Future Supply of $^{99}$Mo, $^{99m}$Tc
Mark Frontera, GE Global Research Center
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Aaron Bernstein $^b$, Tomas Eriksson $^d$, Mathilde Figon $^b$, Karin Granath $^d$, Martin Orbe $^d$, Charlie Shanks $^b$, Erik Stromqvist $^d$, Julie Woodland $^c$, Peter Zavodszky $^a$, Uno Zetterberg $^d$

$^a$ GE Global Research Center, Niskayuna, NY 12309 USA
$^b$ GE Healthcare Global Supply Chain, Arlington Heights, IL 60004 USA
$^c$ GE Healthcare Life Sciences, Amersham, England UK
$^d$ GE Healthcare Cyclotrons, Uppsala, Sweden

Imagination at work.
GE Healthcare Nuclear Medicine Presence

**Life Sciences & Global Supply Chain**

- 99mTc based Products on global market
- 99mTc Generators serving 38 Countries
- 31 United States Radio pharmacies

**Nuclear Cameras**

- +5,500 Cameras sited
- Multiple Product Offerings

**PET Cyclotrons**

- 330 Cyclotrons sited
- 10 MeV, 16 MeV Platforms

**Illustrations:**
- Brain, Sentinel Lymph Nodes, Heart, Lungs, Kidneys, Liver, White blood cell labelling, Rheumatoid arthritis
- 99mTc Technetium Generators Cardiology, Neurology, Oncology Other diseases
Today’s Supply Chain
Tomorrow’s Supply Chain?
Medical Cyclotron Installed Base
Cyclotron $^{99m}$Tc Production

Some Challenges: Regulatory Path & $^{100}$Mo Supply Model

<table>
<thead>
<tr>
<th>Beam Current (µA)</th>
<th>Production Volume (Ci)</th>
<th>Estimated Number of 25 mCi dose per 6 hour run (assuming 50% loss)</th>
</tr>
</thead>
<tbody>
<tr>
<td>130 (IB)</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>250 (IB Upgrade)</td>
<td>10</td>
<td>200</td>
</tr>
<tr>
<td>400 (Future)</td>
<td>15</td>
<td>300</td>
</tr>
</tbody>
</table>

(Left) TRIUMF-designed, GE PETtrace solid target capsule; (right) with mounted $^{100}$Mo target
Reference: P Schaffer, personal communication.

(Left) Enriched $^{100}$Mo target mounted on a copper test backing; (Right) enriched $^{100}$Mo after 6hr, 130 µA irradiation (Schaffer, 2014)
In Summary

• Global supply chain challenges of $^{99}\text{Mo}$, FCR, and conversion to LEU production will stress the current medical imaging supply chain.

• GE is positioned to maintain its current role as a provider of nuclear cameras, agents, $^{99}\text{Mo}$ generators, and radio pharmacies.

• With regulatory and support establishing a $^{100}\text{Mo}$ supply chain, a global introduction of cyclotron produced $^{99m}\text{Tc}$ may enable a stronger ORC position and local supply independence in 2017.
  • Also enables additional tolerance to program, economic, and engineering delays of the alternate production techniques entering the market from 2016 to 2020.

• Government, Industry, Academia and Entrepreneurs must collaborate to provide a stable supply of isotopes from today to beyond 2020.
Works Cited

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