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Protocol to evaluate the alignment of policies and practices for state sponsored educational initiatives for sustainable health workforce solutions in selected Southern African countries

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Protocol to evaluate the alignment of policies and practices for state sponsored educational initiatives for sustainable health workforce solutions in selected Southern African countries

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ABSTRACT

Introduction

Health systems across the world are facing challenges with shortages and maldistribution of skilled health professionals (SHPs). Return-of-Service (ROS) initiatives are government funded strategies used to educate health professionals by contracting beneficiaries to undertake government work on a year-for-year basis after their qualification. It is envisaged that once they have served their contract, they will be attracted to serve in the same area or government establishment beyond the duration of their obligatory period. Little is known about the processes which led to the development and implementation of ROS policies. Furthermore, there is no systematic evaluation of the strategies which demonstrate their utility. This research aims to evaluate the ROS initiatives, explore their efficacy and sustainability in five Southern African countries.

Methods and analysis

This study will be conducted in South Africa, Eswatini, Lesotho, Botswana and Namibia in a phased approach through a multi-methods approach of policy reviews, quantitative and qualitative research. First, a review will be conducted to explore current ROS schemes. Second, a quantitative retrospective cohort study of ROS scheme recipients for the period 2000 to 2010 will be undertaken. Information will be sourced from multiple provincial or national information systems and/or databases. Third, we will conduct semi-structured group or individual interviews with senior health, education, ROS managing agency managers (where appropriate) and finance managers and/policymakers in each country to determine managers' perceptions, challenges, and the costs and benefits of these schemes. Fourth, we will interview or conduct group discussions with health professional regulatory bodies to assess their willingness to collaborate with ROS initiative funders.

Ethics and dissemination

Ethics approval for this study was obtained through the Human Research Ethics Committees of the University of New South Wales (HC200519), Australia; Walter Sisulu University, South Africa (065/2020); and the Botswana Health Research and Development Division (HPDME 13/18/1).

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Keywords: Return-of-service; Scholarship or Bursary, Community Medicine; Human Resource for health; Education, Global health, health policy OR health policies

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Article Summary

Strengths and limitations of this study

- This is the first study to concurrently assess return-of-service scheme policies, measure attainment of policy outcomes, evaluate perceptions of those who administer the scheme and identify possible solutions for the enhancement and reformulation of the schemes.
- The multi-methods design and triangulation of information sources underlying this research provides a unique opportunity to gain a deep insight into ROS schemes and their capacity for sustainable global health workforce solutions.
- Given this study is being conducted during the global COVID-19 pandemic by global researchers in five countries when global travel is restricted, it presents an opportunity for the development of innovative methods to engage with stakeholders and collect data remotely.
- It is anticipated that the study will be limited by non-availability or poor information systems and low quality of the available information.
- If ROS schemes are viable strategies for increasing the pool of skilled health professionals, information systems will need to be significantly improved which will in itself be an important outcome of the study.

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INTRODUCTION

The World Health Organization (WHO) characterises a health system as consisting of six building blocks: leadership and governance; human resources for health; medical products, vaccines, and technologies; information and research; service delivery platform; and health financing.[1-4] Notwithstanding, human resources for health (HRH) act as the key stimulant of the health system, without which health delivery and access is severely impeded. The performance of a health system is therefore reliant on the production, distribution and retention of HRH.[4 5]

The maldistribution of skilled health professionals within and across countries results in poorly functioning services and inequity in access to healthcare especially in low-and middle-income countries (LMIC) where there is a particular shortage of skilled health professionals.[4] Although the WHO estimates the need for a minimum of 45.5 physicians, nurses and midwives per 10 000 population, sub-Saharan Africa (SSA) has only 12.2 physicians, nurses and midwives per 10 000 population.[6-8] Whilst countries like South Africa seem better off with 9.05 physicians per 10 000 population compared to the SSA average (2.34) and countries like Lesotho (0.69), Eswatini (3.29), Namibia (4.18) and Botswana (5.27); South African physicians are not equitably distributed with rural and poorer areas chronically underserviced by SHPs.[6 7]

It has been estimated that despite the fact that 44% of the South African population live in rural areas, they are served by 12% of doctors.[4 6 9-11] Several strategies have been used to try and address this maldistribution in Southern African countries. These include: (i) financial incentives (rural allowance, scholarships and loan repayment schemes); (ii) educational strategies (targeted admission policies for medical schools, undergraduate and postgraduate training exposure, and the location of medical schools in rural areas and/or the inclusion of rural training programmes); (iii) personal and professional support; and (iv) regulatory strategies.[4 9-11]

State sponsored educational initiatives are strategies that combine the training of aspiring health professionals with government human resources recruitment and retention strategies.[4 5 12-16] Also known as return-of-service schemes (ROS), these strategies award a study scholarship or bursary to health sciences students in return for a commitment to serve government on a year for year reciprocal contract after completion of their studies.[4 5 12-16] Some ROS schemes have a financial option for beneficiaries who do not fulfil their contractual obligations.[16 17] The primary objective is to increase the pool of health professionals in a

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defined area and/or government service for a set number of years.[4 5 12-16] The secondary objective is to retain these health professionals in the same area of their service beyond their obligatory service period.[4 5 12-16] Candidates are chosen by reference to their socio-economic status, school grades, career choice of study, and whether they are from a rural setting and a low quantile school.[4] Historically, Eswatini, Lesotho, Botswana and Namibian governments would send health sciences students to study in South African medical schools. Botswana and Namibia have since started training their own medical students with the opening of medical schools in 2009 and 2010 respectively.

The extent to which policy makers review and systematically evaluate the implementation of these strategies is unclear. In addition, although these strategies have been designed to address health workforce shortages and maldistribution, their development appears to lack a basis in evidence-based policies, nor is there clear evidence of consideration of other factors likely to be vital to the success of such policy initiatives.[4] These include a lack of monitoring and evaluation capacity within administrating institutions (including clear plans for review) and the impacts of interactions between different stakeholders, i.e. the training institutions or countries, students, skilled health professionals, regulatory bodies and health facilities.[4] Ideally, ROS policies should be one part of a broader package of initiatives designed to serve as a catalyst for creating a supportive environment for health professionals that build on and reinforce each other, yet, once again, the extent to which this is occurring is unclear.[4] A further potential weakness of these strategies is that anecdotal evidence (based on the researcher's personal communications with beneficiaries of state sponsored educational initiatives) suggests that some graduates do not fulfil their contractual obligations by serving their governments for an equivalent number of years as equivalent to the duration of the funding assistance received nor do they pay financial compensation in lieu of their service, if this is the requirement. By contrast, some studies indicate that most return-of-service beneficiaries fulfil their contractual obligation; their retention beyond their contractual obligation is less successful.[12 16] Furthermore, in many cases there appears to be a potential lack of consideration for the future financial capacity required to pay the future salaries of all graduates from these schemes, suggesting that the health system may not be able to ultimately benefit from ROS beneficiaries as initially planned.[4 5]

The shortages and maldistribution of health professionals is a complex problem needing innovative, sustainable and efficient solutions.[4] Despite the wide use of these educational initiatives across the world (and associated investment of scarce healthcare resources), there is

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limited literature to guide policymakers deciding whether to introduce or continue ROS schemes or on identifying components of the schemes essential to their success. No published literature was found assessing the evolution or formulation of these policies, their impact, successes and challenges nor any systematic investigation of the perceptions of managers and policymakers. Similarly, the relative resource-use implications of these strategies have not been well documented. This dearth of literature casts doubt on the appropriateness of these policies in different contexts, the level of investment that should be directed to ROS schemes as opposed to other possible uses and the best strategies of forming and reformulating the strategies. This research will investigate these issues by documenting the implementation of ROS initiatives across five Southern African nations and providing a critical analysis of the schemes using a multi-methods approach to identify the strengths and limitations of these policies in practice. The research therefore aims to explore the historical development of ROS policies, evaluate the effectiveness and cost-effectiveness of ROS schemes. It also aims to understand the challenges in implementing ROS initiatives, with the aim of proposing a sustainable solution to global health workforce shortages.

In assessing these schemes and the polices underlying their development, the study will consider:

1. What are the motivations and the factors that inform the design of state sponsored educational initiatives used for addressing SHP shortages and/or maldistribution?
2. How are state sponsored educational initiatives evaluated and by whom?
3. Are the state sponsored initiatives effective and cost effective in enhancing the availability of SHPs in specific areas of need?
4. Are the bursaries/scholarships being allocated in accordance with the policy?
5. In what respects do state sponsored educational initiatives for health professionals need to be reformulated to secure a sustainable health workforce solution?

Research Context

This study will be conducted in Botswana, Eswatini, Lesotho, Namibia and South Africa. Except for Namibia and Lesotho, where the bursaries are administered by government agencies (Namibia Students Financial Assistance Fund and the Lesotho National Manpower Development Secretariat), in all the other countries (Botswana, South Africa and Eswatini) they are administered directly by government ministries. The departments responsible in different countries include the nine provincial departments of health in South Africa; the Ministry of Tertiary education in Botswana; the Ministry of labour and social security, and the

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3 Ministry of public service in Eswatini. In all these countries, the Ministry/Department of health
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5 is the main beneficiary and is thus either responsible for placement of graduates and/or for
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7 monitoring their progress and contribution.
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11 **Methods and analysis**
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13 The overall study is guided by a logic framework (Figure 1).
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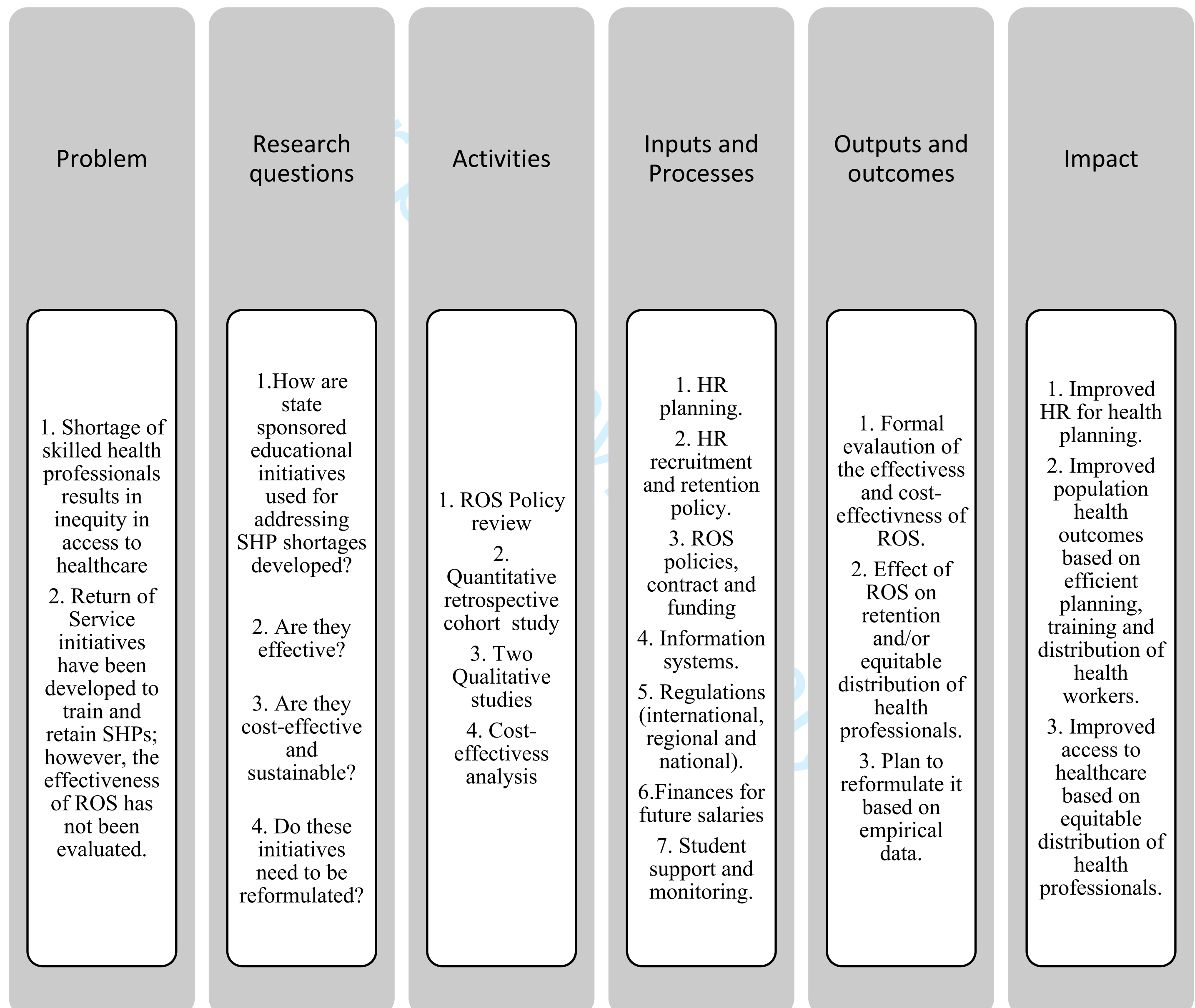

