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ISOTOPE

99

Mo

Molybdenum

Molybdenum-99

The World's Most Commonly Used Diagnostic Isotope

Feature of the Month

Molybdenum-99

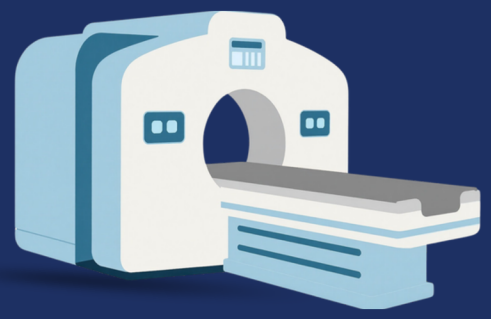
Molybdenum-99 (Mo-99) is a foundational isotope in nuclear medicine. It plays a significant role in modern medicine and diagnostic procedures worldwide.

How It Works

Mo Molybdenum → beta decay → **Tc** Technetium

Mo-99 is the parent isotope of technetium-99m (Tc-99m), a short-lived isotope which is used as a radiotracer for SPECT imaging.

Diagnostic Capabilities



80% of radiotracers for SPECT imaging are powered by Tc-99m, including cardiac perfusion scans.

40 million+ patient scans are supported by Tc-99m each year to detect cancers and heart diseases.

Supply & Production

The current global supply of Mo-99 faces challenges due to its reliance on a small number of aging research reactors.

Canadian Isotope Innovation:
New Production Methods

Scientists at BC Cancer, TRIUMF, and the University of British Columbia, along with other Canadian colleagues, are the first in the world to obtain regulatory approval to produce Tc-99m for clinical use at regional cyclotron facilities in Canada. This milestone marks a new era for access for patients in Canada who rely on these isotopes for critical diagnostic procedures.

Molybdenum-99

Canada's Mo-99 History

1970
First Mo-99 is produced at the National Research Universal Reactor (NRU).

1975
Large scale commercial production of Mo-99 begins at the NRU.

1970-80s
The McMaster Nuclear Reactor begins production of Mo-99.

1990s
The NRU Reactor at Chalk River establishes itself as a major global supplier of Mo-99.

2000s
By 2005, 96% of the world's Mo-99 is produced at just six global research reactors, including NRU.

2018
The NRU is officially retired. Canada begins relying on foreign sources for Mo- 99.

DID YOU KNOW?

At various times in its history, the NRU provided more than **80%** of the world's supply of Mo-99. The NRU produced enough Mo-99 for over **400 million scans.**

Global Market Projections

The International Atomic Energy Agency reported that the world demand for Mo-99 is estimated at

