TG-263: STANDARDIZING NOMENCLATURES IN RADIATION ONCOLOGY

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Parent Session: From Page to Clinic - Bringing Good Ideas to Your Physics Group
LEARNING OBJECTIVES

• At the conclusion of this talk attendees will...

1. Understand the rationale for implementing standardized nomenclature in their clinic, department or group

2. Be familiar with the guidelines and recommendations found in TG-263

3. Feel more comfortable with beginning a new nomenclature initiative, including how to motivate others and how to keep oneself on track
DISCLOSURES

I have no relevant financial interests to disclose related to this talk or this work.

Some of the tools discussed in this presentation may be adapted for commercial applications in the future.

I am a brand-new member of TG-263U1, but was not involved in the original report.

NOMENCLATURE: WHAT’S IN A NAME?

From personal identity to brand recognition, and from classic literature to modern science (and even science fiction!), names have an impact in how we perceive and interact with the world.

BENEFITS OF STANDARDIZATION

Broadly speaking, standardization drives decreases in variation, stress, and training time; increases in quality and reliability; and forms a baseline for continuous improvement.
CHARGE STATEMENT

To provide nomenclature guidelines in radiation oncology for use in clinical trials, data-pooling initiatives, population-based studies, and routine clinical care by standardizing:

CHARGE 1
structure names across image processing and treatment planning system platforms

CHARGE 2
nomenclature for dosimetric data (e.g., dose/volume histogram [DVH]-based metrics)

CHARGE 3
templates for clinical trial groups and users of an initial subset of software platforms to facilitate adoption of the standards

CHARGE 4
formalism for nomenclature schema which can accommodate the addition of other structures defined in the future
TOWARDS SAFER PATIENT CARE

WHAT IS OUR GOAL?
“The difference between a safe practice and special practice”

POSITIVE INFLUENCES
Improved communication in radiation therapy is a cornerstone of ASTRO’s white paper on standardizing dose prescriptions

- “Common nomenclature increases safety by minimizing variability and ambiguity”
- Standardized rules permit automated solutions to check nomenclature itself, and trigger evaluations of plan quality metrics that are driven by the consistent application of names and conventions
  - Targets
  - Laterality
  - Planning approaches
CHALLENGES
DESPITE SOME PROGRESS

• Vendor-based challenges
  • Inter-vendor variation on constraints for character strings used for structures, including length, special characters, and capitalization

• Multi-institutional-based challenges
  • Lack of a clear multi-institutional oversight group to take charge of coordinating the standards
  • Lack of guidelines that extend across multiple languages, even when the specific names cannot
  • Challenges with mapping previously utilized nomenclature to new standards

• Single institutional-based challenges
  • Cost and effort to implement a new nomenclature
  • Consistent use of standards by the range of staffing groups interacting with patient charts (e.g., physicians, physicists, therapists, and dosimetrists)

• Clinical staff challenges
  • Inconsistent approaches to consider/define laterality and other structure qualifiers
  • Lack of detailed and site-specific guidelines for the definition of target structures to enable automated computer algorithms to extract relevant information
  • Lack of clear guidelines for clarifying or incorporating new elements of a standard nomenclature
NEED HELP JUSTIFYING THIS TO YOUR TEAM?

• Standardized nomenclature:
  • enhances safety and quality efforts within and between clinics for routine ongoing practice
  • enables data pooling for outcomes research, registries, and clinical trials
  • is a vital precursor to the development of scalable uses of scripting for quality assurance and treatment plan evaluation

NEED HELP GETTING THE WORK STARTED?

• TG-263’s Section 13 has an implementation plan and good advice
• “Even a basic effort to change to standardized structure naming is beneficial for the individual clinic, as well as the radiation oncology community as a whole”
• The authors recommend gradual implementation, to allow time to build familiarity

1. Identify common treatment sites and corresponding staffing groups affected by changes in nomenclature
2. Detail commonalities already in use for those treatment sites
3. Discuss the final list, and guidelines with the disease site groups and other stakeholders in your clinic as required by your organizational structure
4. Identify local documentation templates used in the clinical practice that may need to be adjusted along with changes to the nomenclature
5. Develop a plan for gradual rollout of the nomenclature into clinical practice
6. Develop a short list and create templates in your treatment planning system containing your new standard structures
RECOMMENDATIONS

- Physicians, dosimetrists, physicists and therapists would all like to convey the maximum amount of information.

