

**IHE-RO Technical Committee  
Face-to-Face  
July 14-15, 2022 8:30-13:30 ET**

**Technical Committee Chairs:  
Scott Hadley, PhD  
Jon Treffert**

**Mission Statement:** *The American Association of Physicists in Medicine (AAPM) sponsors a multi-society Task Force to undertake an initiative to promote the Integration of the Healthcare Enterprise (IHE) – Radiation Oncology (RO). Originally formed by the American Society for Radiation Oncology (ASTRO), it fosters seamless connectivity and integration of radiotherapy equipment and the patient health information systems. The Technical Committee of IHE-RO will undertake use cases defined by members from ASTRO, RSNA, American Association of Physicists in Medicine (AAPM), the American College of Radiology (ACR) and the Medical Imaging and Technology Alliance (MITA). In addition, members of the international community have also been invited to participate in IHE-RO. The IHE-RO Task Force, in close collaboration with radiotherapy product manufacturers, will develop appropriate integration profiles for radiation therapy and setup a demonstration of seamless communication among the full array of radiotherapy products.*

**Attendees:**

Name	Affiliation	Email	7/13	7/14	7/15
Scott Hadley	U. Mich.	<a href="mailto:swhadley@umich.edu">swhadley@umich.edu</a>	I	I	
Jon Treffert	Raysearch Labs	<a href="mailto:Jon.treffert@raysearchlabs.com">Jon.treffert@raysearchlabs.com</a>	I	I	Z
Jill Moton	AAPM	<a href="mailto:Jill@aapm.org">Jill@aapm.org</a>	I	I	Z
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Bruce Curran	AAPM / VCU	<a href="mailto:bhcurran@gmail.com">bhcurran@gmail.com</a>	I		Z
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Bruce Rakes	Mevion	<a href="mailto:rbrakes@mevion.com">rbrakes@mevion.com</a>	Z	Z	Z
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Bob Pekarek	Accuray	<a href="mailto:bpekarek@accuray.com">bpekarek@accuray.com</a>		Z	
Stefan Pall Boman	Raysearch Labs	<a href="mailto:Stefan.p.boman@raysearchlabs.com">Stefan.p.boman@raysearchlabs.com</a>	Z	Z	Z
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Naveen Lakshmana	Philips	<a href="mailto:naveen.kumar.lakshmana@philips.com">naveen.kumar.lakshmana@philips.com</a>	I	Z	Z
Rishabh Kapoor	VCU/VHA	<a href="mailto:Rishabh.kapoor@va.gov">Rishabh.kapoor@va.gov</a>	I		Z
Michael Owens	Reflexion		I	I	
Stuart Swerdloff	Elekta			Z	
Stina Svensson	Raysearch Labs				Z

I = In person, Z = Zoom

Attendance 7/13/22 is for IHE-RO Open House session at the AAPM Annual Meeting in Washington, DC.

## 30 Minutes

I Call to Order Thursday, July 14 at 8:45am ET

II Meeting Scope

- 35 A) Review Agenda  
B) Minutes from the May 19, 2022 TC Meeting were reviewed and approved without objection.

III Topic 1 Profile Updates

- 40 A) TDRC Ion (David W. and Bruce R.). The group reviewed TDRC-ION draft Profile (v. 0.7, 6/30/22).  
1) The Profile has separate requirements for TREATMENT and SETUP beams. Review of presence requirements and source of values for attributes in RT Ion Beams Treatment Record. Attribute values in the Treatment Record should reflect as closely as possible what is displayed to the user or selected at the machine. The value should not simply be copied from the plan.  
2) A SETUP beam for Ion Therapy may serve as a placeholder for more than one patient positioning workflow step. There may not be a fixed relationship between planned and actual (recorded) SETUP beams.  
45 3) **DECISION**: The TDRC Profile (v. 0.7 as revised) was approved for Public Comment  
4) **ACTION 220701**: David W. to cleanup draft Profile; Jon T. to forward draft to Mary Jungers.

