

AN ANALYSIS OF ORAL MORPHINE USE AT PRIMARY HEALTHCARE FACILITIES IN THE CAPE TOWN METRO HEALTH DISTRICT

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ABSTRACT:

BACKGROUND

Access to oral morphine is an essential element of palliative care services, and a useful indicator of the availability of those services. The South African *National Policy Framework and Strategy on Palliative Care 2017-2022(1)* envisages a system in which palliative care is widely available in the primary healthcare or community setting. If this is to be achieved an analysis of the morphine use patterns within the health system, and the development of indicators to monitor implementation are vital.

AIM

The aim of this research was to examine the patterns of oral, outpatient morphine prescription in public healthcare facilities within the Cape Town Metropole, and to develop methods to compare the patterns of oral morphine use between primary care facilities, district hospitals and tertiary hospitals.

SETTING

The setting of this study is the public healthcare system in the Cape Town Metropole during the period 2016-2018.

METHODS

In this descriptive analysis a dataset was generated from routinely collected prescribing and outpatient headcount information to allow an analysis of morphine prescribing patterns within the Metro, and comparison both between facilities and levels of care.

RESULTS

The rate of morphine prescription was much higher at the two tertiary facilities (605.2 episodes/100 000 outpatient visits) than at District Hospitals or at Primary Care (182.1 and 56.6 episodes/100 000 outpatient visits respectively). There was considerable variation between prescribing rates of facilities at the same level of care.

CONCLUSION

Access to oral morphine at the primary care level is limited and needs to be improved if South Africa is to successfully implement local and international guidelines on the provision of palliative care at the primary and community level. The ratio of morphine prescription to outpatient visits allows useful comparisons to be made between access to palliative care services at healthcare service levels and individual facilities.

INTRODUCTION

The provision of adequate pain and symptom control for people with serious illnesses is increasingly recognised as a human right. Globally, access to appropriate pain control interventions is woefully inadequate.(2) The 2009 Human Rights Watch report “Please do not make us suffer any more...” calls the lack of access to pain treatment ‘both perplexing and inexcusable’.(3) In 2011 Human Rights Watch released a report entitled ‘Global state of pain treatment: access to palliative care as a human right’(4) which was based on a survey of global palliative care experts in 2009 and 2010, and details the barriers to effective palliative care in the areas of health policy, education of health workers and drug availability. The report estimates that every year ‘more than 3.5 million terminal cancer and HIV/AIDS patients die ... without access to adequate pain treatment’, and that of those, 300 373 are in South Africa. Of the many barriers to access to adequate analgesia, they identify the fact that oral morphine is less likely to be available at the primary care level as contributing to the generally poor availability of adequate palliative analgesia in low resource settings. Globally, access to opioid analgesia for the treatment of severe pain shows wide variation, with many countries, especially those with lower income, having limited or no access to strong opioids.(5)

Although the provision of oral morphine is just one element of a palliative care package, it is a well-recognised indicator of the general availability of palliative care services, assuming that the indications and dosages are standardised between countries and across levels of care.(6) National and international guidelines emphasise the need for access to immediate release oral morphine at the primary healthcare level.(7, 8) Oral morphine is well recognised as being a fundamental element of pain control in cancer-related pain, (9, 10) and is recommended for the treatment of chronic cancer pain at the primary healthcare level by the Standard Treatment Guidelines and Essential Medicines List for South Africa - Primary Healthcare Level 2020 Edition.(11) The South African *National Policy Framework and Strategy on Palliative Care 2017-2022(1)* envisages a system in which ‘most of the services will actually be provided at the district level within a community setting’, and the 2018 report of the Lancet Commission on Palliative Care and Pain Relief strongly advocates for increasing the availability of oral morphine at the primary care level in low and middle income countries.(2) The WHO publication *Integrating palliative care and symptom relief into primary health care: a WHO guide for planners, implementers and managers* states that ‘most patients who need palliative care are at home and prefer to remain there. Thus, it is imperative that palliative care be provided in the community as part of primary care’.(12)

BACKGROUND

The Cape Town Metropole has arguably the most well-developed and resourced primary healthcare network in South Africa,(13) and South Africa (along with Kenya and Uganda) has one of the most developed Palliative Care initiatives in Africa.(14) Despite this, oral morphine tends to be prescribed at a few central, tertiary centres and is seldom accessed at the primary care level. This pattern of centralised morphine prescription is not unique to South Africa, with a 2011 report on the global state of pain treatment finding that ‘patients with pain often need to be referred to larger health facilities, making treatment less accessible and more costly for them’.(4)

