‘From the Ground Up’
Tackling challenges at a country level

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Disclosures

• None
Cancer is not just a ‘1st world problem’

Global incidence of cancer: projections to 2035

*Raw data for graph provided by Globocan, IARC
## Cancer Incidence in Botswana (2010-2012)

<table>
<thead>
<tr>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervix (77)</td>
<td>Kaposi’s Sarcoma (71)</td>
</tr>
<tr>
<td>Breast (76)</td>
<td>Head and Neck (30)</td>
</tr>
<tr>
<td>Kaposi’s Sarcoma (36)</td>
<td>NHL (17)</td>
</tr>
<tr>
<td>NHL (14)</td>
<td>Esophagus (13)</td>
</tr>
<tr>
<td>Urogenital (14)</td>
<td>Lung/Bronchus (6)</td>
</tr>
</tbody>
</table>
Challenges in Radiation in Africa

INFRASTRUCTURE

- 23 of 54 countries have teletherapy services
- 20 had high- or low-dose brachytherapy resources
- 293 radiotherapy machines serving 1 billion individuals
- 1 machine per 3.6 million people

HUMAN RESOURCES

- 12,149 radiation oncologists, 9915 medical physicists, 29,140 RTT

Abdel-Waheb et al. Lancet Oncolgy 2013
Challenges in Oncology

- Lack of screening programs
- High patient load (with most patients at advanced stages)
- Human resources (nurses, radiologists)
- Long time for pathology
- Limited radiology capacity
- Chemotherapy Stockouts
- Fragmented care (HIV and oncology) → treatment delays
- Lack of communication between private and public hospital
- No follow up after treatment
- Lack of data to inform care
- Lack of uniform and relevant treatment guidelines
Challenges to expanding radiotherapy
Developing Radiation Capacity

EQUIPMENT
- Appropriate equipment
- Servicing of equipment
- Supply chains

PERSONNEL
- Training programs
- Staff retention
Developing Radiation Capacity

HEALTH SYSTEMS
- Care pathways
- Care linkage
- Guidelines
- Registries
- Patient engagement
- Decentralization
- Public-Private partnerships

POLITICAL COMMITMENT
- Government commitment
- Management
- Training
- Retention of staff
Economic Benefits of Treatment

Atun et al. Lancet Oncology 2015
Cervical Cancer Outcomes

Kaplan-Meier survival estimates by HIV status

P = 0.71

Days since start of radiation

HIV = negative
HIV = positive

Grover et al. IGCS 2016
Multifaceted Approach

Governments
NCCP

Accessible radiation treatment

Professional societies, clinical partners, NGOs

Industry and Private Sector

International bodies: IAEA, PACT, ICEC, WHO, NCI
Implementation of Radiation Therapy

- **Purchase of equipment** (MOH/IAEA/PACT)
- **Hiring of staff** (MOH/MPWB)
- **Commissioning an Quality Assurance** (IAEA, MPWB, clinical partners, industry)
- **Training** (IAEA, industry, professional societies, clinical partners)
- **Clinical implementation** (Professional societies, clinical partners)
  - *Workflow*
  - *Checklists*
Implementation of Radiation Therapy

- **Continued training and improvement** (Industry, clinical partners)
- **Data collection to demonstrate improved outcomes** (NCI)
- **Continued advocacy and patients education** (NGOs)
- **Strengthening health system for cancer care** (MOH/NCCP)
- **Retention of staff** (MOH)
- **Development of training program** (MOH, IAEA, clinical and educational partners)
Initiatives in Botswana

- New public radiation oncology center
- Follow up clinic for cervical cancer patients
- Care-linkage software
- Multi-disciplinary conferences for head and neck and breast cancer
- New patient clinics
- Nursing training initiatives: oncology nursing at PMH and GPH
- Survey of patients to document causes of delays
- Development of cancer guidelines
Workflow of Gynecology MDT

- Management issues
- Post-treatment follow up
- MDT Clinic
- Follow up Clinic
- Follow up
- New diagnosis
- Pathology
- Referral
- Staging
- Labs
<table>
<thead>
<tr>
<th>Cervical Cancer CRT/RT Patients</th>
<th>Post-MDT</th>
<th>Pre-MDT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Delay from Bx to Treatment (days)</td>
<td>60.12</td>
<td>120</td>
</tr>
<tr>
<td>Average Delay from Clinic Visit to Treatment (days)</td>
<td>24.6</td>
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Grover et al Journal of Global Oncology 2016
Ongoing Oncology Research in Botswana

- Cancer outcomes study
- Ipabalele- U54
- Delays in treatment/cancer stigma
- HPV subtyping (for various HPV associated cancer subtypes)
- Breast cancer response to neo-adjuvant therapy
- HPV viral load association with treatment response
International Collaborations

- ICEC: Boots on the ground
- NCI Center for Global Health
- IAEA
- AORTIC Special Interest Group in Radiation Oncology: platform for collaboration in Africa
- Professional societies: ASTRO, ESTRO, ASCO, ABS, ASCP
- Academic centers
Acknowledgements

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- Gaborone Private Hospital and Princess Marina Hospital
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- Center of Global Health NCI
- IAEA
Thank you
Thank you

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