

Swaziland National Health Research Agenda: the Formulation Process

DEBATE ARTICLE

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Abstract

Background: The objectives of this article are to describe the process followed in development of the Swaziland's national health research agenda (NHRA); and to provide an overview of the health research priorities that emerged from that process.

Discussion: Swaziland followed a fifteen step process to develop its NHRA, namely: search and review of the existing health research priority setting guidelines; situation analysis included review of Swaziland's health, health systems, national health research system, and socio-economic indicators; identification of research stakeholders; identification of the preliminary main broad research themes; development of questionnaire on ranking of main research themes; workshops with each of the eight stakeholders; ranking of major health themes and identification of sub-themes; identification of research gaps under each sub-theme and main research areas; scoring of research areas; grouping of research areas by sub-themes and ranking; collating research areas ranked as number one in each sub-theme; providing content to the agenda; preparation of the zero NHRA draft report; preparation of the first NHRA draft report taking into account critical inputs from stakeholders; and stakeholder's final validation of the NHRA draft report. The paper provides an overview of communicable diseases, non-communicable diseases, sexual and reproductive health, injuries and health system research gaps under four categories of research: situation (burden and determinants); improvement of existing interventions; effectiveness of interventions; and feasibility of developing new capacities (tools and products).

Conclusions: The National Health Research Department (NHRD), with the support of the National Health Research Review Board (NHRRB), will be responsible for dissemination, preparation of rolling annual ac-

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tion plans to secure government funds for implementation of NHRA, promoting adherence among stakeholders, establishing a registry of Research for Health (R4H), establishing a knowledge translation platform, building of public-private-partnerships for research, mobilization of domestic (including private sector) and external resources, coordination and monitoring of the implementation of the NHRA.

Keywords

Swaziland; National Health Research Agenda; Health Research Priorities; Research Stakeholders; Research Gaps.

Introduction

The Kingdom of Swaziland is situated in Southern Africa, and had an estimated population of 1.287 million people in 2015 [1]. About 21.5% of the population live in urban areas. Thirty-eight percent of the population is aged below 15 years and 5% is aged over 60 years. The literacy rate among people aged 15 years and above is 88% [2]. The gross national income per capita was International Dollars (Int\$) 9,783 in 2016 [3]. About 39.3% of the population live on less than one Int\$ a day (i.e. in purchasing power parity). There are 72 cellular phone subscribers per 100 population [2].

The Swaziland life expectancy at birth (years) of 58.9 years was four years lower than the average for the World Health Organization African Region (WHO/AFR) in 2015 [4]. The Swaziland neonatal mortality rate of 14.2 per 1000 live births, and under-five mortality rate of 60.7 per 1000 live births were lower than African region averages of 28 and 81.3 respectively [1]. The Country's infant mortality rate of 56 per 1000 live births was lower than the regional average of 63 [5]. The Swaziland adult (15-60 years) mortality rates of 494 per 1000 male population and 411 per 1000 female population were higher than regional averages of 343 per 1000 male

population and 298 per 1000 female population [5]. The Swaziland maternal mortality ratio of 389 per 100 000 live births was lower than 542 per 100 000 live births in the region in 2015 [1].

In Swaziland 884 deaths per 100 000 population resulted from communicable diseases; 702 deaths per 100 000 population from non-communicable diseases (NCD); and 119 deaths per 100 000 population from injuries (intentional and unintentional). Those death rates are higher than averages of 683, 652 and 116 for the African Region, respectively. HIV/AIDS incidence rate of 871 per 100 000 population and tuberculosis (TB) incidence rate (among HIV-negative people) of 1,382 per 100 000 population were five times higher than the African Region average in 2013 [2].

The health system has a four tier health care delivery system. The first tier is the community health services provided by community based health care workers comprising of Rural Health Motivators, Faith Based Health Care Providers, Traditional Healers, Traditional Birth Attendants and volunteers providing home based care, support and treatment. The second tier is made of primary health care facilities, consisting of clinics and Public Health Units plus outreach services. The clinics are sub-divided

into two, clinics with maternity and those without maternity. The third tier consists of Health Centres; specialized clinics, such as eye, Ear, Nose and Throat (ENT), physiotherapy, palliative care, Voluntary Counselling and Testing (VCT), gynaecology and obstetrics, dental care, etc.; and regional referral hospitals. The fourth tier consists of national referral hospitals [6].