- There are meaningful limitations within the software that we use (image acquisition, treatment planning, record and verify, quality assurance…)

- With that in mind, the authors of TG-263 aimed to develop a nomenclature system that could:
  - be widely adopted in the vended systems as they currently exist and
  - permit new definitions of data element representations for encapsulating a fuller representation of the data.

- Defined structure is human-readable

- Sufficient information avoids ambiguity between similar items in the system.
BACKGROUND AND MOTIVATION
How frustrations lead to change

• Our department has grown, complexity has increased

• Yet common RT plans require multiple orders/data entry points: Epic, ICIS, ARIA, Eclipse

• Physicians have historically written a ‘custom’ Rx in Aria Prescribe Treatment window, few used templates

• Intra- and Inter-physician discrepancies in Rx naming

• Prescriptions (ARIA) were unlinked to treatment plans (Eclipse)

• ARIA Rx was symbolic, dosimetrists would transliterate into Eclipse

• Dosimetrist and Physicists often would modify Plan ID in Eclipse then change name in ARIA
RX STANDARDIZATION CAME FIRST

• Our very first steps, in 2018:
  • Initiated a standardization effort
  • Canvassed opinions, but kept decision making to a small group
  • Kept Rx simple and predictable
  • Got buy-in from key stakeholders and then hit the campaign trail

• This was spearheaded by one of our newer radiation oncologists, Dr. Thomas Daniels

• His enthusiasm and gusto had a tremendously positive effect on this initiative

• His subsequent ascension to a leadership role in the clinical practice of the department gave weight to his projects
WITH THE RX SUCCESS, WE BROADENED THE HORIZONS

- We decided to aim for a complete overhaul of our internal nomenclature
  - Course ID
  - Plan ID
  - Target ID
  - Rx Name
  - Reference Point ID
- Formed a very small group: one physician, two physicists
  - Held many many meetings
  - Used many many whiteboard markers
- Carefully reviewed TG-263
- Looked back at the wide variety of names and identifiers that had been used previously
- Thought about our technological limitations (Aria/Eclipse, Epic, Varian TrueBeam, Hitachi)

Single institutional-based challenges
- Cost and effort to implement a new nomenclature
- Consistent use of standards by the range of staffing groups interacting with patient charts (e.g., physicians, physicists, therapists, and dosimetrist)

Clinical staff challenges
- Inconsistent approaches to consider/define laterality and other structure qualifiers
- Lack of detailed and site-specific guidelines for the definition of target structures to enable automated computer algorithms to extract relevant information
- Lack of clear guidelines for clarifying or incorporating new elements of a standard nomenclature
WORKING WITHIN THE CONFINES OF OUR TECHNOLOGY, AND THE HISTORICAL CHARACTERISTICS OF OUR CLINICAL CULTURE WE DEVELOPED A SCHEMA

- All sites will abide by the following ground rules, unless specifically indicated:
  - Course ID (16): Course Number(2)AnatomicSites(9)MajorTechnique(4) "MultiSite" is only appropriate within a Course ID
  - Rx Name (16): AnatomicSites(9)Laterality(1)Boost(3)orMajorTechnique(4)
  - Plan ID (13): AnatomicSites(9)Laterality(1)Boost(3)orReplan(3)
  - Target ID (16): VolumeDescriptor(3)AnatomicSites(9)Level(4)
  - Reference Point ID (16): DoseLevelIncGy(4)Modality(1)AnatomicSites(9)Course(2)
DECISIONS, DECISIONS

