MIRION Connect 25

Annual Users' Conference

INNOVATION AT WORK

Connecting Visionaries in Radiation Safety, Science and Industry

Conrad Orlando Resort, FL –July 28th – August 1st

MIRION TECHNOLOGIES

Radiopharmaceutical Track

Plenary Session

Steve Mettler

President, Capintec, a Mirion Medical Company

Mirion Connect | Annual Users' Conference 2025

Orlando, Florida

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Innovation at Work

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The Common Good

- Mirion Vision and Values
- Top Diseases by Mortality
- Economic Costs of Chronic Diseases
- What if Radiopharmaceuticals can … ?

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MIRION MISSION

To harness our unrivaled knowledge of ionizing radiation for the greater good of humanity

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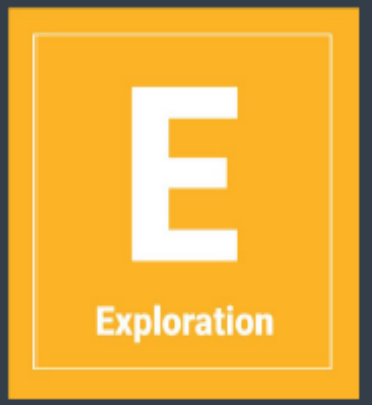
Mirion Values

Our ethical principles inform our actions, championing an unyielding adherence to doing what is right.

Our commitment to employees, customers, and shareholders is unwavering as we recognize the vital role each plays in our success.

We proactively take ownership of decisions and outcomes, fostering an environment of dependability, empowerment, safety and personal growth.

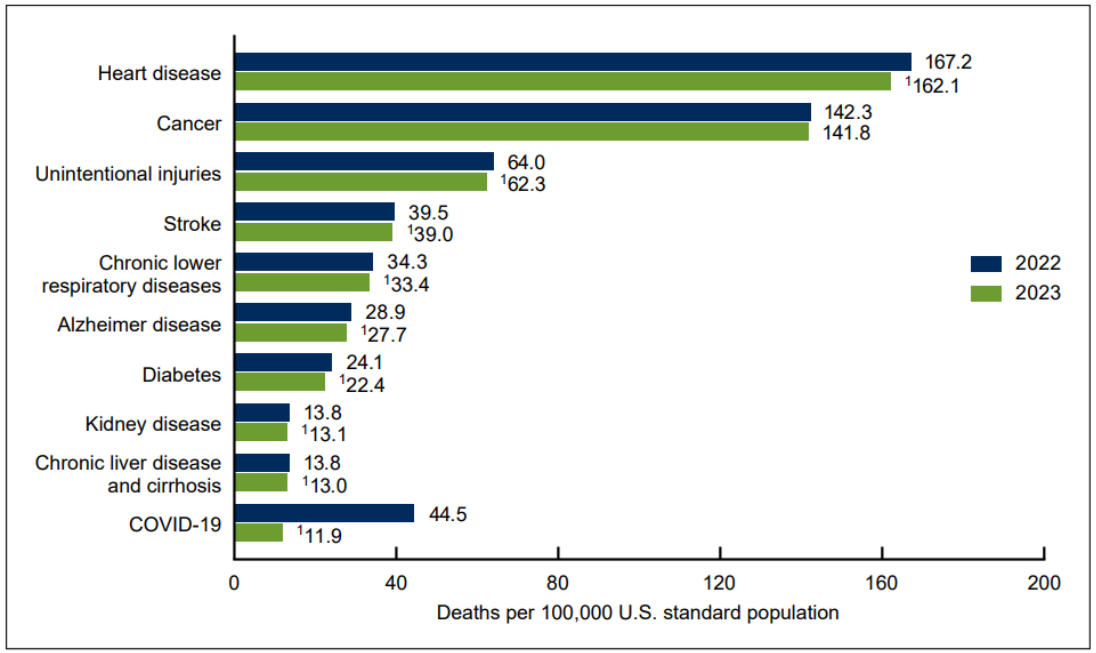
We embrace honesty and teamwork, celebrate diverse perspectives, and seek to create an engaged culture where all contributions are valued.



