

Radiation Therapy in Africa

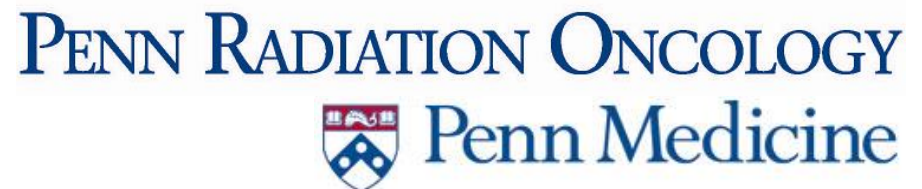
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November 7th, 2016



Disclosures

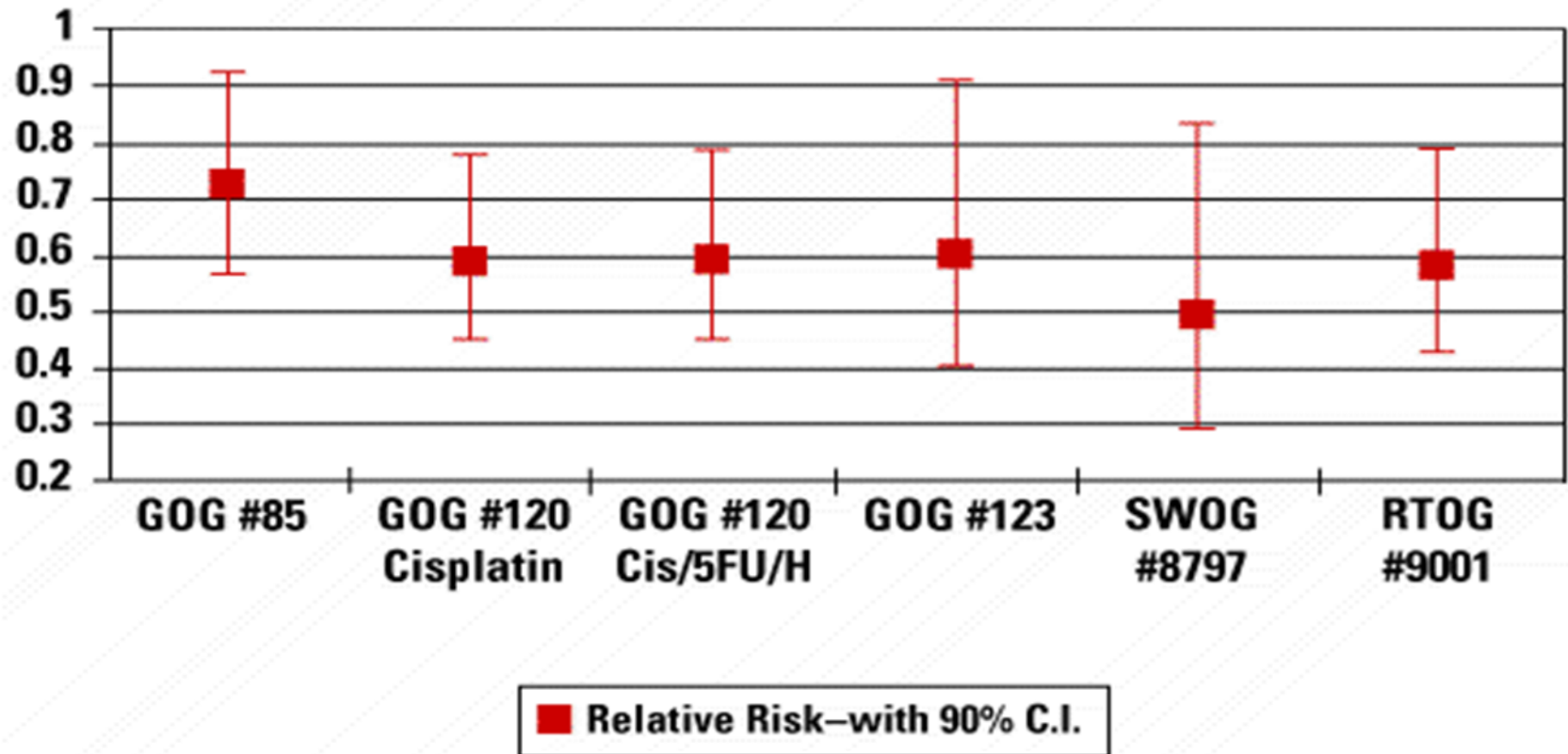
- ◆ **None**

Global Statistics: Cervical Cancer

- ◆ **2nd most common cancer in LMICs**
- ◆ **Most common cause of cancer mortality in LMICs**
- ◆ **New Cases: ~500,000 worldwide**
- ◆ **Majority of patients (87%) present in LMICs present with locally advanced disease**

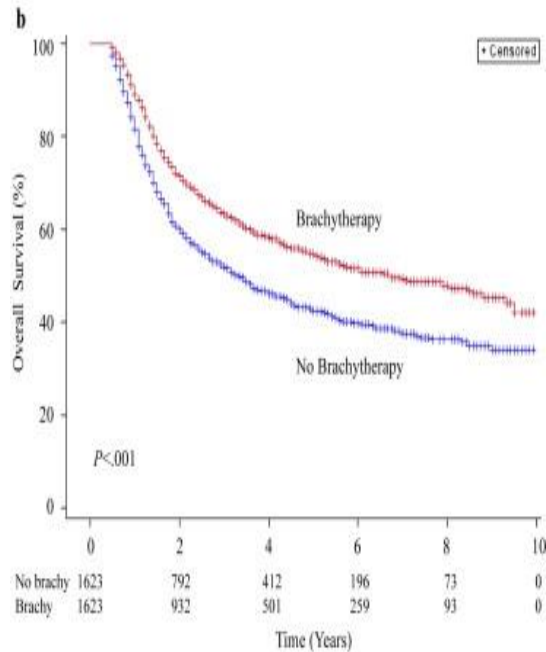
Chemoradiation for Locally Advanced Cervical Cancer