6000

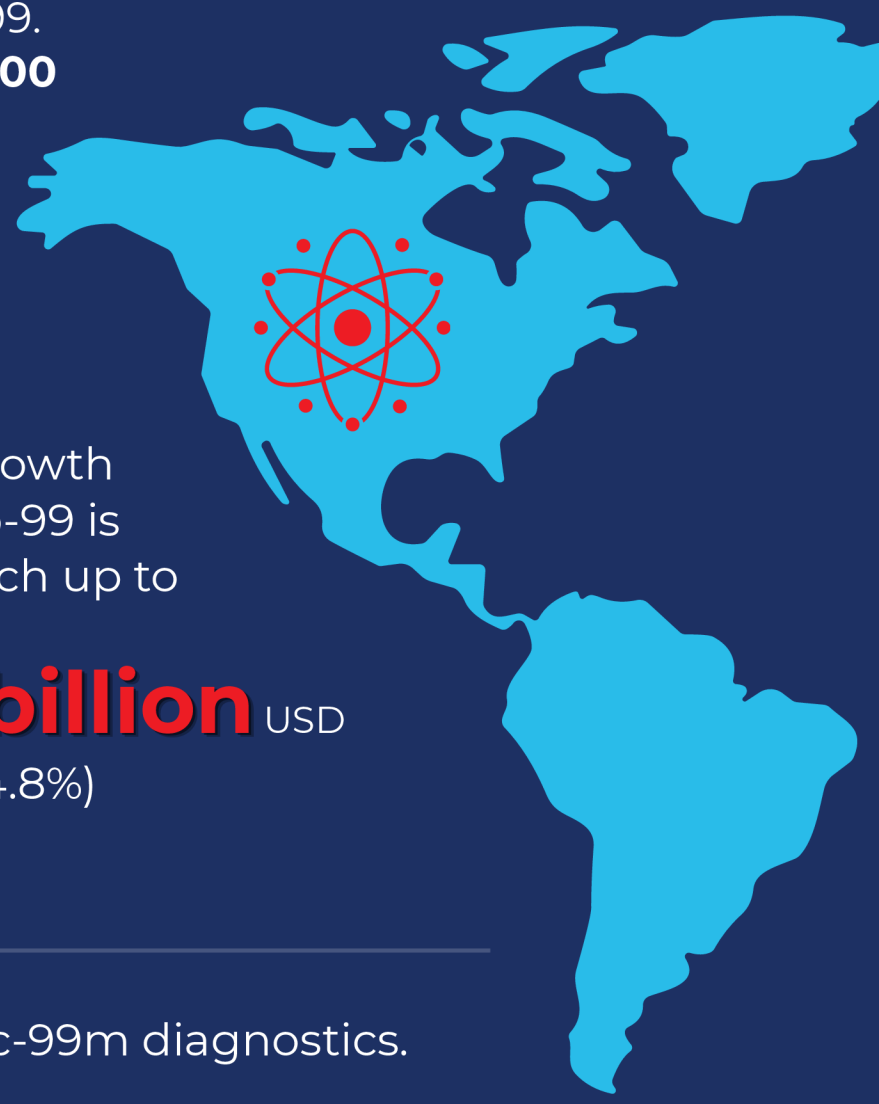
Ci and is expected to increase by 5% per year

According to Growth Plus Report, Mo-99 is expected to reach up to

5.95 billion USD

by 2031 (CAGR 4.8%)

North America accounts for **45%** of the demand for Tc-99m diagnostics.



Molybdenum-99

Re-establishing Canada's Mo-99 Leadership

Following the retirement of the NRU reactor, Canada has largely relied on foreign imports of Mo-99, with only a few research reactors worldwide producing Mo-99.

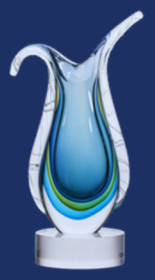
To combat supply demands and re-establish Canada's Mo-99 leadership, Laurentis Energy Partners, in partnership with BWXT Medical Ltd., installed a Target Delivery System at Ontario Power Generation's (OPG) Darlington Nuclear Generating Station (NGS) to produce a variety of isotopes, including Mo-99.

Major Canadian Isotope Milestone

ONTARIO POWER GENERATION · BWXT Medical · Laurentis Energy Partners

Historically, Mo-99 has been produced by research reactors using uranium as the starting material. In comparison, BWXT Medical's Tc-99m generator will use natural molybdenum targets irradiated by Laurentis Energy Partners at OPG's Darlington NGS, greatly reducing waste by-products.

This will make Darlington NGS the **first commercial-scale reactor in North America** to produce Mo-99 with the capacity to meet the **entire North American demand** of Mo-99.



In recognition of this accomplishment, the **2023 CNIC Medical Isotope Milestone Award** was jointly presented to Ontario Power Generation, Laurentis Energy Partners, and BWXT Medical.

This milestone will allow Canada to strengthen its historic global leader in the production of Mo-99.

Due to the unique design of Darlington's CANDU reactors, medical isotopes can be produced without interrupting the generation of clean energy.

DID YOU KNOW?

References

BWXT Medical. Target Delivery System

Cancer patients around the world to benefit from new technology launching in B.C.

Darlington Nuclear now capable of producing life-saving medical isotopes

Darlington to become new source of life-saving medical isotopes

Laurentis Energy Partners. Nuclear products the world needs

New technology for producing life-saving medical isotopes approved for clinical use by Health Canada

NRU reactor recognized for outstanding contributions in the field of isotopes

Nuclear Newswire - The Mo-99 Story

Production technologies for molybdenum-99 and technetium-99m

Shine. Vital Diagnostic Isotope. Molybdenum-99

Shine working toward U.S. production of Mo-99 for SPECT imaging

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