The health infrastructure comprises of 287 health facilities, including 1 national referral hospital, 2 specialized hospitals, 5 regional referral hospitals, 5 health centres, 6 public health units, 23 clinics with maternity, 192 clinics without maternity, 47 specialized clinics, 6 private hospitals. Forty percent of these health facilities are owned by government, 12.2% by mission, 10.8% by industries, 7.0% by private nurses, 22.7% by private doctors, and 7.3% by NGO. Out of the total number of health facilities, 42.25% are in Manzini, 28.6% in Hhohho, 16.7% in Lubombo, and 12.5% in Shiselweni [6].

The health infrastructure is operated by 343 physicians (including specialists), 8 anaesthetic technicians, 3513 nursing and midwifery personnel, 72 dentistry personnel, 67 pharmaceutical personnel, 344 laboratory and imaging personnel, 22 physiotherapy and occupational therapy personnel, and 56 environment health staff [6]. The physician density is 1.7 per 10 000 population, nursing and midwifery 16 per 10 000 population, 0.4 dentistry personnel per 100 000 population and 0.5 pharmaceutical personnel per 10 000 population [2].

Conduct of research was an ongoing activity that was not regulated prior to 2006. In order to increase utilisation of health sector research to inform policy and planning in the Swaziland Kingdom, the Ministry of Health (MOH) established structures to promote and manage research in the country. In 2006, the MOH established the Swaziland Scientific and Ethics Committee (SEC) to protect human subjects involved in research [7]. The SEC receives, reviews and approves research applications. The Kingdom of Swaziland through the Ministry of Health set up

structures to promote and manage research in the country. In 2009, the Country's National Health Sector Strategic plan (NHSSP) identified health research as a priority; and in 2010 established the National Health Research Unit (HRU) under the Strategic Information Department (SID) in the MOH to coordinate all research activities in the health sector [8].

Since 2010, the national HRU has organised national health research conferences on a biennial basis to promote the dissemination of findings from research conducted in the country; and to encourage development of best practice evidence-based policies and guidelines. The national HRU evolved into a National Health Research Department (NHRD) within the MOH to oversee and coordinate the country's research environment including clinical trials. The aim of NHRD is to issue operational guidelines and tools, facilitate, coordinate, guide, monitor and promote health research as well as build health research capacity, productivity and culture [7, 8].

In August 2013, the Kingdom of Swaziland MOH published its National Health Research Policy 2014-2023 whose vision is: "By 2023, the country's health sector will be sufficiently capacitated to generate and utilize evidence for effective delivery of health services" (p. 6) [7]. One of its eight policy directions relates to development of a national health research agenda (NHRA) that articulates priority health research based on burden of disease; bio-medical; clinical; health services and health systems; socio-cultural, environmental health and special populations. The policy states that all health research carried out in the country shall be aligned with NHRA, except in cases of emerging and re-emerging issues.

In November 2013, the MOH published its first Health Research Strategic Plan 2014-2018 [8]. It contains six strategic objectives related to policy and legal environment; governance and leadership; capacity development for health research; health research financing; information and knowledge management; and conduct of research. Under the latter

objective, two of the five strategic directions relate to facilitation and coordination of the development of a NHRA, and promoting compliance with it.

Having a NHRA is one of the tools that would facilitate Government's governance of health research. The objectives of this article are to describe the process followed in development of the Swaziland's NHRA; and to provide an overview of the health research priorities that emerged from that process.

Discussion

Objectives of the NHRA

The objectives of the Swaziland NHRA are to guide priority health research to be conducted; promote rational utilization of scarce resources to address priority health research needs of the country; stimulate interest in health research particularly among university faculty, students and emerging health researchers; and attract increased domestic (including private sector) and external investment in health research.

Research Agenda Stepwise Development Process

Many stakeholders decried the fact some areas were over researched while other areas were neglected. In order to address this challenge, the MOH requested for technical support from the WHO Regional Office for Africa (WHO/AFRO) to guide and facilitate the process of developing a NHRA. Most stakeholder dialogue meetings were hosted by the World Health organization (WHO) Country Office.

The development of the NHRA entailed fifteen steps. First, search and review of the existing health research priority setting guidelines by WHO [9], Council on Health Research for Development (COHRED) [10], Ghaffar [11], Global Forum for Health Research [12], Montorzi *et al* [13], Sibbald [14], and Hindin *et al* [15].

