

# Balancing Equity and Advancement in Radiotherapy



## How Economics Can Help Solve Global Health Challenges

Danielle Rodin MD MPH

Department of Radiation Oncology

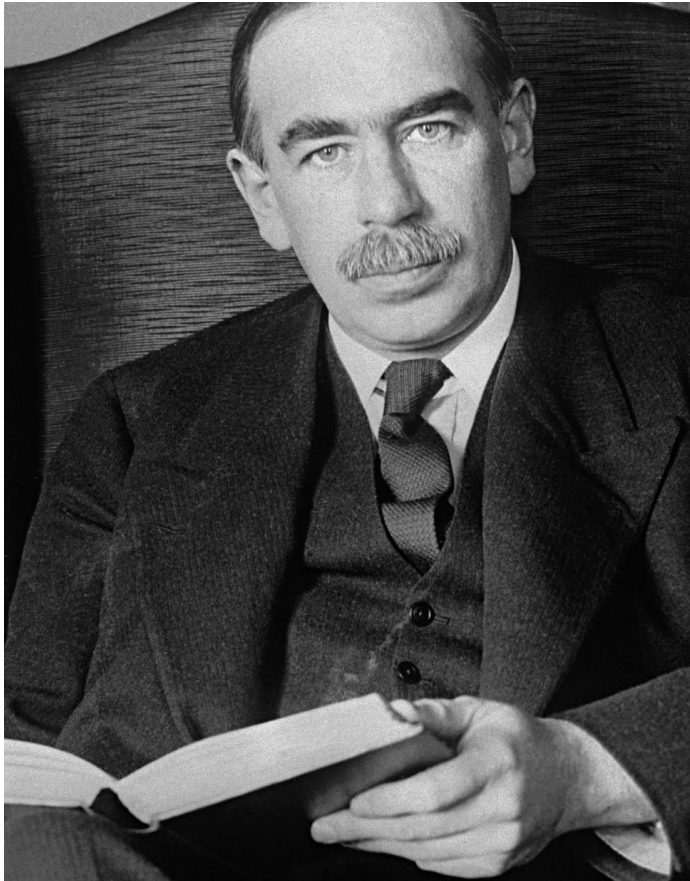
University of Toronto



# Decision-Making in Health Care



# The Science of Economics



“economics is a branch of logic, a way of thinking...an organized and orderly method of thinking out particular problems”

# Health Technology Assessment (HTA)

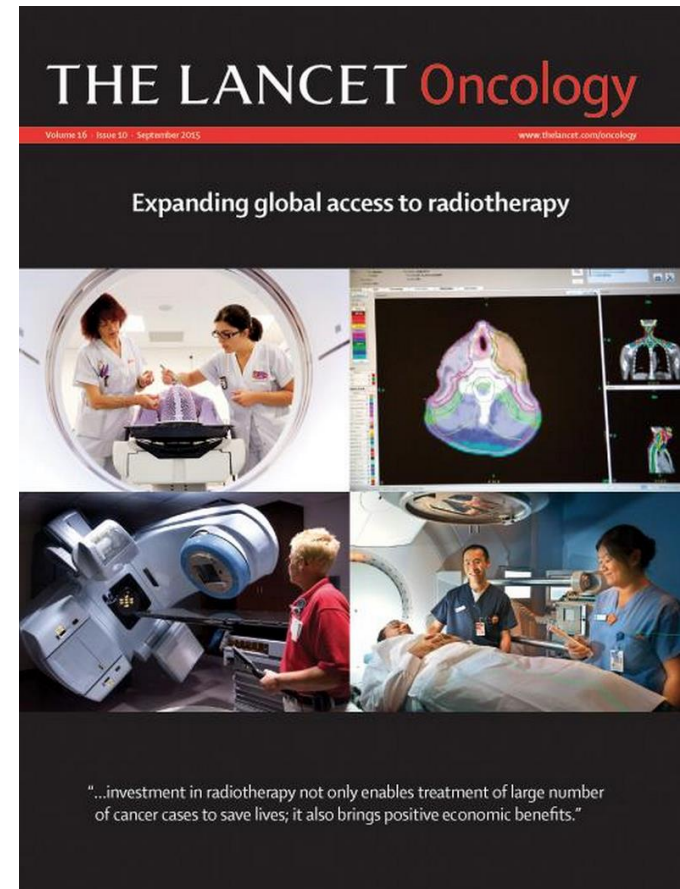
