Future Trends in Demand and Supply for Radiation Oncology Physicists – 2018 Revision

A Crisis in the Demand and Supply 2016 – 2030

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What is the General Problem?

- All professions need to be able to plan for the future
- A key aspect of such planning is to project supply and demand
- Accurate projection of supply and demand positions the profession for the future:
  - Oversupply – unemployment, low wages
  - Undersupply – extended working hours, compromise in patient care, poor quality of life

What is the Specific Problem?

- Radiation Oncology Physicists (ROPs) face three major issues:
  - The rate of retirement of ROPs has risen dramatically as the baby boomers retire
  - Cancer incidence grows at ~2% per year, leading to an increase of ~30% by 2030
  - As of 2014, ROPs must have graduated from a residency program accredited by the Commission for the Accreditation of Medical Physics Education Programs (CAMPEP)
Entry into the Profession

- Since Board Certification is required to become a Radiation Oncology Physicist
- We must have enough residency programs to meet the demand
- We must graduate enough radiation oncology physics residents to meet the demand
- The current number of graduating therapy residents is about 140/year

MS/MSc and PhD Graduate Destination – 2016 CAMPEP Report

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<thead>
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<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
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<tbody>
<tr>
<td>MS RT Residency</td>
<td>46 (22%)</td>
<td>37 (23%)</td>
<td>40 (25%)</td>
<td>46 (23%)</td>
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<tr>
<td>PhD RT Residency</td>
<td>24 (30%)</td>
<td>26 (25%)</td>
<td>31 (29%)</td>
<td>46 (47%)</td>
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Demand – How many jobs?

- Projected Demand Information Required:
  - Cancer incidence 2006 – 2030 (NCI projection cited by AAMC Center for Workforce Studies)
  - Median new cancer patients treated per Clinical FTE Radiation Oncology Physicist (Abt IV Study of Medical Physicist Work Values for Radiation Oncology Physics Services)
Demand - # Jobs? - Assumptions

- One half of all new cancer patients are treated with radiation therapy
- The median number of new cancer patients managed by a FTE Radiation Oncology Physicists was measured as 424 in 1995, 325 in 2002, 304 in 2007, and 225 in 2015
- A working ROP is assumed to spend \( \frac{3}{4} \) time on clinical service. Therefore the ratio of working ROPs to Clinical FTEs is 1.33333

Demand - # Jobs? - Assumptions

- Assume 75% of Full Members of the AAPM are involved in radiation oncology physics service; 69% of these are primarily clinical
- Retiring Therapy Physicists 2016 – 2030 (American Association of Physicists in Medicine membership profile by age, created January 2018)
- Since most radiation oncology physicists retire between 65 and 69, for a given year, average the number of individuals between 65 and 69
- The retirement rate was projected between 0.014 and 0.018 for the years 2016 through 2030

Supply – How many do we make?

- Projected Supply Information Required:
  - CAMPEP ROPs trained 2000 – 2030 (American Association of Physicists in Medicine)
  - Residency Application and Acceptance Rates based on historical data (CAMPEP e.g. application ~65% MS, ~85% PhD, 100% Certificate and DMP)
  - Projected ROPs passing ABR Board Certification Examination 2016 – 2030 (ABR)
  - Number of Working ROPs 2016 – 2030 (AAPM)
Supply - Model design

- Model allows for adjustment in:
  - Radiation Oncology Physics Residents entering CAMPEP Accredited Residency Programs grows between 5 and 6 positions per year through 2030
  - Working ROP Retirement Rate between 2008 and 2030
  - Model adjusts retirement rate if different from expected

What about 2016-2030?
If we follow current growth trends

What about 2016 – 2030?
If we continue current trends

- Cumulative Undersupply Gap between Total Number of ROPs Needed and the Number of Working ROPs = QMP Jobs Unfilled
- Additional Hours Per Clinical Physicist to Accommodate the Workload

- Expected Number of New Residency Graduates Annually
- Annual Undersupply Gap between Increasing Demand and New ROPs entering minus the number of ROPs Leaving the Field
- Number of Physicists Needed
- Additional Hours Per Clinical Physicist to Accommodate the Workload
- Cumulative Undersupply Gap Between Total Number of ROPs Needed and the Number of Working ROPs = QMP Jobs Unfilled
If we follow current trends….

What about 2016-2030?
If we have 200 CAMPEP Residency slots by 2022 versus 160, then growth to 240 slots versus 200 by 2030?

Results and Conclusions
- Current number of CAMPEP Residents must increase from 140 to a minimum of 200 per year by 2022; 160 will not work!
- Then growth must continue to around 240 by 2030 just to head off the growth in demand leaving a gap of 300 unfilled positions.
- Times are indeed challenging for the Radiation Oncology Physics Community!
Better Questions

- If we are unable to make enough ROPs, and the work week spirals out of control:
  - will more QMPs retire or leave the profession?
  - will this impact patient care negatively?
- What if there is a new technology or employment paradigm? – how might it change this model?
- What about current CAMPEP graduates with no pathway to certification?
- Should Academic programs guarantee a residency slot to a successful graduate?