Second, situation analysis included review of Swaziland's socio-economic indicators, e.g. population and annual growth rate, literacy rate, per capita gross national income, adult literacy rate, cellular phone density, water and sanitation coverage (social determinants of health); health indicators, including neonatal, infant, under-five and adult mortality rates, maternal mortality ratio, cause specific mortality rates; health system challenges in leadership and governance, health services delivery and equity, health workforce, health financing, health technologies (essential medicines, vaccines, medical devices, infrastructure), and health management information systems; and national health research system (governance, creating resources for research, producing and using research, and financing of research) challenges [16, 17, 18, 19].

Third, identification (mapping) of research stakeholders at a meeting consisting of the WHO Country Office staff, the Head of the national HRU and two of the WHO/AFRO staff (authors: JMK and MOO). The following stakeholders were identified: The MOH Principal Secretary; SEC; Health Research Technical Working Group (HRTWG); MOH Public Health Programmes; Civil Society Organizations: Coordinating Assembly of Non-Governmental (CANGO), Swaziland Business Coalition on HIV and AIDS (SWABCHA), Red Cross; United Nations (UN) Agencies: WHO, United Nations Population Fund (UNFPA), United Nations Children's Fund (UNICEF), Joint United Nations Programme on HIV and AIDS (UNAIDS); MOH Partners, e.g. Medecins Sans Frontieres (MSF), Management Sciences for Health (MSH), National Emergency Response Council on HIV and AIDS (NERCHA), International Centre for AIDS Care and Treatment Programs (ICAP), University Research Company (URC); and Faculty of Health Sciences, University of Swaziland.

Fourth, identification of the preliminary main broad research themes to be considered in Swaziland. A meeting with selected members of Swaziland health research Technical Working Group

(TWG) (informed by situation analysis) delineated eight broad thematic areas: communicable diseases; NCDs; allied health (e.g. ENT, eye, physiotherapy); injuries; health system; reproductive and child health; health determinants (e.g. water, sanitation, alcohol, tobacco); and emerging and re-emerging diseases (e.g. Ebola Virus Disease).

Fifth, development of questionnaire entitled "Questionnaire on ranking of main research themes for Swaziland" (**Appendix File 1**). It had a set of questions related to respondent's profile, including age, gender, highest level of education attained and occupation. Another question required the respondent to confirm whether the list of eight themes was relevant and exhaustive; and then requested to rank the thematic areas in order of research importance in Swaziland, i.e. from 1 (top priority) to 8 (least priority). The questionnaire was pilot-tested among five UN Agencies staff and three MOH staff; and revised to incorporate the feedback.

Sixth, workshops were held with each group of the eight stakeholders mentioned in Step 3. In each of the workshops, the purpose of the priority setting process was explained; justification for developing a NHRA was provided; and the process of setting health research priorities was explained to the participants. It was explained that the reasons for setting national research for health (R4H) priorities included the fact that it is not economically feasible to undertake all desirable research because resources for research are very scarce; guide public, private and external research funders to focus on research and innovation that addresses priority local health needs; promote science, technology and innovation for health; stimulate development of human resources for R4H; negotiate with partners for targeted funding and long-term investments; encourage faculty and students to conduct research that bridges Swaziland's knowledge gaps; coordination amongst players; balance implementation research and research into development of new tools and products; balance competing interest of constituencies; and

guide country efforts to scale-up coverage of essential public health interventions.

It was also explained that the process of setting health research priorities entailed identification of stakeholders (e.g. policy-makers, health care workers, researchers, programme Managers, media, community, civil society, private sector, funders); assessment of the situation (including national health research system, health indicators, analysis of health system building blocks); identification of broad themes to be considered (e.g. communicable diseases, non-communicable diseases and injuries) to define focus and scope; identification of sub-themes, e.g. Communicable diseases: HIV/AIDS, Tuberculosis (TB), Neglected Tropical Diseases (NTDs), malaria, diarrhoeal diseases; identification of research gaps under each sub-theme (synthesizing scientific information on current research activities in Swaziland under each sub-theme, highlighting progress, identifying knowledge gaps and suggesting priorities for future research); identification of main topics or research areas (e.g. assessment of burden and determinants, assessment of health policy and systems, effectiveness and cost-effectiveness of interventions, implementation research into ways of improving existing interventions, and development of new tools and products to reduce public health problems); agreement on guiding/underlying principles or values; criteria for ranking R4H gaps (e.g. affordability, feasibility, answerability, applicability, potential effect on burden of disease, research capacity, equity, sustainability, alignment with other policies, competitiveness and publication impact, deliverability and generation of commercial products); and ranking of research sub-topics (gaps) by TWG. At each meeting the participants were taken through the questionnaire developed in Step 5 and requested to take copies for completion [9].

