all special issues and article collections to ensure the high standards of publishing ethics and responsiveness are respected and is responsible for the final decision regarding acceptance or rejection of articles.

Open access

We refer you to our open access information page to learn about open access options for this journal.

Ethics and policies

Ethics in publishing

Authors must follow ethical guidelines stated in Elsevier's Publishing Ethics Policy.

Submission declaration

When authors submit an article to an Elsevier journal it is implied that:

the work described has not been published previously except in the form of a preprint, an abstract, a published lecture, academic thesis or registered report. See our policy on multiple, redundant or concurrent publication.

the article is not under consideration for publication elsewhere.

the article's publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out.

if accepted, the article will not be published elsewhere in the same form, in English or in any other language, including electronically, without the written consent of the copyright-holder.

To verify compliance with our journal publishing policies, we may check your manuscript with our screening tools.

Authorship
All authors should have made substantial contributions to all of the following:

The conception and design of the study, or acquisition of data, or analysis and interpretation of data.

Drafting the article or revising it critically for important intellectual content.

Final approval of the version to be submitted.

Authors should appoint a corresponding author to communicate with the journal during the editorial process. All authors should agree to be accountable for all aspects of the work to ensure that the questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Changes to authorship
The editors of this journal generally will not consider changes to authorship once a manuscript has been submitted. It is important that authors carefully consider the authorship list and order of authors and provide a definitive author list at original submission.

The policy of this journal around authorship changes:

All authors must be listed in the manuscript and their details entered into the submission system.

Any addition, deletion or rearrangement of author names in the authorship list should only be made prior to acceptance, and only if approved by the journal editor.

Requests to change authorship should be made by the corresponding author, who must provide the reason for the request to the journal editor with written confirmation from all authors, including any authors being added or removed, that they agree with the addition, removal or rearrangement.

All requests to change authorship must be submitted using this form. Requests which do not comply with the instructions outlined in the form will not be considered.

Only in exceptional circumstances will the journal editor consider the addition, deletion or rearrangement of authors post acceptance.

Publication of the manuscript may be paused while a change in authorship request is being considered.

Any authorship change requests approved by the journal editor will result in a corrigendum if the manuscript has already been published.

Any unauthorised authorship changes may result in the rejection of the article, or retraction, if the article has already been published.

Declaration of interests
All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence or bias their work. Examples of potential competing interests include:

Employment

Consultancies

Stock ownership

Honoraria

Paid expert testimony

Patent applications or registrations

Grants or any other funding

The Declaration of Interests tool should always be completed.

Authors with no competing interests to declare should select the option, "I have nothing to declare".

The resulting Word document containing your declaration should be uploaded at the "attach/upload files" step in the submission process. It is important that the Word document is saved in the .doc/.docx file format. Author signatures are not required.

We advise you to read our policy on conflict of interest statements, funding source declarations, author agreements/declarations and permission notes.

Funding sources

Authors must disclose any funding sources who provided financial support for the conduct of the research and/or preparation of the article. The role of sponsors, if any, should be declared in relation to the study design, collection, analysis and interpretation of data, writing of the report and decision to submit the article for publication. If funding sources had no such involvement this should be stated in your submission.

List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants, scholarships and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, it is recommended to include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of generative AI in scientific writing

Authors must declare the use of generative AI in scientific writing upon submission of the paper. The following guidance refers only to the writing process, and not to the use of AI tools to analyse and draw insights from data as part of the research process:

Generative AI and AI-assisted technologies should only be used in the writing process to improve the readability and language of the manuscript.

The technology must be applied with human oversight and control and authors should carefully review and edit the result, as AI can generate authoritative-sounding output that can be incorrect, incomplete or biased. Authors are ultimately responsible and accountable for the contents of the work.

Authors must not list or cite AI and AI-assisted technologies as an author or co-author on the manuscript since authorship implies responsibilities and tasks that can only be attributed to and performed by humans.

The use of generative AI and AI-assisted technologies in scientific writing must be declared by adding a statement at the end of the manuscript when the paper is first submitted. The statement will appear in the published work and should be placed in a new section before the references list. An example:

Title of new section: Declaration of generative AI and AI-assisted technologies in the writing process.

Statement: During the preparation of this work the author(s) used [NAME TOOL / SERVICE] in order to [REASON]. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the published article.

The declaration does not apply to the use of basic tools, such as tools used to check grammar, spelling and references. If you have nothing to disclose, you do not need to add a statement.

Please read Elsevier's author policy on the use of generative AI and AI-assisted technologies, which can be found in our GenAI Policies for journals.

Please note: to protect authors' rights and the confidentiality of their research, this journal does not currently allow the use of generative AI or AI-assisted technologies such as ChatGPT or similar services by reviewers or editors in the peer review and manuscript evaluation process, as is stated in our GenAI Policies for journals. We are actively evaluating compliant AI tools and may revise this policy in the future.