Relative Risk Estimate of Survival from Five Chemoradiation Clinical Trials

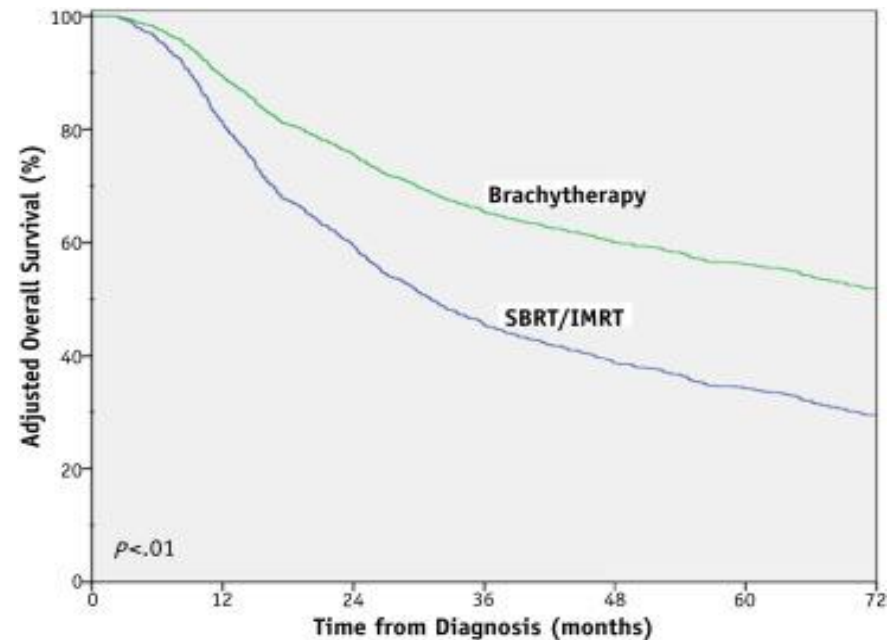


Eifel et al. JCO 2004

Brachytherapy and Survival

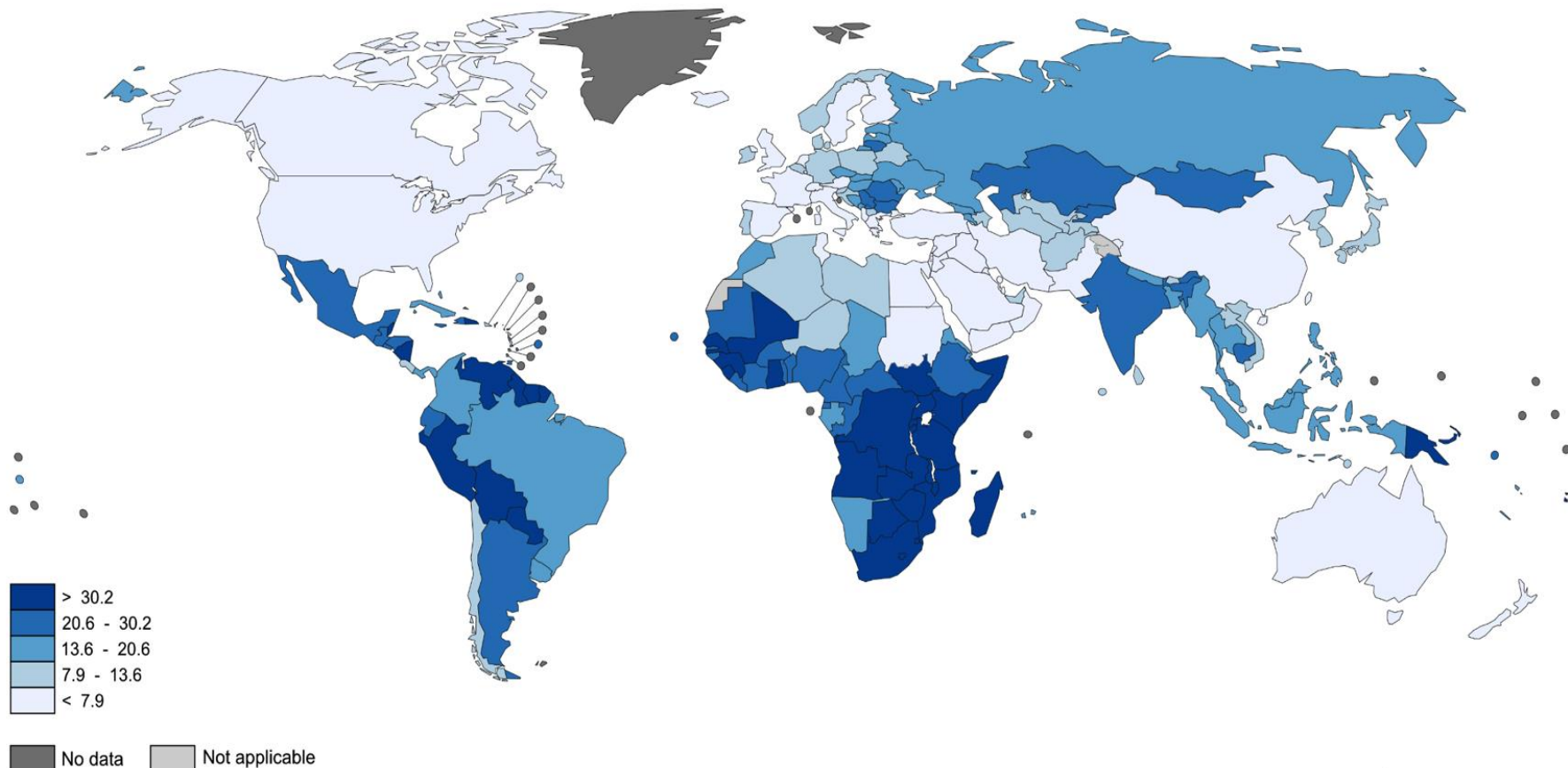


Han et al 2013: 4 year OS: 58% vs. 46%



Gill et al 2014: 4 year OS: 60% vs. 40%

