Improving Access to Radiotherapy in LMICs

Eugenia (Nina) Wendling
Executive Director
International Cancer Expert Corps
Washington DC, USA

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Outline of presentation

• ICEC- systems approach to cancer care
• Defining the gaps
• Efforts to increase access to suitable, affordable, and sustainable enabling technologies
• Cancer care is integral part of a healthcare system: Flex-Competence
• Addressing global cancer care has a very broad global impact
ICEC is a recognized 501c3 non-profit organization based in the US

Mission:

- Reduce mortality and improve the quality of life for people with cancer in LMICs

- Address the needs of indigenous and geographically underserved populations in upper-income countries and regions worldwide

- ICEC accomplishes this through a global mentoring network of cancer professionals who work with local and regional in-country groups to develop and sustain expertise for better cancer care.
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Growing Global Cancer Crisis

- 2018 Globally - 18 million new cancer cases per year diagnosed and 9.6 million cancer deaths
- By 2040- projected number of cancer cases- 27.5M and deaths- 16.3M
- 70% of these deaths will occur in LMICs
- The complete spectrum of care needed: Prevention, screening, diagnosis, treatment, long-term follow-up
- More than 50% of all cancers can benefit from RT for cure or palliation
- Solution requires expertise and enabling technology.
Access to radiation therapy, particularly LINACS is an excellent metric of the gap in comprehensive cancer care.

Map showing the number of people per functioning machine in countries in Africa

<table>
<thead>
<tr>
<th>Country</th>
<th>LINACs</th>
<th>Population</th>
<th>People per LINAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>1</td>
<td>115 M</td>
<td>115,000,000</td>
</tr>
<tr>
<td>Nigeria</td>
<td>7</td>
<td>206 M</td>
<td>29,000,000</td>
</tr>
<tr>
<td>Tanzania</td>
<td>5</td>
<td>59.7 M</td>
<td>11,900,000</td>
</tr>
<tr>
<td>Kenya</td>
<td>11</td>
<td>53.9 M</td>
<td>4,890,000</td>
</tr>
<tr>
<td>Morocco</td>
<td>42</td>
<td>36.9 M</td>
<td>880,000</td>
</tr>
<tr>
<td>South Africa</td>
<td>97</td>
<td>59 M</td>
<td>608,000</td>
</tr>
<tr>
<td>UK</td>
<td>348</td>
<td>67 M</td>
<td>187,000</td>
</tr>
<tr>
<td>Switzerland</td>
<td>72</td>
<td>86 M</td>
<td>102,000</td>
</tr>
<tr>
<td>US</td>
<td>3827</td>
<td>331 M</td>
<td>85,000</td>
</tr>
</tbody>
</table>

- **29** countries have LINAC-RT facilities
- **12** countries only one facility
- **27** no LINACs for RT
- ~400 RT-LINACs for > **1 billion** people
- **Nigeria** has 85 radiation and clinical oncologists and only a few trained linear accelerator maintenance engineers for its nearly 200 million people
Radiation Oncology Workforce Projections

• Current numbers
  – 2018 estimate 664 practicing radiation oncologists in LMICs\(^1\).

• Based on projections
  – -2030 - 13,322 assuming there is adequate investment in RT infrastructure.

• Training the number of future radiation oncologists will be challenging
  – Lack of qualified teaching faculty
  – Demand for radiation oncologists also in HICs exists
  – Costs considerations
  – Emigration of skilled personnel (brain drain)
  – Does not represent shortages for all other RT related personnel (medical physicists, dosimetrists, radiation therapy technicians, oncology nurses, etc.)

Two tracks

1. Increase workforce capability and capacity
   - ICEC Twinning programs -
     - Academic medical institutions in HICs
     - Private practices
     - Professional societies
     - Others
   - Partnering with cancer hospitals and cancer professionals in LMICs for knowledge and skills transfer

2. Understanding technology gaps to increase access to Radiation Therapy
   - Enabling technology for treatment and knowledge transfer
   - Trusted partnerships
   - Research & development
   - Implementation
• ICEC – leveraging trusted partnerships to identify gaps and develop solutions to increase access medical linacs for challenging environments

  - **Gather information** from African hospitals/facilities regarding challenges faced in providing radiotherapy in Africa
  - **Identify** the challenges with those who work with them day-to-day
    - Must keep in mind that machines don't treat patients, **people do**.
  - **Educate, mentor, sustain expertise** through exponential growth.
  - **Metrics** to assess impact and guide growth

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1 Ige TA et al., Surveying the Challenges to Improve Linear Accelerator-based Radiation Therapy in Africa: a Unique Collaborative Platform of All 28 African Countries Offering Such Treatment, Clinical Oncology, https://doi.org/10.1016/j.clon.2021.05.008
Outreach and Engagement

Leveraging and expanding relationships to increase access to RT

- IAEA – Human Health, PACT
- CERN, European Organization for Nuclear Research
- US DOE NNSA ORS
- STFC Research and surveys – understanding barriers to access to radiation therapy
  - SEEIST, Africa Survey 28 Countries with LINACS, Ongoing Eastern Europe Survey
- Professional societies
  - ABS, ASTRO, ESTRO, AAPM, MPWB, etc.
- International organization and NGOs
  - VCDNP, WHO, UICC, United Nations -Economic and Social Council (ECOSOC), CoNGO, WINS, Wilton Park, Geneva Health Forum
ICEC’s Healthcare solution: Global network

Response to crisis – Expandable network of expertise & resources

LEGEND
- Expertise for mentoring, smart technology
- Industry partners and government agencies
- Regional clusters
  - LMIC Centers
  - Satellite and Remote Clinics

Global expertise network; Committed healthcare organizations
Global supply lines with surge capacity
Regional resource sharing enterprise
Global Oncology = Broad Global Impact

A Broad Impact for Global Oncology.
Coleman CN, Wendling EN, Pistenmaa DA.
Resources


- Dosanjh M et al., Developing Innovative, Robust and Affordable Medical Linear Accelerators for Challenging Environments, *Clinical Oncology*, https://doi.org/10.1016/j.clon.2019.02.002
Thank you!

For more information contact Nina Wendling
Nina.wendling@iceccancer.org
www.iceccancer.org