

Radiation Oncology: A Global Perspective

Compiled by the Global Health Initiative
Subcommittee (ARRO)

Section III:

Economics

Financial Burden

- The IAEA estimates over 85% of health costs in low-income countries are paid out of pocket and more than 100 million people are pushed into poverty every year because of health care costs, including cancer care
- The IAEA estimates shortage of 5,000 radiotherapy machines in the developing world
- The capital, infrastructure, and maintenance costs as well as lack of trained staff are a major obstacle for developing countries to purchase radiation equipment

AVAILABILITY OF HEALTH CARE SERVICES

<i>Variable</i>	<i>World Bank GDP/income groupings (%)</i>			
	<i>Low</i>	<i>Low–Mid</i>	<i>Upper–Mid</i>	<i>High</i>
Presence of a national cancer and non-communicable disease (NCD) plan	35	55	60	75
Social or private health insurance coverage for cancer or NCDs	35	50	50	85
Accessibility to care and treatment by health insurance coverage	24	45	64	88
Element of a plan as part of the primary health care system:				
Primary prevention	68	83	93	93
Risk factor detection	50	70	90	93
Risk factors and disease management	62	74	95	91
Support for self-help and care	38	55	66	74
Home-based care	25	41	52	74
Availability of services in the public sector:				
Chemotherapy	37	47	71	85
Palliative/end of life	22	15	57	76
Availability of cancer services in primary care:				
Cervical cytology	20	43	89	83
Visual inspection of cervix with acetic acid	12	23	34	30
Breast self examination	54	74	93	87
Mammography	7	17	64	72
Availability of oral morphine	29	25	57	80
Prevalence of fully implemented, approved, evidence-based guidelines, protocols, or standards for management of cancer and NCDs	10	15–20	20–38	20–50

GDP = gross domestic product.

Economics

- Cost of single fraction palliative treatment in developing countries is less than \$5
- Over 80% of megavoltage cobalt units in the developing countries are providing mainly palliative treatments
- Estimated cost of establishing a new radiotherapy facility in a low to middle income country is about \$5-6 million. If this facility operates for 12hrs a day, then it can deliver half a million doses of radiotherapy over its lifetime, with an amortized costs of less than \$5 per fractions.
- In 2002, IAEA conducted a survey of 11 developing countries to determine the delivery cost of a single fraction treatment with a Co-60 unit or a linac. The median cost per fraction was \$4.87 (\$1.29,\$34.23) for Co-60, while it was \$11.02 (\$3.27, \$39.59) for linacs.

NEED FOR TELETHERAPY MACHINES: IAEA ESTIMATION

TABLE 24. ESTIMATED NEED FOR TELETHERAPY MACHINES PER NUMBER OF PATIENTS AND PER POPULATION^a

Guideline	Per patient	Per population
Linear accelerators		
— General	1 per 450 patients/year	1 per 180 000 persons
— With increasing complexity	1 per 400–450 patients/year	1 per 160–180 000 persons
Radiation oncologists		
— General	1 per 250 patients/year	1 per 100 000 persons
— With increasing complexity	1 per 200–250 patients/year	1 per 80–100 000 persons
Physicists		
— General	1 per 450–500 patients/year	1 per 180–200 000 persons

^a The numbers per population are based on the assumptions of a radiotherapy utilization factor of 50% and a retreatment factor of 1.25.