

Professional development, funding opportunities, and career paths for Medical Physicists in Global Health



Stephen Avery, Ph.D., FAAPM
 Associate Professor of Radiation Oncology
 Director, Medical Physics Graduate Program

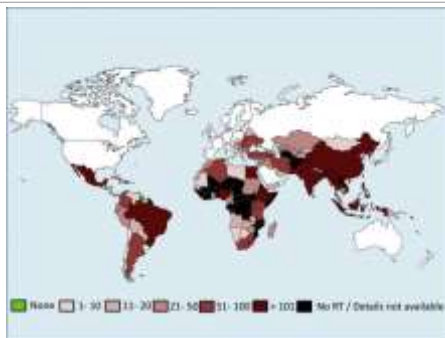


July 29, 2018

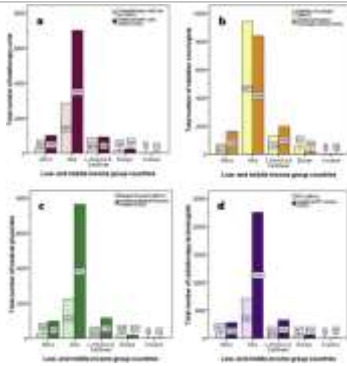
Global Evolution



Projected Needs in LMICs-2020



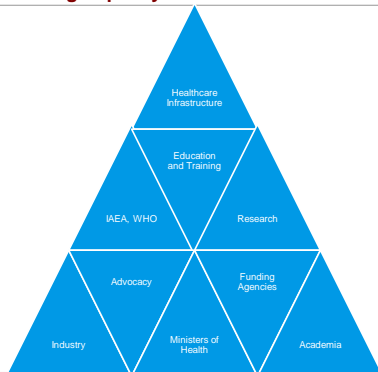
Projected Needs in LMICs-2020



Professional Development goes both ways



Building Capacity from Palliative to Curative Cure

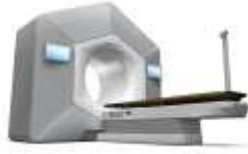


Building Capacity from Palliative to Curative Cure

Varian Halcyon Systems Expand Access to Cancer Care at Three Centers in Africa

May 30, 2018

- Clinique le Littoral Casablanca, Morocco
- Centre d'Oncologie Nakhil Rabat, Morocco
- Busamed Oncology Center- Hillcrest, South Africa



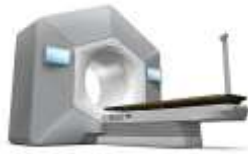
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Building Capacity from Palliative to Curative Cure

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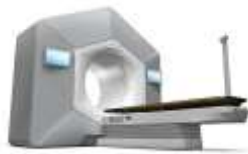
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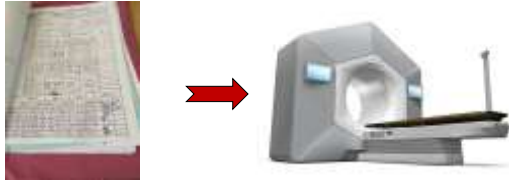
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Building Capacity from Palliative to Curative Care

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Radiation Machines in Africa

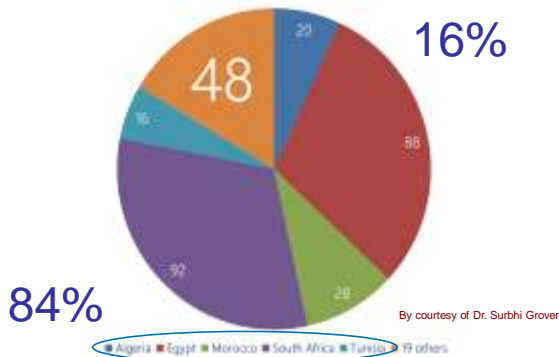


By courtesy of Dr. Surbhi Grover

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Distribution of 293 Radiation Machines in Africa



By courtesy of Dr. Surbhi Grover

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Career Paths in Global Health



BIGGEST - UPenn/Botswana Partnership



By courtesy of Dr. Surbhi Grover

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)

By courtesy of Dr. Surbhi Grover

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**

By courtesy of Dr. Surbhi Grover

BIGGER - What we hope to accomplish?

- ♦ **Medical Physics education and training programs in Tanzania**
 - Master's degree program
 - Short education courses
- ♦ **Regional Training Hub**



The Education Team

- ♦ **Ocean Road Cancer Institute**
 - Dr. Julius Mwaiselage
 - Dr. Khamza Maunda
- ♦ **Muhimbili University**
 - Dr. Twalib Ngoma
- ♦ **University of Pennsylvania**
 - Stephen Avery, PhD
- ♦ **Harvard University**
 - Wilfred Ngwa, PhD