Our inventive spirit drives us to challenge conventions, discover new horizons, and redefine what's possible within our business and throughout the world.

Top Diseases by Mortality Rate

Figure 4. Age-adjusted death rate for the 10 leading causes of death in 2023: United States, 2022 and 2023



[1]Statistically significant decrease from 2022 to 2023 ($p < 0.05$).
NOTES: A total of 3,090,964 resident deaths were registered in the United States in 2023. The 10 leading causes of death accounted for 70.9% of all U.S. deaths in 2023. Causes of death are ranked according to number of deaths in 2023. Rankings for 2022 data are not shown. Data table for Figure 4 includes the number of deaths for leading causes and the percentage of total deaths.
SOURCE: National Center for Health Statistics, National Vital Statistics System, mortality data file.

- **Heart disease (162) and Stroke (39)**
- **Cancer (142)**
- Unintentional Injuries (102)
- Chronic Lower Respiratory diseases (33)
- **Alzheimer's disease (28)**
- Diabetes (22)
- …

Mortality in the United States, 2023, Sherry L. Murphy, B.S. et al; US CDC, December 2024

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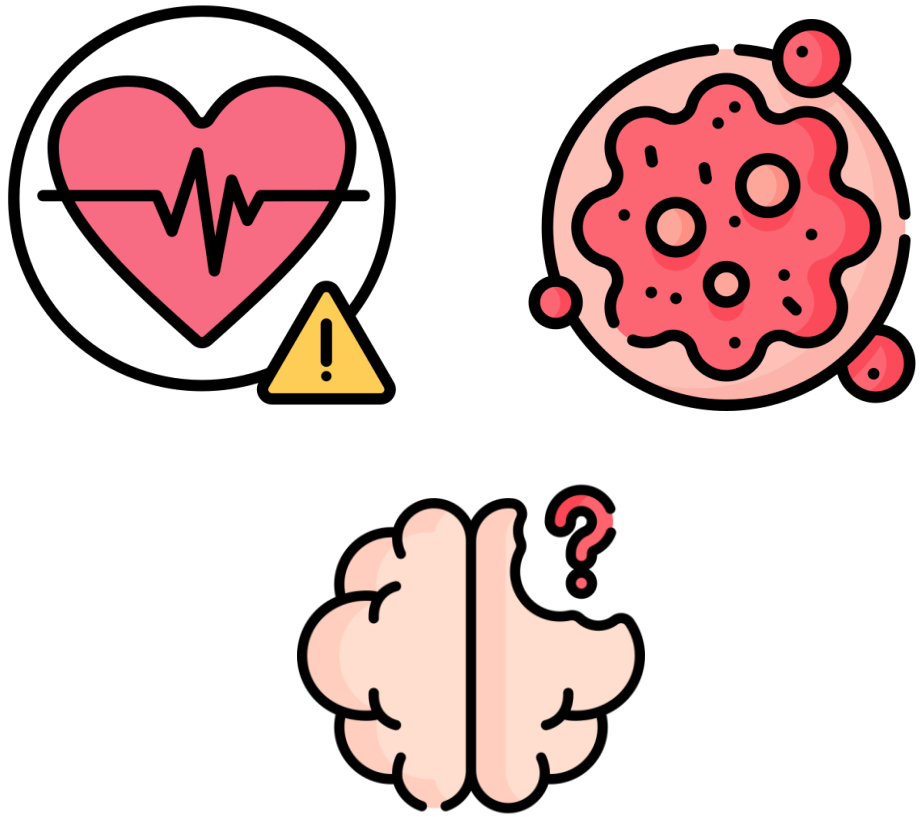
Chronic Diseases are Expensive



- **Heart Disease and Stroke, Cardiovascular Disease ($363B)**
- Diabetes ($413B)
- Obesity ($1.72T)
- **Cancer ($240B)**
- **Alzheimer's disease ($236B)**
- Arthritis ($304B)

Fast Facts: Health and Economic Costs of Chronic Conditions, CDC, July 12, 2024

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What if Radiopharmaceuticals can ... ?

