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31 August 2023

Committee Secretary
Senate Community Affairs References Committee
Parliament House
CANBERRA ACT 2600

Dear Secretary,

Thank you for the opportunity to provide a submission to the *Inquiry into Equitable access to diagnosis and treatment for individuals with rare and less common cancers, including neuroendocrine cancer*.

ANSTO is the custodian of Australia's national nuclear infrastructure, including the Open Pool Australian Light-Water Reactor (OPAL) and the Australian Synchrotron. ANSTO uses its infrastructure, capabilities and expertise to optimise the beneficial impacts of nuclear science on human health.

ANSTO produces over 80% of Australia's nuclear (radiation) medicine at its Lucas Heights campus. Some of this medicine is used in the screening, diagnosis and treatment of cancers, including rare cancers. Ensuring sovereign supply of these important medicines continues to be vital.

ANSTO also plays a role in supporting the development of novel radiotherapy, radiopharmaceuticals, radioisotopes and particle therapy.

ANSTO's Australian Synchrotron is one of Australia's most significant pieces of scientific infrastructure. It is a particle accelerator, which produces a powerful source of light (x-rays and infrared radiation). The facility has ten beamlines which harness that light to support a broad range of research applications, including medical research.

- The Imaging and Medical Beamline is developing tools for more accurate cancer diagnosis (e.g. Breast CT project using X-phase contrast imaging to better detect and diagnose breast cancer). The same facility is also being used to investigate more effective cancer radiation treatments, such as microbeam radiation therapy, which may be used to treat inoperable brain and spinal cancers.
- The Macromolecular Crystallography (MX2) beamline has been used by Australian scientists to investigate new imaging probes for neuroendocrine tumours and glioblastoma.

With the right funding and support these novel synchrotron x-ray tools can specifically target rare and less common cancers to demonstrate clinical impact.

ANSTO has played a key role in convening efforts to introduce particle therapy methods into Australia. Instead of the x-rays used in standard radiation therapy, particle therapy uses protons or heavy ions such as carbon. The particles release their energy more precisely at the site of the tumour. This means that the risk of harm to tissue around a tumour is lower than with standard radiation, making the treatment suitable for cancers near critical parts of the body, such as the eyes, brain and spinal cord. As well as being very precise, carbon ions deposit more energy to the tumour than protons or standard radiation. This means carbon ion therapy can be more effective at killing tumours that are

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resistant to standard radiation. Other particle beam methods such as electron beam therapy and neutron-based methods are also of significant interest for the treatment of hard / impossible to treat cancers such as brain tumours in children.

ANSTO has also developed methods around enhancing particle therapy treatment using the internally generated neutron flux arising from such treatment. These also show promise for the treatment of rare forms of cancer and are currently being investigated for clinical trials.

I hope this information is useful to the Inquiry. Please do not hesitate to contact me at in relation to this submission.

Yours sincerely

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