MUHAS Curriculum

Code	Instructor	Course Name	Theory/Number		Practical/Total		Total	
			Hours	Credits	Hours	Credits	Hours	Credits
Semester 1, 28.7 Credits								
GA 605	MR/AS	Anatomy and Physiology for Medical Physics	132	13.2	300	30.0	432	43.2
ER 600	MR/AS	Epidemiology, Biostatistics and Research Methodology	57	5.7	15	1.5	72	7.2
GR 605	U/PostHarvard	Radiation Physics	66	6.6	66	6.6	132	13.2
GE 605	MR/AS	Medical Imaging Fundamentals	33	3.3	33	3.3	66	6.6
EE 605	MR/AS	Bionics	57	5.7	15	1.5	72	7.2
Total			445	44.5	333	33.3	774	77.4
Semester 2, 24.0 Credits								
RE 605	MR/AS	Radiobiology	55	5.5	60	6.0	115	11.5
BE 600	MR/AS	Education Principles and Practices	40	4.0	60	6.0	100	10.0
GD 605	U/PostHarvard	Radiation Dosimetry and Protection	88	8.8	90	9.0	178	17.8
GE 605	MR/AS	Physics of Diagnostic Imaging and Interventional Radiology	110	11.0	90	9.0	200	20.0
GF 605	U/PostHarvard	Physics of Radiation Oncology and Radiotherapy Therapy	110	11.0	90	9.0	200	20.0
Total			403	40.3	425	42.5	828	82.8
Semester 3, 19.3 Credits								
GG 605	OR/CS/VAM/AN	Clinical Training	20	2.0	492	49.2	512	51.2
RR 609	ALL	Discretionary Module 1: Proposal Writing and Ethical Clearance	0	0	225	22.5	225	22.5
Total			20	2.0	717	71.7	737	73.7
Semester 4, 22.2 Credits								
GR 605	OR/CS/VAM/AN	Clinical Rotation	0	0	492	49.2	492	49.2
RR 609	ALL	Discretionary Module 2: Data Collection and Analysis, Dissertation writing and submission	0	0	225	22.5	225	22.5
Total			0	0	717	71.7	717	71.7
Grand Total			688	68.8	2398	239.8	3044	304.4

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Grant submission – NIH R21

- **AIM 1. Develop the practical USA-Africa Radiation Oncology Core (PROC) through a co-mentored research/training based program in radiological sciences.**
 - Establish a research-based MSc. Degree Program in medical physics at MUHAS. Research co-mentors will include faculty from the USA and Africa. The program will enhance the ability of trainees to develop, implement and conduct low-cost radiation medicine technologies.
 - Partner with Ocean Road Cancer Institute to create a program, for cervical cancer patients, which automatically identifies pathologically enlarged lymph nodes on non-contrast simulation CT images. This program would be used for radiation treatment planning in low-resource environments where diagnostic imaging isn't readily available.
- **AIM 2. Develop and test a virtual USA-Africa ICT-powered Radiation Oncology Core (IROC). This ICT-powered core facility/platform will provide imaging and radiation oncology quality assurance (QA) services and provide a Radiation Oncology Incident Learning or error reporting system that is voluntary and confidential.**

Foundations for Global Health



Internal Funds



Medical Physics Program in Bangladesh

DAAD- PAGEL : Objectives

DAAD DEUTSCHE AKADEMIE FÜR AUSLÄNDISCHES STUDIUM

- The aim of the program is to offer medical training and further education opportunities in the medical field for partner universities, which are cutting-edge and suit the local context.
- In addition, development-related professional networks between students, alumni, and experts in the health sector are to be established. Sustainable development structures are expected to also develop between the participating universities.
- With the PAGEL partnerships, German higher education institutions are expected to significantly expand their expertise in development cooperation.



Medical Physics Program in Bangladesh

Activities of Mannheim Pagel project 2014-2017

- 4 students from Bangladesh attended 1-2 semesters of Mannheim Masters Course Med.Phys.
- Support of 8 graduated med. physicists from Bangladesh (2 per year) for
- 3-month practical trainings at hospitals in Germany
in: Augsburg, Aulich, Brandenburg, Coburg, Frankfurt, Dortmund, Köln, Mannheim
- Support of 3 PhD students from Bangladesh for experimental parts of their thesis in Germany.
- Exchange of 2-4 teachers/scientists per year to / from Bangladesh
- Support of 2 Bangladesh students per year to participate in an Mannheim medical physics workshops



University of Mannheim



Medical Physics Program in Bangladesh

Study fees covered through donations by industrial partners



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Medical Physics Program in Bangladesh

What is planned for 2018-2021 ?

Support of medical physics education in Bangladesh

- Support practical training
- Improve mathematical skills and technical knowledge
- Provide access to e-learning



Support of south-south co-operations and networking

- Joint activities of universities and scientific institutions in teaching and workshops
- **Key role for** South Asia Center for Medical Physics and Cancer Research (SCMPCR)
- Future goals:
joint med. phys. and QA laboratory library
research program for Master and PhD work



Division of Life Sciences



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Medical Physics Program in Bangladesh

What is planned for 2018-2021 ?

Support of medical physics education in Bangladesh

- Exchange of teachers
- Invitation of teachers and graduated medical physicists to advanced med. phys. schools in Germany
- Invitation of students to exchange semesters in Germany
- Support of PhD students

Support of south-south co-operations and networking

- Med Phys. schools and hands-on workshops in Bangladesh and Southern Asia organized by South Asia Center for Medical Physics and Cancer Research (SCMPCR) ?
- Support of teachers and instructors
- Support of students attending teaching and workshops

Training of senior medical physicists

- 3-month practical visits in Germany



Division of Life Sciences

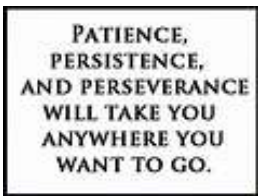


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Final Thoughts

- ♦ Be respectful; build and maintain trust.
- ♦ Be open to change
- ♦ Be creative with funding opportunities



Thank you!!