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DUKE GLOBAL HEALTH INSTITUTE

The Global Cancer Challenge: What can we do?

1. Defining the aggregate problems to be addressed.
2. Global health requires systems solutions to bring together twinning projects, government organizations and individual efforts into a sustainable critical mass.
3. Oncology care is essential and can also develop alternative technologies for treatment and networking.
4. Qualified people- recruiting, retaining and sustaining
5. Who benefits from addressing this hard problem?
6. Translating intention into action. Capacity, capability, credibility – sustainable system that can expand geometrically

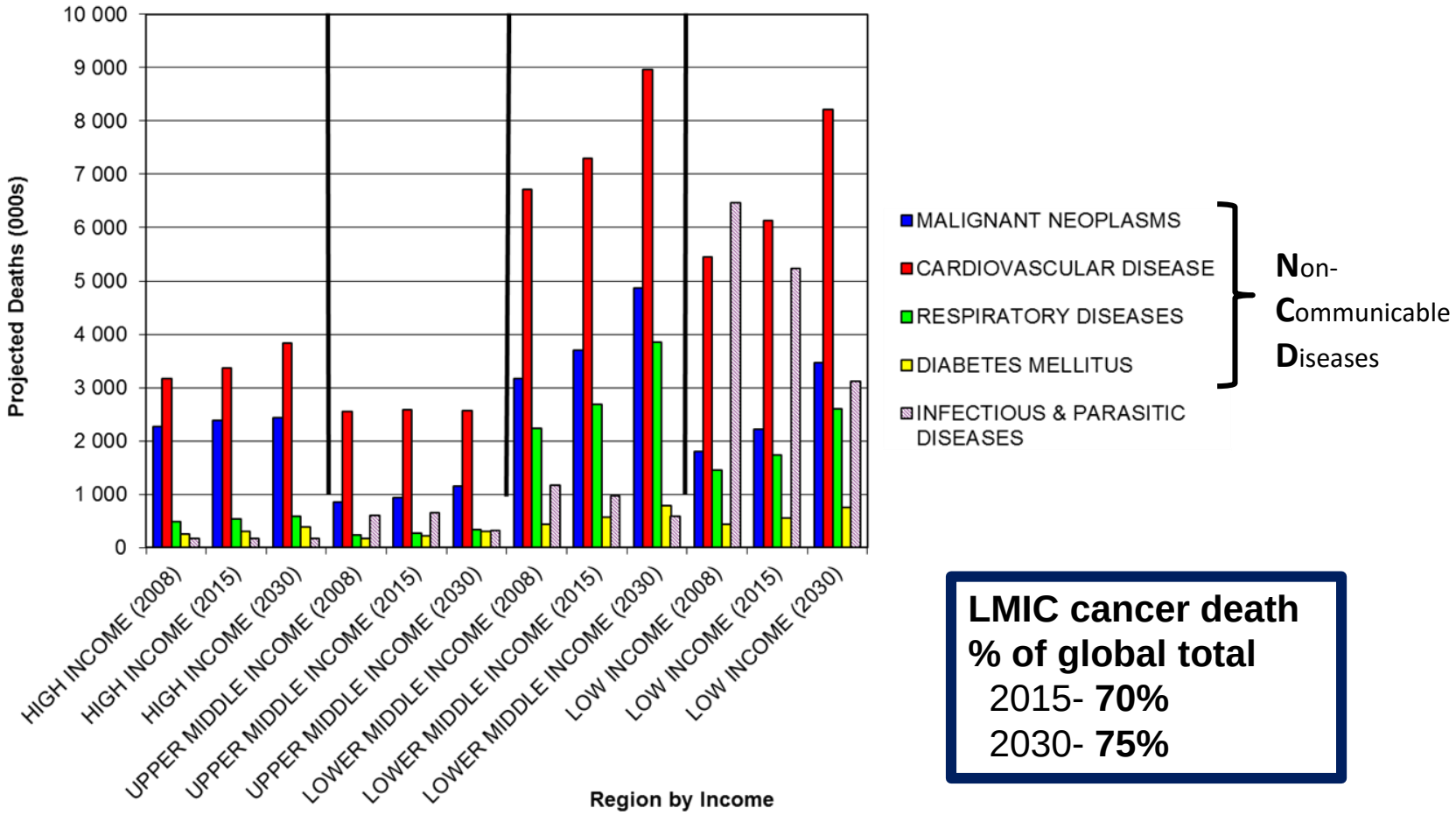
Global Health: Oncology

- Just the plain facts:
  - Of the 7 million cancer deaths, 70% occur in LMIC
  - By 2030, LMIC will bear the brunt of 27 million new cancer cases and 17 million cancer deaths and…
  - 80% of disability adjusted years of life lost to cancer
  - Huge and unperceived costs of inaction

