# Diagnostic imaging and universal health coverage (UHC)

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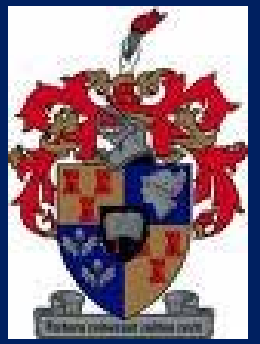
5-8 August 2018



# Diagnostic imaging and universal health coverage (UHC)

*or*

## *Does in-country access to diagnostic imaging resources reflect health coverage?*

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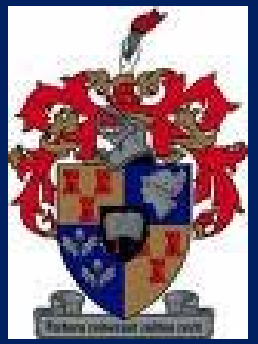

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## Background

The UN 2030 Agenda for Sustainable Development, adopted in September 2015, a clarion call for unified global action.

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To address

- economic
- social
- environmental priorities

reflected in the 17 Sustainable Development Goals **(SDGs)**

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***The message is clear***

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Worldwide inequalities must be addressed

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- eradicate poverty

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Healthcare is addressed in

3rd SDG (SDG3) with 13 targets

covering all major health imperatives, including UHC

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The fully grasp the challenge of UHC, we must have a better understanding of global inequalities

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Global healthcare inequalities exist

- **between**
- **within**

nations

**Between-country** disparities

- principally influenced by national wealth

- broadly stratified by WB income groupings

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LMICs by WB criteria

- home to 84% of the world population
- have 90% of the GBD
- but 12% of global health spending

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## Country-level mortality by WB classification

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Country-level mortality by WB classification

overwhelming majority of global deaths related to poverty and/or poor healthcare infrastructure in **LMICs**

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- **90%** of potentially preventable

- maternal / peri-natal,
- infectious / parasitic
- nutritional deaths globally

- occur in **LMICs**

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**In-country** health-care inequalities

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- largely due to disparities in resource distribution

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- largely due to disparities in resource distribution

- service provision to rural populations a particular challenge.

**Private healthcare** and in-country inequality?

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**Private healthcare** and in-country inequality?

Although private healthcare playing increasing role in service provision in all countries.....

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**Private healthcare** and in-country inequality?

Although private healthcare playing increasing role in service provision in all countries.....

differential access to private facilities contributes to in-country disparities, especially in LMICs

# The vision of UHC….

# The vision of UHC

Provide all people with quality, essential health services, without financial hardship

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Provide all people with quality, essential health services, without financial hardship

**? access to diagnostic imaging**

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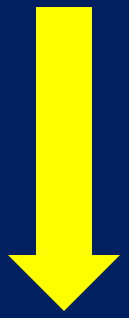
Healthcare technology, including diagnostic imaging



acknowledged as an essential component of any healthcare system.

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Basic radiological services

such as plain X-rays and ultrasound

required for effective primary care

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Access to basic imaging modalities should be seen as integral to achieving UHC

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The WHO postulated that 90% of all imaging requirements in LMICs

can be met by: 1 X-ray unit

1 ultrasound unit

for every 50,000 people

20 units per million people

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This figure may be a yardstick for evaluating country-level access to basic imaging services

Robust country-level data thus required to assess the extent to which countries meet these basic imaging resource targets

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In May 2007, the 60th UN WHA adopted Resolution 60.29, urging member states to

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*"collect, verify, update and exchange information on health technologies, in particular medical devices, as an aid to their prioritization of needs and allocation of resources".*

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However, striking paucity of imaging resource data at country level

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Although the WHO has published national estimates of high-end radiology equipment resources based on questionnaire surveys of member countries

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Although the WHO has published national estimates of high-end radiology equipment resources based on questionnaire surveys of member countries

*these data do not include basic X-ray equipment*

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Very little detailed work on in-country imaging resources globally

The drivers and determinants of these resources remain poorly understood

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The relationship between

- national healthcare expenditure
- national health indicators
- in-country access to diagnostic imaging

not been rigorously assessed

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Little global recognition of the potential role of registered diagnostic imaging equipment in reflecting country-level health coverage

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- assist in defining health coverage

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Our hypothesis is that the national registry of diagnostic radiology equipment can

- assist in defining health coverage
- evaluate equity in access to resources

***What is the basis for this belief?***

Radiology equipment is generally licensed for use in a specific location that has been evaluated and found to meet the infrastructural requirements for safe operation, such as adequate radiation shielding and appropriate electrical supply.