50 IV Topic 2 DICOM Update

- A) First Generation Hybrid Extension (Walter B.)  
1) Walter outlined the development of DICOM 2<sup>nd</sup> Gen RT Information Objects in WG-07 and challenges to their adoption by manufacturers and clinical users. Recent efforts to incorporate 2<sup>nd</sup> Gen RT concepts in Hybrid objects that interoperate with existing 1<sup>st</sup> Gen RT IODs were described. Hybrid extensions to RT Structure Set, RT Plan, and RT Dose IODs were discussed at the June 2022 WG-07 meeting. A list of  
55 DICOM CPs and proposed updates to IHE-RO Profiles was discussed.  
2) Documents related to DICOM WG-07 activities in development of 1<sup>st</sup> Gen Hybrid RT objects can be found in the *IHERO TC Share/DICOM 1<sup>st</sup> Gen Hybrid* Box folder.

60 V Topic 4 – ROTH Profile (Scott H.)

- A) Scott reviewed a presentation he is preparing for the IHE-RO PC meeting 7/19/22. Slides are shared in the *IHERO TC Share/ROTH* folder.  
1) Clinical Impact Statement identifies five Use Cases related to data persistence and portability, i.e.,  
65 export from a managed clinical environment:  
(a) Increased longevity of patients increases the need to support re-planning for re-treatment.  
(b) In System Transfer  
(c) Continuity of Care – portable data for disaster recovery  
(d) Clinical Trial / Registry data export  
(e) Dataset archiving  
70 2) Open Issues discussed include the following:  
(a) What triggers the export of a patient dataset?  
(b) What does a receiver need to be able to do with a dataset?  
(c) Should a ROTH data exporter add Plan Overview information to RT Dose instances?  
(d) How to track revisions of a dataset? Approval status?

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VI Topic 3 Workflow

- A) Mevion Workflow – Bruce R. presented an overview of Mevion Proton Therapy Clinical Workflow, including Extensions of TDW-II for Patient Setup and Patient QA, Communication with 3<sup>rd</sup> party optical guidance systems, and capture of couch position as initial position for future treatment  
80 sessions. Bruce's presentation can be found in the *IHERO TC Share/Presentations* Box folder.

- 1) Modified TDW-II with SETUP beams: SETUP beam(s) in RT Ion Plan serve as placeholder for all patient setup.
- 2) Scheduling for Patient QA using a subset of the TDW-II workflow
  - (a) Patient scheduled as Patient QA rather than Treatment. Workitem Code is 121728 (RT Treatment QA with Internal Verification), No SETUP beam is required if only performing phantom measurements. Treatment Record optionally sent to OST (Treatment Delivery Type = VERIFICATION; Reference Fraction Group Number is NOT included)
- 3) 3<sup>rd</sup> Party Optical Guidance System (OGS) – Implicit Workflow with C-STORE. This approach can be used in combination with TDW-II/UPS.
  - (a) Use DICOM C-Echo as keepalive.
  - (b) Send RT Ion Plan and RT Structure Set to the OGS
  - (c) Use BDI with a (current) single beam and 6-DOF table positions and Beam Task Type = VERIFY. Resend BDI with adjust table positions each time couch is moved. Receive BDI from the OGS containing new Adjusted table positions whenever the user desires to apply deltas based on the OGS.
  - (d) Could use C-STORE response to communicate response status.
- 4) Mevion Couch Capture
  - (a) Update TMS with updated couch positions, setup notes. Send Adjusted Table Top values from BDI to TMS in RT Ion Plan or RT Ion Beams Treatment Record. In Performed Processing Parameters Sequence of Final UPS. Suggested codes could be extended to represent other parameters.
- 5) Alternative approaches were discussed, including use of the existing UPS with N-CREATE and BDI instance referenced in the Output Information Sequence.

