IHE Radiation Oncology
How did we get to Today?

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Disclosures

- Travel funding from AAPM for IHE-RO Meetings
- Thanks to Mark Pepelea, Rishabh Kapoor, Lakshmi Santanam, and other IHE / IHE-RO volunteers for slides
IHE Organizational Structure

Regional Deployment
- IHE North America
  - USA
  - Canada
- IHE Europe
  - France
  - Germany
  - Netherlands
  - Italy
  - Norway
- IHE Asia
  - Japan
  - Korea
  - Taiwan
- IHE Asia-Oceania
  - China
  - Japan
  - Korea
  - Taiwan

Global Development
- Radiology
- IT Infrastructure
- Laboratory
- Cardiology
- Patient Care Coordination
- Pathology
- Radiation Oncology
- Patient Care Devices
- Eye Care
- Public Health, Quality and Research

Professional Societies / Sponsors
- ACC
- ACCE
- ACP
- GMSI
- RSNA
- SFIL
- CCOIR
- EAR-ECR
- DRO
- SIRM
- ESC
- JAHIS
- JIRA
- JRSA
- METI-MLHW-DC
- MEDIS-JAMJ

Contributing & Participating Vendors

IHE Goals - Improve Interoperability / Communicate Solutions!
Standards: Necessary…Not Sufficient

- Standards are
  - Foundational - to interoperability and communications
  - Broad - varying interpretations and implementations
  - Narrow - may not consider relationships between standards domains
  - Plentiful - often redundant or disjointed
  - Focused - standards implementation guides focus only on a single standard

IHE provides a standard process for implementing multiple standards

IHE: Connecting Standards to Care

- Healthcare professionals work with industry
- Coordinate implementation of standards to meet clinical and administrative needs
  - Clinicians and HIT professionals identify the key interoperability problems they face
  - Providers and industry work together to develop and make available standards-based solutions
  - Implementers follow common guidelines in purchasing and integrating effective systems

IHE: A forum for agreeing on how to implement standards and processes for making it happen
Example

- HDR source position refers to which of the following?

  Tip of the Wire?

  Middle of Active Source?

IHE-RO Committees

- Working Group on IHE-RO (Science Council)
  - Provide leadership to Planning and Technical committees
  - Coordinate
  - Liaise with AAPM leadership / develop Budgets, ....

- Leadership
  - Secretary: Jill Moton, jill@aapm.org
  - Co-Chair: Bruce Curran
  - Co-Chair: Bridget Koontz
IHE-RO Committees

- Planning Committee
  - Recruit vendors of relevant clinical systems, and users with clinical and operational experience
  - Identify, gather, review and prioritize inter-operability problems (Use Cases)
  - Prioritize & coordinate domain activities
  - Develop educational materials for the domain and profiles e.g. webinar, presentations

- Leadership
  - Co-Chair: Mary Feng
  - Co-Chair: R. Alfredo Siochi
  - Co-Chair: Björn Hårdemark

Clinical Impact Statements

IHERO profiles provide solutions to clinical challenges in the integration of technologies utilized within radiation oncology. The Clinical Impact Statement for each profile explains the issue, the rationale behind the creation of the profile and the anticipated clinical impact.

<table>
<thead>
<tr>
<th>Advanced Radiation Therapy Interoperability (ART)</th>
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<tbody>
<tr>
<td><strong>Date Created:</strong> 2013-10-03</td>
</tr>
<tr>
<td><strong>Profile Completion Date:</strong> 2013-02-25</td>
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<tr>
<td><strong>Authors:</strong> Jim Panys, Stephanie Torreschi, MD</td>
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**Description:**
Defines the data required to be transferred, accepted and displayed for 54 kinds of C-arm linear accelerator treatment plans from open beam to VMAT.

**Rationale for Profile Creation:**
Differences in describing key treatment parameters have caused incompatibilities or inconsistencies in plan interoperability from one system to another. Given the critical nature of the data being sent to the treatment management system (TMS), these inconsistencies needed to be resolved to enable a method of describing plan content for all current types of C-arm linear accelerator treatment modalities.

