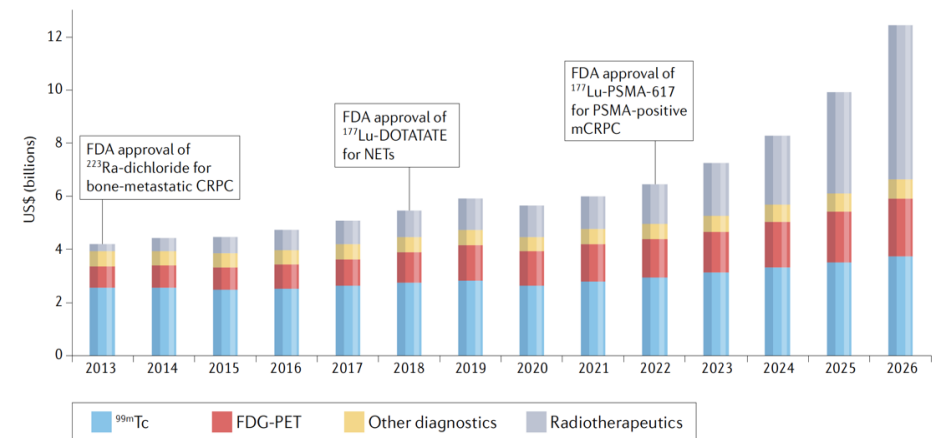


Research & Discovery Domain
John Sunderland, PhD, MBA, FSNMMI

Research and Discovery Domain Initiatives

1. Optimizing Readiness for Increasing Demand for Clinical RPT
2. Optimizing Readiness for Increasing Demand for RPT Clinical Trials
3. Better imaging and Quantitation and Standardization for PET and SPECT imaging
4. RPT Dosimetry and Industry
5. FNIH Dosimetry Clinical Trial Initiative
6. FDA Engagement
7. Educational Initiatives
8. What else should we be doing?