Seventh, ranking of major health themes and identification of sub-themes was done at a TWG workshop. The TWG consisted of 33 representatives of the research stakeholder groups mentioned

in step 3. The objectives of this workshop were: (a) for TWG members to present research gaps by major health theme; (b) to complete the questionnaire that included ranking of the main research themes; (c) to discuss and develop consensus on whether the NHRA should include all the eight main thematic areas or a selected number; and (d) to discuss and agree on the sub-themes under each thematic area. This workshop confirmed national relevance of the eight thematic areas and identified 34 sub-themes contained in **Table 1**. The TWG sub-groups wrote a paragraph on each of the selected main themes taking into account the scoring of the research areas and also giving examples of the specific research needed.

Table 1. Identified themes and sub-thematic research areas.

Number	Major Thematic Areas
1	Communicable diseases (5): HIV/AIDS, tuberculosis (TB), malaria, neglected tropical diseases (NTDs), diarrhoeal diseases
2	Non-communicable diseases (NCDs) (7): Cardiovascular diseases, hypertension, stroke, diabetes, cancer, chronic obstructive pulmonary disease (COPD), and mental health and substance abuse (including alcohol and tobacco)
3	Allied Health (6): oral health, dentistry, eye care, physiotherapy, ENT and occupational health.
4	Injuries (2): intentional and accidental (road traffic accidents) injuries.
5	Health system (6): leadership and governance, services (including community health services and quality of care), health workforce, medical products and technologies (including pharmaco-vigilance and laboratory systems), information, and financing.
6	Reproductive and child health (4): Neonatal and child health, adolescent health, youth, and maternal health
7	Health determinants (3): water and sanitation, climate change, and nutrition.
8	Emerging and re-emerging diseases (1): e.g. Ebola.

Table 2 shows the TWG ranking of the thematic areas in order of research importance in Swaziland, i.e. from 1 (top priority) to 8 (least priority). Thus, the thematic area with the lowest average or median score is of the highest priority.

Table 2. Ranking of main themes according to median and mean scores.

Main themes	Rank	Average Score	Median Score
Communicable diseases (CD)	1	2.76	2
Non-Communicable diseases (NCD)	2	2.77	3
Reproductive and child health (RCH)	3	3.3	3
Health system strengthening (HSS)	4	4.1	4
Health determinants (SDH)	5	4.6	5
Emerging and re-emerging diseases (EERE)	6	4.9	5
Injuries (INJ)	7	6.4	6
Allied health (AH)	8	7.2	7

Due to scarcity of research resources in Swaziland, and hence need to prioritize, the TWG workshop dialogue decided that the NHRA should focus on the top four main thematic areas, i.e. communicable diseases, non-communicable diseases, reproductive and child health, and health system strengthening. The workshop considered that the theme “health determinants” was cross-cutting and should be mainstreamed within the relevant major themes selected. Even though emerging and re-emerging diseases as well as injuries were not among highly prioritized thematic areas, participants agreed to include them as part of the agenda given their potential importance in future.

Eighth, identification of research gaps under each sub-theme and main research areas. Eight sub-groups of the TWG were constituted to review and synthesize scientific information on current research activities in Swaziland under each sub-theme. Each sub-group was tasked to highlight research progress,

identify knowledge gaps and suggest priorities for future research based on following questions: What is known? What research has not been used or applied? What is not known? What research is needed? This process produced 170 research areas, i.e. five research areas for each of the 34 sub-themes (**Additional File 2**).

Ninth, scoring of research areas was done at a two-day national health research priority setting workshop of the NHRA TWG consisting of 33 members. Each member of the TWG scored the main research area (assessment of burden and its determinants, research on health policy and systems, assessment of effectiveness and cost-effectiveness of interventions, research on improving existing interventions, development of new tools and products to reduce burden of disease) under each sub-theme on a scale of 0 (lowest priority) to 100% (highest priority). Their scoring was guided by the underlying principles/values, given set of criteria as well as personal expertise and experience. The scores for the 170 research areas are contained in the **Additional File 2**. The overall median score was 72.5% and the mean score was 72.3% with a standard deviation of 8.3. The scores for the entire spectrum of 170 research areas ranged from a maximum of 88.3% and minimum of 45.0%.