South Africa consumes 71% of the 720 kg of morphine that is used in Sub-Saharan Africa annually(15). Among the barriers to opioid access on the continent are legal and regulatory restrictions, the cultural framing of pain perception and its management, inadequate training of health-care providers, procurement barriers, weak health systems and concerns about diversion and abuse.(15) Despite having more advanced palliative care systems than its neighbours, according to the Worldwide Palliative Care Alliance’s 2014 report, South Africa is regarded as a ‘group 4a’ country, in which hospice-palliative care services are at a stage of preliminary integration into mainstream service provision.(6)

South Africa’s population suffers from a ‘quadruple burden of disease’ including HIV/Aids, non-communicable diseases, maternal and child mortality and trauma.(16) Approximately 49.7% of deaths in South Africa are estimated to need palliative care services.

For South Africa to successfully implement the *National Policy Framework and Strategy on Palliative Care 2017-2022*, it is important to develop a clear understanding of how morphine is accessed within the health system, as well as the patient, healthcare provider and system-related factors which may act as barriers to access at the primary healthcare level. It is also necessary to develop methodologies to monitor the implementation of palliative care initiatives.

There are a wealth of studies and reports on the barriers to morphine access at the national and international level highlighting the importance of monitoring morphine access.(5, 17, 18) The 2021 WHO report *Assessing the development of palliative care worldwide: a set of actionable indicators* developed 18 indicators for monitoring palliative care development. Three of these indicators relate to the monitoring of analgesia provision: the annual morphine consumption per capita; the availability of essential medicines for pain and palliative care at all levels of care and the availability of oral morphine at the primary care level(19). Although these indicators are useful for comparing country-level morphine use and can be used as proxy indicators for the availability of palliative care, they are less useful for monitoring palliative care provision *within* a health system or district, or for comparing how palliative care is provided at different healthcare levels within a system. For example, just

because morphine is available at the national level does not necessarily mean it is being used appropriately at primary care level. Understanding access to morphine across the health system may improve appropriate and sustainable access to the population in Cape Town and thus address this neglect, especially at primary care level.

There is currently little research on the use of morphine at the Primary Care level in South Africa, and a 2014 report on palliative care research in Africa describes the evidence base in the area as 'inadequate' and identifies access and availability of morphine as topics requiring further investigation.(20) At the same time there is an increasing recognition of the importance of and need for access to palliative care services at all levels within our healthcare system. It is hoped that this research will contribute to guiding the development of palliative care services for patients who need them at all levels of the health care system.

The morphine milligram equivalents (MME) consumed per 1000 inhabitants per day in South Africa in 2019 was 14.52, well above the African average of 0.96, but well below the European and North American averages of 346.85 and 853.46 respectively.(21) According to the TreatThePain project of the American Cancer Society, between 2011 and 2013 the average annual MME consumption was 9.3 mg/capita, with 58 020 deaths from cancer and HIV with untreated moderate or severe pain per year.(22) Similarly, Duthey *et al* calculated that in 2010 South Africa used only 4.69 % of the strong opioids that would be needed to meet our morbidity-adjusted needs of 931.58 mg of morphine equivalents (mEq) per capita.(23) These figures suggest that there is a significant under-utilization of opioid analgesia within the South African health system.

By comparing information relating to morphine prescribing episodes to the numbers of outpatient visits across the metro, it is possible to gain an understanding of the relative frequency of outpatient morphine use in the metro, the duration of follow-up of patients receiving morphine, and to compare morphine prescribing practices between primary and tertiary care facilities. By using morphine as an indicator of access to palliative care,(6) it is possible to make inferences about palliative care service provision across the metro.

AIM AND OBJECTIVES

The aim of this research was to examine the patterns of morphine prescription in public healthcare facilities within the Cape Town Metropole, and to develop methods to compare the patterns of oral morphine use between primary care facilities, district hospitals and tertiary hospitals. This was done by analysing oral, outpatient morphine prescription data from healthcare facilities in the metro, as well as outpatient visit information.

RESEARCH METHODS AND DESIGN

STUDY DESIGN

This is descriptive analysis of prescribing and facility visit information.

