RADIOTHERAPY TEACHING AND TRAINING IN AFRICA: CURRENT STATUS AND THE WAY FORWARD

Jeannette Parkes
February 2017
DISCLOSURE

UCT is part of the Access to Care project in Africa. This is a collaboration between UCT, CPUT and Varian Medical Systems.

The project is based at Groote Schuur Hospital, Cape Town.
Radiotherapy requires infrastructure...

- Reliable electricity supply
- Bunker
- Machines - hardware and software
- Staffing: multi-disciplinary
  - Engineers
  - Rad Oncs
  - Medical Physicists
  - RTTs

The services
The buildings
The machines
The people

Developing radiotherapy services is very expensive!
By 2030 70% of cancer will occur in developing countries

Mary Gospodarowicz, UICC, AORTIC 2015
Systematic reviews of the quality of health economic research in Nigeria, Zimbabwe and South Africa, found that a significant proportion of it was suboptimal.

Many LMICs have relied on the transfer of knowledge from HTA paradigms established in HICs, despite differences in the social goals and epidemiological trends between HICs and LMICs.

The problem:

No reliable statistics on which to base planning for the future
INTERVIEW: No cancer machine working in Nigerian hospitals – Health Minister

October 28, 2016 Agency Report

Health Minister, Prof. Isaac Adewole

Nigeria’s minister of health, Isaac Adewole, speaks on various efforts by his ministry to improve health care delivery. He was interviewed by NAN editor-in-chief, Lawal Ado.
QUANTITY VS. QUALITY......

NO RT:
• 42%

Cobalt
• 20 countries
• 90 machines

Linac
• 16 countries
• 139 machines

Type of planning N= 24

3D capability
46%

2D capability
54%

Parkes, SIOP Africa 2012
With the assumed need for radiotherapy in 62.5% of all LMIC cancer cases in 2020, there will be a need for an additional:

- 12,149 radiation oncologists,
- 9,915 medical physicists, and
- 29,140 RTTs in the 84 LMICs with available information in the IAEA Directory of Radiotherapy Centres database.

Health care expenditure per capita in 2014:

- $37 in low-income countries,
- $90 for middle-income countries
- $5,251 for high-income countries
Overview

Cobalt-60 Machines and Medical Linear Accelerators: Competing Technologies for External Beam Radiotherapy

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Infrastructure, Maintenance and Downtime

Security

Cobalt-60 Source Exchange

Patient Throughput

Clinical Use
TRAINING RAD ONCS FOR AFRICA....

4: Sudan
1: Ethiopia
1: Libya
2: Emirates
3: Ghana
3: Botswana
3: Trinidad
1: Tanzania
2: Malawi
1: Zambia
3: Botswana
3: Kenya
1: Tanzania
2: Malawi
1: Zambia
AIM:

Develop a training platform aimed at the specific needs of Radiotherapy centres in Africa who are about to move from 2D to 3DCRT

Safe use of linear accelerators in Africa

Empower teams to deliver high quality 3D Conformal Radiotherapy Treatment

Evidence based clinical protocol development

Implementation of QA/QC protocols
THINK
SO WHO SHOULD WE TRAIN?

- Radiation Centre
- Rad Onc
- Radiation Technicians (RTT)
- Physics
- Medical Oncology
- Surgical Oncology
- Family Physicians
- Radiology
- Pathology
1st live course: Aug/Sept 2015

Ghana:
Accra
Kumasi

Zimbabwe:
Harare
Bulawayo
THE FLIPPED CLASSROOM APPROACH....
SURVEY RESULTS

Familiarity with Imaging and Localisation Equipment

- Pre-course: 30%
- Post-course: 61%

Familiarity with Treatment planning systems (TPS)

- Pre-course: 30%
- Post-course: 60%

Improvement:
- Imaging and Localisation Equipment: 41%
- Treatment planning systems: 30%
FEEDBACK FROM DELEGATES...

3 themes emerged...