#### B) TDOR

- 1) Discussion of the purpose and scope of the Scheduled Treatment Session UID and its relationship to the UPS Transaction UID. Discussion referenced TDOR Draft for Public Comment (rev. 0.6, 2/21/2022).
  - (a) The Profile includes a Scheduled Treatment Session UID (part of the initial Treatment UPS) to relate Treatment Records (and, potentially, other Instances) to the correct treatment sessions.
  - (b) A Public Comment submitted by Stuart Swerdloff was discussed with the TC. Stuart suggested that a combination of UPS Transaction UID, fraction number, and plan UID would suffice to connect offline records within the TMS. Using the UPS Transaction UID to identify the Treatment Session was discussed by the TC. The consensus was that this approach mixes the UPS (protocol logic) with Session (domain logic). Additionally, it would impose limitations on future applications of the TDOR Profile, e.g., with IPDW or DPDW.
  - (c) Using Scheduled Treatment Session UID (not currently required for TDW-II) imposes additional requirements for the Treatment UPS (see Section 7.5.1.1.2). Clarification of the rationale for this additional requirement (including Scheduled Treatment Session UID in the N-CREATE for Treatment Delivery) is needed in the Profile.
  - (d) **ACTION 220702**: Thomas Schwere to add clarification for the concept of using Scheduled Treatment Session UID in the TDOR Profile.

#### C) BQAW

(No update was presented at this meeting.)

[Adjourned for the day 7/14/22 at 1:17pm ET ]  
[Resume meeting 7/15/22 at 8:30am ET]

#### VII Topic 5 Profile Updates

##### A) DRRO (Stina S.)

- 1) Stina gave an update of the DRRO subgroup activities.

- 135 (a) DRRO Workshop, April 11-13, 2022: Informal testing with four vendors focused on Deformable Registrator and Deformable Display Actors.
- (b) The DRRO Profile is in Trial Implementation. Work continues on coding of deformed images, structures, and doses.
- (c) An updated DRRO Content Validator Test Tool has been released with updates to fix issues identified at the Workshop.
- (d) A followup workshop is anticipated in Autumn 2022.
- 140 2) Stina's presentation can be found in the *IHERO TC Share/Presentations* Box folder.
- 3) QRRO (Stefan B.)
- (a) Stefan presented an update on the QRRO Profile. QRRO is a Content Profile with two Actors (Content Retriever, Content Provider).
- 145 (i) Background: the default DICOM query response only provides SOP Instance and Instance Number. Complex and large DICOM RT objects contribute to the need for enhanced query for radiation oncology
- (ii) QRRO Clinical Impact Statement (2013), Initial draft (2015). The draft Profile identifies Attributes to be supported as Query Keys by C-FIND SCPs.
- 150 (b) Discussion of the Use Case and Clinical Impact
- (i) Who will implement QRRO? RO Archive manufacturers?
- (ii) There is some overlap with ROTH. Having ROTH may satisfy much of the demand for QRRO. QRRO supports "forensic"/interactive queries.
- (iii) There appear to be several "small" use cases, but a compelling need is not obvious.
- 155 (c) Use Cases and Clinical Impact for QRRO are to be presented to the IHE-RO PC.
- (d) Stefan's presentation can be found in the *IHERO TC share/Presentations* Box folder.

## VIII Topic 6 Profile Updates

### A) XRTS Update (Rishabh K.)

- 160 1) The XRTS Workshops have demonstrated the ability to transfer RT Summary data using mCODE/CodeX RTTD Data model and FHIR structure.
- (a) End of Treatment Summary (Dec 2021 Workshop)
- (b) On Treatment Summary (May 2022 Workshop)
- 165 2) Workshop Findings Discussion
- (a) Who creates FHIR resource ID: provider or repository? Global uniqueness must be maintained. The Provider may need to update multiple repositories. Resources are identified by a Resource ID and a Business ID.
- (i) Resource ID may be assigned by the web server
- (ii) Business ID is globally unique
- 170 (b) Annotating Time Zones: times are recorded as local time with time zone information. An observer may display according to local configuration and/or IEC, etc. requirements.
- (c) Security Issues: Should the profile require secure (HTTPS) connections? Cloud-based resources must support secure transport. This is primarily a question for testing. HTTPS will need to be supported by the Test Tool.
- 175 (i) Consensus that Demcon should explore use of secure (HTTPS) connections for Test Tools and report on implications.
- (ii) Authentication/authorization is currently at the system level, rather than at the user level. Open channel between Actors.
- 180 3) CodeX RTTD Public call July 19, 2022 11am-12pm ET.
- 4) Prepare for a third XRTS workshop Nov-Dec 2022.
- 5) Rishabh's presentation is available in the *IHERO TC share/Presentations* Box folder.