Published:
May 12th 1921
© The New York Times

The New York Times.

MME. CURIE PLANS TO END ALL CANCERS

Says Radium Is Sure Cure, Even in Deep-Rooted Cases, if Properly Treated.

Innovation at Work

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The Challenge

- Mirion’s End to End VIsion
- Increasing Capacity and Scale
- Complexity of Production and Radiation Protection
- Need for New Standards and Methods
- Its Taking Too Long

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ISOTOPE LIFECYCLE MANAGEMENT

From Production to Patient

MIRION

ISOTOPE PRODUCTION & RADIOPHARMACEUTICALS

a. Gamma, Alpha & Beta Spectroscopy ●
b. Passive & On-Demand Dosimetry ●●
c. Dose Calibrators & Well Counters ●
d. Hot Cells ●
e. Lead Cabinets, Carts & Waste Management ●
f. Radiation Tolerant Cameras ●
g. Effluent Monitoring ●
h. Area Monitors & Alarm Box (Gamma/Neutron) ●
i. Waste Management ●
j. ec² Software ●

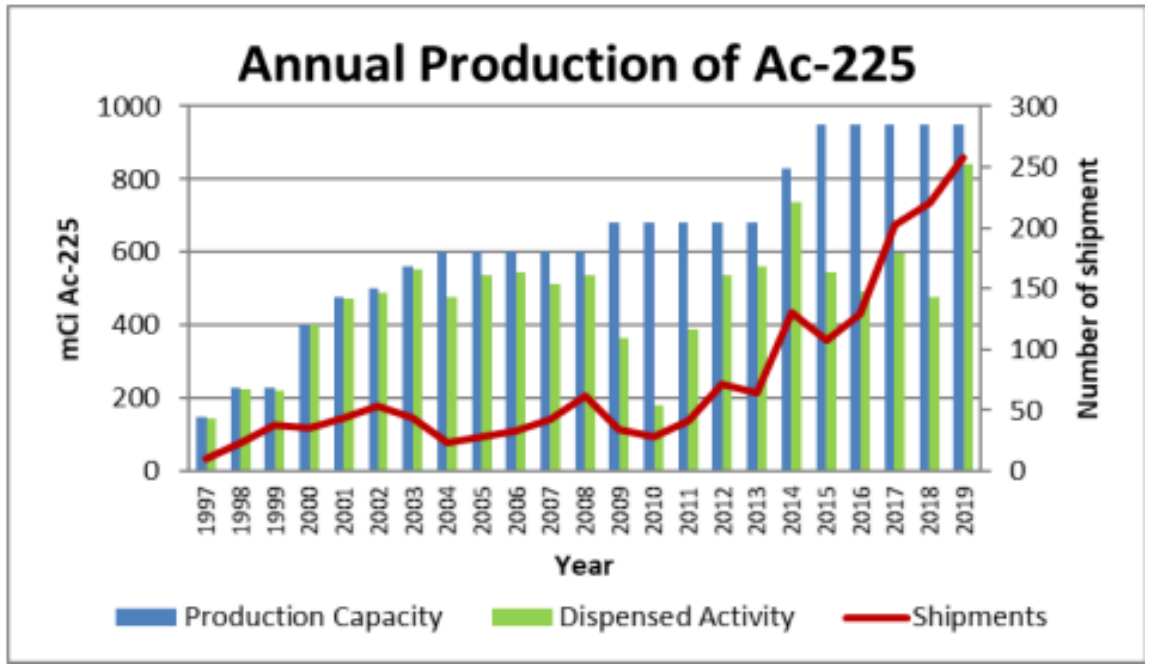
HEALTHCARE

k. Nuclear Medicine
- Dose Calibrators ●
- Thyroid Uptake Systems ●
- Lung Ventilation Systems ●
- Lab Supplies ●
- Quality Assurance ●
- ec² Software

