Practical Implementation of TG 263’s Standardized Nomenclatures Across Multiple Radiation Oncology Practices

Carnell Hampton, PhD, DABR
At the conclusion of this presentation, the participant will be able to:

• Describe Task Group 263’s goals and recommendations
• Review clinical examples and receive guidance for gaining efficiencies across multiple software platforms used during the radiation therapy process across a multi-facility practice
• Explore the use of metrics designed to quantify efficiency gains realized by implementing the Task Group’s recommendations
Disclosures

• None
• Why Standardize?
• Challenges in a multi-facility community-based practice
• Case Study: Standardized Clinical Treatment Planning Standards
  • SBRT Lung
**LCI Rad Therapy By the Numbers:**

- 9 physical locations
- 6 single-linac facilities & 3 multiple-linac sites
- 350+ patients daily
- > 2000 special procedures annually
- Multisite American College of Radiology (ACR) Accreditation
AAPM Task Group 263

• Report issued in 2017

• 57 stakeholders
  • Physicists, Physicians, Dosimetrists, Members of Cooperative group trials, AAPM, DICOM working group, ASTRO, IHE-RO

• Develop consensus position on nomenclature for use in clinical trials, data-pooling initiatives, populations-based studies and routine clinical care by standardizing:
  • Structure names across platforms
  • Nomenclature for dosimetric data
  • Templates for clinical trials groups and users
  • Formalism for nomenclature schema for the future
Why Standardize?

- Clarity in communication among team members
  - Are we talking about the same things?
  - Is our INTENT clear?
  - Are we using AMBIGUOUS methods of communicating?

### Table 1. Variations in standardized nomenclatures reported for non-target structures by 16 institutions.
The number in ( ) indicates the number of respondents using the same value if > 1.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Number of Institutions</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Optic Nerve</td>
<td>12</td>
<td>Lt Optic Nerve, OPTICN_L, OPTICRV_L, optic_nrv_l, L_optic_nerve, OPTIC_NRV_L, OpticNerve_L, LOPTIC, OpticNerve_L (3), Lrl Optic Nerve, ON_L</td>
</tr>
<tr>
<td>Left Lung</td>
<td>12</td>
<td>Lt Lung, Lung_L(4), LUNG_L(3), lung_l, L_lung, LLUNG, L Lung</td>
</tr>
<tr>
<td>Both Lungs</td>
<td>12</td>
<td>Lungs(2), LUNGs, LUNG_TOTAL, lung_total, combined_lung, LUNG, LUNGs(2), Lung,BilatLung, Lung_Both</td>
</tr>
<tr>
<td>8th Cranial Nerve</td>
<td>7</td>
<td>CN_VIII(5), cn_viii(2), CN8, CN_8</td>
</tr>
<tr>
<td>Right External Iliac Artery</td>
<td>2</td>
<td>A_ILIAC_E_R, a_iliac_e_r</td>
</tr>
</tbody>
</table>
Why Standardize?

- Clarity in communication among systems
  - CT Scanners
  - EMRs
  - Treatment Delivery systems
  - Image management systems

- Sometimes our systems don’t cooperate
  - Character limits
  - Case sensitivity
  - Incompatible characters ^, *, #, ’
Multisite ACR re-accreditation in 2016

ACR-ASTRO Practice Guidelines

- Define the goals and requirements of the treatment plan, including the specific dose constraints for the target(s) and nearby critical structure(s).
- Delineate tumor and specify and approve target volumes, preferably using appropriate methodology of the International Commission on Radiation Units and Measurements (ICRU).
- Review and approve all critical structures contoured. Perform final evaluation and approve the final IMRT plan for implementation.
- Additional recommendation to specify goals and “close the loop” by recording results of planning process.
- This was an opportunity...

A kick in the pants...
• Automation
• Solution needed to be deployable across multiple sites
• Configuration allowed for standardization to be encouraged/enforced
ClearCheck

- ClearCheck is a script that is integrated into the Eclipse treatment planning software that provides plan quality assurance functionality.
- Made optimally efficient through the matching of planning structures and a template.
- TG-263 Standardized nomenclature can easily be incorporated into templates.
• TG Report
  • Principles for non-target, target nomenclature
  • Recommendations for DVH Metrics
  • Implementation
• Nomenclature spreadsheet
  • >700 structure names
• Eclipse structure templates

TG-263 Resources

https://www.aapm.org/pubs/reports/RPT_263_Supplemental/
Will my dosimetrists, physicists and oncologists EMBRACE standardization?
Environmental Challenges

- Regional practices
- Varied environments
- Lean staffing Vs Academic practice
- Rotating Coverage
**Technology Challenges**

- Multiple vendor environment
- 3 different EMRs – Varian ARIA 15.1, Varian ARIA 13.6, Mosaiq
- 3 different TPS – Varian Eclipse 15.1, Varian Eclipse 13.6, Raysearch Raystation
- 2nd Check Software – Radcalc
- DVH & Objective Analysis Software – ClearCheck
- Image Management Database – MIM Maestro
Develop Implementation Plan

