Building a Better Safety Net

Plan and Chart Review

Michelle Wells, M.S, DABR

Conflict of Interest

Member of TG 275
Member of MPPG 11.a
No other conflicts
Sources...


RO ILS Quarterly Report – Q3-Q4 2018

Slides from fellow committee members

Overview

The Why: Necessity of Plan and Chart Check
The How: TG 275 & MPPG 11.a
The Win: Clinical Improvements
The Why: The Necessity of Plan and Chart Checks

Why Conduct a Physics Plan Check?

Requirement for Accreditation
How many of you are associated with an accreditation practice?

Requirement for Billing
Expected as part of the planning charge; documented as part of 77336
What Did the Literature Say?

• Clark et al (2010): analyze 2,506 incident reports and half of the report originated in the tx preparation process.

• Novak et al (2016): most frequent (33%) near-miss incidents originated from tx planning process.

• RO-ILS Q4 report (2016): tx planning was the most commonly identified process step where events occurred. (from 2,681 incidents aggregate sum)

• Ezzell et al. (2018): 2/3 common errors types originated prior to initial physics plan check & chart review.
What Did the Literature Say?

The effectiveness of pretreatment physics plan review for detecting errors in radiation therapy
Olga Gopan, Jing Zeng, Avery Novak, Matthew Nyflot, and Eric Ford
Department of Radiation Oncology, University of Washington Medical Center, 1959 NE Pacific Street, Box 358043, Seattle, Washington 98195

• Based on Incidents from departmental ILS & checklist from TG 275 members
• Sensitivity of 38% for physics plan review
• Indicated a need to improve performance

Why should we complete plan & chart review?

Majority of error are occurring in the treatment planning part of the process
Physics Plan Review is one of the most effective quality control checks
Sensitivity for physics plan review is only low - room for improvement
## The Charge

<table>
<thead>
<tr>
<th>TG 275 (Medical Physics)</th>
<th>MPPG 11.a (Journal of Applied Clinical Medical Physics)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review existing data and recommendations that support the use of physics plan and chart review and to review the current recommendations on the qualifications for performing these.</td>
<td>To define the roles of dosimetrists, radiation therapists, medical physicists, and qualified medical physicists as they pertain to the treatment plan/chart review process for external beam radiotherapy (EBRT) and brachytherapy.</td>
</tr>
<tr>
<td>Provide survey information on current practices in the community with respect to physics plan and chart review.</td>
<td>To define a minimum level of practice support for initial, weekly, and end of treatment (EOT) plan/chart reviews organized in the form of lists.</td>
</tr>
<tr>
<td>Provide risk-based recommendations for the effective use of the following physics reviews: initial plan and chart check, weekly chart check, and end-of-treatment chart check.</td>
<td>To make recommendations on the timing of the initial, weekly, and EOT plan/chart review.</td>
</tr>
<tr>
<td>Provide recommendations to software vendors for systems design and operations that best facilitate physics plan and chart review*</td>
<td></td>
</tr>
</tbody>
</table>

*will not consider the vendor sections in this review
How did TG 275 tackle comprehensiveness?

From TG 275

The Survey Basics

From TG 275 Survey
Did the Data Represent the Membership?

**Type of Institution**

From AAPM Website:

**Therapy Members**

- 39.5% community hospitals
- 32.3% academic-affiliates

From TG 275 Survey

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinic Type</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academic</td>
<td>n=423</td>
<td>Non-Academic*</td>
<td>-----</td>
</tr>
<tr>
<td></td>
<td>n=893</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>EMR System</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aria</td>
<td>n=687</td>
<td>Mosaic</td>
<td>-----</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Culture of Safety</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>n=132</td>
<td>Usually</td>
<td>Sometimes**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Patients Per Day</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;50</td>
<td>n=547</td>
<td>51-100</td>
<td>&gt;100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n=458</td>
<td>n=358</td>
</tr>
</tbody>
</table>

* Group 2 = respondents from community hospitals, government hospitals and free-standing clinics

** Group 3 = respondents who answered sometimes, rarely and never

From TG 275 Survey
Overview: Initial Plan Check Items When Sorted by Agreement

Are the checks where we see variations important?