55 **Figure 1: Logic Framework**
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Design and setting

The research questions will be answered through a multi-methods approach of a policy review, a quantitative and two qualitative research studies. This multi-methods approach will allow for the incorporation of various viewpoints and data from within the respective health systems. Data will be collected between the 01st of October 2020 and the 31st of December 2021. Table 1 summarises the research methods.

1: Policy Review

An integrative policy review will be conducted to explore available ROS scheme policies, policy frameworks and relevant ROS documents (e.g. memorandum of agreement, etc.). Historical and current policies will be requested from policy custodians and completed with manual searches of archives in the national libraries of the five countries. The Walt and Gilson triangle policy framework[18 19] will be used as a framework for data extraction to get information on the context, content, processes and actors. This includes the determination of the policy objectives and rationale, government legislations and/or regulations informing the policies, the monitoring and evaluation plan, enforcement mechanisms, policy evolution, processes used to define service needs, the recruitment and selection criteria, resourcing and the interaction of policy actors at different stages of the policy implementation cycle.

2: Quantitative retrospective cohort study

A quantitative retrospective cohort study of ROS scheme recipients for the period 2000 to 2010 will be conducted to: assess the criteria used to select beneficiaries, assess if the signed contracts specify the future service area, determine the service area (rural or urban) serviced by ROS beneficiaries stratified by profession, and quantify the proportion of beneficiaries who fulfil their contractual obligations and those who remain beyond contractual obligations. Information will be sourced from multiple information systems and/or databases.

3: Qualitative descriptive studies

1. Semi-structured group or individual interviews with senior health, education, ROS managing agency managers (where appropriate) and finance managers and/policymakers (from all the selected Southern African countries) will be conducted to investigate the human resources needed over time and their views on ROS as a tool to recruit and retain health professionals.
2. Semi-structured group or individual interviews will be conducted with health professionals' regulatory bodies in each of the countries to assess their abilities to

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monitor ROS initiative recipients and to assess their willingness to collaborate with ROS scheme funders (i.e. policymakers).

Table 1: Research Methods Summary

Study Design	**Objective**	**Analysis**
Policy review	Understand the aim and evolution of ROS policies in use across the different nations, their stated aims, enforcement mechanisms and target populations.	Narrative analysis
Quantitative retrospective cohort study	1. Assess effectiveness of policies a) Demographic characteristics of policy recipients. b) The reach of the policy. c) Proportion of beneficiaries who fulfil contractual obligation. d) Proportion of beneficiaries retained beyond contractual obligation. e) Determine the costs of the policy and the costs per SHP trained and recruited. 2. Evaluate sustainability of the policies.	Survival analysis, Cost analysis
Qualitative descriptive study 1	1. Determine policymakers' and implementers' interpretation, experiences and perceptions of ROS policy. 2. Describe policymakers' and implementers' perceived benefits and challenges of ROS policy.	Thematic analysis
Qualitative descriptive study 2	1. Determine alternative mechanisms and collaborations in the monitoring of ROS beneficiaries by involving professional regulatory bodies	Thematic analysis

Participants and Sampling

Sub-study 1 is a document and policy review, hence no sample size requirements.

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The Quantitative retrospective cohort study is a database review of all ROS beneficiaries who were funded at any time between the year 2000 and the year 2010 from the five countries. Skilled health professionals will be limited to medical doctors (including specialists), dentists, physiotherapists, occupational therapists, speech therapists, audiologists (including dually qualified audiologists and speech therapists) and pharmacists. It is important that the entire population for that period is studied as the main outcomes relate to the proportion of beneficiaries who fulfill their contractual obligations and those who serve beyond their contractual obligations. Sampling will therefore result in loss of valuable data. It is however anticipated that the study will draw ±14000 ROS beneficiaries from the database.

Qualitative study 1: will use purposive sampling to target all managers who can answer relevant questions on the ROS policy. In this sampling strategy, participants will be selected "…based on the researchers' judgement about what potential participants will be most informative".[20] The important issue will be to have the most qualified person answer the questions asked with the appropriate degree of authority. An email advertisement and communication will be sent to stakeholders through the offices of the accounting officers requesting potential participants to contact the research team for consent and scheduling of interviews. A guiding principle in qualitative research is to sample only until data saturation has been achieved.[20] This aspect of the study will also not be limited by the sample size. Based on preliminary discussions, it is anticipated that in all the countries ± 45 senior managers and policy makers will be interviewed mostly in groups.

Qualitative study 2 will target all those in management or governance of the Health Professions Council of South Africa; the Pharmacy Council of South Africa; Botswana Health Professions Council; Eswatini Medical and Dental Council; Lesotho Medical, Dental and Pharmacy Council; and the Health Professions Council of Namibia. It will also use purposive sampling techniques as described above. The aim is to have all technical expertise represented to have a better understanding of the regulatory framework and willingness of these bodies to collaborate with ROS funders in their monitoring strategies. Approximately 15 senior managers will be recruited to participate.

Inclusion and exclusion criteria

Material for the policy review will be sourced from all the five countries of interest and supplement with any published resources through an electronic search of the following

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databases: MEDLINE, PubMed, JSTOR, Science Direct, EMBASE, CINAHL, PsychInfo, Health Systems Evidence and PDQ-Evidence. Information found opportunistically through professional networks, media or email will be included if found to be relevant. Various policy documents including parliamentary Hansards, government archives, government and/or political party policy documents, legislation and regulations will be reviewed to understand the historical context, evolution and policy guidelines of ROS schemes. In addition, print media advertisements will be reviewed from the South African Medical Journal archives and from university prospectuses of the University of Cape Town and University of the Witwatersrand, the two oldest medical universities in Southern Africa. This information will facilitate an understanding of the nature of the schemes over time.

The quantitative retrospective cohort study includes records of participants who benefited from ROS schemes any time between the 01st of January 2000 to the 31st of December 2010. Such beneficiaries will be limited to the skilled health professionals mentioned above.

Qualitative study 1 includes all policymakers and/or implementers involved with the administration of ROS schemes including the accounting officers. Participants in senior management/governance will be invited to participate in the study.

Qualitative study 2 includes all senior managers of regulatory bodies responsible for the registration of health professionals in the selected countries for the selected categories of health professionals.

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Data collection

The policy review will use the Walt and Gilson triangle policy framework[18 19] for data extraction and categorised into four fields, namely; Context, Content, Processes and Actors. Issues pertaining to context include socio-political, economic, demographic, environmental and health reasons for the policy development; content includes policy rationale, monitoring and evaluation plan, presence of policy review date, presence of preceding policy term, if policy was reviewed on pre-determined date, proportion of skills mix required to meet population health needs, recruitment and selection criteria, contractual responsibilities of beneficiaries, enforcement mechanisms framework, education costs covered by funding, details of program funding and resourcing, the proportion and composition of skills mix required to meet population health needs; information on actors includes, a description of characteristics of potential beneficiaries and any stakeholders identified; processes include,

guide or framework used for policy development; stakeholder engagement or participation, number of times policy has been revised; prioritisation or weighting of service areas, and linkage of ROS contract award to future salary needs.

The quantitative retrospective cohort study reports on the criteria used to identify ROS beneficiaries, academic program of study, identified future service area, duration of study, presence of a valid legal contract(s) and its/their duration, fulfilment of service obligation, retention in service area beyond obligatory period, practice history, and program cost per candidate. Socio-demographic characteristics such as sex, income level and ethnic group will be collected to assess the predictors of retention. These variables will also be used to identify ROS scheme beneficiary selection criteria and to match it with the available information on the database. Where affirmative action has been used as a criterion, for example, certain participants could be scored higher than others based on their race, the study will evaluate how the final beneficiary list reflects this factor and which of the criteria (e.g. academic grades, rurality, etc.) is weighted more than another.

The qualitative studies will use English semi-structured interviews (individual or group discussions), and use open-ended questions aided by interview guides "…with early questions being more exploratory" (**Annexure A**).[21] For ROS initiative administrators, initial questions will focus on the policy origin and policy context. Subsequent questions will explore policy decision processes, reviews, challenges, processes of beneficiary employment, and monitoring and evaluation plans.

Interviews with senior health, education, ROS managing agency managers (where appropriate) and finance managers and/policymakers (from all the selected Southern African countries) will be held to investigate the human resource needs over time (burden of disease, human resource skills mix, distribution of skilled health professionals and the human resource for health planning framework), policy intention, development, and monitoring mechanisms, budget allocation for SHP education as a proportion of total health expenditure over time, health workforce budget over time (adjusting for inflation), proportion of health workforce budget over time (adjusting for inflation) and perceptions on the effectiveness of ROS schemes. The latter will get their thoughts on broader issues with the policies, such as reasons for their success or failure, etc.

Similarly, for the regulatory bodies, the interviews will seek to understand the relations regulatory bodies have with ROS scheme funders (**Annexure B**). Subsequent questions will

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explore the process flow of registration of professionals (during studies and employment), renewal of membership, the information system(s) used, and whether they might be open to integration of their information systems with ROS managers. This aspect of the study will therefore assess the feasibility of a gatekeeping mechanism; possibilities of an interoperable information system between the funders, the human resource information system and the regulatory practice information system.

This research is being conducted during the COVID-19 pandemic when Governments have implemented certain restrictions to limit transmission, including the closing of borders and limiting international travel.[22] These uncertainties and restrictions therefore necessitate an innovative approach to data collection in a multi-site research project for a mixed-methods study. Qualitative research interviews will either be virtual, face-to-face or both depending on the feasibility to travel. In the case of virtual interviews, codes and passwords for the interview will be sent to each individual (single user access) or group access point to ensure privacy.