- Define goal
  - Realize efficiencies in the planning and plan documentation processes
  - Enhance safety by standardizing nomenclature
  - Demonstrate utilization and compliance with standards in all clinics

- Leading measure
  - Feedback/participation in weekly implementation meetings
Communication

• Communicate with all stakeholders the broad goal of standardization
• Provide documentation
Pilot Implementations

- Provide training
- Selectively introduce at robust clinical site
- Identify champions
- Develop best practices for workflows, protocols
- Gather feedback from smaller groups
Expansion

• Introduce templates, workflows, protocols at a second rad therapy clinic
• Promote champion’s experience
• Incorporate key lessons learned
Feedback

- Understand small process differences from clinic to clinic
- Identify roadbacks to implementation
- Perform necessary revisions
- Allow constrained creativity
Implementation of Standardized Tx Planning Standards: Lung SBRT

Goal

- Implement ClearCheck as consistent tool for analyzing OAR and target plan quality goal attainment
- Standardize use of consistent OAR nomenclature for all treatment plans
- Eliminate use of multiple spreadsheets or manual plan scoring sheets
Methods

Create Standard for all LCI Clinics

- Download Eclipse template from TG-263 resource page, Import into Eclipse V15.1 and customize:
  - Inclusive of ASTRO consensus OARs
  - Consensus of names for planning structures
  - TG suggested target nomenclature
- Export configured Eclipse Structure Template and import into Eclipse V13.6
Configure ClearCheck Templates

Use TG-263 standardized nomenclature exactly matching TPS
No need for aliases!
Process Refinement

- 3-week “trial” implementation
- All sites encouraged to use clinically
- Record feedback in worksheet
- Weekly Skype meetings with users to demonstrate functionality, answer questions and review feedback
## Results: Efficiency Metric

<table>
<thead>
<tr>
<th>Description</th>
<th>Standardized Plan/Template</th>
<th>Manually Matched OAR Names</th>
<th>Manually Recorded from Eclipse DVH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case #1 – SBRT (New User)</td>
<td>23 PTV/OAR</td>
<td>1 min 2 secs</td>
<td>1 min 53 sec</td>
</tr>
<tr>
<td>Case #1 – SBRT (Experienced User)</td>
<td>0.32 secs</td>
<td>0.43 sec</td>
<td>5 min 55 sec</td>
</tr>
<tr>
<td>Case #2 - IMRT Brain (new user)</td>
<td>11 PTV/OAR</td>
<td>N/A</td>
<td>1 min 3 secs</td>
</tr>
<tr>
<td>Case #1 – IMRT Brain (exp. user)</td>
<td>N/A</td>
<td>N/A</td>
<td>1 min</td>
</tr>
</tbody>
</table>
Results: Structure Naming Variation

LCI Before Standardization

- Lung_Lt, Lung L
- Aorta, large vessels, Great Vessels
- Bronchus_LT
- Small Airway, proximal bronch
- Spinal Cord, cord
- Total Lung
- Skin, Skin_dvh
- Brachial plexus
- Chest wall, chestwall

LCI After TG-263 Standardization

- Lung_L
- GreatVes
- Bronchus_Main
- AirWay_Prox
- SpinalCord
- Lungs, Lungs-ITV
- Skin
- BrachialPlex
- Chestwall
Results: Technique Adoption

• 4 of 9 practices deliver SBRT
• 100% utilization rate for ClearCheck matching to templates with standardized OAR nomenclature
Extension to Other Software Platforms

TG-263 Standardized Nomenclature
Automatic Density Assignments

• Radcalc ROI module recognizes and matches imported structures names matching the TG-263 standardized OAR names in the configuration utility

• Default densities, visibility for structures can be set

• No need for pseudonyms
MIM Maestro

• MIM Maestro custom workflows configured to load “SBRT Lung” ROI templates using TG-263 standardized ROI nomenclature

• Deployment of MIM at all Rad. Therapy centers promotes standardization across platforms

Sim CT kicks off autosegmentation of OARs

Targets contoured by physician; expansions autocreated using scripted workflow

CT with contoured targets, target expansions and OARs transferred to TPS for tx planning
RapidPlan

Standardized nomenclature simplifies the matching of structures to the RapidPlan template
Conclusions

- Use of TG-263’s standardized nomenclature has reduced variation across users at multiple facilities.
- Efficiencies in the planning and plan documentation processes were realized when users employed customized templates based on TG-263 standardized nomenclature across multiple software systems.
- Utilization and compliance with TG-263 templates using standardized nomenclature has been observed in all LCI clinics.
Conclusions

• TG-263’s standardized nomenclature recommendations can be incorporated into the tx planning process across a number of software platforms.
• The medical physicist can serve as a leader or contributor to an effective implementation strategy incorporating varied practice stakeholders.

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