Tenth, the research areas were grouped by sub-themes and ranked. The ranking and scores for each research area under relevant sub-themes are contained in the **Additional File 2**.

Eleventh step involved collating research areas ranked as number one in each sub-theme (**Table 3**). Out of the research areas ranked top priority for each of the 34 sub-themes, 16 (47.1%) were on assessment of burden and determinants; 11 (32.3%) were on research to improve existing interventions; and 7 (20.6%) were on research to develop new capacities (tools and products).

Twelfth, providing content to the agenda. The last workshop of phase one established four sub-groups from TWG and charged them with the

Table 3. Collation of research areas ranked as number one in each sub-theme.

Sub-themes	Score	Research needed
4A_RCH_Neonatal_child_health___Assess_BOD_Determinants	86.4	1=Assess BOD & determinants
4B_HSS_Healthworkforce_____Assess situation	83.9	1=Assess BOD & determinants
4D_HSS_Medical products_technologies__Assess_situation	83.6	1=Assess BOD & determinants
4B_INJ_Unintentional_injuries___Assess_BOD_Determinants	83.0	1=Assess BOD & determinants
4B_NCD_Diabetes___Assess_BOD_Determinants	82.8	1=Assess BOD & determinants
4E_SDH_Substance_Abuse__Assess_BOD_Determinants	80.0	1=Assess BOD & determinants
4B_AH_Eye_health__BOD_Determinants	78.5	1=Assess BOD & determinants
4B_SDH_Sanitation___Assess_BOD_Determinants	75.9	1=Assess BOD & determinants
4D_RCH_Immunization__Assess_BOD_Determinants	75.3	1=Assess BOD & determinants
4E_AH_Occupational_health__BOD_Determinants	73.9	1=Assess BOD & determinants
4B_HSS_Health services (including safety & quality, among others)___Assess situation	73.8	1=Assess BOD & determinants
4C_SDH_Alcohol_____Assess_BOD_Determinants	72.8	1=Assess BOD & determinants
4C_SDH_Climate_Change_____Assess_BOD_Determinants	72.3	1=Assess BOD & determinants
4D_SDH_Tobacco___Assess_BOD_Determinants	72.2	1=Assess BOD & determinants
4B_AH_Dentistry__BOD_Determinants	62.9	1=Assess BOD & determinants
4A_AH_Oral_Health__Assess_BOD_Determinants	62.8	1=Assess BOD & determinants
4C_CD_NTDs__Improve_Existing_Interventions	85.8	4=Improve existing interventions
4C_RCH_Maternal_health__Improve_Existing_Interventions	85.7	4=Improve existing interventions
4C_NCD_Cancer__Improve_Existing_Interventions	82.9	4=Improve existing interventions
4B_RCH_Adolescent health__Improve_Existing_Interventions	82.4	4=Improve existing interventions

Sub-themes	Score	Research needed
4E_HSS_Health_Information___Improve_Existing_Interventions	78.9	4=Improve existing interventions
4A_CD_HIV/AIDS_R4H_Improve_Existing_Interventions	77.9	4=Improve existing interventions
4A_NCD_Cardiovascular diseases___Improve_Existing_Interventions	76.1	4=Improve existing interventions
4B_CD_TB_Improve_Existing_Interventions	75.7	4=Improve existing interventions
4D_NCD_Mental health___Improve_Existing_Interventions	75.5	4=Improve existing interventions
4D_CD_Diarrhoeal diseases___Improve_Existing_Interventions	74.5	4=Improve existing interventions
4A_EERE_Ebola_____Improve_Existing_Interventions	57.3	4=Improve existing interventions
4F_HSS_Health_Financing___New_Capacities_Tools_Products	88.3	5=Develop new capacities (tools & Products)
4A_INJ_Intentional_injuries___New_Capacities_Tools_Products	81.9	5=Develop new capacities (tools & Products)
4A_HSS_Leadership_Governance___New_Capacities_Tools_Products	74.3	5=Develop new capacities (tools & Products)
4A_SDH_Water_____New_Capacities_Tools_Products	74.0	5=Develop new capacities (tools & Products)
4C_AH_Physiotherapy_____New_Capacities_Tools_Products	73.9	5=Develop new capacities (tools & Products)
4D_AH_Ear_nose_throat_____New_Capacities_Tools_Products	71.5	5=Develop new capacities (tools & Products)
4C_CD_Malaria_New_Capacities_Tools_Products	56.5	5=Develop new capacities (tools & Products)

responsibility of providing content to the agenda including a situation analysis under each major and sub-thematic area and research statements aligned to each of the above noted research categories. The output of the working groups formed the basis for the zero draft of the NHRA.

