Disruptive Approaches- Beyond Investment

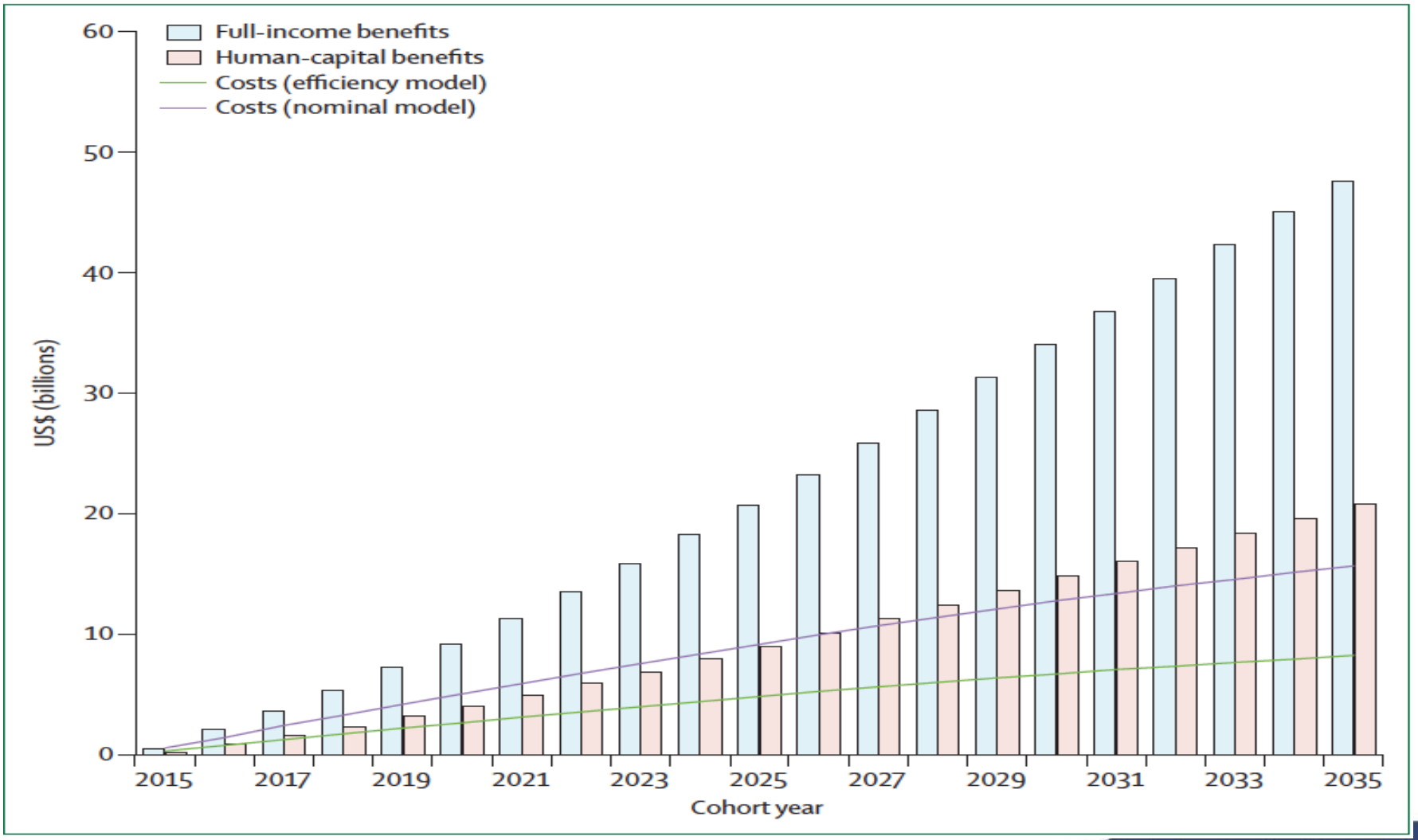
Global Task Force on Radiotherapy for Cancer Control.

The equity gap in access to radiotherapy.