Movement of equipment typically requires re-licensing

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Diagnostic imaging equipment may only be operated by registered radiation workers.

An inventory of licensed equipment thus provides robust data on the number and distribution of units, as well as broader insights into the so-called “imaging enterprise”.

It is in this context that the Division of Radiodiagnosis in the Department of Medical Imaging and Clinical Oncology at Stellenbosch University embarked on this work.

# AIM

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Primary:

Conduct comprehensive analyses of licensed diagnostic imaging equipment in Southern African countries.

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Secondary (1):

Compare Southern African in-country imaging resources between themselves and with the WHO guidelines on basic imaging equipment resources.

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Secondary (2):

An assessment of the association between imaging resources, national economic indicators and national SDG target indicators for Southern African countries

# METHODS

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The analyses are conducted in the respective Southern African countries by citizens of the country, in collaboration with and with the full co-operation of the local Radiation Protection Authority (RPA)

The RPA databases interrogated for all diagnostic imaging equipment in clinical use

- general radiography
- fluoroscopy
- computed tomography (CT)
- mammography
- magnetic resonance (MR),
- angiography and
- positron emission tomography (PET)-CT

Data collated on a customized data sheet and stratified by imaging modality, geographical region, and health-care sector.

# RESULTS

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Completed audits for three countries

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Completed audits for three countries

South Africa (UMIC)

Tanzania (LMIC)

Zimbabwe (LMIC)

Further audits in progress

Zambia

Namibia

Malawi

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- general radiography
- fluoroscopy
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- mammography
- magnetic resonance (MR),
- angiography and
- positron emission tomography (PET)-CT

| | Plain X-ray units (n/$10^6$ people) | | | |
|---|---|---|---|---|
| | total | public | least : best by public sector region | public: private |
| Tanzania | 9 | 6 | 1:2.2 | 1:5 |
| Zimbabwe | 26 | 10 | 1:5 | 1:16 |
| South Africa | 35 | 20 | 1:2.6 | 1:5 |

Studies such as these provide useful medium-term planning data for a country's public sector imaging resources, based on the WHO guideline of 20 basic X-ray units/$10^6$ people.

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They also allow identification of discrepancies in concentration between the public-sector regions informing the optimal placement of any new equipment.

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Some findings are intuitive…..

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South Africa (UMIC) has a greater overall density of diagnostic imaging equipment than Zimbabwe and Tanzania (LICs)

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Public sector imaging resources broadly reflect national per capita healthcare expenditure...

.....the lower the expenditure, the lower the resources.....

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Public sector imaging resources broadly reflect national per capita healthcare expenditure...

.....the lower the expenditure, the lower the resources.....

***The relationship is not linear***

| | Plain X-ray units (n/$10^6$ people) | | | |
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| Tanzania | 9 | 6 | 1:2.2 | 1:5 |
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Although Tanzania has the lowest quantum of national *public sector* resources, it has the most equitable distribution of basic equipment, and the lowest overall discrepancy in access between the public and private sectors.

| Country | Tanzania | Zimbabwe | South Africa |
|---|---|---|---|
| population (millions) | 45 | 13[1] | 54 |
| [2]Rural population (%) | 68 | 67 | 34 |
| [2]GDP( US$) in billions (2017) | 52 | 18 | 350 |
| [2]Health expenditure per capita(US$) (2015) | 32 | 94 | 470 |
| [2]Total health expenditure as % of GDP (2015) | 6 | 10 | 8 |
| [2]Out-of-pocket expenditure (% of current health expenditure) 2015 | 26 | 26 | 8 |
| % population with private health insurance | 16 | 10 | 17 |
| [3]Maternal mortality/ 100000 live births (2015) | 398 | 443 | 138 |
| [3]Neonatal mortality/ 1000 live births (2015) | 19 | 24 | 11 |
| [3]Under 5 Mortality/ 1000 live births(2015) | 49 | 71 | 41 |
| [3]Life expectancy(2015) | 54 | 53 | 55 |
| Plain X-ray units/million people | 9 | 26 | 104 |
| Public sector plain X-ray units/ million people | 6 | 10 | 20 |

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Despite having more imaging resources than Tanzania, Zimbabwe has inferior healthcare indicators.

# CONCLUSIONS

It is hoped that our work provides some insight into how an analysis of diagnostic imaging equipment can reflect country-level health coverage.

Such work can potentially be integrated into future, broader, health service and health systems analyses, and is becoming increasingly important as diagnostic imaging assumes an ever more pivotal position at all levels of health care delivery.

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It is hoped that this work will stimulate similar analyses in other WHO regions and provide a framework for such work, thereby enhancing understanding of the determinants of imaging resources and utilization at country-level.

# Thank you