**CASE**
camelCase
PascalCase

**ORDER**
OPrimary
ReverseO

**ABBREVIATION**
We selected 9 characters for anatomic site to severely limit the need for abbreviations

**SPATIAL CATEGORIES**
We permit these for specific cases:
Extended SSD plans
Plans where ambiguity remains

Making these decisions early allows for faster introduction of new paradigms

But making them too soon might lead to a lot of re-work, be thoughtful and engage stakeholders early and often
AND THEN WE MADE THE BIG LEAP

• The entire system is driven by ICD-10 and anatomy
  • Also drives the insurance approval and reimbursement
  • Limit the number of possible names i.e. for bone mets
  • We have nearly 900 ICD-10 codes with anatomic site names identified and mapped

• Plan names are simple (not a 13 character descriptor of plan nuances)
  • Site, Laterality (when applicable), Boost or Replan
  • Does not include
    • What is being spared, dosimetric facts, elective nodal basins, retreatments

• Goal of 90% predictability
  • Special cases: Peds, CSI, WhBrain, WhAbdomen, TSE, TBI
    • Many ‘iconic’ radiation fields, particularly for peds, are not going to fit into the strictest confines, but can have unique rules to permit reliability
  • Remained committed to protocol mandates, but will ask for small amounts of duplicate work (eg copying and renaming targets) for data integrity
THE ROLLOUT PLAN

- Anatomically specific ICD 10
  - GU
  - Lung
  - Brain
  - Head and neck
  - GI
  - Gyn
- Histologically specific ICD 10
  - Lymphoma
  - Sarcoma
  - Bone and Bone mets
  - Skin
- And finally…
  - Breast cancer
NOMENCLATURE
INITIATIVE
TIME LINE

PROSTATE ROLL OUT
Jan 2020

ADDITIONAL SITES
Every 2 weeks

GLOBAL PANDEMIC
TURNING DIFFICULTIES INTO OPPORTUNITIES

- We already had a rudimentary electronic chart checking system, and elementary scripts for the dosimetry and physics staff.
- The pandemic had a silver lining, allowing our physicist/planner, Ed Clouser, to complete a very ambitious project cheekily called PRANK.
- With dedicated time to work on this, we exceeded our own expectations.
SO, HOW HAVE WE DONE AFTER APPROXIMATELY 12 MONTHS?

Even though we rolled out sites one at a time, the physicians and dosimetrists were really and truly excited!

They tried to incorporate the schema, even before a particular “site” was fully codified

It makes for slightly dirty data, but we couldn’t have paid for that type of enthusiasm and willingness to try something new!

Our dosimetry team has been so patient and gracious, they are rock stars
ALL SITES GAINED SOMETHING

Breast and Lung were reduced from hundreds of plan names, to just a handful
Compliance has been amazing
Always more work to do, some of it with nomenclature, but some of it with modifying physician behavior

_Palliative cases with large less “anatomic” volumes remain a challenge_

Isolated nodes, nodes as part of a larger volume, and nodes as part of a sequential boost, were our very last challenge, and after much effort, even they have been made to fit the standards
We’re hoping physicians will see the usefulness in adding the “met” code to previously treated patients.

We’ll be doing more robust data analysis as we have more months and years of results.

Any change to ICD Codes, will require remapping of our code-to-anatomy correspondence.

We continue to refine rules for unusual and nuanced cases, and add in ICD-10s for sites previously unseen in our department.

We’re working to automate more, and better, which Ed will talk about in his presentation.

We eagerly await any updates to TG-263.

We didn’t attempt any type of non-target nomenclature revisions, that will be a large undertaking, but we have a framework and team in place to help make it a reality at some future time.
THANK YOU

A SINCERE THANKS TO THOMAS DANIELS, ED CLOUSER, AND RACHEL GER FOR THEIR WORK ON THIS EFFORT

HOPING TO TAKE QUESTIONS VIA THE CHAT, OR BY EMAIL AT BUCKEY.COURTNEY@MAYO.EDU

HAPPY NOMENCLATURE STANDARDIZING TO ONE AND ALL