MEDDraysintell Nuclear
Medicine Report &
Directory, Edition 2021

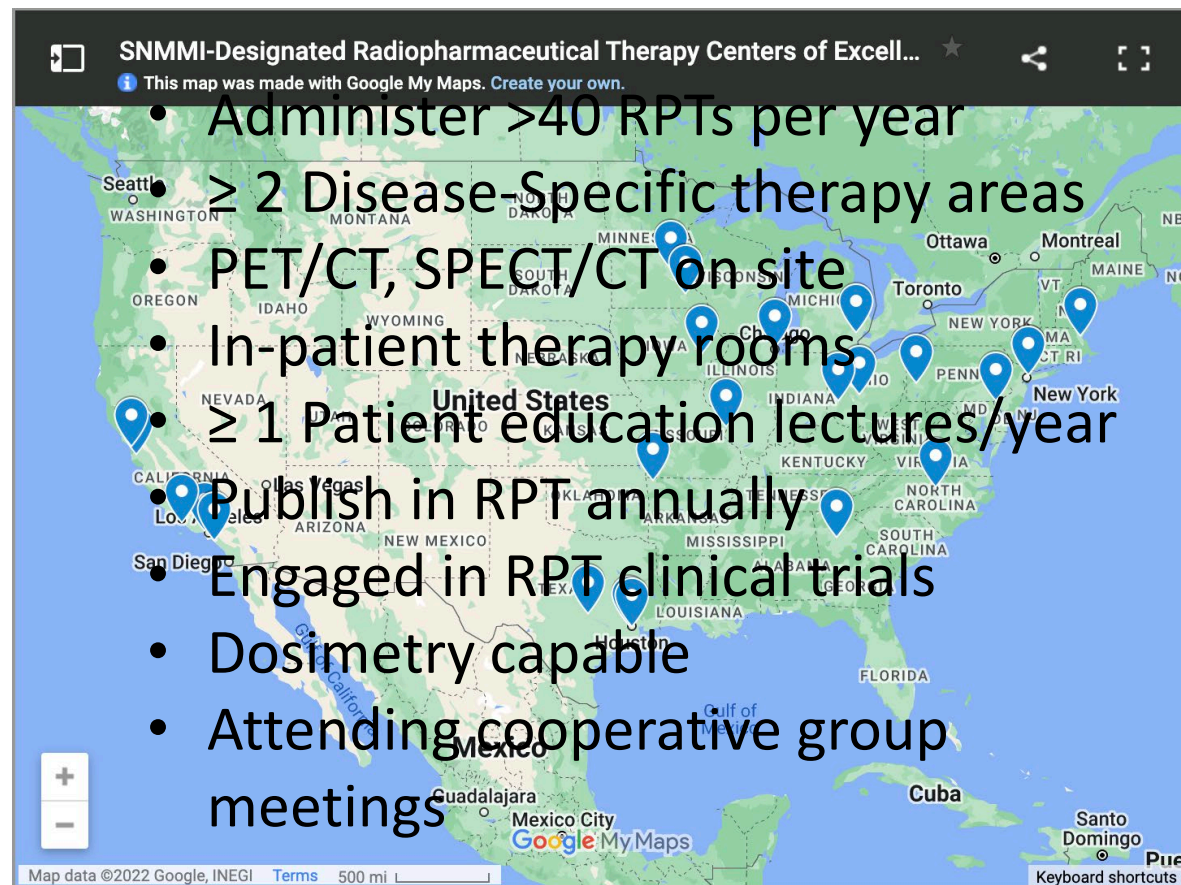


Predicted Global Nuclear
Medicine Market

Optimizing Readiness for Increasing Demand for Clinical RPT: SNMMI Designated Radiopharmaceutical Therapy Centers of Excellence

Comprehensive COEs

- Dana Farber
- Duke
- Emory
- Univ. of Minnesota
- Mayo Clinic
- MD Anderson
- Memorial Sloan Kettering
- Mount Sinai
- St. Louis Univ.
- Stanford
- Ohio State
- Univ. of Minnesota
- UCLA
- UCSF
- Univ. of Colorado
- Univ. of Iowa
- Univ. of Pittsburgh



Optimizing Readiness for Increasing Demand for Clinical RPT: SNMMI Designated Radiopharmaceutical Therapy Centers of Excellence

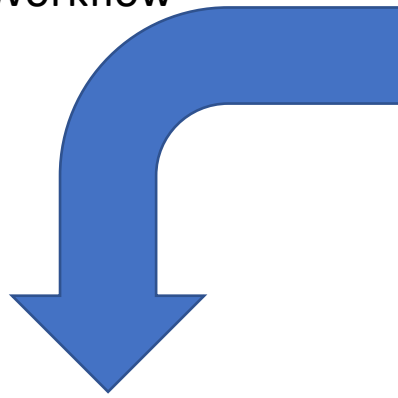
Clinical Centers of Excellence

- ARA Theranostics Center (Austin)
- Christiana Care (Delaware)
- Excel Diagnostics and Nuclear Oncology (Houston)
- Hoag Memorial (Newport)
- Kettering Health (Kettering, Ohio)
- Northwestern Univ. (Chicago)



Optimizing Readiness for Increasing Demand for Clinical RPT: **SNMMI RPT Dosimetry Certificate Program**

Physician Dosimetry
Workflow



Physician Dosimetry Certificate Program

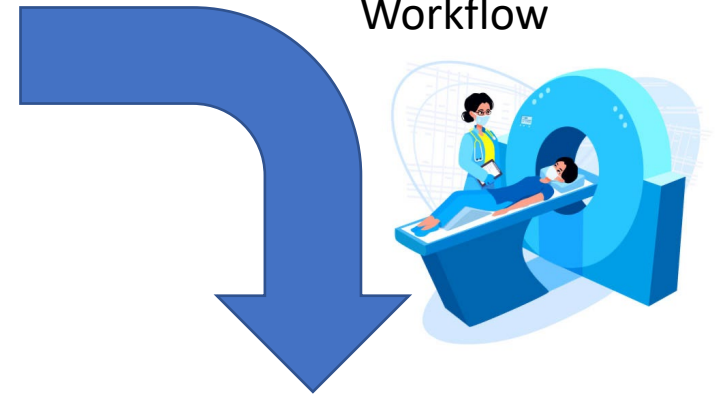
- Didactic Curriculum
 - On-line lectures
- Practicum
 - On-Site
 - Supervised (n cases)
 - Independent (n cases)

Physicist Dosimetry Certificate Program

- Didactic Curriculum
 - On-line lectures
 - Nuclear Medicine
 - Rad Onc
- Practicum
 - On-Site
 - Supervised (n cases)
 - Independent (n cases)

**Preparing the Profession for the
Present and Near Future**

Technologist Dosimetry
Workflow



Technologist Dosimetry Certificate Program

- Didactic Curriculum
 - On-line lectures
- Practicum
 - On-Site
 - Supervised (n cases)
 - Independent (n cases)