UNIVERSAL SOLUTIONS
- Passive & On-Demand Dosimetry ●●
- Survey Meter ●
- Radiation Tolerant Cameras ●

● = Mirion Technologies ● = Mirion Medical (Capintec, ec2, Sun Nuclear, Biodex)

Increasing Capacity and Scale



Ac-225 User Group: Production Effort to Provide Accelerator-Produced 225Ac for Radiotherapy; Cathy S. Cutler, BNL; Kevin John, LANL; U.S. DOE, IP, 2019

- Production of Ac225 growing significantly, from 1 Ci/year to 10 Ci/yr
- Volumes of Lu177 doses are growing significantly (e.g. Pluvicto)
  - NVS announces that they can produce up to 250,000 doses/year in new facilities
  - FDA approval of Pluvicto for earlier stage use (mHSPC)
- Large and broad RPT pipeline

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Complexity of Production and Radiation Protection

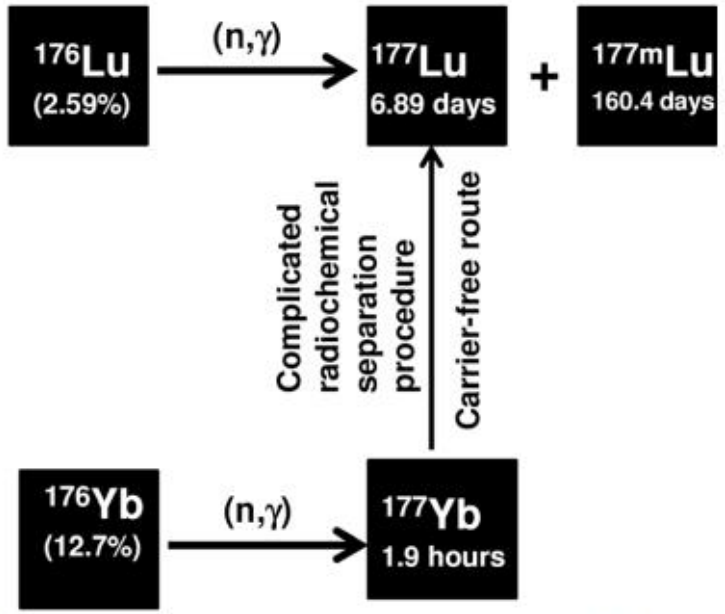

Fig. 2 Two different routes for reactor production of ^{177}Lu

Production of 177Lu for Targeted Radionuclide Therapy: Available Options; Ashutosh Dash et al; 2009

- Radiopharmaceuticals (e.g. Lu177 and Ac225) have different production routes
- Some common intermediate isotopes (e.g. Ac225. Pb212) are gases (radon), not radiometals
- Emerging Radiopharmaceuticals generally have longer half lives and more complex decay chains