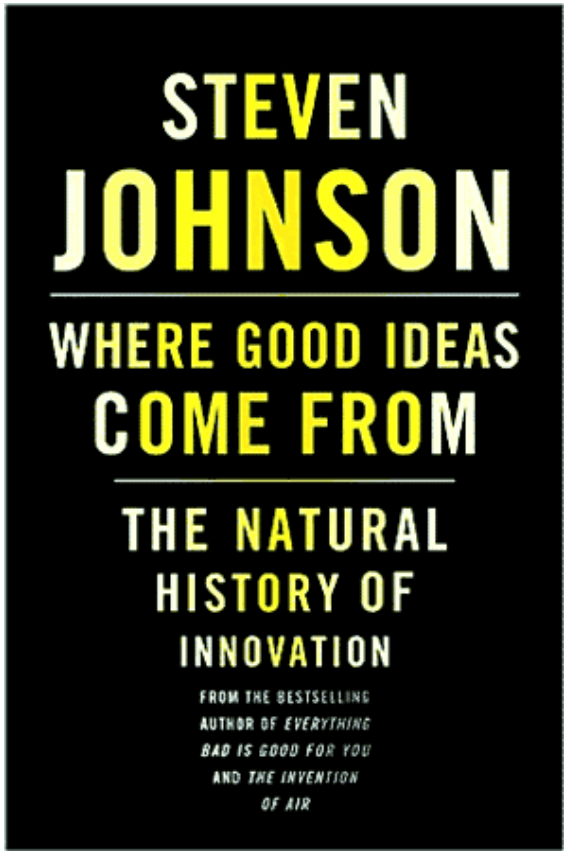
"We unite the cancer community to reduce the global cancer burden, to promote greater equity, and to integrate cancer control into the world health and development agenda."

Professor David Jaffray
University Health Network/University of Toronto
ECC2015, Vienna 26-27 September, 2015

GTFRCC Impact: Connecting Cost and Benefit



Atun et al., Lancet Oncology 2015



"Connectivity as the primary engine of creativity and innovation over the past 600 years." – Steven Johnson

The report of the GTFRCC connects evidence-based practice, cost of care delivery, and financial benefit.

This connectivity has the capacity to stimulate innovation.

Innovating for the Global Expansion of High Quality RT

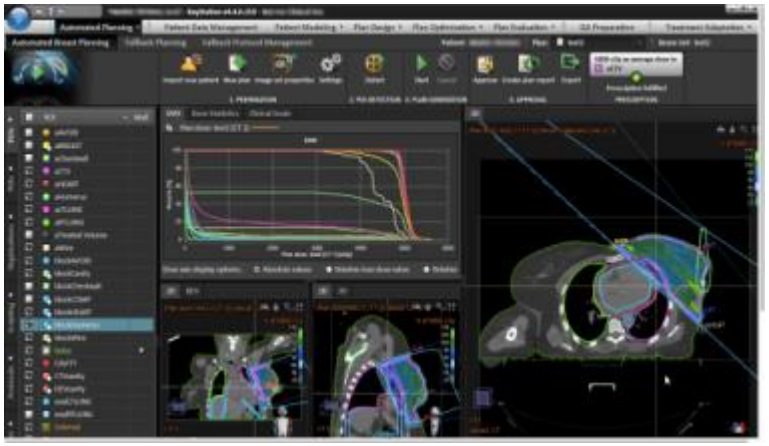
- Key Messages to Drive Innovation
  - Overwhelming Need and Impact
    - >24M/yr cancers in 2035
    - >200M fractions of RT need to be delivered
    - >900,000 lives saved per year
  - Long-term Market
    - RT is an essential part of effective cancer control in 2035
    - Infrastructure, Technology, Skills, Finance
  - Significant Emerging Investment
    - $184B in LMICs in the next 20 years

Atun et al., Lancet Oncology 2015

Innovating for the Global Expansion of Quality RT

- Dimensions of Innovation
  - Technology and Processes
  - Education
  - Finance
  - Leadership and Stewardship

Innovative Technologies

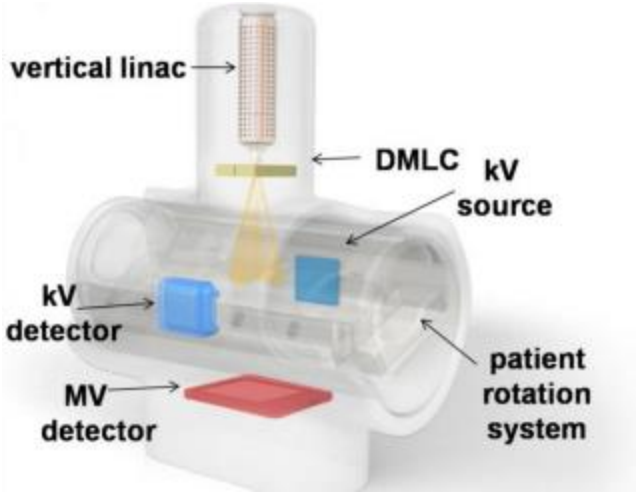


Software systems that automate the treatment planning process AND improve plan quality.