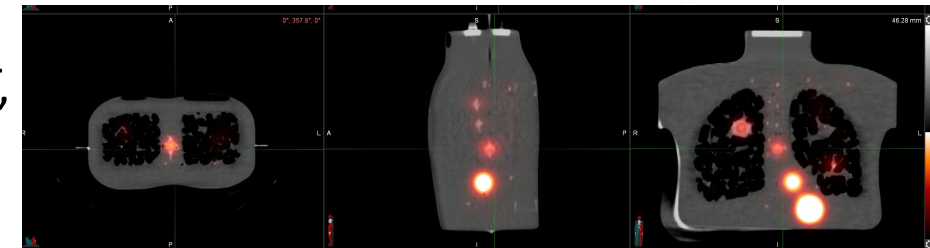
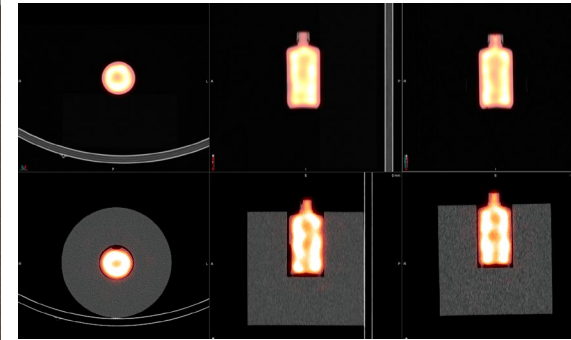
Optimizing Readiness for Increasing Demand for RPT Clinical Trials

The SNMMI Therapy Clinical Trials Network (TCTN)

- Using the **Comprehensive RPT Centers of Excellence** as a core group of *candidate* institutions with experience and infrastructure for clinical trials, dosimetry.
- **Develop standardized/harmonized methodologies** for qualification for therapy trials
 - Minimum Personnel qualifications and staffing requirements
 - Quantitative SPECT and PET Scanner calibration validation procedures
 - Therapeutic administration procedures
- **Creation of a searchable database** with site specific
 - Equipment (scanners, dose calibrators, well counters, centrifuges, ability to store radioactive materials), radioactive materials license specifics, dosimetry software
 - Personnel (physician, physicist, pharmacists, technologists)
 - Previous therapy clinical trial experience (beta, alpha)
 - Dosimetry expertise.

Better Imaging and Quantitation and Standardization for PET and SPECT imaging

- SPECT/CT quantitative calibration program
 - CTN Initiated - Being used in several industry clinical trials currently. Vendor agnostic.
 - Being discussed for NCTN trials
 - Being discussed for inclusion in international harmonized approach for SPECT calibration for clinical trials
 - IAC grant proposal (\$75K) in preparation for further development and inclusion in downstream clinical accreditation programs
 - NIH Grant proposal (submission February 2023 - UI, UAB, NIST, SNMMI) for SPECT/CT calibration development including
 - SPECT Calibration (as above),
 - SPECT Recovery Coefficient evaluation (for use in tumor dosimetry),
 - Dose Calibrator standards creation for clinical trials (both PET and SPECT)



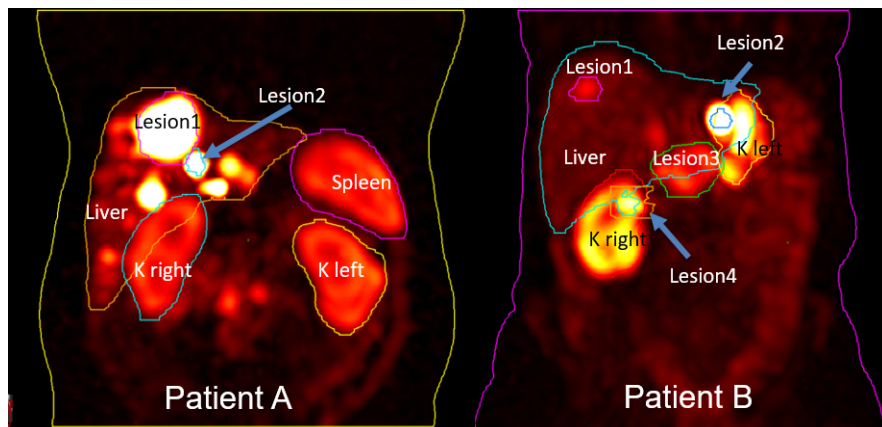
Better Imaging and Quantitation

Secondary Standards Laboratories for Accurate Measurement of Diagnostic and Therapeutic Radionuclides