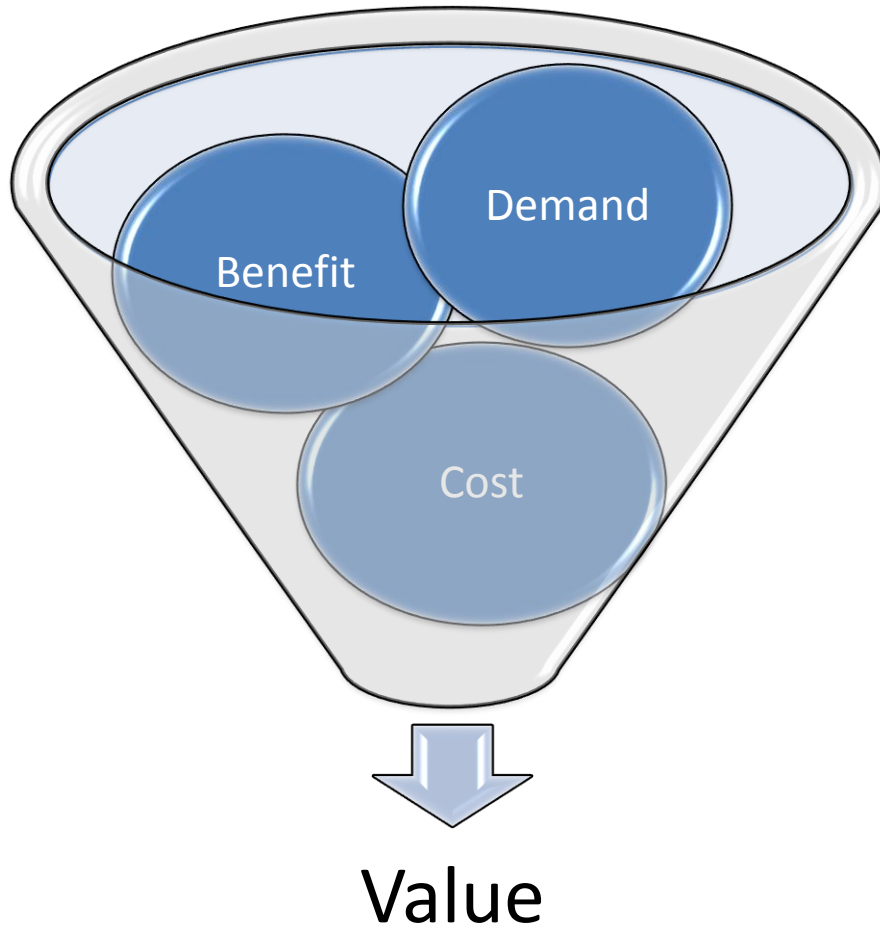
- Policy analysis that examines the medical, economic, social, and ethical implications of the ***incremental value*** of new interventions in health care
  - Evidenced-based approach to decision-making
  - Compares clinical benefit (effectiveness) and cost (efficiency) of competing treatment options
  - Critical for radiotherapy because of the large upfront investment in technology, education, and infrastructure

