FACTORS AFFECTING RESOURCE UTILIZATION IN THE US

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AAPM Annual Meeting 2021

The US practice setting

• In the US, more than 1 million radiotherapy treatment courses are delivered each year, distributed across nearly 2,500 clinics. The majority of those clinics are single-linac or two-linac facilities\(^1\).

• More than half of all centers provide SRS services, \(\frac{3}{4}\) of all centers provide VMAT, and nearly all centers provide IGRT.

• Unlike in other affluent countries with large regional healthcare facilities, specialty radiotherapy procedures such as SRS are offered in all practice settings including small community clinics.

\(^1\) IMV Benchmark Report 2019
Process complexity

- The RO-ILS database now contains >10,000 incidents, providing invaluable insight into failure modes in the radiation oncology process.
- A recent summary report highlights the complexity of modern RadOnc processes, with multiple handoff points.

TG-100: IMRT process

- TG-100 mapped the IMRT process for one of the authors’ institutions, illustrating the complexity of modern workflows.
The Abt reports

- Methodology tied to CPT codes and focused entirely on the physicist’s median time for each CPT code
- Shows the maturity of IMRT and the shift from point-based to volume-based brachytherapy
- Do not reflect the recent community adoption of SBRT

ACR data

- High-level view of actual staffing levels in accredited clinics, stratified by practice setting

<table>
<thead>
<tr>
<th>Ratio</th>
<th>HI</th>
<th>ACR Accredited Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>New patients #FT/E radiation oncologist (2.3)</td>
<td>272</td>
<td>201</td>
</tr>
<tr>
<td>New patients #FT/E physicist (1.2)</td>
<td>247</td>
<td>229</td>
</tr>
<tr>
<td>New patients #FT/E dosimetry (2.3)</td>
<td>314</td>
<td>259</td>
</tr>
<tr>
<td>New patients #FT/E radiation therapist (1.4)</td>
<td>180</td>
<td>62</td>
</tr>
<tr>
<td>FTE radiation therapist (0.75) treatment units (2)</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>New patients #FT/E treatment units (2)</td>
<td>341</td>
<td>250</td>
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</tbody>
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<thead>
<tr>
<th>Ratio</th>
<th>HI</th>
<th>ACR Accredited Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>New patients #FT/E radiation oncologist (1.3)</td>
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<td>280</td>
</tr>
<tr>
<td>New patients #FT/E physicist (2.2)</td>
<td>236</td>
<td>250</td>
</tr>
<tr>
<td>New patients #FT/E dosimetry (2.3)</td>
<td>255</td>
<td>250</td>
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<tr>
<td>New patients #FT/E radiation therapist (0.4)</td>
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<td>62</td>
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<tr>
<td>FTE radiation therapist (0.5) treatment units (2)</td>
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<tr>
<td>New patients #FT/E treatment units (2)</td>
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<td>220</td>
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</table>
Productivity?

- Roughly 200-300 new patients annually per FTE physicist, dosimetrist and radiation oncologist in the US

- Why the seemingly low productivity, when we all feel overworked?

A different approach

- Define a comprehensive set of treatment sites / categories
- Map the entire workflow
- Involve the full clinical team to determine the average time spent by each functional area on each process step, for each treatment site / category
- Identify factors with a strong effect on task time (e.g. software limitations, staff availability)
- Perform the evaluation in several institutions in different geographic regions
A different approach

• Work in progress at:
  • Beth Israel Lahey Health (Boston, MA)
  • Yale Univ (New Haven, CT)
  • Northwestern (Warrenville, IL)
  • Loyola Univ (Maywood, IL)
  • Karmanos Cancer Ctr (Detroit, MI)
  • Univ Washington (Seattle, WA)
A different approach

Snapshot from SBRT Abdomen category for one institution

- **Preliminary results**
  - Significant variation in resource use between institutions
  - Most significant factor appears to be physician conventions and availability, not technology
  - Automation tools appear to be the second-most impactful factor, reducing process time in institutions that have deployed a high level of automation
Opportunities

• The CMS Alternative Payment Model may create an incentive for physicians to change practice conventions with a focus on process efficiency

• Standardization can lead to better efficiency, but only if the physicians are supportive

• Automation (when appropriate) can improve efficiency, but requires capital investment (or higher operating cost)