>Planning from 4 hours to 4 min.

Purdie et al. - Int J Radiat Oncol Biol Phys. 2011

Migration to the Cloud will enable shared learning and lower infrastructure costs.



NanoX radiotherapy system design including fixed linac and patient rotation system.

>Significant construction cost savings.

Keall et al.

http://dx.doi.org/10.1594/ranzcr2014/R-0142

Opportunity to 'bury the complexity' of RT.

Innovative Technologies

FEB
23
2012

German Radiotherapy Clinic Harnesses Sun to Run Systems, Cuts Dependence on Power Grid

During the summer, the array's output will be more than the Radiation Oncology Centre needs to run its two linear accelerators, a large bore CT system and the clinic's IT technology, lighting and air-conditioning.

Lake Constance Radiation Oncology Centre (Germany)

Innovation for Efficiency: Technology, Processes, Purchasing

	Operating cost per fraction: sensitivity analysis			Cost savings relative to base scenario			
	Automation: efficiency	Longer hours	Bulk purchase	High-income countries	Upper-middle-income countries	Lower-middle-income countries	Low-income countries
Combination 1	X	..	..	25%	21%	21%	21%
Combination 2	..	X	..	13%	18%	23%	25%
Combination 3	..	..	X	8%	16%	21%	23%
Combination 4	X	X	..	33%	34%	39%	40%
Combination 5	..	X	X	19%	34%	38%	42%
Combination 6	X	..	X	31%	34%	38%	39%
Combination 7	X	X	X	37%	43%	51%	53%

The operating cost model allows for improved efficiency, longer treatment hours per day, and bulk purchasing savings. These factors can occur alone or in combination, resulting in seven different combinations. X shows the inclusion of a factor in the sensitivity analysis.

***Table 3*: Sensitivity analysis to determine operational costs**

Capacity for significant savings while maintaining quality.

Educational Innovations: Needed

Result: >215,000 RT Professionals to be Trained by 2035

Education of Health Professionals for the 21st Century: A Global Independent Commission

THE LANCET

Health professionals for a new century: transforming education to strengthen health systems in an interdependent world Julio Frenk et al (2010)

