News briefs

NEA activities on medical isotope supply issues

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Medical radioisotopes play a vital role in modern medical practices. One of their principal uses is for nuclear diagnostic imaging techniques. These techniques are powerful and non-invasive, allowing the identification of common diseases such as heart conditions and cancer at an early stage, tracking disease progression and providing predictive information about likely success of a therapy. Such techniques enable precise and accurate management of the disease and may significantly assist in the medical decision-making process, for example removing the need for surgical intervention to obtain diagnostic information. Every year, 46 million people are estimated to benefit globally from such nuclear medicine testing.

However, over the last few years there have been a number of supply shortages of Molybdenum-99 (Mo-99) and its decay product, Technetium-99m (Tc 99m), the most widely used medical radioisotope. These isotopes decay within a matter of days; therefore they must be produced continually in order to meet demand. Most recently, the unexpected extended shutdown of Canada's NRU research reactor – which produces approximately 35 percent of world Mo-99 supply – has compounded existing concerns regarding the supply reliability of these medical radioisotopes. Currently, five reactors between 42 and 52 years old produce over 95 percent of the world's supply of Mo-99 and face challenges in maintaining a continuous supply to the health community. As outlined above, disruptions in this supply chain have affected the availability of vital medical testing for millions of patients around the world.

On 29-30 January 2009, the NEA hosted a workshop on Security of Supply of Medical Radioisotopes at the request of the Government of Canada. The workshop assembled an international group of experts to identify challenges faced in providing a reliable supply of Mo-99 and Tc-99m and measures that should be taken to ensure such reliability.

Workshop participants discussed a wide variety of challenges: the management of existing capacities and maximisation of these capacities in times of shortages; the economic validity of the current model of producing isotopes; flexibility and efficiency of the supply chain; regulatory requirements; and demand-side management. They identified the need to develop, deepen and share, as appropriate, contingency plans for future supply disruptions. They also focused on the longer term and on the need to engage health authorities to reduce uncertainties regarding long-term demand and the means by which to encourage more investment in production and greater spare capacity in the system.

At the workshop, there was unanimous support for the establishment of a working group to carry forward the conclusions of the workshop and to identify the practical measures that should be taken. This working group, the High-level Group on the Security of Supply of Medical Radioisotopes (HLG-MR), was established by the NEA following endorsement by the Steering Committee for Nuclear Energy, and is comprised of 20 experts from 11 countries, the European Commission and the International Atomic Energy Agency. The group will oversee and assist, where necessary, efforts of the international community to address the challenges of medical isotope supply reliability.

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Photos courtesy of AECL, Canada

The NRU research reactor where approximately 35% of world Mo-99 supply is produced.

The HLG-MR has begun work towards increasing the reliability of supply, agreeing to focus first on ensuring that supply and demand information is available and shared amongst all stakeholders and that the available supply is utilised as efficiently as possible. It will then start assessing options to increase short-, medium- and long-term production. As part of the examination of long-term production options, due consideration will be given to encouraging the development of infrastructure using low-enriched uranium.

A key issue raised during HLG-MR discussions and through other initiatives is the possibility of a market failure in the upstream supply chain, whereby it is not economically sustainable for current reactors to produce Mo-99, nor is there sufficient incentive based on the current economic structure to develop additional reactors in order to produce additional Mo-99. As a result, the NEA is undertaking an economic study of the upstream Mo-99 and Tc-99m supply chain. This study is intended to develop a solid factual basis to determine whether there has been a market failure in the supply chain. If so, the study will provide recommendations on how to address this failure in order to create an environment that encourages sufficient investment in medical radioisotope production and related infrastructure. Recommendations may also focus on the appropriate balance between benefits and costs of Mo-99 provision and a better allocation of responsibilities for costs between public and private stakeholders.

The NEA and its HLG-MR recognise that there are a number of other fora also addressing the reliability of medical isotope supply, and care is being taken to ensure that efforts are not duplicated. The NEA's goal in getting involved in this issue is to bring added value to the ongoing work and to support member countries. Bringing the international community together to discuss, share and learn, and applying NEA expertise on nuclear issues and economic studies, represent important contributions to the current global effort. ■