Thirteen, preparation of the zero NHRA draft report. The WHO/AFRO staff (authors JMK and MOO)

and the Head of the HRU at MOH (third author BS) used the materials from the four teams in step 12 to prepare draft zero of NHRA report; and made a presentation to the MOH Permanent Secretary and Director of Health Research.

Fourteenth, preparation of the first NHRA draft report. After the departure of the WHO/AFRO team, the draft zero NHRA report was shared with the different stakeholders for critical review. A writing team consisting of individuals who participated in steps two to eight was constituted by the Ministry of Health to facilitate stakeholders review and finalization of NHRA report. A one-day workshop was held with the writing team and stakeholders to review and refine descriptions of the research gaps and research statements under each of the four thematic areas. The writing team consolidated, reviewed and incorporated the inputs of the stakeholder workshop into draft zero of the NHRA document leading to a first draft. This draft was also shared with the two WHO/AFRO (JMK and OOM) for review.

Final step entailed stakeholder's validation of the NHRA draft report. The first draft was presented to a meeting of stakeholders, the WHO Country Office staff members and Ministry of Health of senior staff members for comment and endorsement. The Writing Team integrated comments on the first draft and produced a final NHRA document.

Research Priority Areas

The Swaziland NHRA has four thematic areas. First priority thematic area is communicable diseases. In this area seven sub-themes areas were delineated, including HIV/AIDs, TB, acute respiratory infections, diarrhoeal diseases, neglected tropical diseases, malaria, and other infectious diseases, e.g. hepatitis, sexually transmitted infections, and drug resistance (**Appendix File 3**). In the case of HIV/AIDs, TB, NTDs and diarrhoeal diseases, research geared at improving effective coverage of existing interventions was ranked as number one, with average scores ranging

between 74.5% and 85.8%. Concerning malaria, research aimed at developing new capacities (tools and products) was ranked as number one, with an average score of 56.5% (**Appendix File 2**).

Second priority thematic area is NCDs including major risk factors. The sub-themes included cardiovascular diseases, chronic obstructive pulmonary diseases, diabetes mellitus, cancer, mental health, injuries, and NCD risk factors (including tobacco, salt, healthy diet, physical activity) (**Appendix File 3**). Regarding cardiovascular diseases, cancer and mental disorders, research aimed at bolstering effective coverage of existing interventions ranked number one, with average scores varying between 75.5% to 82.9%. The assessment of burden and determinants of cancer disease scored 82.8% (**Appendix File 2**).

Third priority thematic area is the sexual and reproductive health and child health, including neonatal, adolescent and adult reproductive health (**Appendix File 3**). Assessment of burden and determinants of diseases afflicting neonates and children was ranked number one, with an average score of 86.4%. With respect to adolescent and maternal health, research aimed at improving effective coverage of existing intervention was ranked number one, with scores of 82.4% and 85.7% respectively (**Appendix File 2**).

Fourth priority thematic area is health systems strengthening, including health financing, service delivery, health workforce, health information systems, medical products and technology, leadership and governance, and community system strengthening (**Appendix File 3**). Research into development of new capacities (tools and products) related to leadership and governance and health financing ranked number one, with average scores of 74.3% and 88.3%, respectively. Assessment of the current situation of health services (including coverage, safety and quality), health workforce, and medical products and technologies ranked number one, with average scores ranging between 73.8%

and 83.9%. Whilst, research into ways of improving the performance of national health information system ranked number one, with an average score of 78.9% (**Appendix File 2**).

Thus, **Appendix File 3** summarizes sub-theme's specific research gaps under four categories of research: situation (burden and determinants); improvement of existing interventions; effectiveness of interventions; and feasibility of developing new capacities (tools and products).

