

## The importance of medical imaging and nuclear medicine in universal health coverage



Good cancer care requires medical imaging. But the unequal access to this life-saving technology remains staggering. This is why the International Atomic Energy Agency (IAEA), in its effort to extend high-quality medical imaging and nuclear medicine to all people, convened its first formal meeting for the *Lancet Oncology* Commission on medical imaging and nuclear medicine in 2018.

Although we knew the scale of the inequality, to understand where exactly the medical imaging infrastructure gaps lay, we first had to overcome the paucity of country-specific global data. In 2019, the IAEA launched the IMAGINE (IAEA Medical imAGInG and Nuclear mEdicine) global resources database, which comprehensively maps the imaging landscape for both equipment and human resources.

The IMAGINE data show that one CT scanner serves an average of 25 000 people in high-income countries compared with 1.7 million people in low-income countries. For PET scanners, the disparity is even greater: in high-income countries, one PET scanner serves 300 000 people compared with 167 million people in low-income countries.

However, measuring the number of scanning machines in a particular country is not enough to guarantee a specific projected outcome. Another major factor is how this technology changes management. For example, staging with PET can avoid futile thoracotomies for one in five patients with suspected non-small-cell lung cancer.<sup>1</sup> Similarly, the National Oncologic PET Registry showed that PET scan findings substantially alter clinical management for more than a third of the patients with non-small-cell lung cancer, lymphoma, oesophageal cancer, and head and neck cancer who are assessed.<sup>2</sup> Such nuanced quality metrics have led to major improvements in patient-centred health-care delivery models, and to the progressive inclusion of medical imaging and nuclear medicine parameters into these models which incorporate the digital maturity of a country and can inform strategic planning.

As a prelude to this Commission report, the *Lancet Oncology* published a stage-specific cancer survival microsimulation model for 200 countries

and territories. This model showed that for 11 cancers “Simultaneous expansion of treatment, imaging, and quality of care could improve 5-year net survival by more than ten times in low-income countries...and could more than double 5-year net survival in lower-middle-income countries...”<sup>3</sup> Meanwhile, a scale-up of relevant imaging modalities “...together with expanded treatment and quality of care could improve 5-year net survival for cervical cancer...”<sup>4</sup>

Now is the time to invest in imaging and to bear in mind that such initiatives can only be effective when used with laboratory and pathology services, and treatments, which also have substantial inequalities. We know that 50-70% of all patients with cancer need radiotherapy, but more than half of the patients with cancer who require radiotherapy in low-income and middle-income countries (LMICs) do not have access to it. This sombre statistic rises to more than nine out of ten patients in low-income countries.<sup>5,6</sup>

In conclusion, what we know is that health systems endowed with the correct tools deliver better results<sup>7</sup> and that LMICs lack these tools. Therefore, this Commission report’s priority is to incorporate imaging diagnostics in essential benefit packages in the context of universal health coverage, with a particular focus on LMICs.

The past year of battling with the COVID-19 pandemic has underscored the importance of having a strong medical imaging base. For this reason, WHO and the IAEA joined with partners in publishing technical specifications for CT, x-ray, and ultrasound for COVID-19. Such easy-to-implement modalities should be considered first in a stepwise manner for the improvement of medical imaging capacity for high-priority clinical indications, such as cancer.

The increase in the importance of medical imaging in public health during the COVID-19 pandemic could lead to further strengthening of the medical imaging capacity of health systems. This, however, needs to be addressed in a structured and systematic manner because suboptimally strengthened health systems compromise not only the health of individual patients but also the health of entire nations.<sup>8</sup>



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For the **IMAGINE global resources database** see <https://humanhealth.iaea.org/HHW/DBStatistics/IMAGINE.html>

For **CT and PET scanner data** see <https://humanhealth.iaea.org/HHW/DBStatistics/IMAGINEMaps.html>

For more on **digital maturity** see <https://www.digitalhealthindex.org/>

For the **technical specifications for imaging devices** see [https://www.who.int/medical\\_devices/priority/Chapter\\_8\\_20167\\_WHO\\_Priority\\_medical\\_devices\\_list\\_for\\_COVID\\_19\\_response\\_8.pdf?ua=1](https://www.who.int/medical_devices/priority/Chapter_8_20167_WHO_Priority_medical_devices_list_for_COVID_19_response_8.pdf?ua=1)

For the **stepwise implementation of imaging** see <https://www.iaea.org/sites/default/files/19/10/milestones-document-2019.pdf>

For **medical devices for cancer** see [https://www.who.int/medical\\_devices/publications/priority\\_med\\_dev\\_cancer\\_management/en/](https://www.who.int/medical_devices/publications/priority_med_dev_cancer_management/en/)

My heartfelt congratulations go to the Commission team on this much awaited *Lancet Oncology* Commission report,<sup>9</sup> which is a call to action for the benefit of patients worldwide: “Science and technology are not the barriers to worldwide equitable scale-up of effective cancer imaging diagnostics; rather, achieving equitable scale-up is a matter of vision and will.”

The IAEA looks forward to further participation in both the vision and coordinated will towards realising Sustainable Development Goal 3, from the global level to the grassroots level. We will continue our work in the assessment of cancer control capabilities, including in diagnostic imaging and subsequent support for cancer management provided through the IAEA’s programmes. Collaboration is strength.

On behalf of the IAEA, it is my earnest wish that no patient with cancer or any patient for whom evidence-based management includes medical imaging should lack access to it ever again.

I declare no competing interests.

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