Data management and analysis

Narrative and critical synthesis of policies and the policy frameworks used will be undertaken for the policy review. Structured analysis will be conducted to ensure reliability of the process. Variables extracted and reported upon include the conception (research, socio-political basis for policy), inception (date of launch or version number, policy framework) and evolution of the policy over time, policy aim, beneficiary recruitment process and selection criteria, skills mix defined by policy, defined service area, details of funding and budgetary implications per year, policy review date and whether the policy was reviewed on stated date, responsibilities of beneficiaries and responsibilities of government, policy monitoring and evaluation processes, etc.

A specially designed Microsoft Access database template will be used to capture data from the ROS beneficiary databases (**Annexure C**). Quantitative data will be analysed using STATA version 16. Categorical variables will be summarised using graphs and frequency tables. Numerical data will be summarised using parametric or non-parametric statistics depending on the normality of the distribution. Normality of numerical data will be explored using the Shapiro Wilk test and/or box-and-whisker plot. Numerical variables will be summarised using the mean, standard deviation and range if normally distributed; and summarised using the median and interquartile range (IQR) if not normally distributed. The analysis of variance test

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(ANOVA) or Kruskal Wallis test will be used to compare the mean or median duration of service by country and/or province depending on normality of the distribution. These will then be followed by use of the relevant two-sample t-test or Wilcoxon rank sum test (Mann-Whitney U test) to determine differences in means or medians between any two comparisons. Survival analysis will be conducted using Kaplan-Meier survival estimates to determine the duration of service and fulfilment of contractual obligations. The Hazard ratios will be used to determine the predictors of retention by practice area (rural and underserved or urban), socio-demographic characteristics and the university or country of study. The 95% confidence interval will be used for the precision of estimates. The level of significance will be p-value$\leq$0.05.

Collected cost data will be used to evaluate the resources invested in the schemes and the proportion of the total health budget spent on ROS schemes. Overall costs will be estimated for each program and a cost per beneficiary trained and retained will be calculated. These will be based on the direct cost of funding granted to the beneficiary over the duration of the funding and other program costs extracted from national databases.

Semi-structured group and individual interviews will be audio-recorded and transcribed by a contracted transcription service for the qualitative studies. All data will be de-identified. The transcripts will be analysed by all authors using an inductive approach to thematic content analysis. This is an approach where codes are developed after data transcription and not basing them on pre-conceived assumptions or frameworks.[23] Interview coding will be organised using NVIVO-12. Two peer researchers will help with the coding and categorisation of the "…data as confirmation that there is a degree of shared interpretation".[24]

Patient and public involvement

Patients and members of the public were not involved in the design of this study since they will not be recruited to participate in the study.

Ethics and dissemination

Ethics approval for this study was obtained from the Human Research Ethics Committees of the University of New South Wales (HC200519), Australia; Walter Sisulu University, South Africa (065/2020); and the Botswana Health Research and Development Division (HPDME 13/18/1). Further ethics and access approval has also been sought from the Health Research

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Ethics committees of Eswatini, Lesotho and Namibia. As of the 28th of October 2020, research access approval has been attained from the Botswana Ministry of Tertiary education and Training, and from three of the nine South African Provincial Health Research Committees. It is envisaged that all the ethics clearances and access approvals would have been attained by the end of November 2020. The policy review has no human participants and therefore has no need for consent. Similarly, a waiver of consent was sought for the quantitative retrospective cohort study due to the fact that it is a database review and it would not be possible to seek consent from the ROS beneficiaries. Furthermore, this aspect of the study will not cause any harm to the beneficiaries as no names or identities will be collected from the database. Permission to access ROS beneficiary data will be sought from the accounting officers.

We will seek written informed consent from participants for the qualitative studies. Participants will be recruited through written advertisements or email invitations sent to the accounting officers. The advertisement/and/or invitation will ask interested managers to contact the research team if they are interested in participating. All potential participants will be sent individual emails through the office of the accounting officer.

Significance: This study will evaluate the effectiveness and cost-effectiveness of ROS schemes. Furthermore, it will provide insights into the implementation of ROS initiatives and seek to ensure that health budgets benefit those segments of the population most in need. Outcomes from this study will help develop interventions for the improvement in SHP distribution in underserved areas, not just in the study sites but globally through the sharing of lessons drawn from this study. Participating governments will also benefit as these findings will serve as an evaluation by an independent panel. Recommendations emanating from this study will not only help ensure efficiency of ROS schemes but could lead to policymakers reviewing a host of other related policies to improve practice and extend the provision of targeted health services.

Results will be published in peer reviewed journals, an academic thesis, technical reports, presented at relevant conferences and communicated via professional networks. Findings will also be shared with and/or presented to all participating governments and institutions.

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Authors' contributions

SM conceived the research, completed the first draft of the manuscript, incorporated and addressed feedback from the co-authors, liaised with stakeholders and sought ethical approval from participating countries. BA edited and commented on versions of the manuscript. RJ co-senior author, lead ethics application processes at the University of New South Wales, commented on versions of the manuscript, edited versions of the manuscript and signed off on the final version. AD co-senior author, commented on versions of the manuscript, edited versions of the manuscript and signed off on the final version. All authors read and approved the final manuscript.

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Competing interests statement

None declared

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Annexure A: Interview Guide - Policymakers

Individual or Group Interview sheet and interview guide for return-of-service scheme policymakers and/or policy-implementers

Thank you so much for agreeing to take time from your busy schedule to answer a few questions on my research. I am doing a research study to find out more about the government policies used to fund health professionals in-training, in exchange for a period of service in the public health sector. The study aims to understand more about the history and evolution of these policies, how they relate with other human resources for health policies, their rationale, and how they are monitored and reviewed.

You are being interviewed because you are a manager that is involved in some way with the development and/or administration of policies that inform government sponsored bursaries or scholarships for health sciences students studying in the country or in other countries.

A group interview allows for a detailed discussion with a diverse group from the different units and divisions at once instead of hosting multitude of interviews with individuals within the department. That is the main reason why I have asked you to participate in the group interview. (For those who are unable to participate in a group interview this will read: I understand that it wasn't possible for you to be part of a group interview due to your schedule. Because I value your contribution it is for this reason that I still requested to have an individual discussion with you). Please do not be intimidated by anyone as the information collected will only be used to enrich the schemes. All the names from this discussion will be de-identified and your identified responses will not be shared outside the research team. Your individual and diverse inputs are therefore highly valued. The aim of the research is not to assess professional competence and the outcomes of the research will not have a negative impact on your employment. In addition, you are welcome to refer to internal human resources and/or bursary/scholarship scheme related documents or even consult colleagues who you think might help remind you of detail that you might have forgotten. It's also ok to not have all the answers. Please remember that the session is being audio recorded. You are welcome to let me know if you are not comfortable with that.

If you are happy with contents of this document and agree with the process could you kindly sign the consent forms and return to me before we start, if you haven't already done so. I am happy to answer any questions that you may have before we begin the discussion. Are there any questions that any of you would like to ask on the process before we start?

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No.	Area of Interest/topic	Initial broad descriptive questions	Possible probing questions
1	Origins and evolution of the policy	- What is the departmental policy on bursaries for health sciences students? - What are the policy objectives? - In your understanding and knowledge, what has influenced the bursary policy for health sciences students? - As far as you know, when was this policy first introduced? - Could you enlighten me more about the development process and implementation of the bursary policy? - Which countries do beneficiaries of the policy go to for their studies?	- Could you please tell me more about any policy development frameworks used for developing your bursary policy or any other human resources for health policies?
2	Custodian of the policy	- Could you let me know which department or departments is or are responsible for the development and implementation of the bursary policy? - Could you give more information about the role of any other departments, offices or sections that could be involved? - Who makes the final decision on who receives an offer?	- How long has the situation been that way? - How has the process evolved over time
3	Review of the policy	- Is the bursary policy regularly reviewed? - What informs the reviewing of this policy?	- Is this related to political term? - What informs the need to review this policy?
4	Decision process	- Could you tell me more about the process that informs the number of beneficiaries that can be funded in any particular funding cycle? - How are the opportunities advertised? - Can you tell me more about the selection criteria used to then select beneficiaries?	- How do you decide between the various categories of health sciences students that you fund?
5	Contract	- In your view, what are the responsibilities of bursary recipients? - At what stage of the bursary offer do beneficiaries sign their contract?	- Is there an opt-out clause to the scheme? Elaborate…

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		- What are the key contents of the contract? - What happens if a beneficiary defaults their contract?	- What happens if a beneficiary doesn't complete their studies?
6	Process after the completion of studies	- How are the new graduates recruited into the health system? - At what stage of the process do you decide on the facility where the recipient will be placed in the health system? - What processes are used to identify the types of facilities that need the placement of beneficiaries? - At what stage do you plan for the salaries of beneficiaries?	- Are beneficiaries placed based on their own choices or on facilities chosen by government? - Who decides on the placement of graduates who previously benefited from the bursary scheme?
7	Policy Challenges	- What challenges has the policy encountered over the years?	- To your knowledge, have recipients defaulted their contracts previously? - What could be the reasons for beneficiaries to default bursary contracts? - What is the sustainability of the policy?
8	Monitoring and evaluation of the policy	- What processes are in place to ensure that beneficiaries fulfil their contractual obligations? - How often or uniformly are penalties imposed on those who default their contracts? - What features help or hinder monitoring of the program? - In your view, does the policy fulfil its objective? - If there is anything that you could change in the policy what would it be? - In your view, what are the ways that could have helped eliminate defaulting of the scheme?	- What Information systems are in place to monitor fulfilment of the policy?

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Wrap-up

Are the any other issues not covered that you would like to talk about?

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Thank you once more for your assistance, could you please also help me with a few documents that will help broaden my understanding on the schemes. You could add any other documents to the list if you think it or they will be of importance.

List of documents to be requested
1. All versions of bursary policy (current and historical) that are used to fund skilled health professionals.
2. Blank copies of bursary contracts.
3. Total health budget for the period 2000 to 2020.
4. Health sciences bursary budget for the period 2000 to 2020.
5. The total number of skilled health professionals (stratified by category and health facility) on 01 July 2020.
6. The total number of skilled health professionals who are bursary beneficiaries (stratified by category and health facility) employed in the contracted government service area on 01 July 2020.
7. Annual performance plans for the period 01 April 2015 to 31 March 2020.
8. Annual performance reports for the period 01 April 2016 to 31 March 2021.

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Annexure B: Interview Guide – Regulatory Bodies

Individual or Group Interview sheet and interview guide for return-of-service scheme Councils

Thank you so much for agreeing to take time of your busy schedule to answer a few questions on my research. I am doing a research study to find out more about the government policies used to fund health professionals in training in exchange for a period of service in the public health sector. The study aims to understand more about the history and evolution of these policies, how they relate with other human resources for health policies, their rationale, and how they are monitored and reviewed. This component of the study aims to explore if there are possible ways that your council could be able to help in the monitoring of these schemes.

Everyone here is a manager that is involved in some way with the registration of selected skilled health professionals in the country. Your council has been approached as the council responsible for the registration of pharmacists, and/or medical doctors, and/or dentists, and/or physiotherapists, and/or speech therapists, and/or occupational therapists, and/or speech therapists, and/or audiologists, and/or dually qualified speech therapists and audiologists.