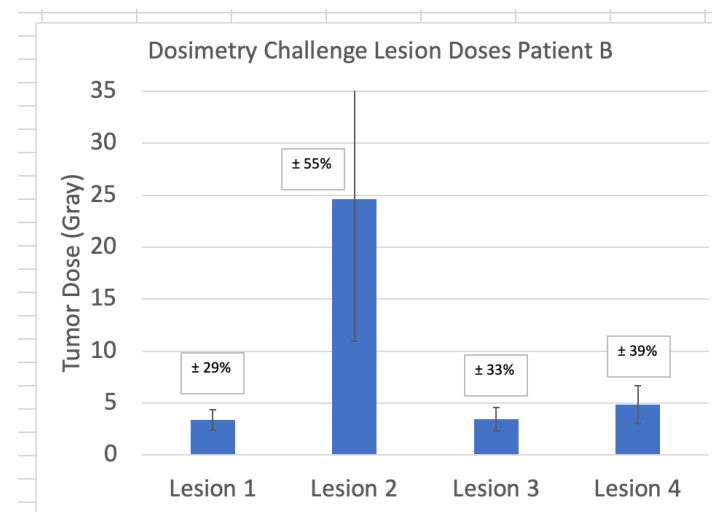
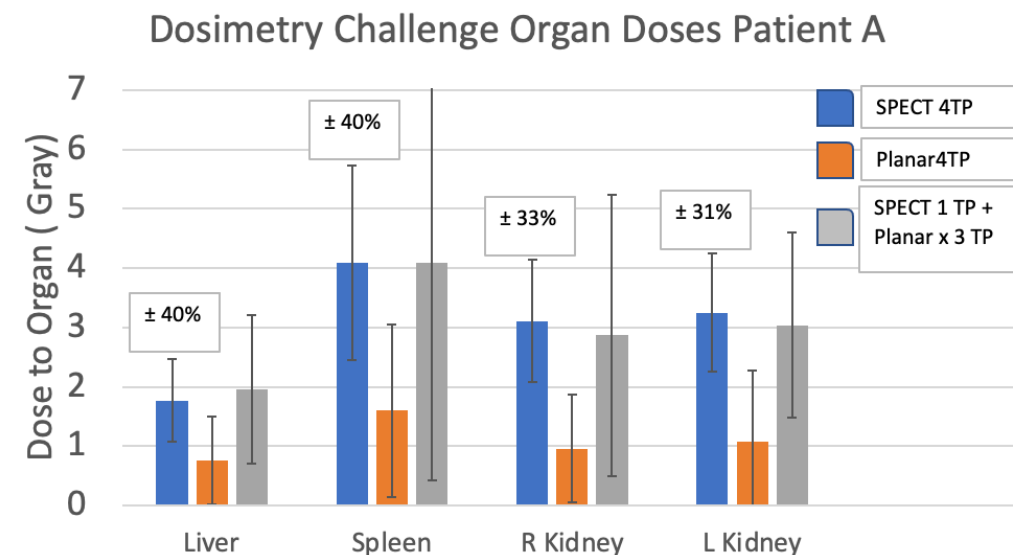
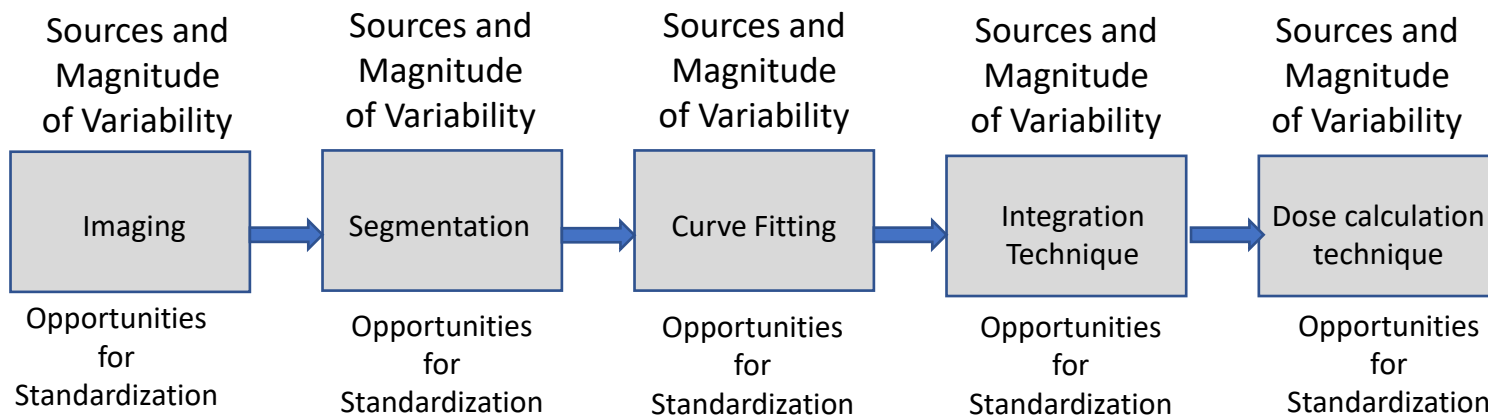
- Clear need for a rapid, accurate, radionuclide calibration service for clinical trials (diagnostic and therapeutic)
- Proposing building network of qualified academic laboratories working hand-in-hand with NIST
- Purpose:
 - Supply sponsors of clinical trials rapid and affordable secondary standard measurement of radionuclides to standardize measurements across trial sites
- Funding:
 - Seed funding from SNMMI
 - Grant funding being sought from NCI Academic Industrial Partnership grant
 - Ultimate goal – financially sustainable model

