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Response to the Letter from Dr. Geoff Currie

I would like to thank Dr. Currie for his interest in the recent JNMT article: "The medical isotope crisis: how we got here and where we are going" (vol. 42, no. 4, pp. 245-248). He is correct in pointing out that the article has a "Northern Hemisphere" perspective, which in reality reflects the major sources of supply and demand for ^{99}Mo. He also correctly points out the fact that the OPAL reactor supplies a not insignificant source of approximately 8% of the world demand for ^{99}Mo, some of which is shipped to the northern hemisphere. There was no intention of negating the role of the many regional reactors; rather the intention of the article was to highlight the non-reactor alternatives under development, which are designed to help wean the world off of our current paradigm of reactor-sourced, and thus government-subsidized, isotope production.
As I stated in my article (1) "*The existing infrastructure of large reactors will be upgraded to increase their production capacity, which should cover the short-term concerns.* While not explicitly stated, the ANSTO-OPAL reactor was inferred in this statement, especially since there are plans for upgrading this reactor with a goal of meeting ~30% of the world demand with perhaps future increases.

All will agree that the cessation of the ^{99}Mo production at the NRU (or any of the current suppliers) in 2016 represents a major concern, and will lead to supply shortages. These risks will remain as long as the world maintains a centralized production model in and aging infrastructure for a short-lived radioactive product. The supply of ^{99}Mo is, and will continue to be fragile. Seeking of alternatives to ^{99}Mo/^{99m}Tc has been a priority and this article was aimed at showing that even a number of efforts (including reactors) are potential solutions on a regional, national and perhaps international level.

I would like to emphasize that there have been several recent developments in 'non-neutron' production methods of both ^{99}Mo and ^{99m}Tc as highlighted in the original article. In addition to the activities at MURR, contracts between NorthStar and SHINE with large-scale private sector partners, provides for avenues to decentralize supply, at least in North America. Also, significant developments in Canada toward direct-cyclotron production of ^{99m}Tc add to the mix of options. The two Canadian groups have demonstrated multi-Ci production of ^{99m}Tc, sufficient to supply urban centres on a daily basis (>1.10 TBq, 30 Ci/irradiation). Such solutions enable a decentralized production model with the potential of maintaining inter-regional redundancy to help stave off future, wide spread supply shortages. Those wanting to be in control of their own supply reliability will have options.

In closing, it is my hope that readers will come away from these article(s) and opinion pieces with the impression that there remains a significant risk in the existing ^{99m}Tc supply chain, and concern about the viability of an aging global reactor infrastructure should be taken seriously. With the development of a number of alternative production methods from many sources (neutron, proton and electron-based methods included) there is optimism that a full-cost-recovery solution exists and that the future of isotope production will be dictated by a free market, unperturbed by subsidy.

1. Ruth, T 2014, The medical isotope crisis: how we got here and where we are going, J Nucl Med Technol, vol. 42, no. 4, pp. 245-248.
2. vanNoorden, R 2013 Radioisotopes: The medical testing crisis. Nature 2013 (Dec), 504:202-204.
3. http://www.triumf.ca/research-highlights/experimental-result/team-demonstrates-solution-tc-99m-crisis

Thomas J. Ruth, PhD, Senior Research Scientist, Emeritus, TRIUMF and BC Cancer Agency