A group interview allows for a detailed discussion with a diverse group from the different units and divisions at once instead of hosting multitude of interviews with individuals within the council. That is the main reason why I have asked you to participate in the group interview. (For those who are unable to participate in a group interview this will read: I understand that it wasn't possible for you to be part of a group interview due to your schedule. Because I value your contribution it is for this reason that I still requested to have an individual discussion with you). Please do not be intimidated by anyone as the information collected is meant to enrich the schemes. Your individual and diverse inputs are therefore highly valued. The aim of the research is not to assess professional competence and the outcomes of the research will not have a negative impact on your employment. In addition, you are welcome to refer to internal organisational documents or the legislative framework (e.g. governing registration of health professionals and/or monitoring of constituent members' bursary obligations, etc) and/or even consult colleagues who you think might help remind you of detail that you might have forgotten. It's also ok to not have all the answers. Please remember that the session is being audio recorded, all names taken and/or mentioned during the discussion will be deleted from the transcript. You are welcome to let me know if you are not comfortable with that.

If you are happy with contents of this document and agree with the process could you kindly sign the consent forms and return to me before we start, if you haven't already done so. I am

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happy to answer any questions that you may have before we begin the discussion. Are there any questions that any of you would like to ask on the process before we start?

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No	Area of Interest/topic	Initial broad descriptive questions
1.	Relations with the Department of Health	- Could you describe the nature of the relations that the council has with the various departments of health (e.g. national, provincial or regional and district)?
2.	Knowledge of government sponsored bursaries	- What do you know about government sponsored bursaries? - Are you satisfied by the way bursary schemes are implemented? - In your view(s), what ways could the bursary schemes be improved?
3.	Monitoring of government sponsored bursaries	- How are they monitored? - What ways could the council assist bursary policymakers in the monitoring of bursary holders? - What processes would need to be followed for councils to be able to assist government in the monitoring of bursary holders?
4.	Registration of domestic students	- What is the process involved in the registration of health sciences students under your jurisdiction whilst they are still students?
5.	Registration of students studying in foreign countries	- What is the process involved in the registration of health sciences students who are studying outside the country?
6.	Health professionals' registration	- What is the process involved in the registration of health sciences professionals immediately after completion of their studies?
7.	Membership renewal	- What is the process involved in the renewal of membership for health professionals under your jurisdiction? - Is there a way for renewal to be linked to ROS service conditions?
8.	Information System	- Is the information system used to register health professionals owned by your council? - Is your council open to the integration of the government's human resource information system with your registration system to allow for the monitoring of bursary holders to ensure that their council registration is linked with the place where they are meant to work (according to their contract)? - What challenges do you foresee with such a system?

Is there anything else that you would like to add on the discussion that we have just had?

Thank you once more for your assistance. You are free to assist me with documents that would guide the legal framework that your council would need to comply with if you were to assist government with the monitoring of the bursary schemes.

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Field	Value
Subject Number	102040
Auto Number	1
Country	South Africa
Province/Region	Mpumalanga
Gender	Male
Race	African
Date of Birth	21/12/1981
Postal Code (at Application)	1331
Year of Matriculation	1999
Year of A or B levels	0
Aggregate Results	82
Additional Notes on any prior learning	
Name of University	Universidad de la Habana
Date when bursary offer was made	1/06/2000
Year of first enrolment for Academic Program	1/09/2000
Marital Status at Commencement of studies	Single
Secondary University of Study if Applicable	UCT
Mother Alive	Yes
Father Alive	Yes
Primary Carer	Mother
Primary Carer employed	Yes
Both Parents employed	No
Household Source of Income	Employment, Pen
Household income amount per annum (Rands/Pula)	200000
School Postal Code	1207
Name of High school	Mathews Phosa College

SUBJECT	RESULTS
isiZulu	81
English	78
Mathematics	95
Physical Science	83
Life Orientation	
Life Sciences/Biology	76
Geography	80

Field	Value
Country of Study	Cuba
Academic Year of Study when bursary was issued	1
Academic Program of Study	MBChB/MBBCh/
Did beneficiary complete their studies	Yes
Year of completion of studies	31/08/2008
Presence of bursary renewal contract signed by all parties Yr7	Yes
Additional Notes on Bursary Contract	None
Marital Status at Completion of studies	Single
Date of Commencement of Internship	1/09/2008
Internship hospital 1 (Name)	Victoria Hospital
Internship hospital 1 (Date of departure)	31/08/2010
Internship hospital 2 (Name)	N/A
Internship hospital 2 (Date of Commencement)	1/09/2008
Internship hospital 3 (Name)	
Internship hospital 3 (Date of Commencement)	
Date of Completion of Internship	31/08/2010
Date of commencement of Community service	1/09/2010
Community Service Hospital1 (Name)	Themba Hospital
Community Service Hospital1 (Date of Departure)	31/08/2011
Community Service Hospital2 (Name)	
Community Service Hospital2 (Date of Commencement)	
Date of Completion of Community Service	31 August 2011
Employer 1 Name	Johannesburg General H
Employer 1 Date of Commencement	1/09/2011
Employer 1 Job Title	Medical Officer
Employer 1 Date of Departure	31/07/2012
Employer 2 Name	
Employer 2 Date of Commencement	
Employer 2 Job Title	
Employer 2 Date of Departure	
Employer 7 Name	
Employer 7 Date of Commence	
Employer 7 Job Title	
Employer 7 Date of Departure	
Employer 8 Name	
Employer 8 Date of Commence	
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Field	Value
Additional Information on Tertiary Studies	Studied in Cuba for 6-years and returned to UCT for integration for 2-years.
Presence of bursary offer contract signed by all parties (Year1)	Yes
Presence of bursary renewal contract signed by all parties Yr2	No
Presence of bursary renewal contract signed by all parties Yr3	No
Presence of bursary renewal contract signed by all parties Yr4	No
Presence of bursary renewal contract signed by all parties Yr5	No
Presence of bursary renewal contract signed by all parties Yr6	No

Field	Value
Presence of bursary renewal contract signed by all parties Yr8	Yes
Post completion service area specified (Yes/No)	Yes
Name of Post completion service area	Mpumalanga Department of
Cost of Sponsorship (ZAR/Pula) Year1	250000
Cost of Sponsorship (ZAR/Pula) Year2	275000
Cost of Sponsorship (ZAR/Pula) Year3	302500
Cost of Sponsorship (ZAR/Pula) Year4	332750
Cost of Sponsorship (ZAR/Pula) Year5	366025
Cost of Sponsorship (ZAR/Pula) Year6	402628
Cost of Sponsorship (ZAR/Pula) Year7	442890
Cost of Sponsorship (ZAR/Pula) Year8	487179

Field	Value
Employer 3 Name	
Employer 3 Date of Commencement	
Employer 3 Job Title	
Employer 3 Date of Departure	
Employer 4 Name	
Employer 4 Date of Commencement	
Employer 4 Job Title	
Employer 4 Date of Departure	
Employer 5 Name	
Employer 5 Date of Commencement	
Employer 5 Job Title	
Employer 5 Date of Departure	
Employer 6 Name	
Employer 6 Date of Commencement	
Employer 6 Job Title	
Employer 6 Date of Departure	

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Checklist for cohort, case-control, and cross-sectional studies (combined)

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5 - 8
Objectives	3	State specific objectives, including any pre-specified hypotheses	7
Methods			
Study design	4	Present key elements of study design early in the paper	9 & 10
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	7
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	10 - 12
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	12 - 15
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	*12 - 15*
Bias	9	Describe any efforts to address potential sources of bias	12 - 15
Study size	10	Explain how the study size was arrived at	10 - 11
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	14 - 15
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	14 - 15
		(*b*) Describe any methods used to examine subgroups and interactions	14 - 15
		(*c*) Explain how missing data were addressed	N/A
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed	14 - 15

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		Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	N/A
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	10 - 12
		(b) Indicate number of participants with missing data for each variable of interest	N/A
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	9
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	N/A
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	
		Cross-sectional study—Report numbers of outcome events or summary measures	N/A
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	N/A
		(*b*) Report category boundaries when continuous variables were categorized	N/A
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	N/A
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	N/A
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	N/A
Generalisability	21	Discuss the generalisability (external validity) of the study results	N/A
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	20

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.
Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Protocol to evaluate the alignment of policies and practices for state sponsored educational initiatives for sustainable health workforce solutions in selected Southern African countries: A multi-methods study

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Protocol to evaluate the alignment of policies and practices for state sponsored educational initiatives for sustainable health workforce solutions in selected Southern African countries: A multi-methods study.

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ABSTRACT

Introduction

Health systems across the world are facing challenges with shortages and maldistribution of skilled health professionals (SHPs). Return-of-Service (ROS) initiatives are government funded strategies used to educate health professionals by contracting beneficiaries to undertake government work on a year-for-year basis after their qualification. It is envisaged that once they have served their contract, they will be attracted to serve in the same area or government establishment beyond the duration of their obligatory period. Little is known about the processes which led to the development and implementation of ROS policies. Furthermore, there is no systematic evaluation of the strategies which demonstrate their utility. This research aims to evaluate the ROS initiatives, explore their efficacy and sustainability in five Southern African countries.

Methods and analysis

This study will be conducted in South Africa, Eswatini, Lesotho, Botswana and Namibia in a phased approach through a multi-methods approach of policy reviews, quantitative and qualitative research. First, a review will be conducted to explore current ROS schemes. Second, a quantitative retrospective cohort study of ROS scheme recipients for the period 2000 to 2010 will be undertaken. Information will be sourced from multiple provincial or national information systems and/or databases. Third, we will conduct semi-structured group or individual interviews with senior health, education, ROS managing agency managers (where appropriate) and finance managers and/policymakers in each country to determine managers' perceptions, challenges, and the costs and benefits of these schemes. Fourth, we will interview or conduct group discussions with health professional regulatory bodies to assess their willingness to collaborate with ROS initiative funders.

Ethics and dissemination

Ethics approval for this study was obtained through the Human Research Ethics Committees of the University of New South Wales (HC200519), Australia; South Africa and Lesotho (065/2020); Eswatini (SHR302/2020), Namibia (SK001) and Botswana (HPDME 13/18/1). Relevant findings will be shared through presentations to participating governments, publications in peer-reviewed journals and presentations at relevant conferences.

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Keywords: Return-of-service; Scholarship or Bursary, Community Medicine; Human Resource for health; Education, Global health, health policy OR health policies

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Article Summary

Strengths and limitations of this study

- This is the first study to concurrently assess return-of-service scheme policies, measure attainment of policy outcomes, evaluate perceptions of those who administer the scheme and identify possible solutions for the enhancement and reformulation of the schemes.
- The multi-methods design and triangulation of information sources underlying this research provides a unique opportunity to gain a deep insight into ROS schemes and their capacity for sustainable global health workforce solutions.
- Given this study is being conducted during the global COVID-19 pandemic by global researchers in five countries when global travel is restricted, it presents an opportunity for the development of innovative methods to engage with stakeholders and collect data remotely.
- It is anticipated that the study will be limited by non-availability or poor information systems and low quality of the available information.
- If ROS schemes are viable strategies for increasing the pool of skilled health professionals, information systems will need to be significantly improved which will in itself be an important outcome of the study.

