

Access to essential

Radiotherapy



Lives saved and economic returns

Key messages

Radiotherapy is an essential component of care for the most common cancers globally.

Achieving equity in access is imperative - 80% of the world's cancer patients are in low- and middle- income countries (LMICs), but have access to only 5% of global radiotherapy resources.

By 2035, models suggest that 12 million patients per year in LMICs would benefit from radiotherapy.

Investment in meeting radiotherapy needs has the potential to return USD 278.1 billion net in benefits and save 26.9 million life years for an investment of USD 184 billion. The cost of inadequately treated cancer had already reached USD 895 billion in 2010.

The associated upfront costs of developing radiotherapy services are expected to be recouped within 10-15 years in LMICs.

Background

A global issue

Since 2011, the international health and development communities have recognised that cancer, as part of a broader set of non-communicable diseases (NCDs), is significantly undermining social and economic development (see international commitments). The UN Political Declaration on NCDs states that NCDs “**constitute one of the major challenges for development in the twenty-first century.**”

However there are a number of key measures that can be taken to reduce the impact of NCDs, and cancer more specifically, on individuals and countries. One of the most pressing challenges is the inequities in access to cancer diagnosis and treatment facilities.

Access to radiotherapy facilities is emblematic of this; around **80% of cancer cases occur in LMICs which only have access to around 5% of the world's radiotherapy resources.** However LMICs are due to see the fastest growth of cancer incidence over the next 20 years.

The **economic burden of inadequately treated cancer was estimated to be USD 895 billion in 2010.**

Disability and premature death from cancer are already having a significant impact on national productivity and, with cancer care costs often borne out of pocket, potentially catastrophic impacts on individual households. **A comprehensive cancer prevention and treatment strategy** is an essential component of any universal health care and development strategy and, as the Lancet Oncology commission demonstrates, **radiotherapy must be a core component of this.**

International commitments

The international momentum behind the need to tackle NCDs has grown substantially.

- The Sustainable Development Goals (SDGs) set out the need to reduce premature mortality from NCDs 33% by 2030
- The 2013-2020 WHO Global NCD Action Plan includes a target to achieve an 80% availability of technologies used to manage NCDs

The global health community has a unique opportunity to leverage these recent international development commitments in order to address the national shortfalls in radiotherapy access.

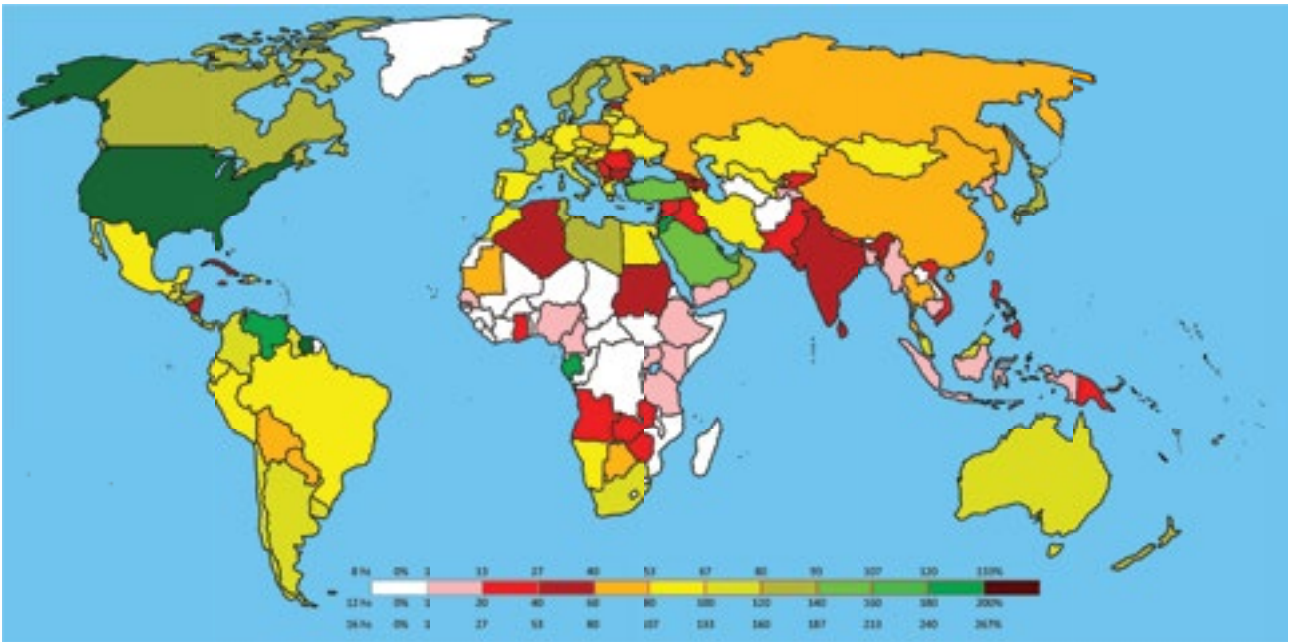


Figure 1. Global distribution of radiotherapy facilities.