Cervical Cancer Incidence Worldwide-GLOBOCAN 2012



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

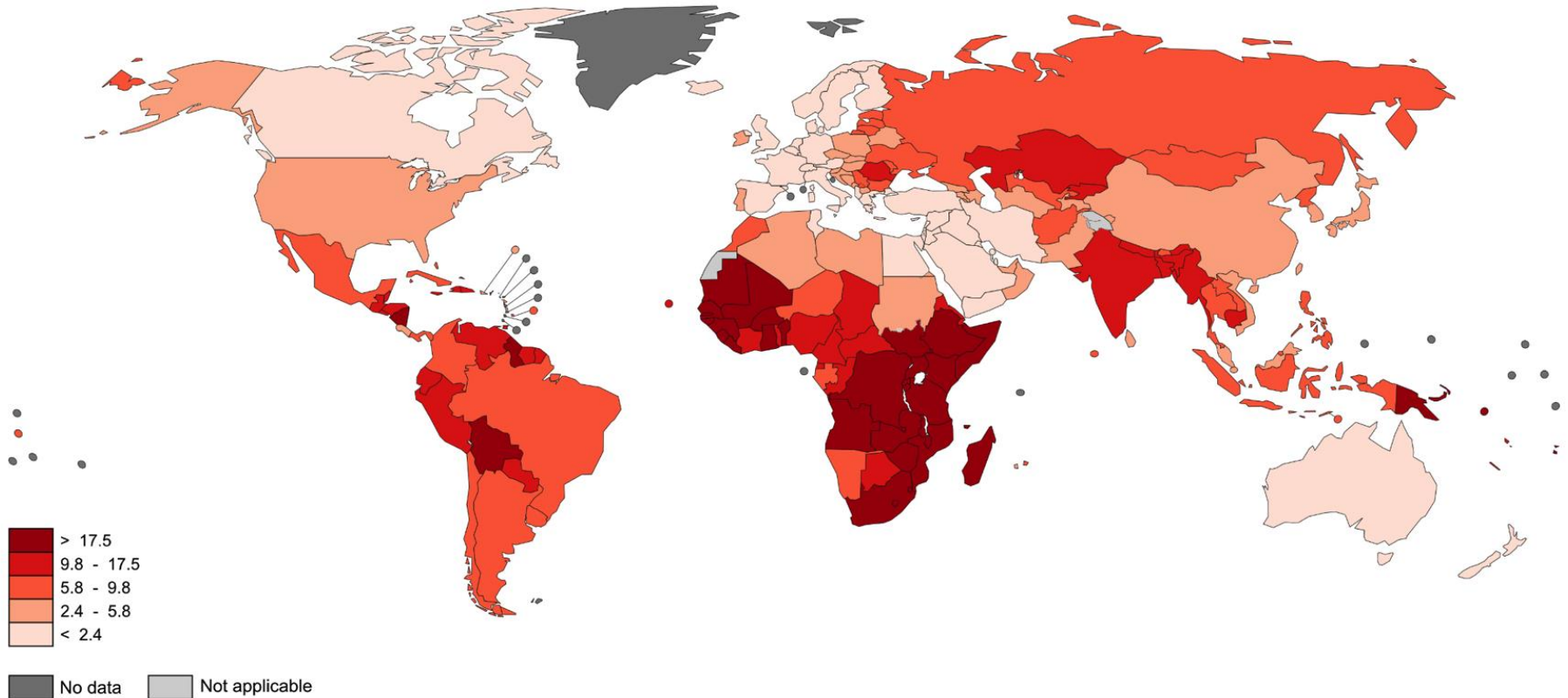
Data source: GLOBOCAN 2012
 Map production: IARC
 World Health Organization



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Estimated age-standardised rates (World) per 100,000