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INTRODUCTION

The World Health Organization (WHO) characterises a health system as consisting of six building blocks: leadership and governance; human resources for health; medical products, vaccines, and technologies; information and research; service delivery platform; and health financing.[1-4] Notwithstanding, human resources for health (HRH) act as the key stimulant of the health system, without which health delivery and access is severely impeded. The performance of a health system is therefore reliant on the production, distribution and retention of HRH.[4 5]

The maldistribution of skilled health professionals within and across countries results in poorly functioning services and inequity in access to healthcare especially in low-and middle-income countries (LMIC) where there is a particular shortage of skilled health professionals.[4] Although the WHO estimates the need for a minimum of 45.5 physicians, nurses and midwives per 10 000 population, sub-Saharan Africa (SSA) has only 12.2 physicians, nurses and midwives per 10 000 population.[6-8] Whilst countries like South Africa seem better off with 9.05 physicians per 10 000 population compared to the SSA average (2.34) and countries like Lesotho (0.69), Eswatini (3.29), Namibia (4.18) and Botswana (5.27); South African physicians are not equitably distributed with rural and poorer areas chronically underserviced by SHPs.[6 7]

It has been estimated that despite the fact that 44% of the South African population live in rural areas, they are served by 12% of doctors.[4 6 9-11] Several strategies have been used to try and address this maldistribution in Southern African countries. These include: (i) financial incentives (rural allowance, scholarships and loan repayment schemes); (ii) educational strategies (targeted admission policies for medical schools, undergraduate and postgraduate training exposure, and the location of medical schools in rural areas and/or the inclusion of rural training programmes); (iii) personal and professional support; and (iv) regulatory strategies.[4 9-11]

State sponsored educational initiatives are strategies that combine the training of aspiring health professionals with government human resources recruitment and retention strategies.[4 5 12-16] Also known as return-of-service schemes (ROS), these strategies award a study scholarship or bursary to health sciences students in return for a commitment to serve government on a year-for-year reciprocal contract after completion of their studies.[4 5 12-16] Some ROS schemes have a financial option for beneficiaries who do not fulfil their contractual obligations.[16 17] The primary objective is to increase the pool of health professionals in a

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defined area and/or government service for a set number of years.[4 5 12-16] The secondary objective is to retain these health professionals in the same area of their service beyond their obligatory service period.[4 5 12-16] Candidates are chosen by reference to their socio-economic status, school grades, career choice of study, and whether they are from a rural setting and a low quantile school.[4] Historically, Eswatini, Lesotho, Botswana and Namibian governments would send health sciences students to study in South African medical schools. Botswana and Namibia have since started training their own medical students with the opening of medical schools in 2009 and 2010 respectively.

The extent to which policymakers review and systematically evaluate the implementation of these strategies is unclear. In addition, although these strategies have been designed to address health workforce shortages and maldistribution, their development appears to lack a basis in evidence-based policies, nor is there clear evidence of consideration of other factors likely to be vital to the success of such policy initiatives.[4] These include a lack of monitoring and evaluation capacity within administrating institutions (including clear plans for review) and the impacts of interactions between different stakeholders, i.e. the training institutions or countries, students, skilled health professionals, regulatory bodies and health facilities.[4] Ideally, ROS policies should be one part of a broader package of initiatives designed to serve as a catalyst for creating a supportive environment for health professionals that build on and reinforce each other, yet, once again, the extent to which this is occurring is unclear.[4] A further potential weakness of these strategies is that anecdotal evidence (based on the researcher's personal communications with beneficiaries of state sponsored educational initiatives) suggests that some graduates do not fulfil their contractual obligations by serving their governments for an equivalent number of years as equivalent to the duration of the funding assistance received nor do they pay financial compensation in lieu of their service, if this is the requirement. By contrast, some studies indicate that most return-of-service beneficiaries fulfil their contractual obligation; their retention beyond their contractual obligation is less successful.[12 16] Furthermore, in many cases there appears to be a potential lack of consideration for the future financial capacity required to pay the future salaries of all graduates from these schemes, suggesting that the health system may not be able to ultimately benefit from ROS beneficiaries as initially planned.[4 5]

The shortages and maldistribution of health professionals is a complex problem needing innovative, sustainable and efficient solutions.[4] Despite the wide use of these educational initiatives across the world (and associated investment of scarce healthcare resources), there is

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limited literature to guide policymakers deciding whether to introduce or continue ROS schemes or on identifying components of the schemes essential to their success. No published literature was found assessing the evolution or formulation of these policies, their impact, successes and challenges nor any systematic investigation of the perceptions of managers and policymakers. Similarly, the relative resource-use implications of these strategies have not been well documented. This dearth of literature casts doubt on the appropriateness of these policies in different contexts, the level of investment that should be directed to ROS schemes as opposed to other possible uses and the best strategies of forming and reformulating the strategies. This research will investigate these issues by documenting the implementation of ROS initiatives across five Southern African nations and providing a critical analysis of the schemes using a multi-methods approach to identify the strengths and limitations of these policies in practice. The research therefore aims to explore the historical development of ROS policies, evaluate the effectiveness and cost-effectiveness of ROS schemes. It also aims to understand the challenges in implementing ROS initiatives, with the aim of proposing a sustainable solution to global health workforce shortages.

In assessing these schemes and the polices underlying their development, the study will consider:

1. What are the motivations and the factors that inform the design of state sponsored educational initiatives used for addressing SHP shortages and/or maldistribution?
2. How are state sponsored educational initiatives evaluated and by whom?
3. Are the state sponsored initiatives effective and cost effective in enhancing the availability of SHPs in specific areas of need?
4. Are the bursaries/scholarships being allocated in accordance with the policy?
5. In what respects do state sponsored educational initiatives for health professionals need to be reformulated to secure a sustainable health workforce solution?

Research Context

This study will be conducted in Botswana, Eswatini, Lesotho, Namibia and South Africa. Except for Namibia and Lesotho, where the bursaries are administered by government agencies (Namibia Students Financial Assistance Fund and the Lesotho National Manpower Development Secretariat), in all the other countries (Botswana, South Africa and Eswatini) they are administered directly by government ministries. The departments responsible in different countries include the nine provincial departments of health in South Africa; the Ministry of Tertiary education in Botswana; the Ministry of labour and social security, and the

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Ministry of public service in Eswatini. In all these countries, the Ministry/Department of health is the main beneficiary and is thus either responsible for placement of graduates and/or for monitoring their progress and contribution.

Methods and analysis

The overall study is guided by a logic framework (Figure 1).

Design and setting

The research questions will be answered through a multi-methods approach of a policy review, a quantitative and two qualitative research studies. This multi-methods approach will allow for the incorporation of various viewpoints and data from within the respective health systems. Data will be collected between the 01st of October 2020 and the 31st of December 2021. Table 1 summarises the research methods.

1: Policy Review

An integrative policy review will be conducted to explore available ROS scheme policies, policy frameworks and relevant ROS documents (e.g. memorandum of agreement, etc.). Historical and current policies will be requested from policy custodians and completed with manual searches of archives in the national libraries of the five countries. The Walt and Gilson triangle policy framework[18 19] will be used as a framework for data extraction to get information on the context, content, processes and actors. This includes the determination of the policy objectives and rationale, government legislations and/or regulations informing the policies, the monitoring and evaluation plan, enforcement mechanisms, policy evolution, processes used to define service needs, the recruitment and selection criteria, resourcing and the interaction of policy actors at different stages of the policy implementation cycle.

2: Quantitative retrospective cohort study

A quantitative retrospective cohort study of ROS scheme recipients for the period 2000 to 2010 will be conducted to: assess the criteria used to select beneficiaries, assess if the signed contracts specify the future service area, determine the service area (rural or urban) serviced by ROS beneficiaries stratified by profession, and quantify the proportion of beneficiaries who fulfil their contractual obligations and those who remain beyond contractual obligations. Information will be sourced from multiple information systems and/or databases.

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3: Qualitative descriptive studies

1. Semi-structured group or individual interviews with senior health, education, ROS managing agency managers (where appropriate) and finance managers and/policymakers (from all the selected Southern African countries) will be conducted to investigate the human resources needed over time and their views on ROS as a tool to recruit and retain health professionals.
2. Semi-structured group or individual interviews will be conducted with health professionals' regulatory bodies in each of the countries to assess their abilities to monitor ROS initiative recipients and to assess their willingness to collaborate with ROS scheme funders (i.e. policymakers).

Participants and Sampling

Sub-study 1 is a document and policy review, hence no sample size requirements.

The Quantitative retrospective cohort study is a database review of all ROS beneficiaries who were funded at any time between the year 2000 and the year 2010 from the five countries. Skilled health professionals will be limited to medical doctors (including specialists), dentists, physiotherapists, occupational therapists, speech therapists, audiologists (including dually qualified audiologists and speech therapists) and pharmacists. It is important that the entire population for that period is studied as the main outcomes relate to the proportion of beneficiaries who fulfill their contractual obligations and those who serve beyond their contractual obligations. Sampling will therefore result in loss of valuable data. It is however anticipated that the study will draw ±14000 ROS beneficiaries from the database.

Qualitative study 1: will use purposive sampling to target all managers who can answer relevant questions on the ROS policy. In this sampling strategy, participants will be selected "…based on the researchers' judgement about what potential participants will be most informative".[20] The important issue will be to have the most qualified person answer the questions asked with the appropriate degree of authority. An email advertisement and communication will be sent to stakeholders through the offices of the accounting officers requesting potential participants to contact the research team for consent and scheduling of interviews. A guiding principle in qualitative research is to sample only until data saturation has been achieved.[20] This aspect of the study will also not be limited by the sample size. Based on preliminary discussions, it is anticipated that in all the countries ± 45 senior managers and policy makers will be interviewed mostly in groups.

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3 Qualitative study 2 will target all those in management or governance of the Health Professions Council of South Africa; the Pharmacy Council of South Africa; Botswana Health Professions Council; Eswatini Medical and Dental Council; Lesotho Medical, Dental and Pharmacy Council; and the Health Professions Council of Namibia. It will also use purposive sampling techniques as described above. The aim is to have all technical expertise represented to have a better understanding of the regulatory framework and willingness of these bodies to collaborate with ROS funders in their monitoring strategies. Approximately 15 senior managers will be recruited to participate.

Inclusion and exclusion criteria

Material for the policy review will be sourced from all the five countries of interest and supplement with any published resources through an electronic search of the following databases: MEDLINE, PubMed, JSTOR, Science Direct, EMBASE, CINAHL, PsychInfo, Health Systems Evidence and PDQ-Evidence. Information found opportunistically through professional networks, media or email will be included if found to be relevant. Various policy documents including parliamentary Hansards, government archives, government and/or political party policy documents, legislation and regulations will be reviewed to understand the historical context, evolution and policy guidelines of ROS schemes. In addition, print media advertisements will be reviewed from the South African Medical Journal archives and from university prospectuses of the University of Cape Town and University of the Witwatersrand, the two oldest medical universities in Southern Africa. This information will facilitate an understanding of the nature of the schemes over time.

The quantitative retrospective cohort study includes records of participants who benefited from ROS schemes any time between the 01st of January 2000 to the 31st of December 2010. Such beneficiaries will be limited to the skilled health professionals mentioned above.