The Task Force

The Global Task Force on Radiotherapy for Cancer Control (GTFRCC) was formed in 2013 as an international collaboration to understand the **global demand for radiotherapy and to quantify the investment needed to achieve global equity in access by 2035**, alongside, the key findings were presented in a Lancet Oncology commission exploring:

1. The **20-year future global burden of cancer and the associated demand for radiotherapy**, which was in turn used to calculate the total life-years gained from expanding access to radiotherapy to meet 100% of global demand by 2035 alongside increases in economic productivity from this improved life expectancy and quality
2. The **facilities, equipment, and personnel required to deliver a single radiotherapy treatment**. These estimations were used to calculate the costs of creating and delivering the required global radiotherapy capacity
3. From this the commission determined the **cost benefit ratio of an investment into radiotherapy**.

While the commission developed two models to explore these attributes, the figures quoted here are drawn from the more conservative nominal model. As such, there is the potential for significant efficiency gains for each of the outcomes identified.

The Commission's key finding was that expanding access to radiotherapy not only saves or prolongs lives, but also delivers notable economic returns.

Commission findings

Radiotherapy demand

The commission estimated that **radiotherapy is recommended in 50% of cancer cases in LMICs**, which equates approximately 7 million cancer patients based on 2012 data on cancer stage distribution and incidence. This need is forecasted to increase to **12 million people with cancer warranting radiation treatment in 2035**. For many of the most common cancers, including lung, breast, cervical, head and neck cancers, there is no effective treatment without radiotherapy.

Costs of radiotherapy

The continuing geographic disparity in access is perpetuated by the **misconception that radiotherapy is too costly or impractical to successfully implement in LMICs**.

To explore radiotherapy costs, further the commission divided them into two components:

- Capital costs – to develop a new facility, including building, equipment, and training new staff
- Operating costs – to deliver treatments once a facility is established, including salaries and maintenance.

The commission found that the burden of each of these costs varied by country income level and, across most LMICs, the one-off capital costs were the major cost drivers. The rate at which these costs were recouped followed a similar trend. For example,

the capital costs to create a radiotherapy centre and services (calculated as two radiotherapy units and supporting facilities) for a LMIC was estimated at USD 350 per session or a one-off investment of USD 5 million to benefit 800 - 1,000 cancer patients per year.

The ongoing operating costs, which are essential to maintaining the efficiency of facilities, amounted to approximately USD 60 per session which equates to USD 860,000 – USD 1.08m in maintenance to benefit 800 - 1,000 cancer patients per year.

The commission's core message from the modelling was that establishing radiotherapy services requires a large initial investment; **however the benefits of upfront investment are recouped over 10-15 years.** Operational costs are far smaller and more predictable by comparison in LMICs and as Figure 2 demonstrates, the benefits of radiotherapy quickly outweigh its costs.

Direct returns on investment

If radiotherapy capacity were increased incrementally, **26.9 million life-years could be saved in LMICs, resulting in a net economic benefit of USD 278.1 billion.**

The **cost of meeting 100% of global need for radiotherapy by 2035 in LMICs is estimated at USD 184 billion.**

The model used to develop these estimates was highly conservative and did not account for key efficiency savings such as longer operating hours for machines, or price reductions through purchasing

planning. A significantly larger net benefit could therefore be achieved if more efficient operating models are used.

After estimating the costs and the economic benefits from the scale-up of radiotherapy, the GTFRC's estimates indicate positive and substantial returns on investment (Fig. 2).

Strengthening health systems

The commission highlighted that **radiotherapy facilities also provide immense value for patients by providing palliative care and pain relief services**, however these were not factored into the economic model. Although a direct economic benefit is not easy to quantify, there are clear benefits for terminally ill patients and their families by alleviating the often distressing symptoms at the end of life.

Radiotherapy investment also brings with it structural benefits as part of health system development. The commission recognised that the delivery of radiotherapy requires a strong enabling environment, but this **investment in radiotherapy processes can help to strengthen healthcare delivery.** Developing the skills and regulatory environment needed to deliver radiotherapy safely has the potential to meet current skills gaps and thereby significantly strengthen the whole health system. Moreover, as health systems grow there is the capacity to develop radiotherapy facilities incrementally using the spoke-and-hub model and enable developments to reflect national needs and capacities.