- Integration with ec2

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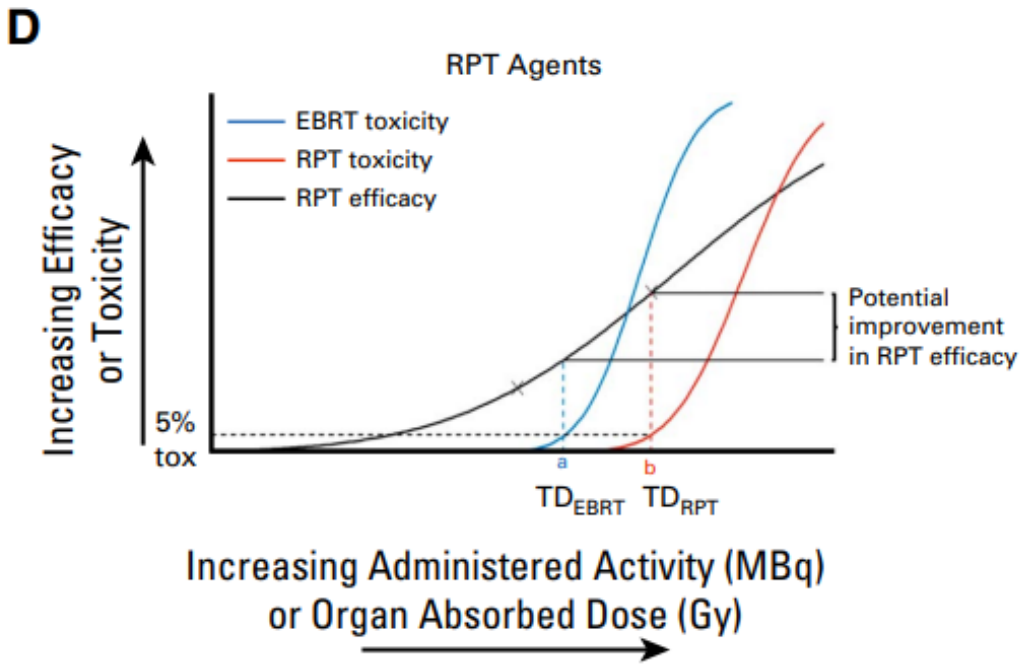
Need for New Standards And Methods



How Can Radiopharmaceutical Therapies Reach Their Full Potential? Improving Dose Reporting and Phase I Clinical Trial Design; Ana P. Kiess, MD, PhD et al; March 14, 2024

- Improvements in radiopharmaceutical therapy effectiveness are possible
- Underdosing based on use and application of EBRT dose limits
- Patient specific pharma-kinetics and doses
- Requiring better methods – dose calculation, dose accuracy

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Its Taking Too Long

REVIEW

The answer is 17 years, what is the question: understanding time lags in translational research

Zoë Slote Morris[1] • Steven Wooding[2] • Jonathan Grant[2]

[1]Institute of Public Health, University of Cambridge, Cambridge CB2 0SR, UK
[2]RAND Europe, Cambridge CB4 1YG, UK
Correspondence to: Jonathan Grant. Email: jgrant@rand.org

- It takes 17 years for translational research to result in a patient benefit
- Policy and practice cause lags, such as safety and effectiveness
- Preferences for ‘averages’ not paying attention to distributions and variances

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Thank you

THURSDAY JULY 31		
TIME	**SESSION**	**PRESENTERS**
7:30 – 8:30am	**Breakfast/Registration**	
8:30 – 9:30am	Opening session	Steve Mettler, President, Capintec Scott Claunch, President, TerraPower Isotopes
9:30 – 10:15am	Radioprotection & Safety in a Complex Environment	Shaun Kelley, MHP, CHP, CHMM Director, Radiation Safety and Corporate Radiation Safety Officer, Nucleus RadioPharma
10:15 – 11:00am	Radionuclidic Purity Methods	Miguel Toro Gonzalez, Sr Radiochemist, NorthStar Medical Radioisotopes
11:00 – 11:30am	Practical Applications for Radionuclidic Purity	Kara Phillips, Product Line Manager, Mirion Technologies
11:30am – 12:30pm	**Lunch**	
12:30 – 1:30pm	ORNL Isotope Production	Mike Stafford Nuclear and Radiological Protection Division Director Oak Ridge National Laboratory
1:30 – 2:30pm	Best Practices for Nuclear Pharmacies	Wendy Galbraith, PharmD, FAPhA, BCNP Clinical Associate Professor University of Oklahoma Dept. of Pharmaceutical Sciences
2:30 – 3:00pm	**Break**	
3:00 – 4:00pm	Workflow Optimization	Marieanne Miserendino Director of Project Management, ec^2 Software Solutions
4:00 – 5:00pm	Future of Nuclear Medicine & Theranostics	Babak Saboury, MD, MPH Medical Director, United Theranostics, President, Institute of Nuclear Medicine
5:00 – 5:15pm	Conclusion	Steve Mettler, President, Capintec
7:00 - 9:30pm	**Group Dinner**	