Qualitative study 1 includes all policymakers and/or implementers involved with the administration of ROS schemes including the accounting officers. Participants in senior management/governance will be invited to participate in the study.

Qualitative study 2 includes all senior managers of regulatory bodies responsible for the registration of health professionals in the selected countries for the selected categories of health professionals.

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Data collection

The policy review will use the Walt and Gilson triangle policy framework[18 19] for data extraction and categorised into four fields, namely; Context, Content, Processes and Actors. Data will be extracted using a customised data extraction tool (**Annexure A**). Issues pertaining to context include socio-political, economic, demographic, environmental and health reasons for the policy development; content includes policy rationale, monitoring and evaluation plan, presence of policy review date, presence of preceding policy term, if policy was reviewed on pre-determined date, recruitment and selection criteria, contractual responsibilities of beneficiaries, enforcement mechanisms framework, education costs covered by funding, details of program funding and resourcing, the proportion and composition of skills-mix required to meet population health needs; information on actors includes, a description of characteristics of potential beneficiaries and any stakeholders identified; processes include, guide or framework used for policy development; stakeholder engagement or participation, number of times policy has been revised; prioritisation or weighting of service areas, and linkage of ROS contract award to future salary needs.

The quantitative retrospective cohort study reports on the criteria used to identify ROS beneficiaries, academic program of study, identified future service area, duration of study, presence of a valid legal contract(s) and its/their duration, fulfilment of service obligation, retention in service area beyond obligatory period, practice history, and program cost per candidate. Socio-demographic characteristics such as sex, income level and ethnic group will be collected to assess the predictors of retention. These variables will also be used to identify ROS scheme beneficiary selection criteria and to match it with the available information on the database. Where affirmative action has been used as a criterion, for example, certain participants could be scored higher than others based on their race, the study will evaluate how the final beneficiary list reflects this factor and which of the criteria (e.g. academic grades, rurality, etc.) is weighted more than another.

The qualitative studies will use English semi-structured interviews (individual and group discussions), and use open-ended questions aided by interview guides "…with early questions being more exploratory" (**Annexure B**).[21] For ROS initiative administrators, initial questions will focus on the policy origin and policy context. Subsequent questions will explore policy decision processes, reviews, challenges, processes of beneficiary employment, and monitoring and evaluation plans.

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Interviews with senior health, education, ROS managing agency managers (where appropriate) and finance managers and/policymakers (from all the selected Southern African countries) will be held to investigate the human resource needs over time (burden of disease, human resource skills-mix, distribution of skilled health professionals and the human resource for health planning framework), policy intention, development, and monitoring mechanisms, budget allocation for SHP education as a proportion of total health expenditure over time, health workforce budget over time (adjusting for inflation), proportion of health workforce budget over time (adjusting for inflation) and perceptions on the effectiveness of ROS schemes. The latter will get their thoughts on broader issues with the policies, such as reasons for their success or failure, etc.

Similarly, for the regulatory bodies, the interviews will seek to understand the relations regulatory bodies have with ROS scheme funders (**Annexure C**). Subsequent questions will explore the process flow of registration of professionals (during studies and employment), renewal of membership, the information system(s) used, and whether they might be open to integration of their information systems with ROS managers. This aspect of the study will therefore assess the feasibility of a gatekeeping mechanism; possibilities of an interoperable information system between the funders, the human resource information system and the regulatory practice information system.

This research is being conducted during the COVID-19 pandemic when Governments have implemented certain restrictions to limit transmission, including the closing of borders and limiting international travel.[22] These uncertainties and restrictions therefore necessitate an innovative approach to data collection in a multi-site research project for a mixed-methods study. Qualitative research interviews will either be virtual, face-to-face or both depending on the feasibility to travel. In the case of virtual interviews, codes and passwords for the interview will be sent to each individual (single user access) or group access point to ensure privacy.

Operational definition of major study variables

Duration of funding will consider the full duration of in-kind or funding support paid to beneficiaries from ROS schemes.

Service need will describe the process used to either justify the recruitment of a beneficiary from a specific area of residence or placement of beneficiary in a specific service area.

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Skills-mix refers to the proportional distribution of the different categories of health professionals (including doctors, nurses, pharmacists, rehabilitation professionals, etc.).

Return-of-service will be assessed through analysis of the service history and compared with the duration of funding received.

Data management and analysis

Narrative and critical synthesis of policies and the policy frameworks used will be undertaken for the policy review. Structured analysis will be conducted to ensure reliability of the process. Variables extracted and reported upon include the conception (research, socio-political basis for policy), inception (date of launch or version number, policy framework) and evolution of the policy over time, policy aim, beneficiary recruitment process and selection criteria, skills-mix defined by policy, defined service area, details of funding and budgetary implications per year, policy review date and whether the policy was reviewed on stated date, responsibilities of beneficiaries and responsibilities of government, policy monitoring and evaluation processes, etc.

A specially designed Microsoft Access database template will be used to capture data from the ROS beneficiary databases (**Annexure D**). Quantitative data will be analysed using STATA version 16. Categorical variables will be summarised using graphs and frequency tables. Numerical data will be summarised using parametric or non-parametric statistics depending on the normality of the distribution. Normality of numerical data will be explored using the Shapiro Wilk test and/or box-and-whisker plot. Numerical variables will be summarised using the mean, standard deviation and range if normally distributed; and summarised using the median and interquartile range (IQR) if not normally distributed. The analysis of variance test (ANOVA) or Kruskal Wallis test will be used to compare the mean or median duration of service by country and/or province depending on normality of the distribution. These will then be followed by use of the relevant two-sample t-test or Wilcoxon rank sum test (Mann-Whitney U test) to determine differences in means or medians between any two comparisons. Survival analysis will be conducted using Kaplan-Meier survival estimates to determine the duration of service and fulfilment of contractual obligations. The Hazard ratios will be used to determine the predictors of retention by practice area (rural and underserved or urban), socio-demographic characteristics and the university or country of study. The 95% confidence interval will be used for the precision of estimates. The level of significance will be p-value≤0.05.

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Collected cost data will be used to evaluate the resources invested in the schemes and the proportion of the total health budget spent on ROS schemes. Overall costs will be estimated for each program and a cost per beneficiary trained and retained will be calculated. These will be based on the direct cost of funding granted to the beneficiary over the duration of the funding and other program costs extracted from national databases.

Semi-structured group and individual interviews will be audio-recorded and transcribed by a contracted transcription service for the qualitative studies. All data will be de-identified. The transcripts will be analysed by all authors using an inductive approach to thematic content analysis. This is an approach where codes are developed after data transcription and not basing them on pre-conceived assumptions or frameworks.[23] Interview coding will be organised using NVIVO-12. Two peer researchers will help with the coding and categorisation of the "…data as confirmation that there is a degree of shared interpretation".[24]

Integration of the data

First, the policy evolution and evaluation strategy as stated in policy documents will be compared descriptively with the responses of policymakers. Second, the selection criteria of beneficiaries as described in policy document(s) will be descriptively compared with responses of policymakers and information sourced during quantitative component of the study to assess criteria used to select an individual beneficiary. Third, the policy objectives as stated in policy documents will be compared with the responses of policymakers and the attainment of these objectives as analysed in the quantitative sub-study. Fourth, information sourced from policymakers on monitoring mechanisms will be triangulated with information sourced from regulatory bodies to assess possibilities of collaboration. Broadly, with the policy review and qualitative components of the study there to deepen the quantitative study, the sub-studies will complement each other.

Limitations

Even though care will be taken to limit systematic biases in data collected and analyses performed, our work will be limited by the availability and quality of program data and the availability of participants. All efforts will be taken to mollify the impact of these factors. We will conduct individual or group interviews based on the availability of participants. Working in collaboration with national and sub-national authorities, data will be extracted from administrative data collections on all bursary recipients, providing access to the best available

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data for our research questions. This will be triangulated by both qualitative and quantitative bespoke data collected through this study as described to provide the fullest picture possible on the operation and income of these schemes. Administrative data will be extracted by local collaborators in each nation and will be assisted by trained research assistants if necessary.

Patient and public involvement

Patients and members of the public were not involved in the design of this study since they will not be recruited to participate in the study.

Ethics and dissemination

Ethics approval for this study was obtained from the Human Research Ethics Committees of the University of New South Wales (HC200519), Australia; South Africa and Lesotho: Walter Sisulu University, South Africa (065/2020); Botswana: the Health Research and Development Division (HPDME 13/18/1); Eswatini: Eswatini Health and Human Research Review Board (SHR302/2020); and Namibia: National Commission on Research Science and Technology (SK001). Research access approval has been attained from all the study sites. The policy review has no human participants and therefore has no need for consent. Similarly, a waiver of consent was sought for the quantitative retrospective cohort study due to the fact that it is a database review and it would not be possible to seek consent from the ROS beneficiaries. Furthermore, this aspect of the study will not cause any harm to the beneficiaries as no names or identities will be collected from the database. Permission to access ROS beneficiary data will be sought from the accounting officers.

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We will seek written informed consent from participants for the qualitative studies. Participants will be recruited through written advertisements or email invitations sent to the accounting officers. The advertisement and/or invitation will ask interested managers to contact the research team if they are interested in participating. All potential participants will be sent individual emails through the office of the accounting officer.

Significance: This study will evaluate the effectiveness and cost-effectiveness of ROS schemes. Furthermore, it will provide insights into the implementation of ROS initiatives and seek to ensure that health budgets benefit those segments of the population most in need. Outcomes from this study will help develop interventions for the improvement in SHP distribution in underserved areas, not just in the study sites but globally through the sharing of lessons drawn

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from this study. Participating governments will also benefit as these findings will serve as an evaluation by an independent panel. Recommendations emanating from this study will not only help ensure efficiency of ROS schemes but could lead to policymakers reviewing a host of other related policies to improve practice and extend the provision of targeted health services.

Results will be published in peer reviewed journals, an academic thesis, technical reports, presented at relevant conferences and communicated via professional networks. Findings will also be shared with and/or presented to all participating governments and institutions.