Preprints

Preprint sharing

Authors may share preprints in line with Elsevier's article sharing policy. Sharing preprints, such as on a preprint server, will not count as prior publication.

We advise you to read our policy on multiple, redundant or concurrent publication.

Use of inclusive language

Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Authors should ensure their work uses inclusive language throughout and contains nothing which might imply one individual is superior to another on the grounds of:

age

gender

race

ethnicity

culture

sexual orientation

disability or health condition

We recommend avoiding the use of descriptors about personal attributes unless they are relevant and valid. Write for gender neutrality with the use of plural nouns ("clinicians, patients/clients") as default. Wherever possible, avoid using "he, she," or "he/she."

No assumptions should be made about the beliefs of readers and writing should be free from bias, stereotypes, slang, reference to dominant culture and/or cultural assumptions.

These guidelines are meant as a point of reference to help you identify appropriate language but are by no means exhaustive or definitive.

Reporting sex- and gender-based analyses
There is no single, universally agreed-upon set of guidelines for defining sex and gender. We offer the following guidance:

Sex and gender-based analyses (SGBA) should be integrated into research design when research involves or pertains to humans, animals or eukaryotic cells. This should be done in accordance with any requirements set by funders or sponsors and best practices within a field.

Sex and/or gender dimensions of the research should be addressed within the article or declared as a limitation to the generalizability of the research.

Definitions of sex and/or gender applied should be explicitly stated to enhance the precision, rigor and reproducibility of the research and to avoid ambiguity or conflation of terms and the constructs to which they refer.

We advise you to read the Sex and Gender Equity in Research (SAGER) guidelines and the SAGER checklist (PDF) on the EASE website, which offer systematic approaches to the use of sex and gender information in study design, data analysis, outcome reporting and research interpretation.

For further information we suggest reading the rationale behind and recommended use of the SAGER guidelines.

Definitions of sex and/or gender

We ask authors to define how sex and gender have been used in their research and publication. Some guidance:

Sex generally refers to a set of biological attributes that are associated with physical and physiological features such as chromosomal genotype, hormonal levels, internal and external anatomy. A binary sex categorization (male/female) is usually designated at birth ("sex assigned at birth") and is in most cases based solely on the visible external anatomy of a newborn. In reality, sex categorizations include people who are intersex/have differences of sex development (DSD).

Gender generally refers to socially constructed roles, behaviors and identities of women, men and gender-diverse people that occur in a historical and cultural context and may vary across societies and over time. Gender influences how people view themselves and each other, how they behave and interact and how power is distributed in society.

Jurisdictional claims

Elsevier respects the decisions taken by its authors as to how they choose to designate territories and identify their affiliations in their published content. Elsevier's policy is to take a neutral position with respect to territorial disputes or jurisdictional claims, including, but not limited to, maps and institutional affiliations. For journals that Elsevier publishes on behalf of a third party owner, the owner may set its own policy on these issues.

Maps: Readers should be able to locate any study areas shown within maps using common mapping platforms. Maps should only show the area actually studied and authors should not include a location map which displays a larger area than the bounding box of the study area. Authors should add a note clearly stating that "map lines delineate study areas and do not necessarily depict accepted national boundaries". During the review process, Elsevier's editors may request authors to change maps if these guidelines are not followed.

Institutional affiliations: Authors should use either the full, standard title of their institution or the standard abbreviation of the institutional name so that the institutional name can be independently verified for research integrity purposes.

Studies in humans and animals

Authors must follow ethical guidelines for studies carried out in humans and animals.

Studies in humans

Work which involves the use of human subjects should be carried out in accordance with the World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects.

Manuscripts should follow the International Committee of Medical Journal Editors (ICMJE) recommendations for the conduct, reporting, editing and publication of scholarly work in medical journals and aim to be representative of human populations in terms of sex, age and ethnicity. Sex and gender terms should be used correctly, as outlined by WHO (World Health Organization).

Manuscripts must include a statement that all procedures were performed in compliance with relevant laws and institutional guidelines and have been approved by the appropriate institutional committee(s). The statement should contain the date and reference number of the ethical approval(s) obtained.

Manuscripts must also include a statement that the privacy rights of human subjects have been observed and that informed consent was obtained for experimentation with human subjects.

This journal will not accept manuscripts that contain data derived from unethically sourced organs or tissue, including from executed prisoners or prisoners of conscience, consistent with recommendations by Global Rights Compliance on Mitigating Human Rights Risks in Transplantation Medicine. For all studies that use human organs or tissues, sufficient evidence must be provided that these were procured in line with WHO Guiding Principles on Human Cell, Tissue and Organ Transplantation. The source of the organs or tissues used in clinical research must be transparent and traceable. If your manuscript describes organ transplantation you must additionally declare within the manuscript that:

autonomous consent free from coercion was obtained from the donor(s) or their next of kin.

organs and/or tissues were not sourced from executed prisoners or prisoners of conscience.