# Proven Success of this Approach

- Global modeling projections of costs and benefits of strategic investment in HIV/AIDs, tuberculosis, and malaria led to the creation of the Global Fund (2002) resulting in
  - 15 million lives saved since inception
  - 140-180 million new infections averted since 2012
- In 2016, 7.3 million alive on anti-retroviral therapy, 4.6 million on DOTS, and 90 million insecticidal nets distributed



# GTFRCC Investment Framework: An Application of HTA



# Calculation of Benefit in the GTFRCC Framework

- Human Capital Approach

- Benefits from labour force participation and productivity as a result of deaths avoided from cancer.



- Full Income (Value of Life Years) Approach

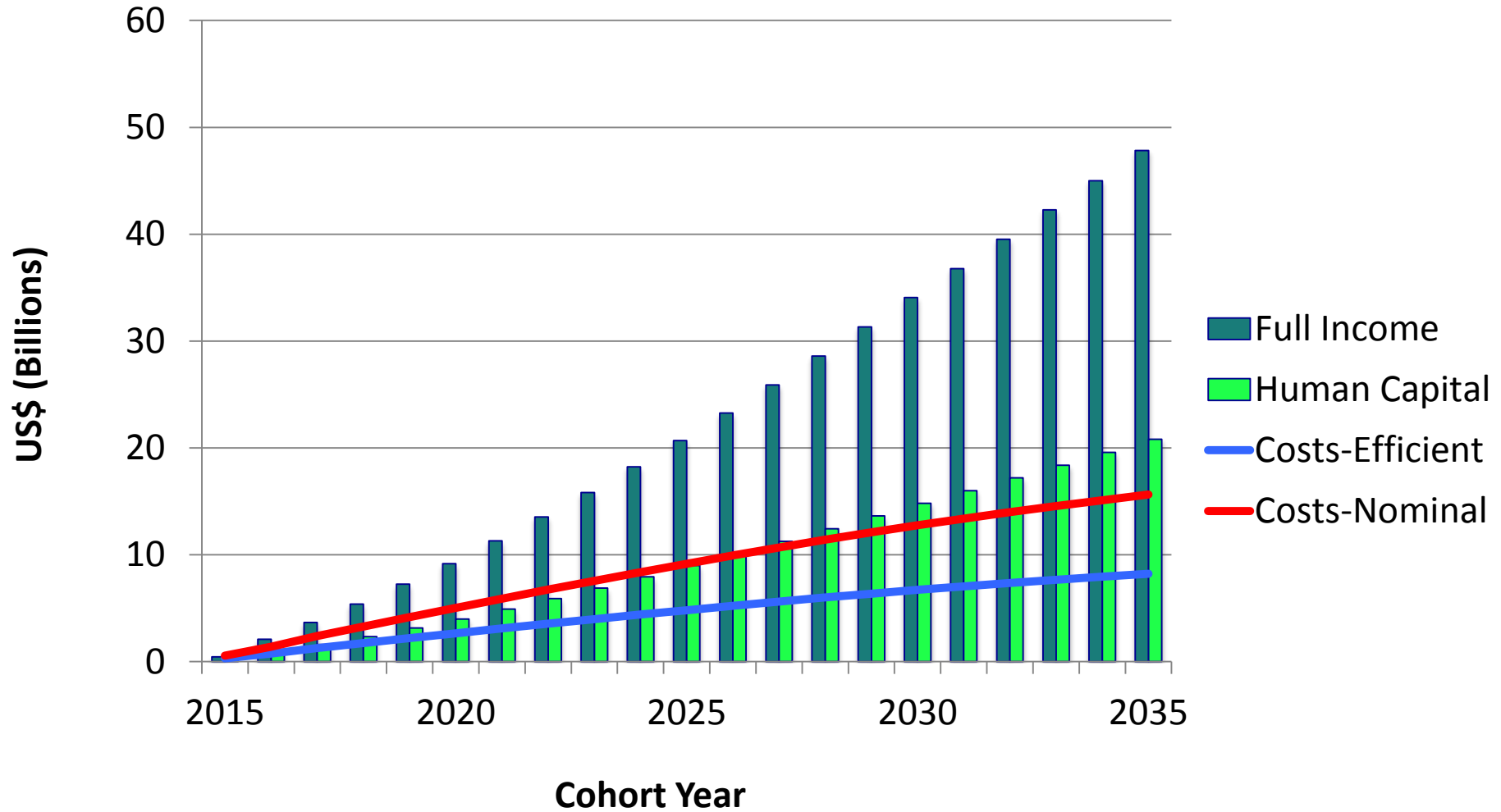
- The monetary value (trade-offs) of living a longer life
- Captures the intrinsic value of increased life expectancy and its effects on population welfare

# Costing of the GTFRCC Technology Package

- Activity-based model based on RT centre with 2 MV treatment units and a 3D-CRT treatment planning system
- Efficiency-based sensitivity analyses
  - Increasing the # of fractions per hour and reducing time for treatment planning and quality assurance
  - Extending operating hours
  - Using bulk purchasing for equipment acquisition



# GTFRCC Economic Results Across LMICs



# Regional HTA Considerations in Implementation and Outcomes

- Population distribution
  - Centralized vs. distributed care
- Equity and affordability
  - Availability of RT within universal health coverage schemes
- Health care systems
  - Broader cancer program development
- Adaptability to local constraints
  - 40% of medical equipment in LMICs out of service, vs 1% in high-income countries (HICs)

# Lowering the Price of RT

- Production of technology for LMICs in LMICs
  - Lower costs of labour
  - Less stringent regulation
  - Lower construction costs
- Local production to facilitate local product support and maintenance
- “Leapfrog” across entrenched inefficient systems of practice in HICs
- Frugal design and more innovation
  - One size doesn’t fit all



# Lessons from the Jaipur Foot

- A rubber prosthetic foot designed in India in 1968 for use in LMICs
- Flexible design
  - Enables walking on uneven surfaces and can be worn without a shoe
- Locally sourced
  - Rubber is locally available, mass-produced with commercially available ovens
  - No patents (no license fees or royalties)
- Costs US \$40 (2009 prices) vs \$8000-\$12000 for prostheses in HICs.



Imperial College  
London

THE LANCET

Technologies for global health

Peter Howitt, Ara Darzi, Guang-Zhong Yang, Hutan Ashrafian, Rifat Atun, James Barlow, Alex Blakemore, Anthony M J Bull, Josip Car, Lesong Conteh, Graham S Cooke, Nathan Ford, Simon A J Gregson, Karen Kerr, Dominic King, Myutan Kulendran, Robert A Malkin, Azeem Majeed, Stephen Matlin, Robert Merrifield, Hugh A Penfold, Steven D Reid, Peter C Smith, Molly M Stevens, Michael R Templeton, Charles Vincent, Elizabeth Wilson



# Innovative Financing to Support Innovative Technology

- Procurement arrangements to increase purchase volumes
  - Example of The Global Fund
- Tiered pricing based on purchasing power parity
- International assistance through taxation and debt relief programs tied to investment in health

# Conclusions

- HTA is a powerful tool to help decision-makers understand the human and economic *value* of new technologies
  - Must be locally validated and accessible
- Decision-makers will still look at the bottom line
  - Need for solutions that lower the absolute price
- The money is out there
  - Successful track record of innovative financing

# Thank You

