

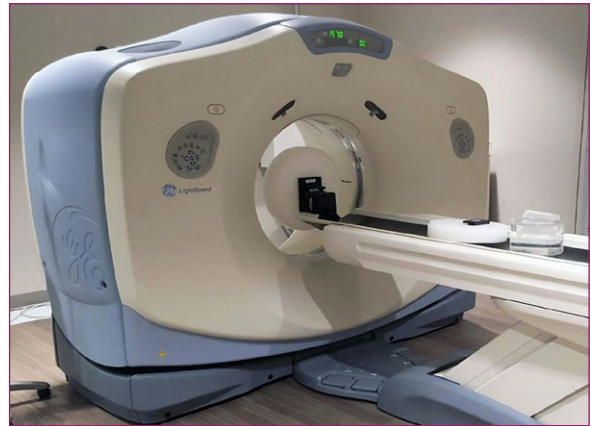
Radiology equipment resources in Africa

Elsie Kiguli-Malwadde looks at the relation between the distribution of Radiology Equipment to achievement of Universal Health Coverage

Diagnostics Medical Imaging plays an important role in diagnosis, treatment, and prognosis of disease, with imaging required for 30% of all medical conditions.¹ For imaging to be performed, radiology equipment has to be available. Imaging is an important part of Universal Health Coverage (UHC). Despite the growth in medical imaging there remains considerable global inequality in access to it. The United Nations 2030 Agenda for Sustainable Development calls for unified global action to address the economic, social and environmental priorities reflected in the 17 Sustainable Development Goals (SDGs).² Healthcare is particularly addressed in SDG3 – Good Health and Wellbeing. This goal has 13 targets, covering all major health imperatives, including UHC. The vision of UHC is to provide all people with quality essential health services. This is especially important for the African countries where most are far from achieving UHC.

Developing countries account for 84% of global population, 90% of the global disease burden, and 20% of global Gross Domestic Product (GDP), but only 12% of global health spending. At the same time, low-income countries (LICs) are struggling with a large burden of communicable diseases, while also confronting increases in the prevalence of non-communicable diseases and injuries, a trend that is likely to continue for some time.³ The availability of resources to meet these numerous health needs is limited. Africa is the world's second fastest-growing region, experiencing average annual GDP growth of 4.6% for the period from 2000 and 2016. For the current five-year period until 2022, Africa's real GDP is projected to grow at 3.9% annually. Despite sustained economic growth and impressive income poverty reduction in Africa, most countries in Africa are in the low-income bracket, as described by the World Bank.⁴

Healthcare technology, including diagnostic imaging, is acknowledged as an essential component of any healthcare system. Basic medical diagnostic imaging services, such as plain X-rays and ultrasound, are required for effective primary care of patients.⁵ Access to these basic imaging modalities should be seen as integral to achieving UHC. The World Health Organization (WHO) has postulated that 90% of all imaging requirements in low- and middle-income countries (LMICs) can be met by the provision of one X-ray unit and a single ultrasound machine for every 50,000



people, or 20 units per million people.² This figure may serve as the yardstick for evaluating access to basic imaging at country level. Robust country-level data are thus required to assess the extent to which countries meet basic imaging resource targets. In May 2007, the 60th UN World Health Assembly adopted Resolution 60.29, urging member states to “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”.⁶

There is little published work on in-country imaging resources globally, less still in Africa. This information is important to inform health planning in the countries, but is not currently available. The drivers and determinants of these resources remain poorly understood. Furthermore, the relationship between national healthcare expenditure, national health indicators and in-country access to diagnostic imaging has not been rigorously assessed. There are individual studies regarding availability in Africa, but for relatively few countries. Studies have been done in Uganda, South Africa, Tanzania and Zimbabwe.⁷ All except for South Africa show that the number of radiography units is lower than the WHO-recommended minimum; South Africa is reported to have a higher average level of availability, exceeding the WHO minimum recommendations, but access for the poor is limited by disparity by region and between public and private sectors.⁷

In Uganda it was reported that there were 15.5 units of equipment per one million people, which is less than the WHO recommendation of 20 units per one million. It is also less than what has been reported from South Africa and Zimbabwe, but better than what has been reported from Tanzania. The good indicators reported from South Africa and Zimbabwe might possibly be

Elsie Kiguli-Malwadde is the Director Health Workforce Education and Development at the African Center for Global Health and Social Transformation (ACHEST).

due to the fact that those countries are putting in more resources to cater for radiology equipment for their population since their health expenditure per capita is more than that of Uganda and Tanzania.