Cervical Cancer Mortality-GLOBOCAN 2012



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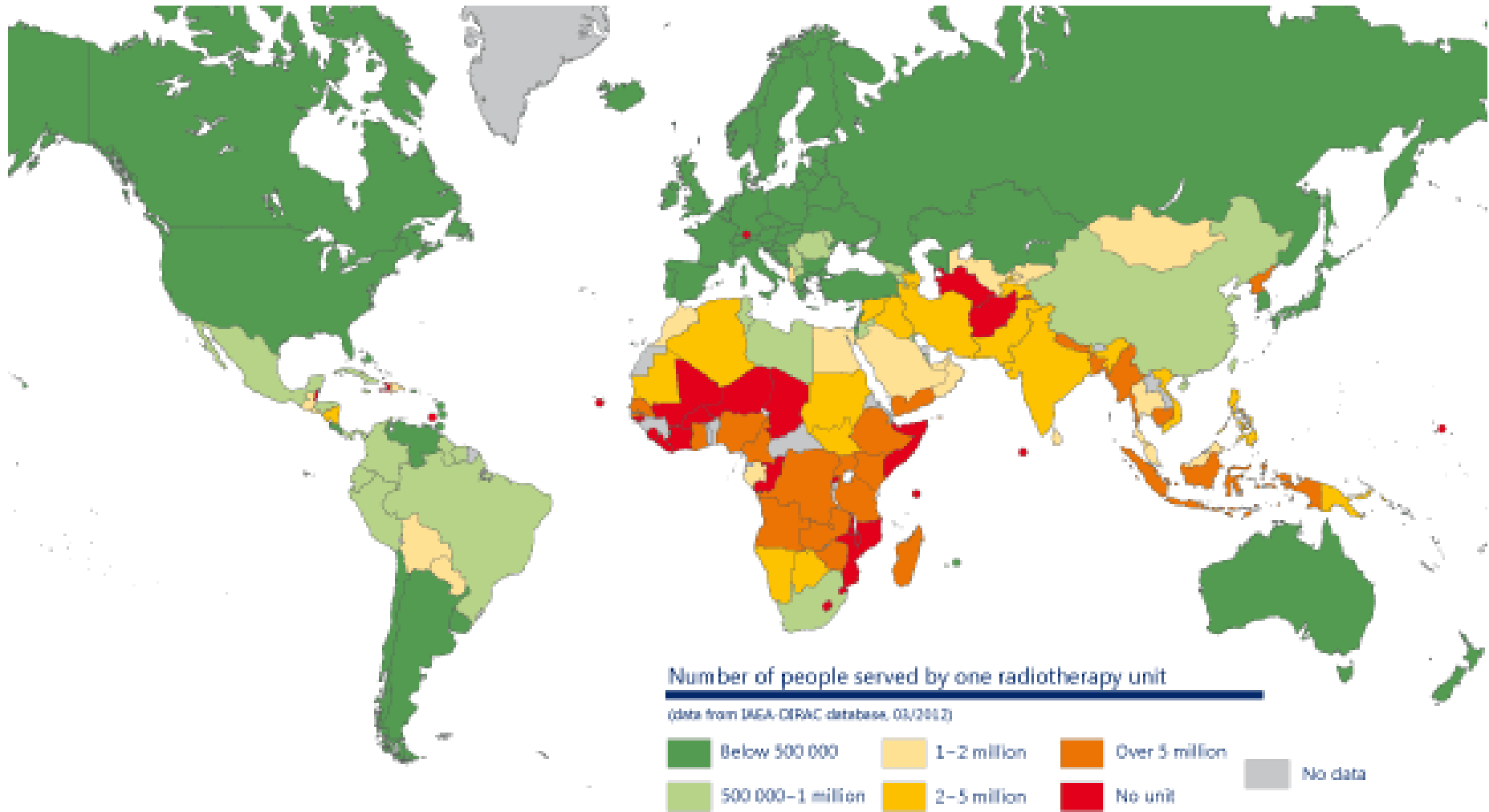
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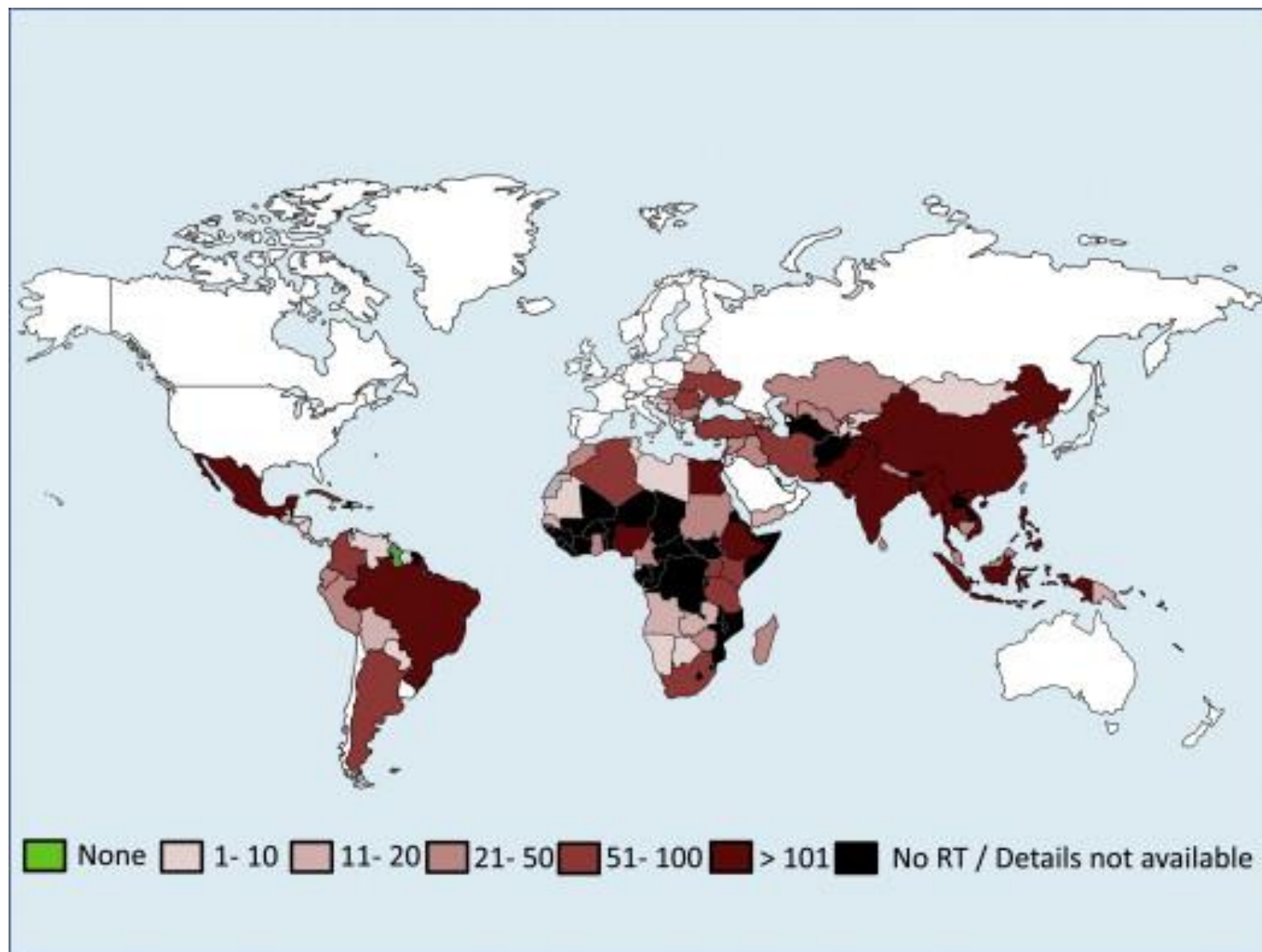
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Estimated age-standardised rates (World) per 100,000

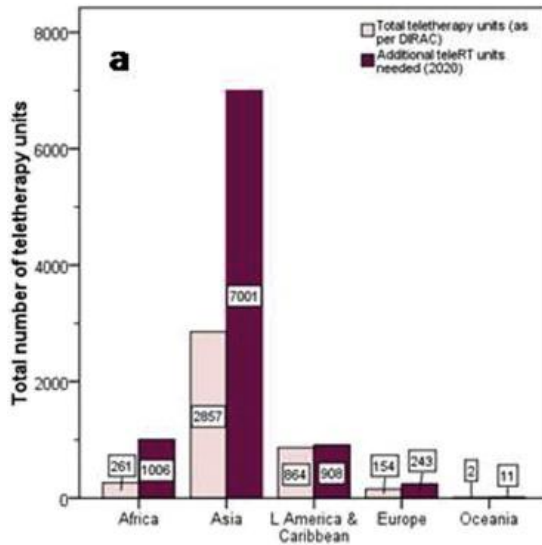
Distribution of Radiation Machines Worldwide



