Radiation Oncology: A Global Perspective

Compiled by the Global Health Initiative Subcommittee (ARRO)

Please refer to the sources listed below each chart/graph/table for more information
Section II:

Availability of Radiotherapy Services (Current)
Current Availability of Radiation Equipment

• Over 50-60% of cancer patients will require radiation therapy as part of their treatment; however, in the developing countries, less than 20% of cancer patients will have access to radiotherapy.

• Developing countries account for 85% of world’s population, but only account for 35% of world’s radiation facilities. Developed countries account for 15% of the population, with 85% of radiation facilities.

• Total number of radiotherapy machines in developing countries: 4,400 (35% of world’s radiation facilities).

• At least one radiotherapy unit for every 250,000 people is available in most high income countries; while, a survey of 20 low and middle income countries found that one radiotherapy unit to every 5 million people and sometimes, one unit for every 20 million people is available.

• Currently, 30 countries (15 in Africa and Asia) do not have any radiation machine.

Relationship of Cancer Incidence and Shortage of Radiation Units in LMIC

Current incidence of cancer in developing low-middle income countries (LMIC): Eight million per year
Current radiotherapy units needed: 9,600
Current supply: 4,400
Current Shortage: 5,000

Table 2: Crude cancer incidence for the LMIC regions

<table>
<thead>
<tr>
<th>Region</th>
<th>Crude cancer incidence/ million population</th>
<th>60% needing RT treatment</th>
<th>Add 23% for Re-treatment</th>
<th>Number of RT units/ million population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>725</td>
<td>435</td>
<td>535</td>
<td>1</td>
</tr>
<tr>
<td>Asia</td>
<td>1,487</td>
<td>892</td>
<td>1,097</td>
<td>2</td>
</tr>
<tr>
<td>East Asia</td>
<td>2,370</td>
<td>1,422</td>
<td>1,749</td>
<td>&gt;3</td>
</tr>
<tr>
<td>West Asia</td>
<td>999</td>
<td>599</td>
<td>737</td>
<td>&gt;1</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>1,573</td>
<td>944</td>
<td>1,161</td>
<td>&gt;2</td>
</tr>
<tr>
<td>Average All LMIC</td>
<td>1,280</td>
<td>768</td>
<td>944</td>
<td>2</td>
</tr>
<tr>
<td>Europe</td>
<td>4,381</td>
<td>2,629</td>
<td>3,233</td>
<td>6</td>
</tr>
</tbody>
</table>
Distribution of Megavoltage Units per World region

FIG. 2. Distribution of megavoltage units (linacs and $^{60}$Co machines together) per region of the World. (Source: IAEA, DIRAC directory, 2006 [126]).
FIG. 3. Distribution of megavoltage units (linacs and $^{60}$Co machines) considering their industrial development. (Source: Created with data from IAEA, DIRAC, 2006 [126]; Hitoshi, 2005[127]).
Average Number of Megavoltage Units per Million

FIG 4. Average number of megavoltage units per million. (Source: IAEA, DIRAC directory, 2006 [126]).
Megavoltage Unit per Million Inhabitants (Country Specific)

FIG. 5. Countries with the highest average number of megavoltage units per million inhabitants. Source: IAEA, DIRAC directory, 2006 [126].
Megavoltage Unit per Million Inhabitants (LMIC)

FIG. 6. Average number of megavoltage units per million inhabitants in regions of low and middle income countries. Source: IAEA, DIRAC directory, 2006 [126].
FIG. 9. Distribution of brachytherapy equipment (LDR manual and afterloaders, MDR, HDR) relative to industrial development. Source: Created with data from IAEA, DIRAC directory, 2006 [126]; Ferlay et al. 2004–GLOBOCAN 2002 [4]; IMV Medical Division, Nucletron, USA.
Distribution of Megavoltage Units per World region

Source: IAEA-DIRAC