Conclusions

This paper has described in detail the process followed in development of the Swaziland's NHRA and provided an overview of the health research priorities that emerged. The NHRD of the MOH will be responsible for dissemination, promoting adherence among stakeholders, establishing a registry of R4H, coordination and monitoring of the implementation of the NHRA. NHRD will be supported by the National Health Research Review Board to evaluate the research protocols submitted for approval to ensure protection of the animal and human research subjects. In addition, the SEC will complement the efforts of NHRD in monitoring the research proposals submitted to the MOH for approval to ensure that they are compliant with the NHRA. All investigators whose research proposals are approved would be mandatorily required to submit copies of the research reports (and publications) and datasets to the NHRU for entry into the national health research registry. The MOH through NHRU should establish a knowledge translation platform that will ensure that research results are utilized by the relevant stakeholders for policy and decision-making.

The NHRD will develop rolling annual costed action plans as part of the planning and budgeting process of the MOH to secure core funding for implementation of the NHRA. In addition, the NHRD will need to mobilize additional resources from public-private-partnerships and external resources.

All local and international researchers and domestic and external partners have the responsibility to comply and support the implementation, monitoring and evaluation of the NHRA.

List of Abbreviations

AH: Allied Health; AIDS: Acquired Immune Deficiency Syndrome; AMICAALL: Alliance of Mayors' Initiative for Community Action on AIDS at the Local Level; ARI: Acute Respiratory Infection; BOD: Burden of Disease; CANGO: Coordinating Assembly of Non-Governmental; CD: Communicable Diseases; CMS: Community Management Information System; COHRED: The Council on Health Research for Development; COPD: Chronic Obstructive Pulmonary Disease; CVDs: Cardio Vascular Diseases; ENT: Ear, Nose And Throat; EERE: Emerging and re-emerging diseases; HAART: Highly Active Anti-Retroviral Therapy; GBV: Gender Based Violence; HMIS: Health Management Information System; HIV: Human Immunodeficiency Virus; HRU: Health Research Unit; HRTWG: Health Research Technical Working Group; HSS: Health Systems Strengthening; HTC HIV: Testing and Counselling; ICAP: International Centre for AIDS Care and Treatment Programs; ICH-GCP: International Conference On Harmonisation - Guideline For Good Clinical Practice; IMCI: Integrated Management of Childhood Illnesses; INJ: Injuries; M & E: Monitoring and Evaluation; MDGs: Millennium Development Goals; MICS: Multiple Indicator Cluster Survey; MNCH: Maternal, Neonatal and Child Health; MOH: Ministry of Health; MSF: Medecins Sans Frontieres; MSH: Management Sciences for Health; MSM: Men having sex with men; NCDs: Non Communicable Diseases; NERCHA: National Emergency Response Council on HIV and AIDS; NGO: Non-Governmental Organization; NHRD: National Health Research Development; NHRA: National Health Research Agenda; SNHRRB: Swaziland National Health Research Review Board; NHSSP: National Health Sector Strategic Plan; NTDs: Neglected Tropical Diseases; PMTCT: Prevention of Mother to

Child Transmission; PLHIV: People Living with HIV; R4H: Research for Health; RCH: Reproductive and Child Health; SAM: Service Availability Mapping; SDH: Social Determinants of Health; SDHS: Swaziland Demographic and Health Survey; SEC: Swaziland Scientific and Ethics Committee; STIs: Sexual Transmitted Infections; SWABCHA: Swaziland Business Coalition on HIV and AIDS; SWAP: Sector Wide Approach; SWOT: Strengths Weaknesses Opportunities Threats; TB: Tuberculosis; TWG: Technical Working Group; UN: United Nations; UNAIDS: Joint United Nations Programme on HIV and AIDS; UNFPA: United Nations Population Fund; UNICEF: United Nations Children's Fund; URC: University Research Company; VCT: Voluntary Counselling and Testing; WHO: World Health Organization; WHO/AFR: WHO African Region; WHO/AFRO: World Health Organization Regional Office for Africa.

Ethical Considerations

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Authors' Contributions

JMK, MOO, and BS conceived and designed the process of developing Swaziland's NHRA, conducted workshops with stakeholders, designed and administered the ranking questionnaire, analysed the ranking data, conducted literature review, wrote the Swaziland NHRA report, and drafted this manuscript. All authors read and approved the manuscript.

Competing Interest

None declared.

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