SETTING

The Cape Town Metro Health District covers the area of Cape Town and its immediate surrounds with a population of 4 140 565 in 2018, of which an estimated 3 561 600 (87.2%) were reliant on state healthcare in 2018.(24) Within the Cape Town Metro Health District, state healthcare is provided at 152 primary level healthcare facilities, 8 district hospitals and 2 tertiary hospitals. The primary healthcare facilities range from small satellite and mobile clinics, to large Community Health Centres serving significant numbers of patients.(24) The general model of care is for most primary and day-to-day services to be provided at primary health care facilities, with referral to district or tertiary facilities as needed.

Palliative care in the metro is provided by a mixture of state, non-governmental and private organizations. There are dedicated palliative care services at one of the two tertiary hospitals, one district hospital and several community health centres. Several community-based organizations provide palliative services in their areas.

STUDY POPULATION AND SAMPLING STRATEGY

This study included all outpatient, oral morphine prescribing episodes during the years 2016-2018 at public healthcare facilities within the Cape Town Metropole. Data from all facilities which use computerised pharmacy information systems (30 Community Day Clinics, 9 Community Health Centres, 9 District Hospitals, 6 Specialized Hospitals and 2 Tertiary Hospitals – a total of 56 facilities with 41 097 dispensing episodes to 18 241 unique patients) was used to establish an overview of the oral morphine use in the district using aggregated prescribing data. The timeframe was selected to provide a representative sample which coincided with the adoption of the National Policy Framework and Strategy on Palliative Care 2017 – 2022.(1) In order to enable meaningful comparisons between facilities, further analysis of the prescribing practices of oral morphine was limited to the 29 larger facilities for which there was both morphine prescribing data and general outpatient visit data available, after excluding the specialized hospitals (paediatric, psychiatric, maternity and TB), limiting the analysis to 10 Community Day Clinics, 9 Community Health Centres, 8 District Hospitals and 2 Tertiary Hospitals, including 37 608 dispensing episodes to 16 736 unique patients (see Figure 1).