Studies in animals

All animal experiments should comply with ARRIVE (Animal Research: Reporting of In Vivo Experiments) guidelines.

Studies should be carried out in accordance with Guidance on the operation of the Animals (Scientific Procedures) Act 1986 and associated guidelines, EU Directive 2010/63 for the protection of animals used for scientific purposes or the NIH (National Research Council) Guide for the Care and Use of Laboratory Animals (PDF) or those of an equivalent internationally recognized body.

The sex of animals, and where appropriate, the influence (or association) of sex on the results of the study must be indicated and a statement included in your manuscript that such guidelines as listed above have been followed.

Informed consent and patient details

Authors must document in the manuscript that ethics committee approval and informed consent have been obtained for studies involving patients or volunteers (including organ/tissue donors). Key guidelines:

Appropriate consents, permissions and releases must be obtained if case details, personal information and images of patients or any other individuals are included in a publication, even if anonymized.

Patient and research subjects' names, initials, hospital or social security numbers, dates of birth or any other personal or identifying information should never be used, even where consent has been provided.

Written consents must be retained. They should not be provided to this journal unless this is specifically requested in exceptional circumstances, for example, when a legal issue arises. Only then should you provide copies of the consents, or evidence that all relevant consents were obtained.

Personal details of any patient must only be included in your article or in any supplementary materials (including all images and videos) in cases where written permission has been given by the patient (or, where applicable, the next of kin).

We advise you to review Elsevier's policy on patient consent prior to preparing your manuscript.

Writing and formatting
File format
We ask you to provide editable source files for your entire submission (including figures, tables and text graphics). Some guidelines:

Save files in an editable format, using the extension .doc/.docx for Word files and .tex for LaTeX files. A PDF is not an acceptable source file.

Lay out text in a single-column format.

Remove any strikethrough and underlined text from your manuscript, unless it has scientific significance related to your article.

Use spell-check and grammar-check functions to avoid errors.

We advise you to read our Step-by-step guide to publishing with Elsevier.

Double anonymized peer review
This journal follows a double anonymized review process which means author identities are concealed from reviewers and vice versa.To facilitate the double anonymized review process, we ask that you provide your title page (including author details) and anonymized manuscript (excluding author details) separately in your submission.

The title page should include:

Article title

Author name(s)

Affiliation(s)

Acknowledgements

Declaration of Interest statement

Corresponding author address (full address is required)

Corresponding author email address

The anonymized manuscript should contain the main body of your paper including:

References

Figures

Tables

It is important that your anonymized manuscript does not contain any identifying information such as author names or affiliations.

Read more about peer review.

Title page
You are required to include the following details in the title page information:

Article title. Article titles should be concise and informative. Please avoid abbreviations and formulae, where possible, unless they are established and widely understood, e.g., DNA).

Author names. Provide the given name(s) and family name(s) of each author. The order of authors should match the order in the submission system. Carefully check that all names are accurately spelled. If needed, you can add your name between parentheses in your own script after the English transliteration.

Affiliations. Add affiliation addresses, referring to where the work was carried out, below the author names. Indicate affiliations using a lower-case superscript letter immediately after the author's name and in front of the corresponding address. Ensure that you provide the full postal address of each affiliation, including the country name and, if available, the email address of each author.

Corresponding author. Clearly indicate who will handle correspondence for your article at all stages of the refereeing and publication process and also post-publication. This responsibility includes answering any future queries about your results, data, methodology and materials. It is important that

the email address and contact details of your corresponding author are kept up to date during the submission and publication process.

Present/permanent address. If an author has moved since the work described in your article was carried out, or the author was visiting during that time, a "present address" (or "permanent address") can be indicated by a footnote to the author's name. The address where the author carried out the work must be retained as their main affiliation address. Use superscript Arabic numerals for such footnotes.

Abstract

You are required to provide a concise and factual abstract which does not exceed 250 words. The abstract should briefly state the purpose of your research, principal results and major conclusions. Some guidelines:

Abstracts must be able to stand alone as abstracts are often presented separately from the article.

Avoid references. If any are essential to include, ensure that you cite the author(s) and year(s).

Avoid non-standard or uncommon abbreviations. If any are essential to include, ensure they are defined within your abstract at first mention.

Keywords

You are required to provide 1 to 7 keywords for indexing purposes. Keywords should be written in English. Please try to avoid keywords consisting of multiple words (using "and" or "of").

We recommend that you only use abbreviations in keywords if they are firmly established in the field.

Highlights

You are encouraged to provide article highlights at submission.