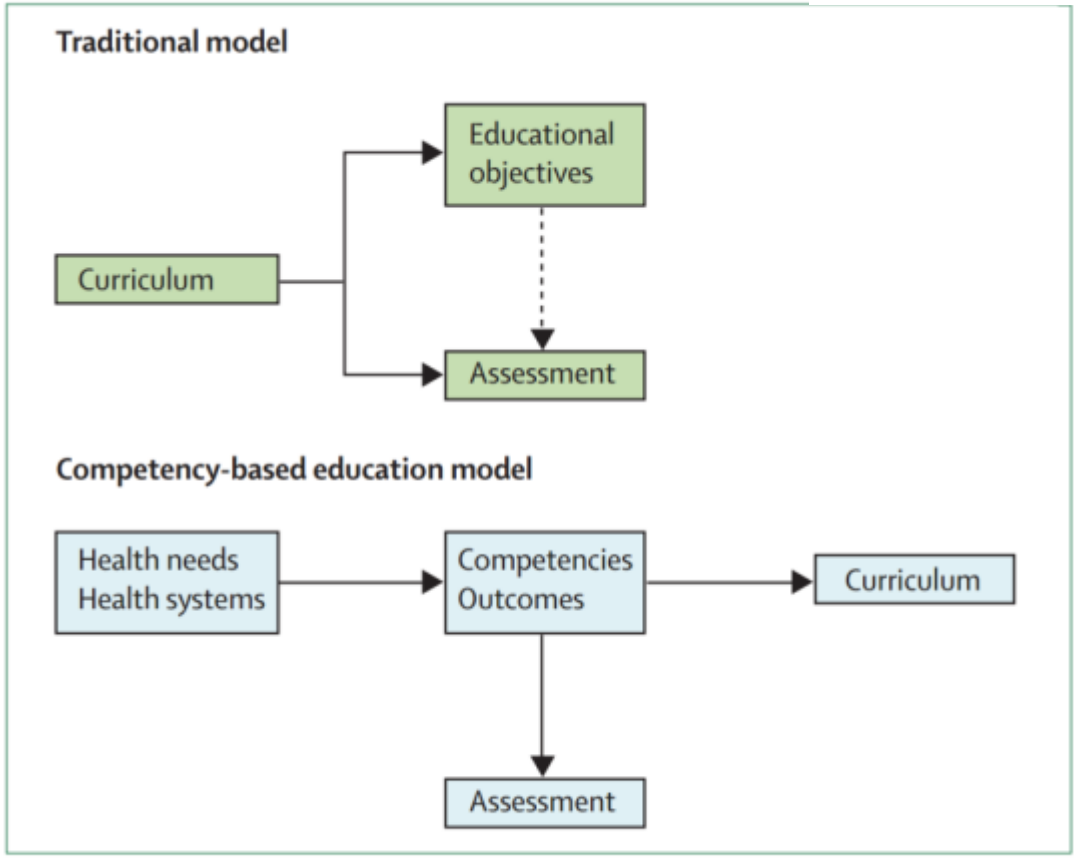
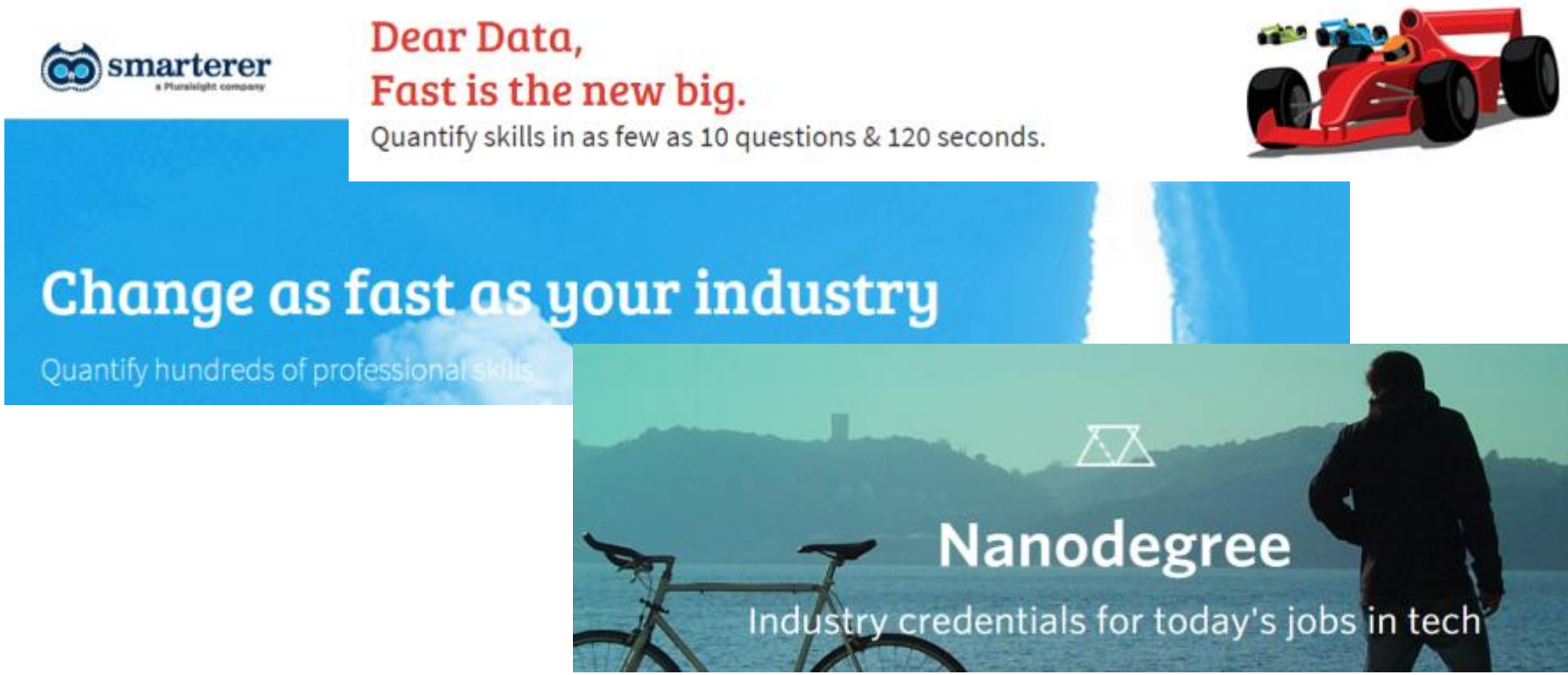