TG-275 Top 10 Failure Modes

<table>
<thead>
<tr>
<th>FM</th>
<th>Number of Checks</th>
<th>RPN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrong or Inaccurate physician contours</td>
<td>7</td>
<td>261.3</td>
</tr>
<tr>
<td>Miscommunication about prior dose, pacemakers, pregnancy</td>
<td>4</td>
<td>214.1</td>
</tr>
<tr>
<td>Improper margins for PTV</td>
<td>2</td>
<td>198.0</td>
</tr>
<tr>
<td>Unintentional re-irradiation of previously treated area</td>
<td>3</td>
<td>181.2</td>
</tr>
<tr>
<td>Incorrect or missing pathology</td>
<td>3</td>
<td>180.3</td>
</tr>
<tr>
<td>Dose in plan does not match intended</td>
<td>7</td>
<td>175.3</td>
</tr>
<tr>
<td>Wrong or inaccurate dosimetrist contours</td>
<td>5</td>
<td>175.2</td>
</tr>
<tr>
<td>Suboptimal treatment plan related to communication or coordination with multidisciplinary care</td>
<td>4</td>
<td>160.2</td>
</tr>
<tr>
<td>Plan does not reflect intent: target extent (i.e. prostate vs prostate/SV)</td>
<td>0</td>
<td>159.1</td>
</tr>
<tr>
<td>Unable to assess potential overlap of prior and current treatment fields</td>
<td>3</td>
<td>155.9</td>
</tr>
</tbody>
</table>

Σ 38 checks
Weekly and Final Chart Checks

92.4% perform a weekly chart check
~70% have a formal procedure
56% use a checklist
1 in 4 do not have a mechanism to ensure checks aren’t missed
1 in 5 caught a reportable event

83.9% perform a final chart check
~95% perform task within 5 days
54% produce a document

From TG 275 Survey
TG 275 Recommendations for Initial Plan Check

From TG 275

MPPG 11.a Guidance

- Key elements that should be considered in plan/chart documentation
- Minimum professional qualifications for completing a chart review
- Appropriate timeliness for completing the review
Qualifications as Defined by MPPG 11.a

**QMP - Qualified Medical Physicist**
- Defined by AAPM Professional Policy 1-J
- Met academic and training requirements
- Granted certification in a specific subfield(s) of medical physics by an appropriate certification body
- Competent to independently provide clinical professional services in therapeutic medical physics

**QMP Designee**
- Medical physicist or a certified medical dosimetrist
- Demonstrated competency in a specific task
- Performs the task under general supervision of a QMP

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Key Elements for External Beam Workflow

- **Simulation Order**
  - Table 1 – Radiation Oncologist

- **Simulation**
  - Table 2 - Therapist

- **Prescription / Contour**
  - Table 3 – Radiation Oncologist & Planner

- **Planning**
  - Tables 5 – Planner

- **Pre-treatment**
  - Tables 8 & 9 – Physicist & Therapist

Note: Tables 4 and 7 are for brachytherapy.
Qualifications of Initial Plan Reviewer

Qualified Medical Physicist (QMP) or designee

Dosimetrist under the direction of a QMP if practice has a single physicist who created the plan

QMP completes review prior to the first fraction

AFTER HOURS TREATMENT

On-call medical physicist reviews the treatment plan remotely or in-person

For institutions without on-call physics, radiation oncologist may conduct the initial plan/chart review.

QMP or QMP-designated medical physicist should check the plan on the next business day, or prior to the treatment on the next business day if additional fractions are prescribed.
Minimum Standards for Weekly Chart Review

Within every five fractions or before the next block of five fractions begins

May be performed more frequently than once a week or less than once a week. Non-conventional treatment schedule with less than five fractions, ideally once near the beginning of the course

Table 10 – 15 required items, 6 optional items

MPPG 11.a

Minimum Standards for Weekly Chart Review

Qualified Medical Physicist (QMP) or QMP designated medical physicist

QMP designated dosimetrist on a rotating basis. Medical physicist to review dosimetrist weekly chart check documentation

QMP or designee alternates to prevent the same person from checking the chart during the entire course of treatment

MPPG 11.a
PLAN CHANGES

Any change that affects the dosimetry of a treatment plan should be handled as a new treatment plan.

A new plan report of the modified plan should be created.

The modified plan should undergo an initial plan/chart review.

“A wise man changes his mind, a fool never will.”

Icelandic Proverb

Minimum Standards for End of Treatment Check

- Within five days of the patient’s last delivered fraction
- QMP and/or their designated medical physicist
- Table 11 – 5 required items, 2 optional items
END OF TREATMENT CHECK

For a single fraction treatment course, ideally, the EOT chart review should be conducted on the same day of the treatment or on the next business day.

If the prescribed treatment course is not completed, clearly document the aborted treatment in a highly visible location in the chart.

How should we complete chart review?

Each clinic should develop standardized policies & procedures based on a risk analysis of local processes

Incorporate physics reviews as early in the workflow as possible

Plan and chart review is a team effort
The Win: Clinical Improvements

Spinal vertebral misalignments reported in RO ILS, noted during weekly chart check.

Multiple mitigation strategies suggested.
1. Contour adjacent structures
2. Increase the FOV
3. Institute maximum shift tolerances
4. Index immobilization devices
5. Include alignment structures on imaging orders
What are the “wins” from plan and chart review?

Error prevention & mitigation
Clinical process improvement
Plan & chart review modifications

THANK YOU!