### B) Incident Learning System Use Case (Rishabh K)

- 185 1) ASTRO / Clarity maintains a database of clinical incidents, near misses. This information is protected from discovery for litigation. Challenge: there are multiple Patient Safety Organizations (RO-ILS, CARS, etc.) that maintain ILSs. PSOs need to report this information. How can data from these ILSs be combined? There is consensus on data elements for representing incident information (published data model) and a CDA-based standard for transport.
- 190 2) Consensus to present Use Case to the IHE-RO PC.

IX Topic 7 Test Tool Updates (Walter B., Harold B. )

A) Test Tools: current versions

- 1) DRRO Validator 0.0.6 (expires 10/1/22)
- 195 2) XRTS Validator 2.3.0 (expires 10/1/22)
- 3) Content Validator 1.1.13 (11/5/21)
- (a) Test data is needed for TPPC-Ion Profile. Ion plan manufacturers were asked to provide test datasets and upload them to the *IHERO TC share/Test Data/TPPC-Ion* folder in Box.
- 4) UPS Validator 1.4.0 (11/5/21)

B) Demcon Work Priorities

- 200 1) DRRO Validator – cleanup issues from April DRRO Workshop (complete)
- 2) Content Validator – cleanup backlog issues (work in progress)
- 3) FHIR/XRTS Validator – investigate HTTPS support
- 4) DRRO Validator – extend testing to content validation of deformed images, structure sets, dose

205 X Topic 8: DICOM Update II

A) CPs for consideration

- 1) CP 2150 Add OAR to RT ROI Interpreted Type
- (a) Add to BRTO-II as part of roll-up with other CPs → BRTO-III
- 2) CP 2152 Add Plan Overview parameters to RT Dose
- 210 (a) Use cases
- (i) Dose export from “boutique” machines without RT Plan.
- (ii) Archiving for future use (store RT Dose with Plan Overview)
- (b) Consider new content Profile. Straightforward: one Transaction with Producer and Consumer
- 3) CP 2153 Add Calibration Parameters to Treatment Plan
- 215 (a) Add to TPPC as part of roll-up with other CPs →TPPC-II

XI Topic 9: TF

A) Proposal to migrate content of TF (Actor and Transaction definitions) to Gazelle Master Model

220 B) **ACTION 220703**: Jon Treffert and David Wikler to explore migration of source of truth for Actor and Transaction definitions to Gazelle.

XII Topic 10: Next Meetings

A) September F-F

- 225 1) Proposed dates: Sept 19-23, 2022. Alternative dates: Oct 10-14, 2022.
- 2) Update to AAPM vaccine policy is expected mid-August.
- 3) **ACTION 220704**: Jill to poll TC for Sept 19-23 and Oct 10-14 meeting dates.

B) November 2022 Connectathon

- 230 1) Plan to test in person at AAPM HQ
- 2) Extended hours may be possible at AAPM to accommodate testing with remote sites in other timezones.
- 3) Profiles to be tested
- (a) Formal: BRTO-II, MMRO-III, TPPC, TDW-II
- (b) Informal: TPPC-Ion
- 235 4) Proton Machine Models for TPPC-Ion Testing
- (a) Need to agree on common machine models and distribute parameter sets.

(b) TPPC-Ion subgroup to select representative treatment machine parameter set(s) for testing.

C) 2023 Meetings for budget planning

1) Spring (Mar-Apr) 4.5 day face-to-face meeting.

Proposed dates: April 3-7, 2023 in Orlando (with AAPM-Spring Clinical Meeting)

2) Connectathon in Europe

Proposed dates: Oct 9-14, 2023 or Oct 16-21, 2023, Location: TBD

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XIII Adjournment 7/15/22 at 12:54pm ET