Geographic Access to Radiation Therapy in the United States

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Disclosure

• Employer: The University of Texas MD Anderson Cancer Center
• I have no conflicts of interest to disclose.

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Why does geographic access to RT matter?

- Between half and two thirds of people diagnosed with cancer get radiation therapy.
- Radiation therapy usually requires multiple treatments.
- Distance from radiation facilities is correlated with receipt of RT:
  - Decision for breast-conserving surgery + RT vs. mastectomy for breast cancer.
  - Definitive RT vs. surgical management of prostate cancer.
  - Affects clinical trial participation.

...but these studies are often based on physician location.

Method

• Contacted state regulatory bodies and dosimetric accrediting bodies to collect information on locations where patients receive RT (2018-2020)

• Geocoded addresses into latitude/longitude coordinates; rounded coordinates to 2 decimal places (~1km) to create identifiers of RT sites

• Geospatial analysis:
  • Generated maps
  • Attributed populations to counties based on census data
  • Calculated distance between county centroids and closest RT facilities

• Compared results with similar database created in 2005
Results: Proximity to Clinics

~70% of the U.S. population lives within 12.5 miles of a radiation therapy facility.

4.5% of the U.S. population lives >50 miles from the closest facility.
Results: Change Over Time

- **17% growth**: 2,332 facilities in 2020 versus 1,987 in 2005
- 33% of sites (662/1987) in the 2005 dataset did not exist in the updated dataset
- The rate of growth increased faster for people closest to facilities than it did for those farther away

*Percent of US population* within a given distance from RT

<table>
<thead>
<tr>
<th>Distance</th>
<th>2005</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;12.5 miles</td>
<td>65%</td>
<td>70%</td>
</tr>
<tr>
<td>&lt;25 miles</td>
<td>84%</td>
<td>86%</td>
</tr>
<tr>
<td>&lt;50 miles</td>
<td>95%</td>
<td>96%</td>
</tr>
</tbody>
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*based on attributing the population to a county centroid*
Discussion

• Growth in RT facilities (17% from 2005-2020) mirrors the growth in treated cases (12% from 2004-2014). Both ~1.2% annual growth

• The percent of the population with greatest access (<12.5 or <25 miles to RT) increased faster than the population <50 miles to RT. Are resources being allocated appropriately?

• Findings are consistent with recent reports of substantial variation in radiation oncologist density

Conclusions

• This is the most complete database on RT facilities in the US

• Despite a significant growth in the number of RT facilities over the past 15 years, about 4.5% of the US population still has limited geographic access to RT (>50 miles)

• Future opportunities to use this data to better understand underserved US populations