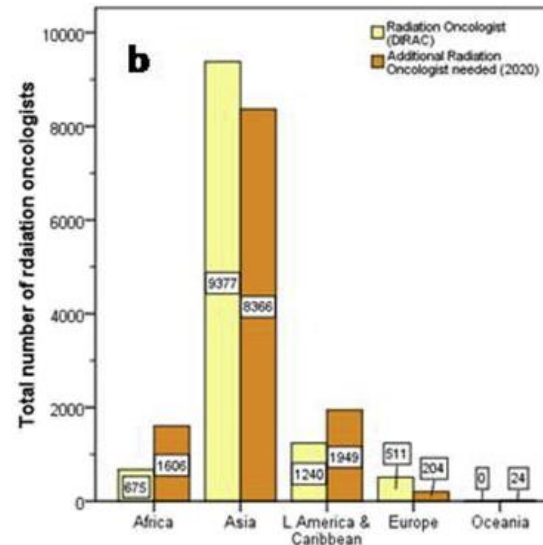
Projected Needs in LMICs-2020



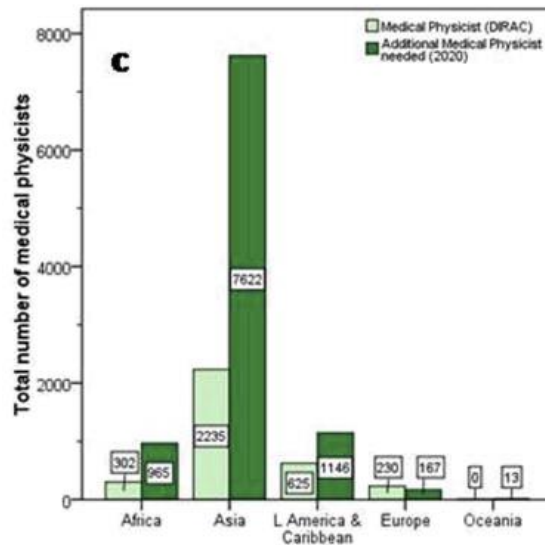
Datta et al. IJROBP 2014



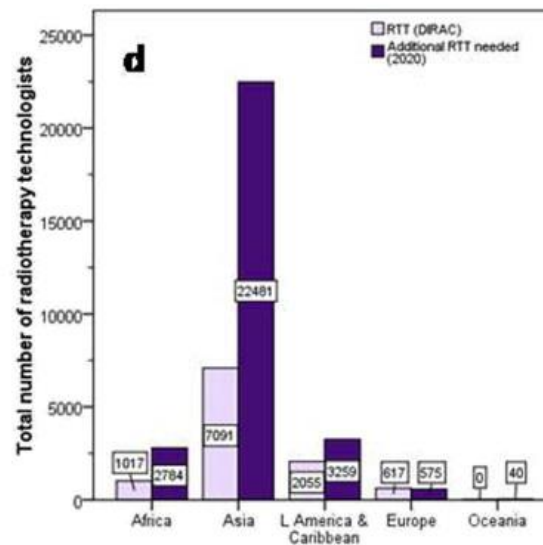
Low- and middle-income group countries



Low- and middle-income group countries

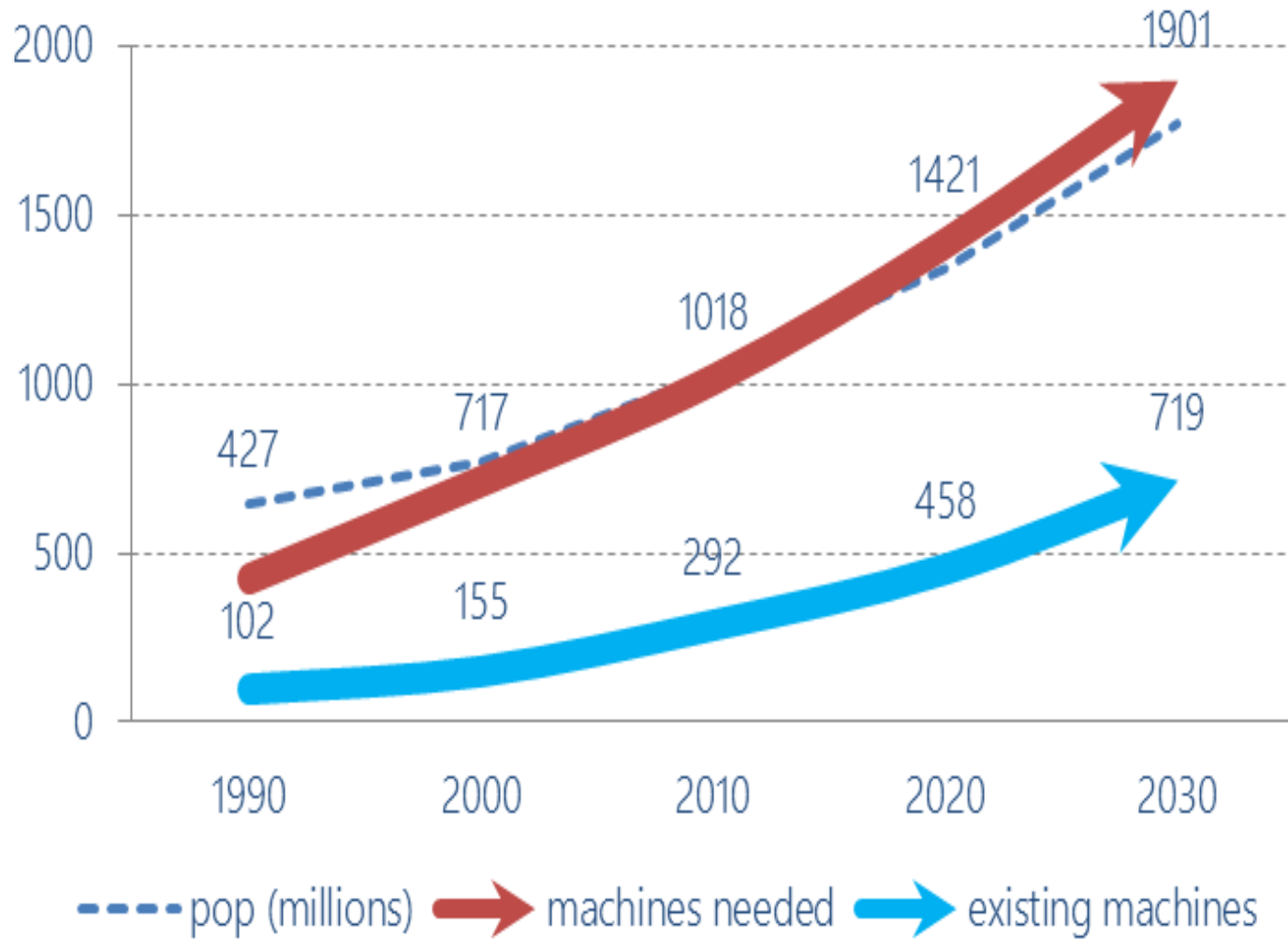


Low- and middle-income group countries

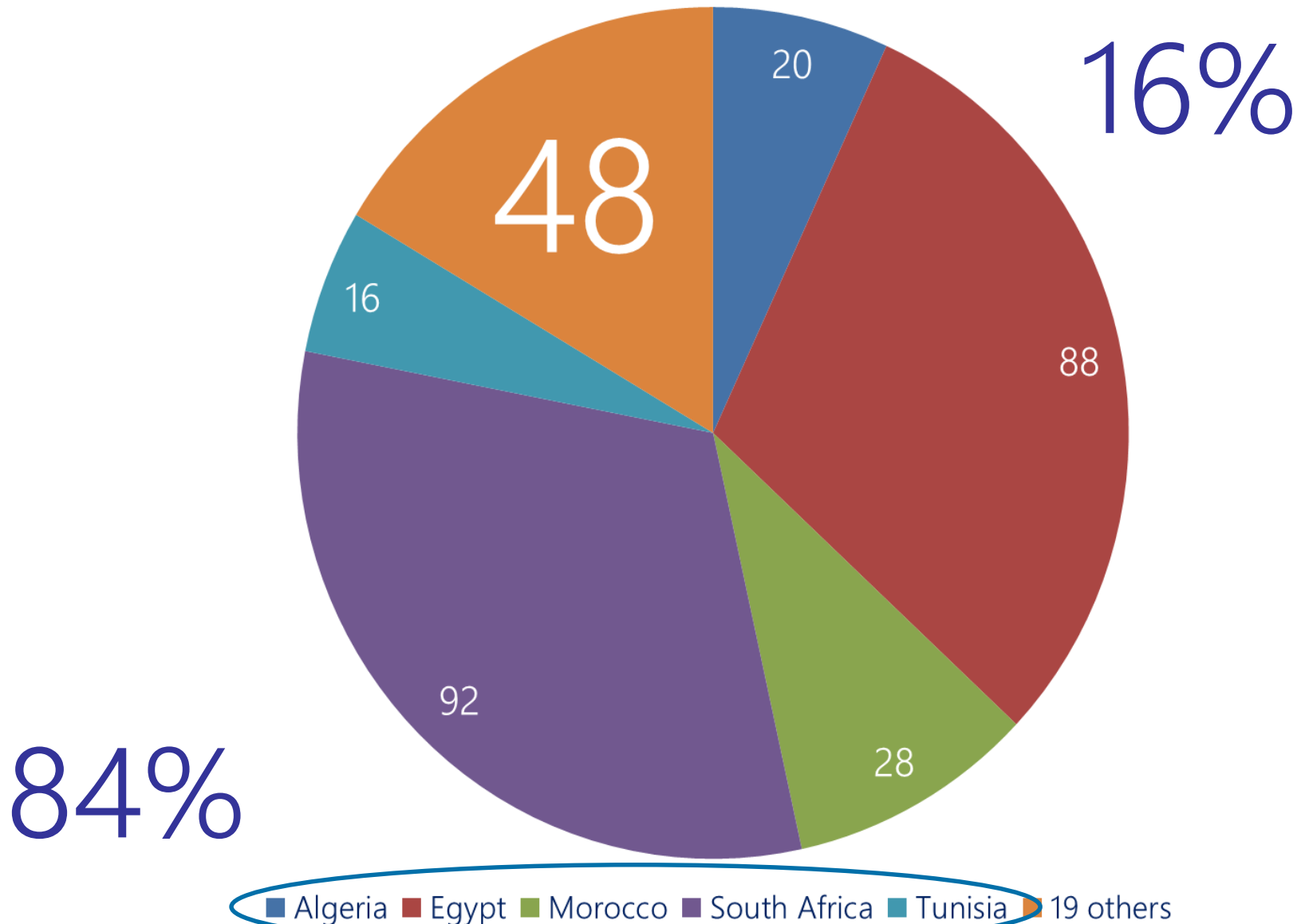


Low- and middle-income group countries

Radiation Machines in Africa



Distribution of 293 Radiation Machines in Africa



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 Oncology 2013
Grover et al. Front in Oncology. Jan 2015
Balogun et al. Radiation Oncology Aug 2016. In Press.

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**





Developing Radiation Capacity

EQUIPMENT

- ◆ **Appropriate equipment**
- ◆ **Servicing of equipment**
- ◆ **Supply chains**