Table 1: Research Methods Summary

Study Design	Objective	Data Points	Data Collection method	Data Collection Instruments	Analysis
Policy review	Understand the motivation, aim and evolution of state sponsored educational initiative policies in use across the different nations, their stated aims, enforcement mechanisms and target populations.	1. Policy Context. 2. Policy Implementation Processes. 3. Policy Content. 4. Policy Actors (Stakeholders).	1. Request policy documents from custodians. 2. Country specific National archive sources. 3. Literature review.	Data extraction tool.	Narrative analysis using the Walt and Gilson policy framework
Quantitative retrospective cohort study	1. Assess effectiveness of policies a) Demographic characteristics of policy recipients. b) The reach of the policy. c) Proportion of	1. Beneficiary demographic characteristics before and after enrolment into scheme. 2. Selection criteria used that qualified beneficiary into scheme. 3. University and country	1. Beneficiary custodian extracts and triangulate data from their internal sources. 2. De-identifie	1. Export data from Microsoft Excess into customised Microsoft Access database.	Survival analysis, Cost analysis

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	beneficiaries who fulfil contractual obligation. d) Proportion of beneficiaries retained beyond contractual obligation. e) Determine the costs of the policy and the costs per SHP trained and recruited. 2. Evaluate sustainability of the policies.	where beneficiary studied. 4. Name of qualification that beneficiary studied for. 5. Duration of sponsorship. 6. Duration of studies. 7. Completion status of qualification. 8. Service record (working history) after completion. 9. Amount of sponsorship per beneficiary. 10. Programme cost relative to Total budget.	d data shared with research team in Microsoft excel.		
Qualitative descriptive study 1	1. Determine policymakers' and implementers' interpretation, experiences and perceptions of ROS policy. 2. Describe policymakers' and	1. Origins and evolution of the policy. 2. Custodian of the policy. 3. Review of the policy. 4. Decision process. 5. Contract. 6. Process after the	1. Audio-recorded Semi-structured, virtual interviews using interview guide. 2. Transcription of	1. Microsoft Teams.	Thematic analysis

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	implementers' perceived benefits and challenges of ROS policy.	completion of studies. 7. Policy Challenges. 8. Monitoring and evaluation of the policy.	interviews.		
Qualitative descriptive study 2	1. Determine alternative mechanisms and collaborations in the monitoring of ROS beneficiaries by involving professional regulatory bodies	1. Relations with ROS scheme custodians. 2. Knowledge of state sponsored ROS schemes. 3. Process of registration of students to council. 4. Process of registration of health professionals. 5. Monitoring of ROS schemes. 6. Membership renewal. 7. Information systems	1. Audio-recorded Semi-structured, virtual interviews using interview guide. 2. Transcription of interviews.	1. Microsoft Teams.	Thematic analysis

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Authors' contributions

SM conceived the research, completed the first draft of the manuscript, incorporated and addressed feedback from the co-authors, liaised with stakeholders and sought ethical approval from participating countries. BA edited and commented on versions of the manuscript. RJ co-senior author, lead ethics application processes at the University of New South Wales, commented on versions of the manuscript, edited versions of the manuscript and signed off on the final version. AD co-senior author, commented on versions of the manuscript, edited versions of the manuscript and signed off on the final version. All authors read and approved the final manuscript.

Competing interests statement

None declared

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Figure 1: Logic Framework

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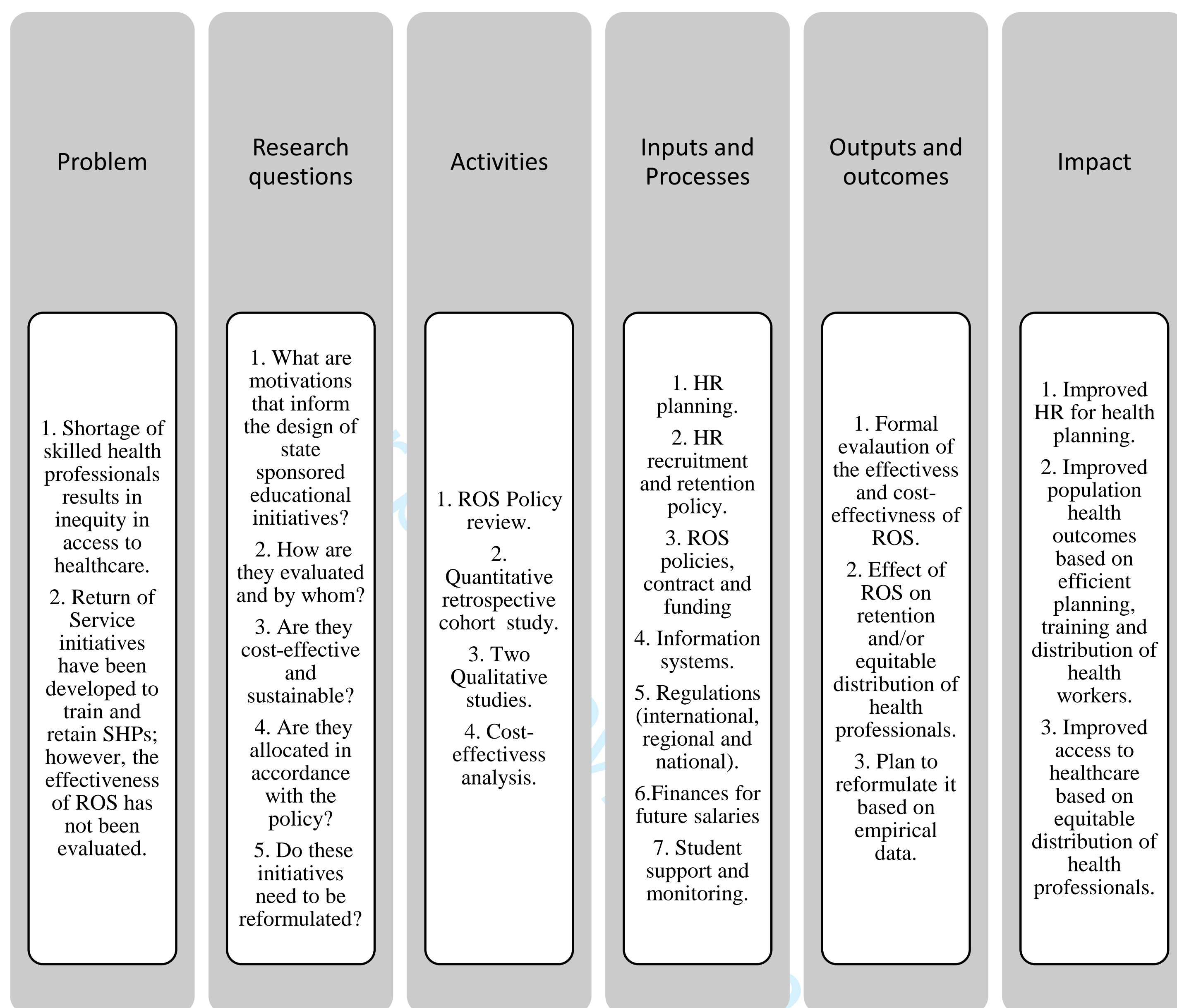
Problem
Research questions
Activities
Inputs and Processes
Outputs and outcomes
Impact
1. Shortage of skilled health professionals results in inequity in access to healthcare.
2. Return of Service initiatives have been developed to train and retain SHPs; however, the effectiveness of ROS has not been evaluated.
1. What are motivations that inform the design of state sponsored educational initiatives?
2. How are they evaluated and by whom?
3. Are they cost-effective and sustainable?
4. Are they allocated in accordance with the policy?
5. Do these initiatives need to be reformulated?
1. ROS Policy review.
2. Quantitative retrospective cohort study.
3. Two Qualitative studies.
4. Cost-effectiveness analysis.
1. HR planning.
2. HR recruitment and retention policy.
3. ROS policies, contract and funding
4. Information systems.
5. Regulations (international, regional and national).
6.Finances for future salaries
7. Student support and monitoring.
1. Formal evalaution of the effectivess and cost-effectivness of ROS.
2. Effect of ROS on retention and/or equitable distribution of health professionals.
3. Plan to reformulate it based on empirical data.
1. Improved HR for health planning.
2. Improved population health outcomes based on efficient planning, training and distribution of health workers.
3. Improved access to healthcare based on equitable distribution of health professionals.

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Annexure A

Data Extraction: Policy Review

A. General Information and Eligibility

1. Date form completed		
2. Name of person extracting data		
3. Report title		
4. Publication type		
5. Type of document		
6. Publication reference		
7. Country of publication		
8. Province		
9. Policy description		
10. Decision	Include	
	Exclude	
11. Notes (include reasons for exclusion):		

*No continuation if excluded.

B. Context

Contextual variable	Description	Location in document
12. Date of publication		
13. Version number		
14. Prior version Review Date		
15. Current version review Date		
16. Policy motivation and rationale		
17. Policy history		
18. Acts which informed policy		
19. Target beneficiaries		
20. Any other contextual issues		

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C. Policy Content

Factor	Description	Location in document
21. Classification of beneficiaries		
22. Beneficiary selection criteria		
23. Policy objectives and/or purpose		
24. Skills-mix of beneficiaries		
25. Conditions of the funding		
26. Duration of funding		
27. Budgetary implications		
28. Administration of scheme		
29. Beneficiary responsibilities		
30. Person/body responsible for admitting beneficiaries into scheme.		
31. Any other factors:		

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D. Process Implementation

Process	Description	Location in document
32. Statutory conditions for validity of policy/contract		
33. Term of policy		
34. Trigger for review of policy		
35. Trigger for evaluation of policy		
36. Skills or service needs determination process		
37. Beneficiary selection process		
38. Contract renewal process		
39. Beneficiary monitoring processes		

40. Placement of beneficiaries into services after completion of studies		
41. Any other processes		

E. Actors Involved

Actors	Description	Location in document

F. Conclusion

Remark	Description	Location in document

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Annexure B: Interview Guide - Policymakers

Individual or Group Interview sheet and interview guide for return-of-service scheme policymakers and/or policy-implementers

Thank you so much for agreeing to take time from your busy schedule to answer a few questions on my research. I am doing a research study to find out more about the government policies used to fund health professionals in-training, in exchange for a period of service in the public health sector. The study aims to understand more about the history and evolution of these policies, how they relate with other human resources for health policies, their rationale, and how they are monitored and reviewed.

You are being interviewed because you are a manager that is involved in some way with the development and/or administration of policies that inform government sponsored bursaries or scholarships for health sciences students studying in the country or in other countries.

A group interview allows for a detailed discussion with a diverse group from the different units and divisions at once instead of hosting multitude of interviews with individuals within the department. That is the main reason why I have asked you to participate in the group interview. (For those who are unable to participate in a group interview this will read: I understand that it wasn't possible for you to be part of a group interview due to your schedule. Because I value your contribution it is for this reason that I still requested to have an individual discussion with you). Please do not be intimidated by anyone as the information collected will only be used to enrich the schemes. All the names from this discussion will be de-identified and your identified responses will not be shared outside the research team. Your individual and diverse inputs are therefore highly valued. The aim of the research is not to assess professional competence and the outcomes of the research will not have a negative impact on your employment. In addition, you are welcome to refer to internal human resources and/or bursary/scholarship scheme related documents or even consult colleagues who you think might help remind you of detail that you might have forgotten. It's also ok to not have all the answers. Please remember that the session is being audio recorded. You are welcome to let me know if you are not comfortable with that.

If you are happy with contents of this document and agree with the process could you kindly sign the consent forms and return to me before we start, if you haven't already done so. I am happy to answer any questions that you may have before we begin the discussion. Are there any questions that any of you would like to ask on the process before we start?