Defining the Problem:

WHO Global Burden of Disease

http://www.who.int/healthinfo/global_burden_disease/projections/en/index.html



LMIC cancer death % of global total

2015- **70%**

2030- **75%**

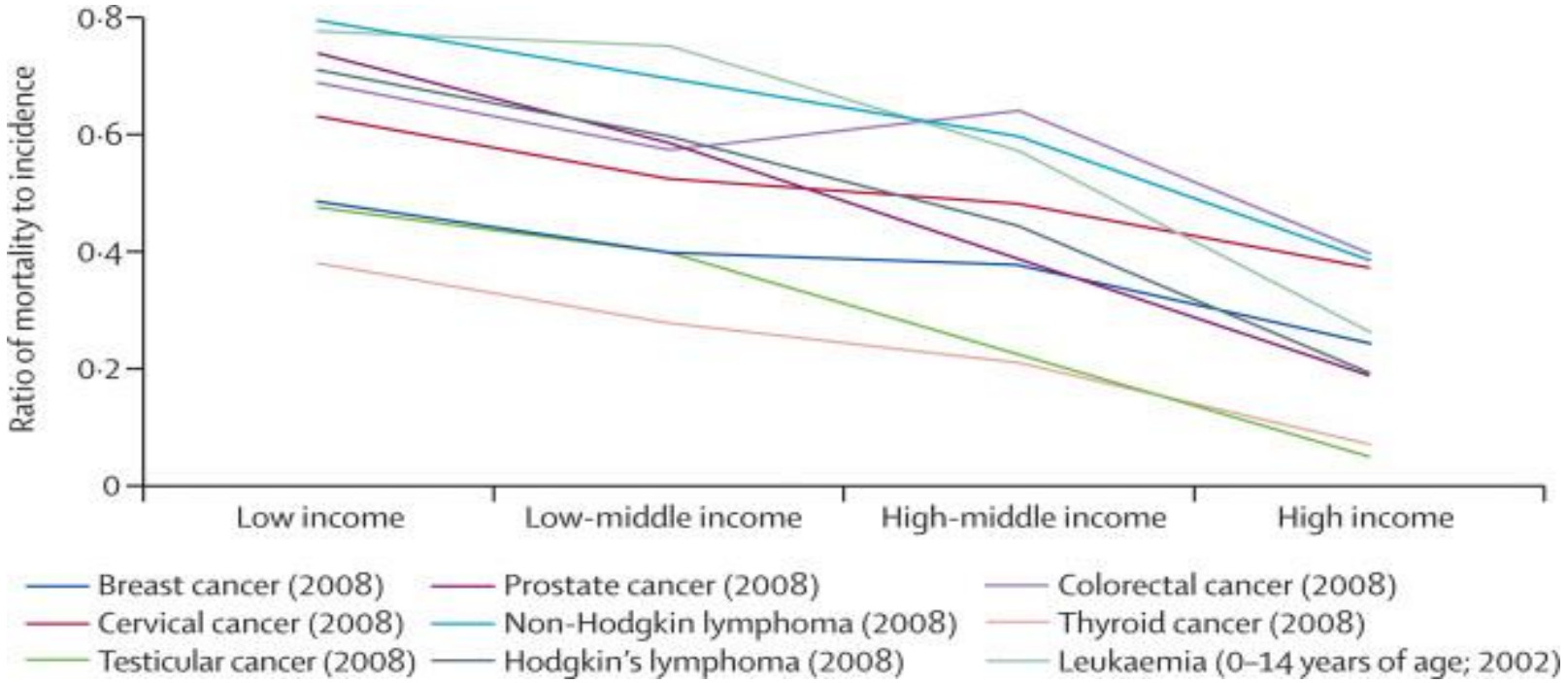


Figure Ratio of mortality to incidence in a specific year by cancer type and country income Case fatality (calculated by approximation from the ratio of mortality to incidence in a specific year) is much lower in high-income countries than in lo...