**Clinical Impact:**
This profile describes the accepted way to export external beam plans delivered on a C-arm. Where there has been ambiguity in defining plan data at each point in the delivery, this profile defines one way to report it – for example, rotational wedge monitor units, electron field sizes and dynamically arc beams. The goal of this profile is to be able to interoperate accurately. An individual meeting this profile should be able to identify the required elements of such an export for a specific type of plan.

The profile also states that the user can display the original plan content on the receiving system and this allows the user to compare the original data to the receiving system’s internal, working version of the plan. This can serve as an auditing tool if information doesn’t match up after a data transfer. This profile facilitates this by specifying the mandatory, minimally available data for comparison of plans. This allows the user to see the original plan content so that it is readable not just in DICOM format.
IHE-RO Committees

- Technical Committee
  - Recruit vendors of relevant clinical systems, and users with technical experience
  - Assess the feasibility and estimated effort for PC selected Use Cases
  - Build consensus on the appropriate standards-based solutions
  - Develop Integration Profiles for Use Case solutions
  - Maintain Technical Framework for domain Integration Profiles

- Leadership
  - Co-Chair: Jon Treffert
  - Co-Chair: Scott Hadley

Profile Life Cycle

- PC starts the process
  - Input from IHE RO members PC, SC, TC
  - Input from Radiation Oncology Community
  - Draft Clinical use cases & Impact Statements
  - Ranked in terms of importance and prioritized

- TC investigates and determines
  - Available standard for implementation
  - Possible technical issues with profile
Connectathon

- Cross-vendor, live, supervised, structured test event.
  - All participating vendors’ products tested together in the same place/time.
  - Experts from each vendor available for immediate problem resolution... fixes are often done in minutes, not months!!
  - Each vendor tests with multiple vendor partners (actual product to product).
  - Testing of real-world clinical scenarios with IHE Integration Profiles.
  - Supervised by independent test monitors, i.e. “judges”.

IHE-RO Connectathon

- Annual, week-long event
- Hosted by AAPM, held at AAPM, vendor facilities, or academic centers
- Expected to be virtual in 2020
How can IHE-RO affect me?

If you ever said

“Why can’t those two boxes talk to each other – they are supposed to be DICOM compliant?”...

IHE-RO might be the answer.

Again, the main point of IHE is safe and effective interoperability.

Why is IHE-RO important?

> Further developing our Integrating the Healthcare Enterprise – Radiation Oncology (IHE-RO) connectivity compliance program to ensure that medical technologies from different manufacturers can safely transfer information to reduce the chance of a medical error.

> Promotes discussion and correction of protocols / standards for data communication to improve the reliability and safety of data exchange in radiation oncology

> Provides a mechanism for inter-manufacturer testing of radiation oncology products prior to delivery

Courtesy, Lakshmi Santanam
Safety Lapses in Radiotherapy

- Design failure: 4%
- Commissioning: 4%
- Others: 4%
- Human failure: 18%
- Lack of communication: 11%
- Hardware/software failures: 13%
- Inadequate resources: 13%
- Inadequate training: 15%
- Lack of standardized procedures: 18%

How to Participate in IHE?

- Apply for IHE International Organizational Membership
  - Visit: www.ihe.net/Join_IHE_Application
- Participate in IHE Domains & Committees
  - IHE Members only
  - 12 Clinical and Operational Domains
  - Each Domain has one Planning and one Technical committee
- Non-members participate in comment periods and implement IHE Technical Frameworks
  - Public comment
    - https://www.ihe.net/resources/public_comment/
How to Participate in IHE-RO?

Let vendors know that you need compliance

- Ask vendors what profiles they support
- Put language requesting IHE-RO Profile support in your Request for Purchase
- Join the IHE-RO Planning Committee (UN28) or Technical Committee (UN27) as a Guest (contact Jill@aapm.org)

Where to Find More IHE-RO Info?

- IHE-RO’s Technical Frameworks on IHE.net are:
  - https://wiki.ihe.net/index.php/Frameworks
- IHE-RO Profiles on IHE-RO’s Wiki page are:
- Learn More
  - IHE wiki: http://wiki.ihe.net
  - General IHE information: https://www.ihe.net
  - AAPM IHE-RO Home: https://www.aapm.org/IHERO/?od1n
Thank you