Highlights are a short collection of bullet points that should capture the novel results of your research as well as any new methods used during your study. Highlights will help increase the discoverability of your article via search engines. Some guidelines:

Submit highlights as a separate editable file in the online submission system with the word "highlights" included in the file name.

Highlights should consist of 3 to 5 bullet points, each a maximum of 85 characters, including spaces.

We encourage you to view example article highlights and read about the benefits of their inclusion.

Graphical abstract

You are encouraged to provide a graphical abstract at submission.

The graphical abstract should summarize the contents of your article in a concise, pictorial form which is designed to capture the attention of a wide readership. A graphical abstract will help draw more attention to your online article and support readers in digesting your research. Some guidelines:

Submit your graphical abstract as a separate file in the online submission system.

Ensure the image is a minimum of 531 x 1328 pixels (h x w) or proportionally more and is readable at a size of 5 x 13 cm using a regular screen resolution of 96 dpi.

Our preferred file types for graphical abstracts are TIFF, EPS, PDF or MS Office files.

We encourage you to view example graphical abstracts and read about the benefits of including them.

Tables

Tables must be submitted as editable text, not as images. Some guidelines:

Place tables next to the relevant text or on a separate page(s) at the end of your article.

Cite all tables in the manuscript text.

Number tables consecutively according to their appearance in the text.

Please provide captions along with the tables.

Place any table notes below the table body.

Avoid vertical rules and shading within table cells.

We recommend that you use tables sparingly, ensuring that any data presented in tables is not duplicating results described elsewhere in the article.

Figures, images and artwork

Figures, images, artwork, diagrams and other graphical media must be supplied as separate files along with the manuscript. We recommend that you read our detailed artwork and media instructions. Some excerpts:

When submitting artwork:

Cite all images in the manuscript text.

Number images according to the sequence they appear within your article.

Submit each image as a separate file using a logical naming convention for your files (for example, Figure_1, Figure_2 etc).

Please provide captions for all figures, images, and artwork.

Text graphics may be embedded in the text at the appropriate position. If you are working with LaTeX, text graphics may also be embedded in the file.

Artwork formats

When your artwork is finalized, "save as" or convert your electronic artwork to the formats listed below taking into account the given resolution requirements for line drawings, halftones, and line/halftone combinations:

Vector drawings: Save as EPS or PDF files embedding the font or saving the text as "graphics."

Color or grayscale photographs (halftones): Save as TIFF, JPG or PNG files using a minimum of 300 dpi (for single column: min. 1063 pixels, full page width: 2244 pixels).

Bitmapped line drawings: Save as TIFF, JPG or PNG files using a minimum of 1000 dpi (for single column: min. 3543 pixels, full page width: 7480 pixels).

Combinations bitmapped line/halftones (color or grayscale): Save as TIFF, JPG or PNG files using a minimum of 500 dpi (for single column: min. 1772 pixels, full page width: 3740 pixels).

Please do not submit:

files that are too low in resolution (for example, files optimized for screen use such as GIF, BMP, PICT or WPG files).

disproportionally large images compared to font size, as text may become unreadable.

Figure captions

All images must have a caption. A caption should consist of a brief title (not displayed on the figure itself) and a description of the image. We advise you to keep the amount of text in any image to a minimum, though any symbols and abbreviations used should be explained.

Provide captions in a separate file.

Color artwork

If you submit usable color figures with your accepted article, we will ensure that they appear in color online.

Please ensure that color images are accessible to all, including those with impaired color vision. Learn more about color and web accessibility.

For articles appearing in print, you will be sent information on costs to reproduce color in the printed version, after your accepted article has been sent to production. At this stage, please indicate if your preference is to have color only in the online version of your article or also in the printed version.

Generative AI and Figures, images and artwork
Please read our policy on the use of generative AI and AI-assisted tools in figures, images and artwork, which can be found in Elsevier's GenAI Policies for Journals. This policy states:

We do not permit the use of Generative AI or AI-assisted tools to create or alter images in submitted manuscripts.

The only exception is if the use of AI or AI-assisted tools is part of the research design or methods (for example, in the field of biomedical imaging). If this is the case, such use must be described in a reproducible manner in the methods section, including the name of the model or tool, version and extension numbers, and manufacturer.

The use of generative AI or AI-assisted tools in the production of artwork such as for graphical abstracts is not permitted. The use of generative AI in the production of cover art may in some cases be allowed, if the author obtains prior permission from the journal editor and publisher, can demonstrate that all necessary rights have been cleared for the use of the relevant material, and ensures that there is correct content attribution.

Supplementary material
We encourage the use of supplementary materials such as applications, images and sound clips to enhance research. Some guidelines:

Cite all supplementary files in the manuscript text.

Submit supplementary materials at the same time as your article. Be aware that all supplementary materials provided will appear online in the exact same file type as received. These files will not be formatted or typeset by the production team.