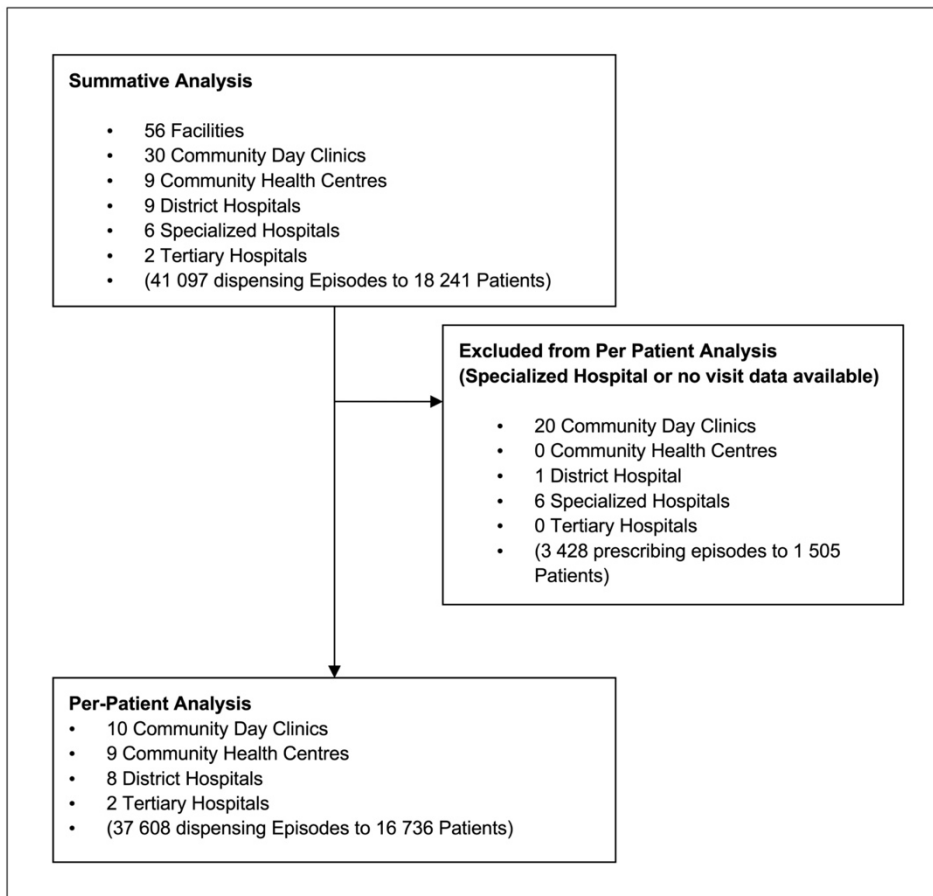


FIGURE 1: FLOWCHART OF EXCLUSIONS FROM FINAL ANALYSIS

DATA COLLECTION

Morphine prescription in South Africa is tightly regulated, and the legislation requires that all prescriptions be accurately recorded. In the Cape Town Metro Health System, morphine prescription information is recorded in an electronic pharmacy system. Facility visit information is recorded on separate platforms for the primary health care facilities and hospitals. Data from public healthcare facilities in the Cape Town Metropole are collated by the Provincial Health Data Centre (PDHC), a health information exchange which collects and collates data from multiple sources on a daily basis, including laboratory, facility visit and pharmacy data. The collated data are used as a clinical tool in the care of individual patients, as well as for epidemiological surveillance and as a research resource.(25, 26) The research dataset used in this analysis was provided by the Provincial Health Data Centre, from the Pharmacy records covering the years 2016-2018, which is an amalgamation of routinely collected data from provincial health care information systems, and included aggregated counts of all outpatient oral morphine dispensing episodes occurring at public healthcare facilities within the Cape Town Metro during the period 2016-2018.

DATA ANALYSIS

The dataset obtained from the PHDC was reviewed with a hospital pharmacist to identify inaccuracies in the structure of the prescribing data, and inconsistencies relating to the methods of data entry into the JACS prescribing system were resolved.

Prior to release of the data by the PHDC, the data were stripped of all potentially personally identifying information and data perturbation techniques were applied. The tables generated included counts of outpatient morphine prescribing episodes and counts of unique patients receiving morphine broken down by year of dispensing, subdistrict and facility; the headcount of unique patients seen at general outpatient encounters broken down by year, subdistrict and facility and an anonymised line listing of all morphine prescribing episodes in the metro including the amount of morphine dispensed broken down by date, subdistrict and service type (primary care, district hospital, regional hospital, tertiary hospital or specialized hospital) but not by individual facility to prevent re-identification. The overall rate of morphine prescription, as well as the rate per outpatient visit, was then compared between facilities and between levels of care.

The focus of this analysis was to identify the patterns of morphine prescription within the metropole, including the average amounts of morphine prescribed per patient, the frequency of patient visits and medication collection and the inter-facility mobility of patients within the healthcare system. The patterns of morphine prescription were compared between primary care facilities (CHCs and CDCs), District Hospitals and Tertiary Hospitals. This analysis was performed on the research dataset generated by the Provincial Health Data Centre using the R statistical package,(12) Microsoft Excel(27), SPSS(28) and Tableau(27).

ETHICAL CONSIDERATIONS

Ethics approval was received from the University of Cape Town Faculty of Health Sciences Human Research Ethics Committee (HREC REF 746/2019). Permission to access provincial health data and conduct research in provincial health facilities was received from the Western Cape Government Department of Health (Ref. WC_202001_019). The data obtained from the PHDC was anonymised and perturbed prior to being accessed to ensure that no personally identifying information was included in the analysis.

RESULTS

Within the public health care system in the Cape Town metro there were a total of 17 015 869 general outpatient encounters recorded during the study period. Of these, 8 979 195 (52.8%) were at the primary care level, 3 522 528 (20.7%) were at district hospitals and 4 514 146 (26.5%) at the

tertiary level. There were 37 608 individual morphine prescribing episodes involving 16 736 unique patients, with 4300 (11.4%) prescribing episodes at the primary care level, 5875 (15.6%) at the District Hospital level, and 27433 (72.9%) at the Tertiary level.

The majority (94%) of oral morphine was prescribed in solution form, with 6% prescribed as tablets. Morphine suppositories were prescribed 14 times in the study period. Patients were more likely to receive tablets at tertiary hospitals (9% of prescriptions) than at the primary care level (1% of prescriptions).

The most common strength of morphine solution prescribed was 20mg/5ml (n = 36876, 94.0 %), compared to 100mg/5ml (n = 966, 2.5%) and 10mg/5ml (n = 1394, 3.5%). The 10mg/5ml strength was used almost exclusively at the district hospital level (n=1385, 22% of district hospital level prescriptions). At the primary care level, the most common solution strength was 20mg/5ml (n = 6636, 99.9% of prescriptions) with the 100mg/5ml strength seldom used (n = 9, 0.1% of prescriptions). At the tertiary level the 20mg/5ml strength solution was prescribed 96.8% of the time (n=25352) and the 100mg/5ml strength solution made up 3.2% of prescriptions (n=847).