PERSONNEL

- ◆ **Training programs**
- ◆ **Staff retention**

Developing Radiation Capacity

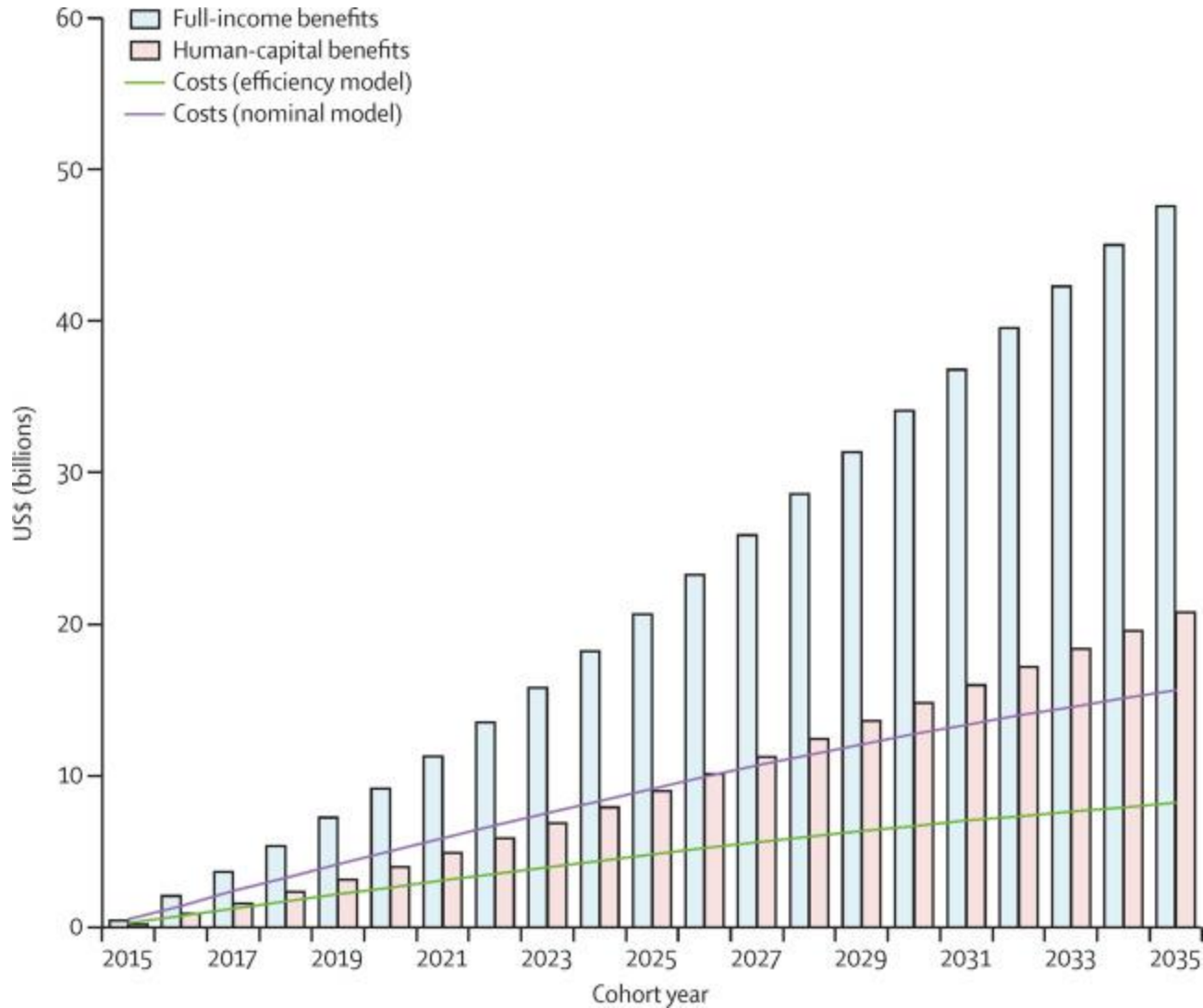
HEALTH SYSTEMS

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

POLITICAL COMMITMENT

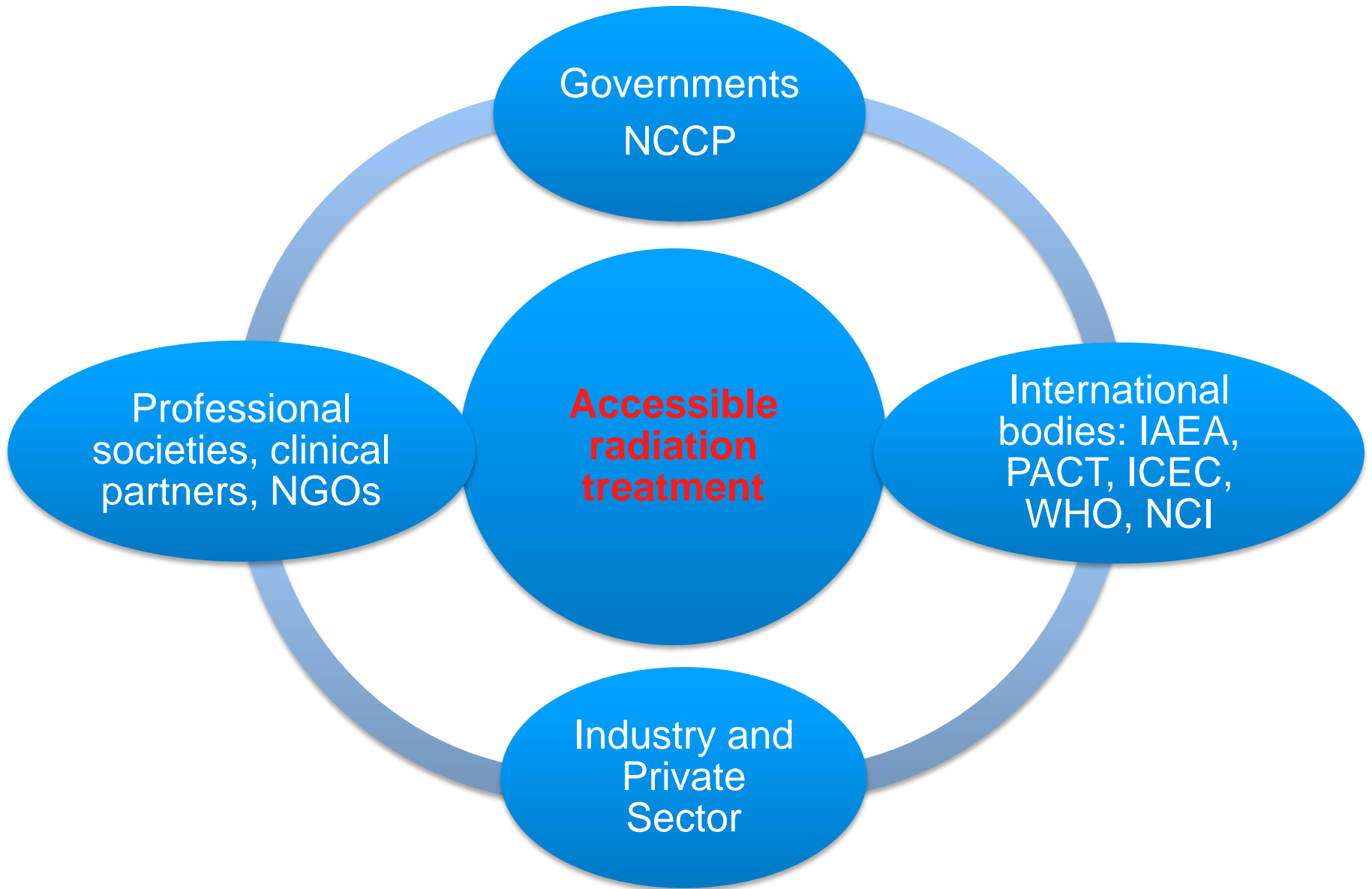
- ◆ Government commitment
- ◆ Management
- ◆ Training
- ◆ Retention of staff

