

## Towards a robust supply chain for medical radioisotopes

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### **Background / objective:**

Demand for nuclear medicines for diagnostic, therapeutic and theranostic use is growing fast, driven by the development of highly effective novel drugs against cancer and life-threatening diseases. Whereas molybdenum-99 is the most commonly used isotope for diagnostic SPECT scans, it is expected that lutetium-177 will be the main workhorse in the coming decades for therapeutic applications. However, security of supply is at risk, especially for therapeutic isotopes, as radioisotopes are irradiated by only a handful of aging reactors, some of which will stop production in the coming decade. The objective of this paper is to assess if any shortage of production may emerge and to identify options for creating a robust supply chain.

### **Methodology:**

PALLAS has built a bottom-up model to estimate potential global demand for medical isotopes, based on an analysis of medicines under development, their indications and potential adoption among patient populations. PALLAS has also made a forecast model of available reactor capacity for both diagnostics and therapeutics. Finally, PALLAS has developed scenarios to assess any gap in production capacity.

### **Results and discussion:**

The resulting demand and supply scenarios indicate that while the number of diagnostic scans will grow moderately, the number of therapies could grow steeply to several hundred thousand by 2030. PALLAS research shows that the available capacity for a key isotope such as lutetium-177 will not be able to meet demand as of 2025. As no effective alternative production methods exist for most therapeutic isotopes, it is clear that new reactor capacity will be required.

### **Conclusion:**

The PALLAS foundation was initiated with a loan from the Dutch government with the objective of constructing a new nuclear reactor, to replace the current High Flux Reactor in Petten, the Netherlands, for the production of medical isotopes and research, but under the explicit condition that the reactor be privately financed. Driven by the need for private investment, the PALLAS team has developed a market-oriented approach and value proposition that will help transform the nuclear isotope sector.

Source: PALLAS research

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