Include a concise, descriptive caption for each supplementary file describing its content.

Provide updated files if at any stage of the publication process you wish to make changes to submitted supplementary materials.

Do not make annotations or corrections to a previous version of a supplementary file.

Switch off the option to track changes in Microsoft Office files. If tracked changes are left on, they will appear in your published version.

We recommend you upload research data to a suitable specialist or generalist repository. Please read our guidelines on sharing research data for more information on depositing, sharing and using research data and other relevant research materials.

Video

This journal accepts video material and animation sequences to support and enhance your scientific research. We encourage you to include links to video or animation files within articles. Some guidelines:

When including video or animation file links within your article, refer to the video or animation content by adding a note in your text where the file should be placed.

Clearly label files ensuring the given file name is directly related to the file content.

Provide files in one of our recommended file formats. Files should be within our preferred maximum file size of 150 MB per file, 1 GB in total.

Provide "stills" for each of your files. These will be used as standard icons to personalize the link to your video data. You can choose any frame from your video or animation or make a separate image.

Provide text (for both the electronic and the print version) to be placed in the portions of your article that refer to the video content. This is essential text, as video and animation files cannot be embedded in the print version of the journal.

We publish all video and animation files supplied in the electronic version of your article.

For more detailed instructions, we recommend that you read our guidelines on submitting video content to be included in the body of an article.

Research data

We are committed to supporting the storage of, access to and discovery of research data, and our research data policy sets out the principles guiding how we work with the research community to support a more efficient and transparent research process.

Research data refers to the results of observations or experimentation that validate research findings, which may also include software, code, models, algorithms, protocols, methods and other useful materials related to the project.

Please read our guidelines on sharing research data for more information on depositing, sharing and using research data and other relevant research materials.

For this journal, the following instructions from our research data guidelines apply.

Option B: Research data deposit, citation and linking

You are encouraged to:

Deposit your research data in a relevant data repository.

Cite and link to this dataset in your article.

If this is not possible, make a statement explaining why research data cannot be shared.

Data statement
To foster transparency, you are to state the availability of any data at submission.

Ensuring data is available may be a requirement of your funding body or institution. If your data is unavailable to access or unsuitable to post, you can state the reason why (e.g., your research data includes sensitive or confidential information such as patient data) during the submission process. This statement will appear with your published article on ScienceDirect.

Read more about the importance and benefits of providing a data statement.

Data linking
Linking to the data underlying your work increases your exposure and may lead to new collaborations. It also provides readers with a better understanding of the described research.

If your research data has been made available in a data repository there are a number of ways your article can be linked directly to the dataset:

Provide a link to your dataset when prompted during the online submission process.

For some data repositories, a repository banner will automatically appear next to your published article on ScienceDirect.

You can also link relevant data or entities within the text of your article through the use of identifiers. Use the following format: Database: 12345 (e.g. TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

Learn more about linking research data and research articles in ScienceDirect.

Research Elements
This journal enables the publication of research objects (e.g. data, methods, protocols, software and hardware) related to original research in Elsevier's Research Elements journals.

Research Elements are peer-reviewed, open access journals which make research objects findable, accessible and reusable. By providing detailed descriptions of objects and their application with links to the original research article, your research objects can be placed into context within your article.

You will be alerted during submission to the opportunity to submit a manuscript to one of the Research Elements journals. Your Research Elements article can be prepared by you, or by one of your collaborators.

Article structure

Article sections

Divide your article into clearly defined and numbered sections. Number subsections 1.1 (then 1.1.1, 1.1.2, ...), then 1.2, etc.

Use the numbering format when cross-referencing within your article. Do not just refer to "the text."

You may give subsections a brief heading. Headings should appear on a separate line.

Do not include the article abstract within section numbering.

Theory and calculation

The theory section should lay the foundation for further work by extending the background you provided in the introduction to your article. The calculation section should represent a practical development from a theoretical basis.

Glossary

Please provide definitions of field-specific terms used in your article, in a separate list.

Footnotes

We advise you to use footnotes sparingly. If you include footnotes in your article, ensure that they are numbered consecutively.

You may use system features that automatically build footnotes into text. Alternatively, you can indicate the position of footnotes within the text and present them in a separate section at the end of your article.

Acknowledgements

Include any individuals who provided you with help during your research, such as help with language, writing or proof reading, in the acknowledgements section. Include acknowledgements only in the title page since this journal follows a double anonymized peer review process. Do not add it as a footnote to your title.

Author contributions: CRediT

Corresponding authors are required to acknowledge co-author contributions using CRediT (Contributor Roles Taxonomy) roles:

Conceptualization

Data curation

Formal analysis

Funding acquisition

Investigation

Methodology

Project administration

Resources

Software

Supervision

Validation

Visualization

Writing – original draft

Writing – review and editing

Not all CRediT roles will apply to every manuscript and some authors may contribute through multiple roles.