Better Imaging and Quantitation for PET and SPECT

The Dosimetry Challenge: Quest to Understand Magnitude and Source of Variability



- 2 Patient data sets were shared
- 321 Submission from 51 sites around the globe



Community Awareness of Dosimetry and Dosimetry Tools:

- Annual Meeting in Vancouver: **Industry Hands-On Dosimetry Open House – Targeting *Physicists***
- SNMMI Fall Therapeutics Conference, November 17-19, 2022 in DC:
 - **Industry Hands-On Dosimetry Open House – Targeting *Physicians***
 - Utility of dosimetry programmed into each session (Thyroid, prostate, neuroendocrine)



Enhanced Efficacy of RPT Through Dosimetry:

The FNIH Initiative : **New**

- The FNIH Model
 - High impact trials in the pre-competitive space
 - Funded primarily by a shared-cost model by a consortium of industry partners that stand to benefit from the clinical trial
 - Contributing funders can and should contribute to trial design.
- NCI has proposed a Prostate Ca dosimetry guided Therapeutic trial with Lu-177 PSMA (Pluvicto)
- FNIH scheduled presentation two weeks ago (NCI presented)
 - Follow-up meeting imminent
- In a parallel, serendipitous effort, a physician-based Dosimetry Task Force Subgroup has been developing a Dosimetry-Guided Prostate Cancer RPT trial.
 - This is being handed off to a physicist-based Dosimetry Task Force Subgroup
 - Potential Primary, Secondary, and Tertiary Endpoints being discussed
 - Tumor Dosimetry - Guided
 - Investigating Higher Administered Doses (>200 mCi) guided by dosimetry
 - Investigating not limiting number of cycles (using dosimetry and AEs as stopping rules)
 - Investigating Tumor Dosimetry Guided Cohorts
 - Investigating Global Average Tumor Dose as Guidance for Predicting Response

SNMMI/FDA Engagement

Therapeutic space

- Subgroup drafting a Phase 1-2 manuscript defining what, optimally, should be required and collected for dosimetry in early phase trials
 - Specific recommendations targeting what FDA should and should not require for Beta and alpha-emitting radiopharmaceuticals
- A mitigation strategy for the approved standardized (e.g. 200 mCi) doses
 - how do we backtrack to using personalized doses where we can give higher/lower doses as dosimetry dictates?

Diagnostic space

- How to deal more effectively and efficiently in the non-proprietary space
 - FDA cites “real world evidence” from literature can be used, but this is too vague for planning.

Educational Initiatives for New Radiopharmaceuticals

- Creation of Web-based voice-over PowerPoint style didactic training for new radiopharmaceuticals
 - Basic background science
 - Case-based examples
- In-Person Case-Based training for new radiopharmaceuticals
 - Individual iPads issued to each participant, pre-loaded with sample cases (DICOM)
 - Expert facilitator leading case presentation and discussion – interactive
- **NEW!** Cloud-based DICOM image server with entire case studies loaded
 - Clinical metadata provided
 - Fully functional image viewing and analysis software available
 - Walks the learner through key findings
 - Entirely remote
 - Amyloid imaging is the first use-case

What Else Should We Be Doing?

Questions?