Figure 9: **Competency-based education**

"Health professionals have made enormous contributions to health and development over the past century, but complacency will only perpetuate the ineffective application of 20th century educational strategies that are unfit to tackle 21st century challenges."

Educational Innovations: Competency

- New methods to assess skills and measure individual progress, competency-based learning, and ultimately ROI.



http://www.inc.com/aaron-skonnard/5-top-trends-in-education-technology-2015.html

Educational Innovations: Needed

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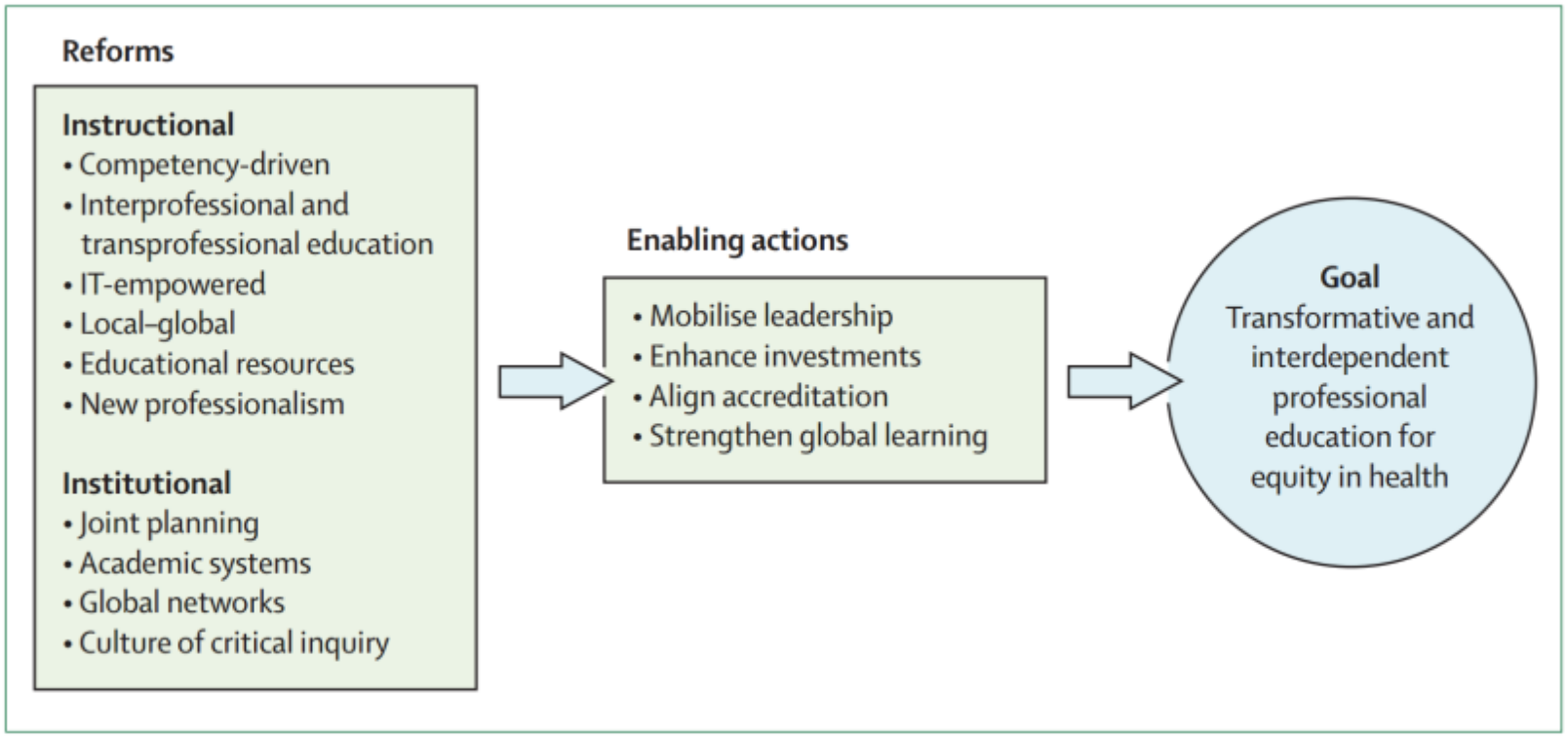
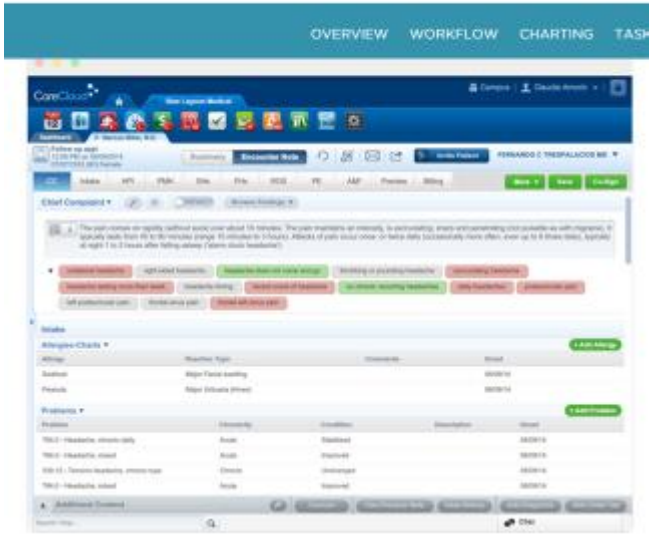