Economic Benefits of Treatment



Atun et al. Lancet Oncology 2015

Multifaceted Approach



Implementation of Radiation Therapy

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

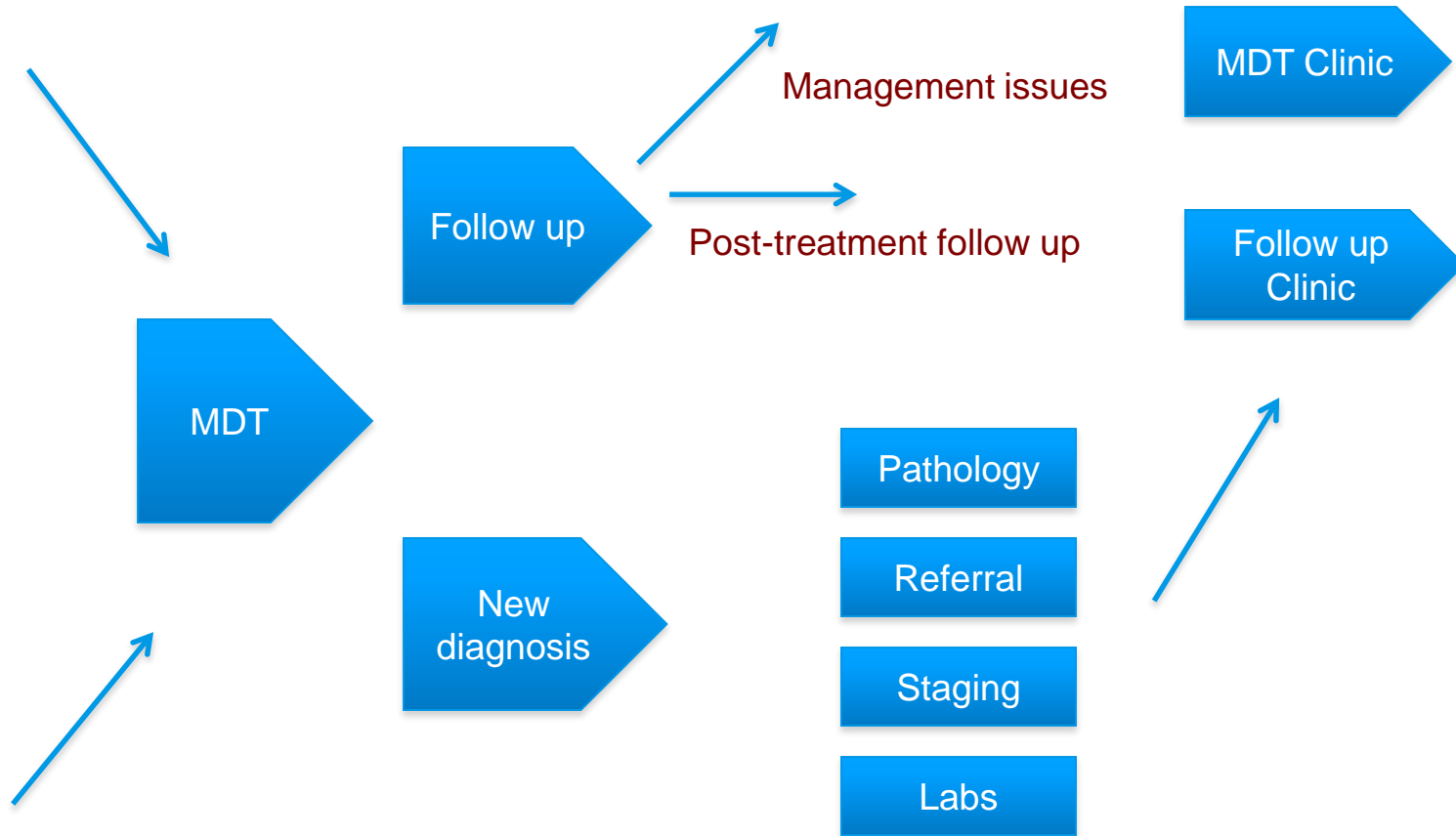
Implementation of Radiation Therapy

- ◆ 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/NCCCP)
- ◆ Retention of staff (MOH)
- ◆ Development of training program (MOH, IAEA, clinical and educational partners)

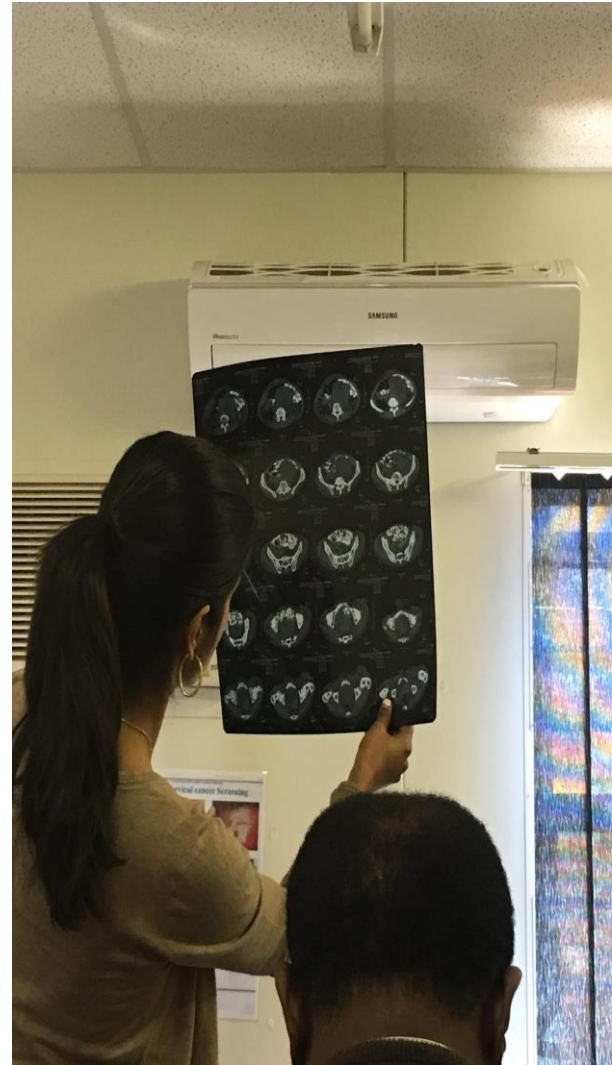
Initiatives in Botswana

- ◆ **Development of a new public radiation oncology center**
- ◆ **Development of follow up clinic for cervical cancer patients**
- ◆ **Development of care-linkage software**
- ◆ **Multi-disciplinary conferences for head and neck and breast cancer**
- ◆ **Development of 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



| Cervical Cancer CRT/RT Patients | Post-MDT | Pre-MDT |
|---|----------|---------|
| Average Delay from Bx to Treatment (days) | 60.12 | 120 |
| Average Delay from Clinic Visit to Treatment (days) | 24.6 | |



Ongoing Oncology Research in Botswana

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

.

Initiatives Underway in Botswana

- ◆ **Cancer control program initiated by Ministry of Health**
- ◆ **Development of oncology curriculum in medical school and training of Motswana oncology residents in South Africa through IAEA**
- ◆ **Expansion of clinical care, tele-support and pathology support with collaborations from University of Pennsylvania, Massachusetts General Hospital and Baylor**
- ◆ **Expansion of HIV and cervical cancer research (U54 consortia grant and AIDS Malignancy consortium) to improve treatment of patients with cervical cancer and HIV**

Grover et al. Cancer Control in Botswana. UICC 2014

Rotation for Oncology Trainees

- ◆ **PMH**

- Clinics (Thurs-new patient clinic)
- Ward rounds
- MDT** (Breast, Gyn, Head and Neck)

- ◆ **GPH**

- New consults
- RT planning

- ◆ **Other specialty clinics**

- ◆ **Research meetings**

- ◆ **Weekly teaching sessions**

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, ASCO, ABS, ASCP**
- ◆ **Academic centers**

Acknowledgements

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- ◆ *Tata Memorial Cancer Center*
- ◆ *IAEA*



Thank you

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