The amount of morphine issued per prescription was similar in tertiary hospitals (median 2000 mg, IQR 1800-4000mg) and at primary care level (median 2240mg, IQR 1600-4000mg), but lower at district hospitals (median 1200 mg, IQR 800-2240mg).

There was no statistically significant difference between the likelihood of a patient receiving morphine at a Community Day Clinic (CDC) and at a Community Health Centre (CHC) (CDC mean 39.0 morphine dispensing episodes/100 000 outpatient visits vs. CHC mean 59.9 morphine dispensing episodes/100 000 outpatient visits; mean difference 20.8, 95% CI -96.8 – 138.6; p = 0.69), and thus for further analysis CHCs and CDCs were grouped together as Primary Health Care (PHC).

Oral outpatient morphine prescription was much more common at the two tertiary hospitals included in the analysis (mean 605.2 morphine prescriptions per 100 000 outpatient visits) than at district hospitals (mean 182.1 prescriptions per 100 000 outpatient visits) or primary healthcare facilities (mean 56.6 prescriptions per 100 000 outpatient visits – see Table 1). Patients were more likely to experience continuity of morphine prescription at tertiary hospitals than at district hospitals or the primary care level, with an average of 4.11 morphine dispensing episodes per unique patient in tertiary hospitals, 2.03 in district hospitals and 2.47 at the primary care level.

TABLE 1: MORPHINE PRESCRIBING EPISODES/100 000 OUTPATIENT VISITS

Morphine prescribing episodes/100 000 outpatient visits (Mean; Range)			Statistical Comparisons (Mean Difference, 95% CI, p)		
Tertiary	District	Primary	Tertiary vs. District	Tertiary vs. Primary	Primary vs. District
605.2; 460.8-749.5	182.1; 49.6-447.3	56.6; 3.9-131.2	423.1, 289.0-557.1, p < 0.001	584.6, 422.6-674.6, p < 0.001	125.5, 54.0-196.9, p = 0.001

Within each level of the healthcare system, there was considerable variation in the amount of oral morphine prescribed. For example, when comparing the two tertiary hospitals included in the study, although they had similar numbers of general outpatients (395 900 vs. 397 747 unique patients during the study period) and had similar numbers of out-patient visits (2 296 516 vs. 2 217 630 visits respectively), there was considerable difference in the likelihood of morphine prescription between the two hospitals (460.8 vs. 749.5 morphine prescribing episodes/100 000 outpatient visits). The range of morphine prescribing episodes/100 000 outpatient visits was even larger among district hospitals (49.6 vs. 447.3) and Primary Care Facilities (3.9 vs. 131.2). Although the confidence intervals for the mean differences between levels of care are relatively broad, they achieve statistical significance – see Table 1.

A total of 131.7 kg of morphine was prescribed to outpatients in the Cape Town metro during the study period, corresponding to an annual morphine consumption of 12.33 mg/capita for the metro.

DISCUSSION

Within the state healthcare system in the Cape Town Metro, the per-capita oral morphine consumption was 12.33 mg/capita/year during the study period, which is considerably lower than the calculated need of 931.53 mEq mg/capita/year for South Africa in 2010 (23), suggesting that there is a considerable unmet need for strong opioids. This unmet need manifests in deaths in unnecessary suffering from severe pain and other debilitating symptoms.

Although the measurement of morphine consumption in this study is relatively crude, is clear from that, within the Cape Town Metro, patients are much more likely to access morphine at the tertiary than the primary level (605.2 vs 56.6 morphine prescribing episodes per 100 000 outpatient visits). While some of this difference can be explained by referral patterns within the metro – for example patients with suspected malignancies will be referred from primary to tertiary level for diagnosis and treatment – it is at odds with the South African *National Policy Framework and Strategy on Palliative Care 2017-2022* which suggests that most patients with palliative needs will access such services at the district or community level,(1) as well as international guidelines which suggest that most

palliative care should be provided at the primary care level close to patients' homes.(2, 29) Within this framework, even patients who are receiving treatment at the tertiary level for serious health conditions should also access palliative services close to home much of the time. Given that the overall use of morphine in the metro at all levels of care is significantly lower than international norms, this suggests a significant lack of access to strong opioids (and palliative care) at the primary care level and limited focussed palliative care services at primary care facilities. Further research is needed into identifying the specific barriers to the provision of palliative care at the primary care level in the Cape Town metro, but possible factors include a perception amongst healthcare workers that palliative care is more appropriately provided at a specialized level, a lack of confidence amongst primary healthcare workers in the provision of palliative care, a lack of a healthcare workers dedicated to palliative care provision and overwhelmed primary care facilities.

