Experiences in building DICOM module for Proton radiation therapy planning system

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Proton Radiation Therapy Workflow

1. CT/MR image acquisition
2. Import CT/MR images into Treatment Planning System and make clinical plan
3. Export clinical plan to OIS, TDS, milling machine etc…
Usage Of RT ION Plan

- Oncology Information System (OIS)
- Treatment Delivery System (TDS)
- Milling Machine

Used to create beam modifiers

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It addresses the requirements for transfer of treatment plans generated by a treatment planning system before or during a course of Ion therapy treatment.

Such plans may contain fractionation information, and define Ion beams.
Descriptive Vs Prescriptive model of TPS

Prescriptive model: It provides the physical components of the treatment machine in sufficient detail in order to generate an accurate plan for treatment.

Descriptive model: It provides the output of the treatment machine in terms of the physical parameters of the radiation beam itself.
Various interoperability Challenges

Proton Therapy Technology is evolving

Different Interpretation of the same attribute

<table>
<thead>
<tr>
<th>&gt;&gt;Compensator Mounting Position</th>
<th>(300A,02E1)</th>
<th>1</th>
<th>Indicates on which side of the Compensator Tray the compensator is</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;&gt;Compensator Column Offset</td>
<td>(300A,02E5)</td>
<td>1C</td>
<td>The offset distance (in mm) applied to the x coordinate of the Compensator Position (300A,00EA) for even numbered rows. Required if the compensator pattern is hexagonal.</td>
</tr>
</tbody>
</table>
Various interoperability Challenges

- Physical machine component details required in exported DICOM file is different for different treatment machine
Various interoperability challenges

- Correct communication of beam modifier (like Compensator & Aperture) to vendors

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Our Approaches:

- Work closely with vendors and run interoperability tests in various scenarios
- Review the results of interoperability tests in great detail
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Thank you for your attention!
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http://dicom.nema.org/