We advise you to read more about CRediT and view an example of a CRediT author statement.

Funding sources

Authors must disclose any funding sources who provided financial support for the conduct of the research and/or preparation of the article. The role of sponsors, if any, should be declared in relation to the study design, collection, analysis and interpretation of data, writing of the report and decision to submit the article for publication. If funding sources had no such involvement this should be stated in your submission.

List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants, scholarships and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, it is recommended to include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Appendices
We ask you to use the following format for appendices:

Identify individual appendices within your article using the format: A, B, etc.

Give separate numbering to formulae and equations within appendices using formats such as Eq. (A.1), Eq. (A.2), etc. and in subsequent appendices, Eq. (B.1), Eq. (B. 2) etc. In a similar way, give separate numbering to tables and figures using formats such as Table A.1; Fig. A.1, etc.

References
References within text
Any references cited within your article should also be present in your reference list and vice versa. Some guidelines:

References cited in your abstract must be given in full.

We recommend that you do not include unpublished results and personal communications in your reference list, though you may mention them in the text of your article.

Any unpublished results and personal communications included in your reference list must follow the standard reference style of the journal. In substitution of the publication date add "unpublished results" or "personal communication."

References cited as "in press" imply that the item has been accepted for publication.

Linking to cited sources will increase the discoverability of your research.

Before submission, check that all data provided in your reference list are correct, including any references which have been copied. Providing correct reference data allows us to link to abstracting and indexing services such as Scopus, Crossref and PubMed. Any incorrect surnames, journal or book titles, publication years or pagination within your references may prevent link creation.

We encourage the use of Digital Object Identifiers (DOIs) as reference links as they provide a permanent link to the electronic article referenced.

Reference format
This journal does not set strict requirements on reference formatting at submission. Some guidelines:

References can be in any style or format as long as the style is consistent.

Author names, journal or book titles, chapter or article titles, year of publication, volume numbers, article numbers or pagination must be included, where applicable.

Use of DOIs is recommended.

Our journal reference style will be applied to your article after acceptance, at proof stage. If required, at this stage we will ask you to correct or supply any missing reference data.

Reference style
Indicate references by adding a number within square brackets in the text. You can refer to author names within your text, but you must always give the reference number, e.g., "as demonstrated [3,6]. Barnaby and Jones [8] obtained a different result ....".

Number references in the order they appear in your article.

Abbreviate journal names according to the List of Title Word Abbreviations (LTWA).

Examples:

Reference to a journal publication:

[1] J. van der Geer, T. Handgraaf, R.A. Lupton, The art of writing a scientific article, J. Sci. Commun. 163 (2020) 51 – 59. https://doi.org/10.1016/j.sc.2020.00372.

Reference to a journal publication with an article number:

[2] J. van der Geer, T. Handgraaf, R.A. Lupton, 2022. The art of writing a scientific article. Heliyon. 19, e00205. https://doi.org/10.1016/j.heliyon.2022.e00205.

Reference to a book:

[3] W. Strunk Jr., E.B. White, The Elements of Style, fourth ed., Longman, New York, 2000.

Reference to a chapter in a book:

[4] G.R. Mettam, L.B. Adams, How to prepare an electronic version of your article, in: B.S. Jones, R.Z. Smith (Eds.), Introduction to the Electronic Age, E-Publishing Inc., New York, 2020, pp. 281 - 304.

Reference to a website:

[5] Cancer Research UK, Cancer statistics reports for the UK. http://www.cancerresearchuk.org/aboutcancer/statistics/cancerstatsreport/, 2023 (accessed 13 March 2023).

Reference to a dataset:

[6] M. Oguro, S. Imahiro, S. Saito, T. Nakashizuka, Mortality data for Japanese oak wilt disease and surrounding forest compositions [dataset], Mendeley Data, v1, 2015. https://doi.org/10.1234/abc12nb39r.1.

Reference to software:

[7] E. Coon, M. Berndt, A. Jan, D. Svyatsky, A. Atchley, E. Kikinzon, D. Harp, G. Manzini, E. Shelef, K. Lipnikov, R. Garimella, C. Xu, D. Moulton, S. Karra, S. Painter, E. Jafarov, S. Molins, Advanced Terrestrial Simulator (ATS) v0.88 [software], Zenodo, March 25, 2020. https://doi.org/10.1234/zenodo.3727209.

Reference style
All citations in the text should refer to:

Single author: the author's name (without initials, unless there is ambiguity) and the year of publication.

Two authors: both authors' names and the year of publication.

Three or more authors: first author's name followed by 'et al.' and the year of publication.