The discrepancy between the morphine prescription practices at the two tertiary hospitals included in the study, despite their similar size and numbers of outpatient visits, is an avenue for further research. It is possible that the higher rate of morphine prescription at one hospital is linked to the presence of a dedicated palliative care unit at that hospital, and there is some evidence that the presence of specialized palliative care services at a facility improve the overall quality of pain management. (30)

There is a need to develop robust indicators of palliative care service provision, and the comparison of oral morphine prescription rates to outpatient headcounts is a useful and practical indicator of access to palliative care and allows meaningful comparisons of prescribing practices between facilities and levels of care. An additional dataset covering 2019 to present has been generated, and the development of palliative care services at the primary care level within the metro can be monitored in comparison to this analysis.

LIMITATIONS

This analysis focused exclusively on oral morphine prescribed in an outpatient setting, as this is the formulation most used in a palliative care setting and the most used strong opioid in the South African public health system, and excluded other formulations (for example intravenous morphine) and other opioids (for example Tramadol and fentanyl), which limits the usefulness of comparisons with published per-capita opioid use, which is typically reported in milligrams of morphine equivalent (mEq) and includes all strong opioids excluding methadone. Including these formulations in future research would make international comparisons more meaningful, assuming that there is standardization of prescribing indications across countries and levels of care.

The comparisons between facility morphine prescribing rates are limited by the lack of inclusion of confounding factors in the analysis (for example the demographics of the patient population served by particular facilities and local referral patterns).

CONCLUSION

This analysis demonstrates both an absolute and relative lack of morphine use and palliative care services at the primary healthcare level in the Cape Town Metro, indicating a lack of palliative care integration in primary care. By identifying an indicator that allows comparison of morphine prescribing practices between facilities and levels of care the further integration and expansion of palliative services at the primary care level, in line with both South African and international guidelines, can be monitored and guided. This research can also form the basis for further investigation of the reasons for differences in prescribing patterns between facilities at the same level of care and identifying best practices of palliative care integration at the primary care level. Further research into the reasons for a lack of access to essential palliative care services at the primary care level in the metro and the rest of the country is needed.

If South Africa is going to achieve the goals of the National Policy Framework on Palliative Care, and reduce the 'perplexing and inexcusable' lack of availability of pain treatment and palliative care to much of the population,(3) it will be necessary to actively investigate and improve the provision of palliative care at the primary care level. One intervention that would inform the introduction of quality improvement initiatives in the provision of palliative care at the primary care level would be ongoing monitoring and morphine prescribing practices within the metro, with the development of clear morphine prescribing targets.

ACKNOWLEDGEMENTS:

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We acknowledge the contribution of pharmacy data from the Provincial Health Data Centre, Health Intelligence Directorate, Western Cape Government Health and Wellness. The PHDC acknowledges funding from the US National Institutes of Health (R01HD080465, U01AI069911), Bill and Melinda Gates Foundation (1164272; 1191327; INV-004657, INV-017293), the Wellcome Trust (203135/Z/16/Z), the United States Agency for International Development (72067418CA00023)

NT acknowledges funding from the Bill & Melinda Gates Foundation (The African Data and Biospecimen Exchange, INV-037558), the CIDRI-Africa Wellcome Trust grant (203135/Z/16/Z) and the UKRI/MRC (MC_PC_MR/T037733/1).

COMPETING INTERESTS

The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.

AUTHOR CONTRIBUTIONS

R.K. conceived of the research topic, contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript. N.T. contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript. F.P. generated the research datasets and contributed to the data analysis. G.H. contributed to the conception of the research topic, the design and implementation of the research, the analysis of the results and the writing of the manuscript.

FUNDING

The authors received no financial support for the research, authorship, and/or publication of this article.

DATA AVAILABILITY

The data used for this study are subject to a data sharing agreement with the Western Cape Government Department of Health and Wellness, which prohibits further sharing of patient-level data. Access to these and related data should be requested directly from this organisation and is subject to the necessary ethical and organisational approval processes.

DISCLAIMER

The views expressed in this article are the authors' own, and do not represent the official positions of any of the institutions with which they are affiliated.

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