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No.	Area of Interest/topic	Initial broad descriptive questions	Possible probing questions
1	Origins and evolution of the policy	- What is the departmental policy on bursaries for health sciences students? - What are the policy objectives? - In your understanding and knowledge, what has influenced the bursary policy for health sciences students? - As far as you know, when was this policy first introduced? - Could you enlighten me more about the development process and implementation of the bursary policy? - Which countries do beneficiaries of the policy go to for their studies?	- Could you please tell me more about any policy development frameworks used for developing your bursary policy or any other human resources for health policies?
2	Custodian of the policy	- Could you let me know which department or departments is or are responsible for the development and implementation of the bursary policy? - Could you give more information about the role of any other departments, offices or sections that could be involved? - Who makes the final decision on who receives an offer?	- How long has the situation been that way? - How has the process evolved over time
3	Review of the policy	- Is the bursary policy regularly reviewed? - What informs the reviewing of this policy?	- Is this related to political term? - What informs the need to review this policy?
4	Decision process	- Could you tell me more about the process that informs the number of beneficiaries that can be funded in any particular funding cycle? - How are the opportunities advertised? - Can you tell me more about the selection criteria used to then select beneficiaries?	- How do you decide between the various categories of health sciences students that you fund?
5	Contract	- In your view, what are the responsibilities of bursary recipients? - At what stage of the bursary offer do beneficiaries sign their contract?	- Is there an opt-out clause to the scheme? Elaborate…

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		- What are the key contents of the contract? - What happens if a beneficiary defaults their contract?	- What happens if a beneficiary doesn't complete their studies?
6	Process after the completion of studies	- How are the new graduates recruited into the health system? - At what stage of the process do you decide on the facility where the recipient will be placed in the health system? - What processes are used to identify the types of facilities that need the placement of beneficiaries? - At what stage do you plan for the salaries of beneficiaries?	- Are beneficiaries placed based on their own choices or on facilities chosen by government? - Who decides on the placement of graduates who previously benefited from the bursary scheme?
7	Policy Challenges	- What challenges has the policy encountered over the years?	- To your knowledge, have recipients defaulted their contracts previously? - What could be the reasons for beneficiaries to default bursary contracts? - What is the sustainability of the policy?
8	Monitoring and evaluation of the policy	- What processes are in place to ensure that beneficiaries fulfil their contractual obligations? - How often or uniformly are penalties imposed on those who default their contracts? - What features help or hinder monitoring of the program? - In your view, does the policy fulfil its objective? - If there is anything that you could change in the policy what would it be? - In your view, what are the ways that could have helped eliminate defaulting of the scheme?	- What Information systems are in place to monitor fulfilment of the policy?

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Wrap-up

Are the any other issues not covered that you would like to talk about?

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Thank you once more for your assistance, could you please also help me with a few documents that will help broaden my understanding on the schemes. You could add any other documents to the list if you think it or they will be of importance.

List of documents to be requested
1. All versions of bursary policy (current and historical) that are used to fund skilled health professionals.
2. Blank copies of bursary contracts.
3. Total health budget for the period 2000 to 2020.
4. Health sciences bursary budget for the period 2000 to 2020.
5. The total number of skilled health professionals (stratified by category and health facility) on 01 July 2020.
6. The total number of skilled health professionals who are bursary beneficiaries (stratified by category and health facility) employed in the contracted government service area on 01 July 2020.
7. Annual performance plans for the period 01 April 2015 to 31 March 2020.
8. Annual performance reports for the period 01 April 2016 to 31 March 2021.

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Annexure B: Interview Guide – Regulatory Bodies

Individual or Group Interview sheet and interview guide for return-of-service scheme Councils

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Thank you so much for agreeing to take time of your busy schedule to answer a few questions on my research. I am doing a research study to find out more about the government policies used to fund health professionals in training in exchange for a period of service in the public health sector. The study aims to understand more about the history and evolution of these policies, how they relate with other human resources for health policies, their rationale, and how they are monitored and reviewed. This component of the study aims to explore if there are possible ways that your council could be able to help in the monitoring of these schemes.

Everyone here is a manager that is involved in some way with the registration of selected skilled health professionals in the country. Your council has been approached as the council responsible for the registration of pharmacists, and/or medical doctors, and/or dentists, and/or physiotherapists, and/or speech therapists, and/or occupational therapists, and/or speech therapists, and/or audiologists, and/or dually qualified speech therapists and audiologists.

A group interview allows for a detailed discussion with a diverse group from the different units and divisions at once instead of hosting multitude of interviews with individuals within the council. That is the main reason why I have asked you to participate in the group interview. (For those who are unable to participate in a group interview this will read: I understand that it wasn't possible for you to be part of a group interview due to your schedule. Because I value your contribution it is for this reason that I still requested to have an individual discussion with you). Please do not be intimidated by anyone as the information collected is meant to enrich the schemes. Your individual and diverse inputs are therefore highly valued. The aim of the research is not to assess professional competence and the outcomes of the research will not have a negative impact on your employment. In addition, you are welcome to refer to internal organisational documents or the legislative framework (e.g. governing registration of health professionals and/or monitoring of constituent members' bursary obligations, etc) and/or even consult colleagues who you think might help remind you of detail that you might have forgotten. It's also ok to not have all the answers. Please remember that the session is being audio recorded, all names taken and/or mentioned during the discussion will be deleted from the transcript. You are welcome to let me know if you are not comfortable with that.

If you are happy with contents of this document and agree with the process could you kindly sign the consent forms and return to me before we start, if you haven't already done so. I am

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No	Area of Interest/topic	Initial broad descriptive questions
1.	Relations with the Department of Health	- Could you describe the nature of the relations that the council has with the various departments of health (e.g. national, provincial or regional and district)?
2.	Knowledge of government sponsored bursaries	- What do you know about government sponsored bursaries? - Are you satisfied by the way bursary schemes are implemented? - In your view(s), what ways could the bursary schemes be improved?
3.	Monitoring of government sponsored bursaries	- How are they monitored? - What ways could the council assist bursary policymakers in the monitoring of bursary holders? - What processes would need to be followed for councils to be able to assist government in the monitoring of bursary holders?
4.	Registration of domestic students	- What is the process involved in the registration of health sciences students under your jurisdiction whilst they are still students?
5.	Registration of students studying in foreign countries	- What is the process involved in the registration of health sciences students who are studying outside the country?
6.	Health professionals' registration	- What is the process involved in the registration of health sciences professionals immediately after completion of their studies?
7.	Membership renewal	- What is the process involved in the renewal of membership for health professionals under your jurisdiction? - Is there a way for renewal to be linked to ROS service conditions?
8.	Information System	- Is the information system used to register health professionals owned by your council? - Is your council open to the integration of the government's human resource information system with your registration system to allow for the monitoring of bursary holders to ensure that their council registration is linked with the place where they are meant to work (according to their contract)? - What challenges do you foresee with such a system?

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Is there anything else that you would like to add on the discussion that we have just had?

Thank you once more for your assistance. You are free to assist me with documents that would guide the legal framework that your council would need to comply with if you were to assist government with the monitoring of the bursary schemes.

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Annexure C: Interview Guide – Regulatory Bodies

Individual or Group Interview sheet and interview guide for return-of-service scheme Councils

Thank you so much for agreeing to take time of your busy schedule to answer a few questions on my research. I am doing a research study to find out more about the government policies used to fund health professionals in training in exchange for a period of service in the public health sector. The study aims to understand more about the history and evolution of these policies, how they relate with other human resources for health policies, their rationale, and how they are monitored and reviewed. This component of the study aims to explore if there are possible ways that your council could be able to help in the monitoring of these schemes.

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Subject Number 1
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Country
Province/Region
First Name
Last Name
Gender
Race
Date of Birth
House Number (at application)
Street Number (at Application)
Street Name (at Application)
Town/Suburb (at Application)
Postal Code (at Application)
Year of Matriculation 0
Year of A or B levels 0
Aggregate Results
Additional Notes on any prior learning

Name of University
Date when bursary offer was made
Year of first enrolment for Academic Program
Marital Status at Commencement of studies
Secondary University of Study if Applicable

Identity Number 0
Mother Alive
Father Alive
Primary Carer
Primary Carer employed
Both Parents employed
Household Source of Income
Household income amount per annum (Rands/Pula)
School Postal Code 0
Name of High school

SUBJECT	RESULTS
Mathematics	
Physical Science	
Life Orientation	
Life Sciences/Biology	

Country of Study
Academic Year of Study when bursary was issued
Academic Program of Study
Did beneficiary complete their studies
Year of completion of studies
Presence of bursary renewal contract signed by all parties Yr7

Additional Notes on Bursary Contract

Marital Status at Completion of studies
PERSAL/Employment Number 0
Date of Commencement of Internship
Internship hospital 1 (Name)
Internship hospital 1 (Date of departure)
Internship hospital 2 (Name)
Internship hospital 2 (Date of Commencement)
Internship hospital 3 (Name)
Internship hospital 3 (Date of Commencement)
Date of Completion of Internship
Date of commencement of Community service
Community Service Hospital1 (Name)
Community Service Hospital1 (Date of Departure)
Community Service Hospital2 (Name)
Community Service Hospital2 (Date of Commencement)
Date of Completion of Community Service
Employer 1 Name
Employer 1 Date of Commencement
Employer 1 Job Title
Employer 1 Date of Departure
Employer 2 Name
Employer 2 Date of Commencement
Employer 2 Job Title
Employer 2 Date of Departure

Employer 7 Name
Employer 7 Date of Commence
Employer 7 Job Title
Employer 7 Date of Departure
Employer 8 Name
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Employer 9 Date of Departure
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Employer 10 Job Title
Employer 10 Date of Departur

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Additional Information on Tertiary Studies

Presence of bursary offer contract signed by all parties (Year1)

Presence of bursary renewal contract signed by all parties Yr2

Presence of bursary renewal contract signed by all parties Yr3

Presence of bursary renewal contract signed by all parties Yr4

Presence of bursary renewal contract signed by all parties Yr5

Presence of bursary renewal contract signed by all parties Yr6

Presence of bursary renewal contract signed by all parties Yr8

Post completion service area specified (Yes/No)

Name of Post completion service area

Field	Value
Cost of Sponsorship (ZAR/Pula) Year1	0
Cost of Sponsorship (ZAR/Pula) Year2	0
Cost of Sponsorship (ZAR/Pula) Year3	0
Cost of Sponsorship (ZAR/Pula) Year4	0
Cost of Sponsorship (ZAR/Pula) Year5	0
Cost of Sponsorship (ZAR/Pula) Year6	0
Cost of Sponsorship (ZAR/Pula) Year7	0
Cost of Sponsorship (ZAR/Pula) Year8	0

Employer 3 Name

Employer 3 Date of Commencement

Employer 3 Job Title

Employer 3 Date of Departure

Employer 4 Name

Employer 4 Date of Commencement

Employer 4 Job Title

Employer 4 Date of Departure

Employer 5 Name

Employer 5 Date of Commencement

Employer 5 Job Title

Employer 5 Date of Departure

Employer 6 Name

Employer 6 Date of Commencement

Employer 6 Job Title

Employer 6 Date of Departure

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STROBE 2007 (v4) checklist of items to be included in reports of observational studies in epidemiology*
Checklist for cohort, case-control, and cross-sectional studies (combined)

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5 - 8
Objectives	3	State specific objectives, including any pre-specified hypotheses	7
Methods			
Study design	4	Present key elements of study design early in the paper	9 & 10
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	7
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	10 - 12
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	12 - 15
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	*12 - 15*
Bias	9	Describe any efforts to address potential sources of bias	12 - 15
Study size	10	Explain how the study size was arrived at	10 - 11
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	14 - 15
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	14 - 15
		(*b*) Describe any methods used to examine subgroups and interactions	14 - 15
		(*c*) Explain how missing data were addressed	N/A
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed	14 - 15

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		Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	N/A
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	10 - 12
		(b) Indicate number of participants with missing data for each variable of interest	N/A
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	9
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	N/A
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	
		Cross-sectional study—Report numbers of outcome events or summary measures	N/A
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	N/A
		(*b*) Report category boundaries when continuous variables were categorized	N/A
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	N/A
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	N/A
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	N/A
Generalisability	21	Discuss the generalisability (external validity) of the study results	N/A
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	20

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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