Citations can be made directly (or parenthetically). Groups of references can be listed either first alphabetically, then chronologically, or vice versa. Examples: "as demonstrated (Allan, 2020a, 2020b; Allan and Jones, 2019)" or "as demonstrated (Jones, 2019; Allan, 2020). Kramer et al. (2023) have recently shown".

The list of references should be arranged alphabetically and then chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters 'a', 'b', 'c', etc., placed after the year of publication.

Abbreviate journal names according to the List of Title Word Abbreviations (LTWA).

Examples:

Reference to a journal publication:

Van der Geer, J., Handgraaf, T., Lupton, R.A., 2020. The art of writing a scientific article. J. Sci. Commun. 163, 51–59. https://doi.org/10.1016/j.sc.2020.00372.

Reference to a journal publication with an article number:

Van der Geer, J., Handgraaf, T., Lupton, R.A., 2022. The art of writing a scientific article. Heliyon. 19, e00205. https://doi.org/10.1016/j.heliyon.2022.e00205.

Reference to a book:

Strunk Jr., W., White, E.B., 2000. The Elements of Style, fourth ed. Longman, New York.

Reference to a chapter in a book:

Mettam, G.R., Adams, L.B., 2023. How to prepare an electronic version of your article, in: Jones, B.S., Smith, R.Z. (Eds.), Introduction to the Electronic Age. E-Publishing Inc., New York, pp. 281–304.

Reference to a website:

Cancer Research UK, 2023. Cancer statistics reports for the UK. http://www.cancerresearchuk.org/aboutcancer/statistics/cancerstatsreport/ (accessed 13 March 2023).

Reference to a dataset:

Oguro, M., Imahiro, S., Saito, S., Nakashizuka, T., 2015. Mortality data for Japanese oak wilt disease and surrounding forest compositions [dataset]. Mendeley Data, v1. https://doi.org/10.17632/xwj98nb39r.1.

Reference to software:

Coon, E., Berndt, M., Jan, A., Svyatsky, D., Atchley, A., Kikinzon, E., Harp, D., Manzini, G., Shelef, E., Lipnikov, K., Garimella, R., Xu, C., Moulton, D., Karra, S., Painter, S., Jafarov, E., & Molins, S., 2020.

Advanced Terrestrial Simulator (ATS) v0.88 (Version 0.88) [software]. Zenodo. https://doi.org/10.5281/zenodo.3727209.

Web references

When listing web references, as a minimum you should provide the full URL and the date when the reference was last accessed. Additional information (e.g. DOI, author names, dates or reference to a source publication) should also be provided, if known.

You can list web references separately under a new heading directly after your reference list or include them in your reference list.

Data references

We encourage you to cite underlying or relevant datasets within article text and to list data references in the reference list.

When citing data references, you should include:

author name(s)

dataset title

data repository

version (where available)

year

global persistent identifier

Add [dataset] immediately before your reference. This will help us to properly identify the dataset. The [dataset] identifier will not appear in your published article.

Preprint references

We ask you to mark preprints clearly. You should include the word "preprint" or the name of the preprint server as part of your reference and provide the preprint DOI.

Where a preprint has subsequently become available as a peer-reviewed publication, use the formal publication as your reference.

If there are preprints that are central to your work or that cover crucial developments in the topic, but they are not yet formally published, you may reference the preprint.

Reference management software

Most Elsevier journals have their reference template available in popular reference management software products. These include products that support Citation Style Language (CSL) such as Mendeley Reference Manager.

If you use a citation plug-in from these products, select the relevant journal template and all your citations and bibliographies will automatically be formatted in the journal style. We advise you to remove all field codes before submitting your manuscript to any reference management software product.

If a template is not available for this journal, follow the format given in examples in the reference style section of this Guide for Authors.

Submitting your manuscript
Submission checklist
Before completing the submission of your manuscript, we advise you to read our submission checklist:

One author has been designated as the corresponding author and their full contact details (email address, full postal address and phone numbers) have been provided.

All files have been uploaded, including keywords, figure captions and tables (including a title, description and footnotes) included.

Spelling and grammar checks have been carried out.

All references in the article text are cited in the reference list and vice versa.

Permission has been obtained for the use of any copyrighted material from other sources, including the Web.

For gold open access articles, all authors understand that they are responsible for payment of the article publishing charge (APC) if the manuscript is accepted. Payment of the APC may be covered by the corresponding author's institution, or the research funder.

Suggest reviewers
To support the peer review process, we ask you to provide names and institutional email addresses of several potential reviewers for their manuscript. Some guidelines:

Reviewers should not be colleagues or have co-authored or collaborated with you during the last three years.

Do not suggest reviewers with whom you have competing interests.

Suggest reviewers who are located in different countries or regions from yourself. This helps to provide a broad and balanced assessment of your work and to ensure scientific rigor.

Consider diversity in your reviewer suggestions, such as gender, race and ethnicity and career stage.

Do not suggest members of our Editorial Board.