However, the fact that the radiology equipment distribution per population in Uganda, Tanzania and Zimbabwe is still below the recommended WHO number is a point of concern. If these countries are to satisfactorily attain SDG3, the amount of equipment per million population needs to increase through provision of the different radiology equipment across the country. This calls on the Ministries of Health of respective countries to work together with other stakeholders to increase funding if these countries are to attain the WHO recommended figure.

A country's official national registry of diagnostic radiology equipment can assist in defining health coverage. Diagnostic imaging equipment that uses ionizing radiation is generally licensed for use in a specific location. Such locations have typically been formally evaluated and found to meet the infrastructural requirements for safe operation, such as adequate radiation shielding and appropriate electrical supply. Relocation of radiology equipment typically requires re-licensing and infrastructural development. Furthermore, imaging equipment using ionising radiation are only operated by a registered radiation worker. An inventory of licensed imaging equipment thus provides robust data on the number and distribution of units, as well as broader insights into the so-called imaging enterprise. Nonetheless, there appears to be scant global recognition of the potential role of registered diagnostic imaging equipment in reflecting country-level health coverage.

Conducting an audit is important for planning purposes for the health care system if the number, type and functional status of the equipment is to be known. Findings from such audits are potentially useful to the Ministries of Health and also provide a basis for such audits in other developing countries.

It is well documented that radiology equipment distribution is linked to provision of efficient Primary Health Care which is important for meeting SDG 3 targets and consequently attaining Universal Health Coverage.

These few studies conducted in sub-Saharan bring to light several issues that might potentially be applicable across different low-resource settings. The first issue relates to the equipment to population ratio which is below the WHO recommended ratio for three out of four countries. Attaining the WHO recommended numbers may require deliberate policy formulation and planning, together with strengthening the public-private-partnerships. Allocation of more funding to radiology and imaging across the countries is a factor that needs to be brought to light for policy makers.

Therefore, despite the challenges with financing and maldistribution of radiology equipment, some improvements are still needed. For example, there is need to find ways of how to effectively utilize the available limited supply of imaging equipment for impacting patient management and improve treatment outcomes.



This calls for evidence-based planning and purchasing of equipment. The disease burden within communities and at health facilities dictate on the type, level of technological sophistication and number of equipment to be purchased. Use of evidence-based clinical imaging guidelines is also likely to improve appropriateness of imaging decisions and supposedly influencing management and treatment decisions, and hopefully impacting treatment outcomes.

Such studies are important for the region and would be even better if key stakeholders responsible for purchasing, financing and planning for this equipment are interviewed as key informant interviews. This would provide a richer holistic picture and explanation for some of the findings in the four countries.

Conclusion

Africa still lags behind in UHC and there is evidence that it equally lags behind in population access to and distribution of Radiology Equipment which consequently affects the implementation of primary health care. It is imperative that African countries look at their equipment distribution and assess how they can improve it as this is likely to impact their achievements in meeting the SDG targets.

References

- 1 Welling RD, Azene EM, Kalia V, Pongpirul K, Starikovskiy A, Sydnor R, et al. White Paper Report of the 2010 RAD-AID Conference on International Radiology for Developing Countries: Identifying sustainable strategies for imaging services in the developing world. *J Am Coll Radiol* 2011;8:556–62.
- 2 United Nations. Transforming our World. The 2030 Agenda for sustainable development. A/RES/70/1. <https://sustainabledevelopment.un.org/post2015/transformingourworld/publication>. Accessed 16 June 2019
- 3 World Bank. Health Transitions, disease burdens, and health expenditure patterns. 2005. Accessed 02 March 2021
- 4 <https://www.odi.org/events/4592-africas-economic-growth-new-global-context> Accessed March 2021
- 5 Health Sector Development Plan 2015/16 - 2019/20. <http://health.go.ug/content/health-sector-development-plan-2015/16-2019/20>. Accessed 16 September 2019
- 6 World Health Organization. Local production and technology transfer to increase access to medical devices: addressing the barriers and challenges in low- and middle-income countries. http://www.who.int/medical_devices/1240EHT_final.pdf. Accessed March 2021.
- 7 Elsie Kiguli-Malwadde, Rosemary Byanyima, Michael Grace Kwooya, Aloysius Gonzaga Mubuuke, Roy Clark Basimwa, Richard Pitcher: An audit of registered Ugandan radiology equipment resources Pan African Medical Journal. 2020;37:295. Published on 02 Dec 2020.