- Challenging hierarchical structures
- Implementing team work
- Financial constraints
PROCUREMENT...IS A TEAM EFFORT AND A TEAM BUILDER...
PROTOCOL DEVELOPMENT IS CRITICAL

HOW AND WHY TO DEVELOP A PROTOCOL?

Theresa Binz
June 2015
WE MUST BE WARY OF APPLYING HIC STANDARDS AND HIC SOLUTIONS...

Challenges:
- Differing standards
- Differing expectations
- Differing budgets
- Huge discrepancies between LIC’s and MIC’s

WE WANT COST EFFECTIVE CARE....

DO THE RIGHT THINGS FOR THE RIGHT PATIENTS

DO THE RIGHT THINGS RIGHT FOR THE RIGHT PATIENTS
... IT CAN BE A LONG WAY DOWN PAST THE SWEET SPOT!
AND IF YOU PUT IT TOGETHER ...
CHECK YOUR PROTOCOL!

Once you have chosen a protocol:
- You must fastidiously use it!
- You must collect all the data
- You must audit your outcomes
- And you must adjust based on those outcomes!

As NICE in the UK points out an AUDIT CYCLE is …

AUDIT – ADJUST – AUDIT

And then you must publish it!
Paediatric medulloblastoma incidence by subtype (Nanostring)

<table>
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<th>Subtype</th>
<th>Red Cross, Cape Town</th>
<th>Global</th>
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<tbody>
<tr>
<td>Group 4</td>
<td>15%</td>
<td>35%</td>
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<tr>
<td>Group 3</td>
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<tr>
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<td>30%</td>
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<tr>
<td>WNT</td>
<td>25%</td>
<td>10%</td>
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QUALITY ASSURANCE IS CRITICAL

THE RADIATION BOOM

Radiation Offers New Cures, and Ways to Do Harm

By WALT BOGDANICH
Published: January 23, 2010

ECRI Top 10 Health Technology Hazards

- 2010:
  - Number 4 – CT Radiation dose;
  - Number 7 – Problems with computerized equipment and systems
- 2011:
  - Number 1 – Radiation overdose and other dose errors during radiation therapy;
  - Number 4 – The high radiation dose of CT scans
- 2012
  - Number 2 – Exposure hazards from radiation therapy and CT
- 2013
  - Number 3 – Unnecessary exposures and radiation burns from diagnostic radiology procedures
- 2014
  - Number 3 – CT radiation exposures in paediatric patients
  - Number 5 – Occupational radiation hazards in hybrid ORs
It's not about getting there faster... it's about getting there safer...
Overview

Postgraduate Education in Radiation Oncology in Low- and Middle-income Countries

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**Partnerships to Improve Training within Low- and Middle-income Countries**

- American Society for Radiation Oncology (ASTRO) has run an eContouring Ambassador Initiative programme
- Varian’s educational programme, ‘Access to Care’,
- The Global Radiation Oncology Collaboration in Education (GRaCE)
- Medical Physics for World Benefit (MPWB, formerly called Medical Physicists Without Borders)
Competency-based Training and Curriculum Development

- National and Cross-national Partnerships
- Distant Learning Approaches
  - IAEA- AFRONET
  - ESTRO-FALCON
  - Virtual University for Cancer Control (VUCCnet)- IAEA

- Travel grants sponsored by professional organisations...ESMO, ASTRO, Canadian Association of Radiation Oncology (CARO)
INNOVATIVE APPROACHES

IAEA launches new **smartphone app** for cancer staging.


**Telemedicine** helps to improve access to radiation medicine.


Echo project using Zoom platform
CONCLUSIONS

Africa is currently profoundly under-equipped to deal with the number of expected cancer cases over the next 15 years.

Investment in infra-structure is happening slowly but surely

Training capability is limited:

- Training needs to be modernised and innovative:
  - A team approach is essential
  - Protocol development is essential
- Loco-regional training is desirable
- Ongoing mentorship and audit is necessary
- Audit and series publication is essential

South Africa is ideally placed to undertake such training
THE FOUR AGREEMENTS

Be Impeccable With Your Word

Don’t Make Assumptions

Never Take Anything Personally

Always Do Your Best