The journal editors will take the final decision on whether to invite your suggested reviewers.

Submit online

Our online submission system guides you through the process steps of entering your manuscript details and uploading your files. The system converts your article files to a single PDF file used in the peer-review process.

Editable files (e.g., Word, LaTeX) are required to typeset your article for final publication. All correspondence, including notification of the editor's decision and requests for revision, is sent by email.

Please follow this link to submit your paper.

After receiving a final decision

Article Transfer Service

If your manuscript is more suitable for an alternative Elsevier journal, you may receive an email asking you to consider transferring your manuscript via the Elsevier Article Transfer Service.

The recommendation could come from the journal editor, a dedicated in-house scientific managing editor, a tool-assisted recommendation or a combination.

If you agree with the recommendation, your manuscript will be transferred and independently reviewed by the editors of the new journal. You will have the opportunity to make revisions, if necessary, before the submission is complete at the destination journal.

Publishing agreement

Authors will be asked to complete a publishing agreement after acceptance. The corresponding author will receive a link to the online agreement by email. We advise you to read Elsevier's policies related to copyright to learn more about our copyright policies and your, and your employer’s/institution’s, additional rights for subscription and gold open access articles.

License options

Authors will be offered open access user license options which will determine how you, and third parties, can reuse your gold open access article. We advise that you review these options and any funding body license requirements before selecting a license option.

Open access
We refer you to our open access information page to learn about open access options for this journal.

Permission for copyrighted works
If excerpts from other copyrighted works are included in your article, you must obtain written permission from the copyright owners and credit the source(s) within your article using Elsevier's permission request and license form (Word).

Proof correction
To ensure a fast publication process we will ask you to provide proof corrections within two days.

Corresponding authors will be sent an email which includes a link to our online proofing system, allowing annotation and correction of proofs online. The environment is similar to Word. You can edit text, comment on figures and tables and answer questions raised by our copy editor. Our web-based proofing service ensures a faster and less error-prone process.

You can choose to annotate and upload your edits on the PDF version of your article, if preferred. We will provide you with proofing instructions and available alternative proofing methods in our email.

The purpose of the proof is to check the typesetting, editing, completeness and correctness of your article text, tables and figures. Significant changes to your article at the proofing stage will only be considered with approval of the journal editor.

Responsible sharing
We encourage you to share and promote your article to give additional visibility to your work, enabling your paper to contribute to scientific progress and foster the exchange of scientific developments within your field. Read more about how to responsibly share and promote your article.

Resources for authors
Elsevier Researcher Academy
If you would like help to improve your submission or navigate the publication process, support is available via Elsevier Researcher Academy.

Elsevier Researcher Academy offers free e-learning modules, webinars, downloadable guides and research writing and peer review process resources.

Language and editing services
We recommend that you write in American or British English but not a combination of both.

If you feel the English language in your manuscript requires editing to eliminate possible grammatical or spelling errors and to conform to correct scientific English, you may wish to use the English Language Editing service provided by Elsevier's Author Services.

Getting help and support

Author support

We recommend that you visit our Journal Article Publishing Support Center if you have questions about the editorial process or require technical support for your submission. Some popular FAQs:

How can I track the status of my submitted article?

When will my article be published?

Appendix 7: Ethics clearance

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

FACULTY OF HEALTH SCIENCES
Human Research Ethics Committee

FHS016: Annual Progress Report / Renewal

HREC office use only (FWA00001637; IRB00001938) **This serves as notification of annual approval, including any documentation described below.**			
☑ Approved	Annual progress report	Approved until/next renewal date	30.01.2026
☐ Not approved	See attached comments		
Signature Chairperson of the HREC/ Designee		Date Signed	19/1/2025

Note: Please email this form and supporting documents (if applicable) in a combined pdf-file to hrec-enquiries@uct.ac.za.

Please use the latest form found on our website:
http://www.health.uct.ac.za/fhs/research/humanethics/forms

HUMAN RESEARCH ETHICS COMMITTEE
17 JAN 2025
HEALTH SCIENCES FACULTY
UNIVERSITY OF CAPE TOWN

Comments to PI from the HREC
Thank you for Declaration document

Principal Investigator to complete the following:

1. Protocol information

Date (when submitting this form)	13/1/2025		
HREC REF Number	764/2022	Current Ethics Approval was granted until	30/11/2024
Protocol title	Competencies and applicability of Master of Public Health (MPH) programmes. A qualitative study of graduates from South African Universities		
Protocol number (if applicable)			
Are there any sub-studies linked to this study?	☐ Yes	X☐ No	
If yes, could you please provide the HREC Reference number for all sub-studies? **Note:** A separate FHS016 must be submitted for each sub-study.			
Principal Investigator	Associate Professor Maylene Shung King		
Department and email address	maylene.shungking@uct.ac.za		