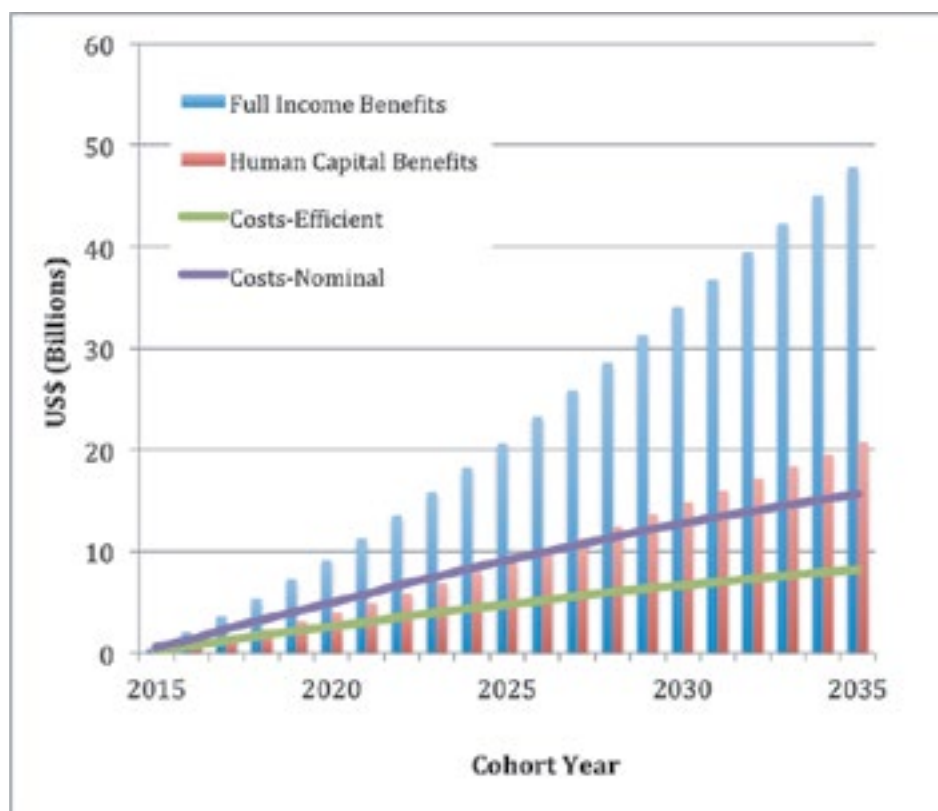


Figure 2: Expansion of global access to radiotherapy carries a positive return on investment. Benefits account for both a person's economic contribution to GDP and also the intrinsic societal value of a life-saving intervention.

Closing the gap

The expansion of radiotherapy is feasible in low-income settings. Different models of applying key technical and financial innovations to develop facilities are already being implemented in India, Bangladesh, Zimbabwe and Brazil.

To help build the human resources required to deliver radiotherapy, Brazil has begun to use distance learning platforms in partnership with local practical training. Distance or e-learning also have the potential to support or mentor oncology professionals, while telemedicine can help to facilitate diagnosis and reporting where skills are lacking in local areas.

Innovative financing for radiotherapy investments, such as guarantees by development banks, could be used to mitigate investment risk. Health planners are already benefitting from drawing on numerous models, such as strategies used to mobilise and pool resources for AIDS, tuberculosis and malaria, to fund radiotherapy investment as well as integrating services nationally.

There must also be concerted efforts to engage the leaders of tomorrow, inspiring them to drive efforts in making radiotherapy more accessible. Youth directed initiatives, such as GlobalRT and the International Cancer Expert Corps' Early Career Leaders, are critical to realising long-term objectives are realised.

These successes are the result of clear policy action at the national level, but to create a truly enabling environment, there must be a united front. This includes coordinated effort between governments, the World Health Organization, the International Atomic Energy Agency, the Union for International Cancer Control, multilateral development agencies, civil society, professional associations and the private sector.

References

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Call to action

GFRCC recommendations for expanding access to radiotherapy:

1. **Population-based cancer control plans:** Incorporate radiotherapy into the population-based cancer control plans in 80% of countries by 2020
2. **Expansion of access to radiotherapy:** Increase the 2015 radiotherapy treatment capacity by 25% by 2025, including the establishment of at least one cancer centre in each LMIC by 2020
3. **Human resources for radiotherapy:** Train, with the aid of new cancer centres, 7,500 radiation oncologists, 20,000 radiation technologists, and 6,000 medical physicists in LMICs by 2025
4. **Sustainable financing to expand access to radiotherapy:** Invest USD 46 billion by 2025 to establish radiotherapy infrastructure and training in LMICs
5. **Align radiotherapy access with Universal Health Coverage:** Include radiotherapy services as part of the universal health coverage plans in 80% of LMICs by 2020.