SESSION 1: IMPROVING QUALITY of LIFE

PANEL 1.1B: Human Health

Professor and Chair of Medical Physics, Virginia Commonwealth University

Jatinder Palta is the Chairman of Medical Physics at the Department of Radiation Oncology, Virginia Commonwealth University and National Chief of Physics in the office of VHA National Radiation Oncology Program. Palta has contributed significantly to the fields of radiation oncology and medical physics and he is a recipient of the William D. Coolidge Gold Medal from the American Association of Physicists in Medicine (AAPM)
Nuances and Safe Implementation of Advanced Radiotherapy

Jatinder R Palta PhD, FAAPM, FASTRO, FACR
Virginia Commonwealth University &
National Radiation Oncology Program
Veterans Health Administration, USA
We made great progress in optimizing the planning and delivery of radiotherapy (Circa 2018)

Virtual Simulation, 3D Computation & Optimization, IMRT, IGRT, Monte Carlo Computation, PT, IMPT, etc.
State-of-the-Art Radiotherapy

How have the technologies helped evolution of RT?

Image-guided radiotherapy Planning and Delivery

Unresolved Clinical Challenge

How to manage dose delivery uncertainties due to temporally varying inter-, intra-fraction motion, and physiological changes?
Emerging Trend in Radiotherapy

- Real time imaging
  - using MRI-guided radiotherapy
- Real time radiotherapy treatment adaptation
  - to manage anatomical motion
- Response-adapted radiotherapy
  - using anatomical and functional information
Future Trends in Radiotherapy

- Big Data, Artificial Intelligence, Machine Learning, and …-omic

Radiotherapy Challenges
Circa 2018

• Training and education in advanced radiotherapy techniques
  – Several modern treatment technologies and practices (IMRT, IGRT, SBRT, PT) developed in the past ten years
    • In pursuit of highly conformal target coverage and normal tissue sparing

• High technical complexity
  – Multiple systems (software and hardware)
    • A few parameters to several hundred parameters compounded by interconnectivity and interoperability challenges

• Limited guidance/standards
  – Pressure to bring new technologies into clinics as soon as possible

• Stressful and high pressure work environment
  – Decreased resources and increased workload

• Increased potential for catastrophic failures
  – Complex clinical workflow
Call to Action for Global Cancer Community

- Inclusion of detailed plans for RT implementation in national cancer control plans that are tailored to local environment,
- Building cancer system capacity through the establishment of national comprehensive cancer resources in every country,
- Training tens of thousands of RT professionals,
- Creating novel financing solutions to allow countries to make the investment in RT,
- Securing access through the inclusion of RT in universal health coverage plans.

What should we do in Global Cancer Care?

- Facilitate rapid interactions, peer reviews, and clinical collaboration amongst HICs and LMICs leveraging electronic infrastructures
- Training the trainer, fostering mentor and mentee relationships
- Work with the technology developers and industry to respond to global need through innovations that address pressing global problems as opposed to tweaking existing solutions.
- Disruptive technologies that lower cost and decrease complexity will be attractive to both developed and developing nations.
  - This will require special consideration of the local environment such as resources, physical and personnel infrastructure