Figure 12: **Recommendations for reforms and enabling actions**

Educational Innovations: Integrated

- ‘Cloudification’ Trend
  - EMRs + LMS + TPS
  - Moodle - an open source LMS – OpenSaaS integration with Cloud-based applications.
- API integration
  - Allow systems to share data and provide integrated services (e.g. Twitter feed on any website).
  - Education support is *inside* the EMR system.



Innovative Leadership and Stewardship

A major reason for their slow progress is the "know-do gap"—the gap between what is known and what gets implemented in low and middle income countries (LMICs).
[Pablos-Mendez et al. 2006].

Innovative Leadership and Stewardship

International Cancer Expert Corps

Partnering to transform global cancer care

…a mentoring network of cancer professionals who work with local and regional in-country groups to develop and sustain expertise for better cancer care.

http://www.iceccancer.org/

Medical Physicists Without Borders

…provide Medical Physics support with the goal of improving the effectiveness and safety in the use of physics and technologies in medicine, especially in LMICs.

http://www.mpwb.org/

GLOBALRT

…is a movement of young leaders to turn radiotherapy into a global health priority.

http://globalrt.org/

Financing Innovations

- Novel financing solutions for mobilising, pooling, channelling, and funding radiotherapy services

  Atun R et al. Lancet 2012; 380: 2044–49.

  - AIDS, tuberculosis, malaria, and children's immunisation programmes
- Leverage scale for cooperative approaches to supply and manufacturing
  - Brazil will source 40% of the parts, accessories an software from within the country.
- Innovative financing instruments
  - Commitments (GAVI), Bonds (Diaspora), or Guarantees (World Bank)

Summary

- Connecting need, value and cost creates clearer motivation for innovation.
- Radiotherapy is an essential component of effective cancer care and provides sound motivation for investment.
- Results of the GTFRCC will attract innovators and entrepreneurs to bring solutions that enable high quality radiotherapy to benefit the 24M people per year that will be diagnosed with cancer in 2035.

Acknowledgements

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ESTRO European Society for RADIOTHERAPY & ONCOLOGY

GTFRCC | UICC PRESIDENT'S PORTFOLIO GLOBAL TASK FORCE ON RADIOTHERAPY FOR CANCER CONTROL

UHN Princess Margaret Cancer Centre

THE LANCET Oncology

CCORE Collaboration for Cancer Outcomes Research and Evaluation

IAEA International Atomic Energy Agency

HARVARD T.H. CHAN

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FIGHTING CANCER TOGETHER