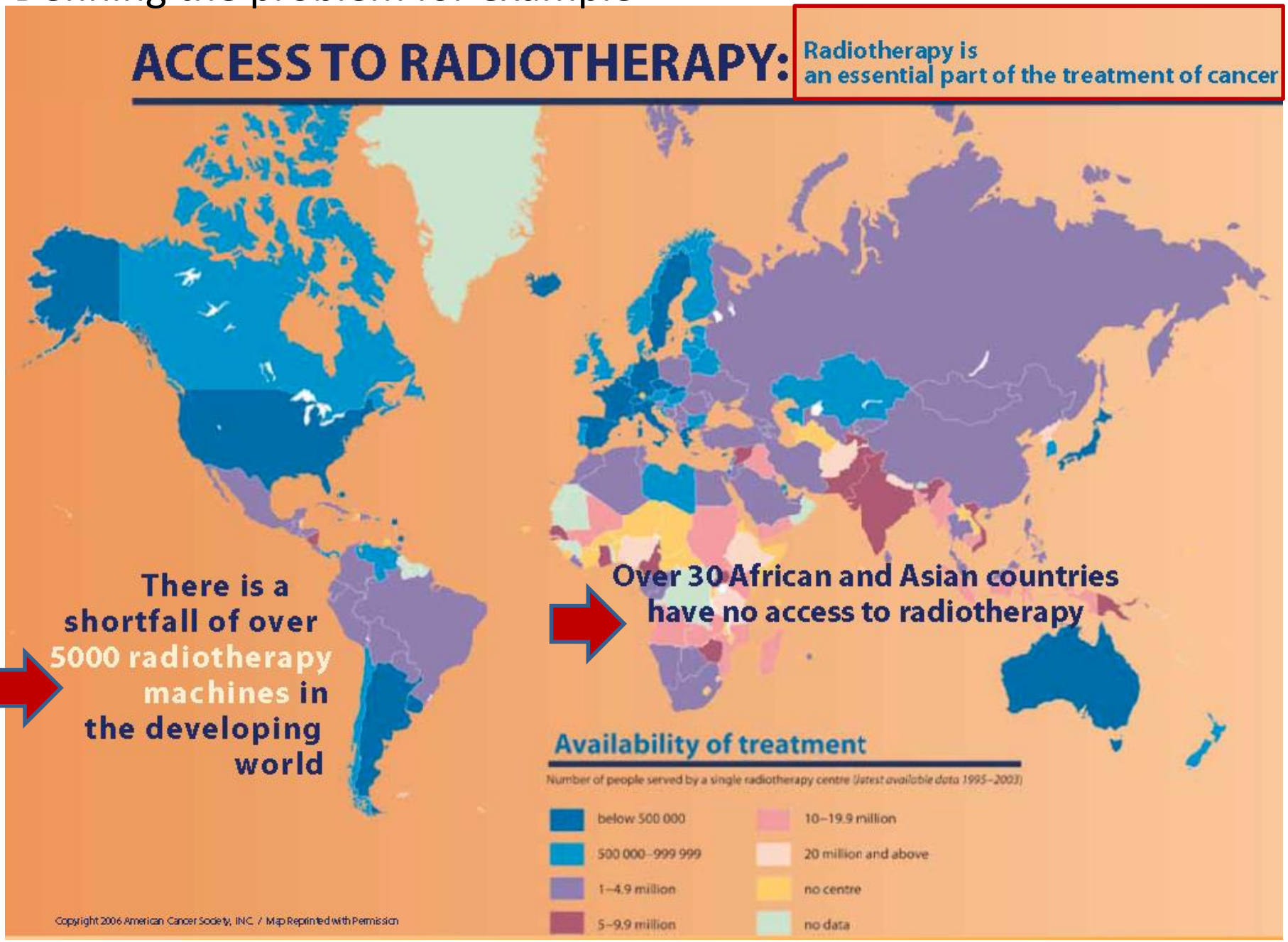
Paul Farmer , Julio Frenk , Felicia M Knaul , Lawrence N Shulman , George Alleyne , Lance Armstrong , Rifat Atun ...

Expansion of cancer care and control in countries of low and middle income: a call to action

The Lancet Volume 376, Issue 9747 2010 1186 - 1193

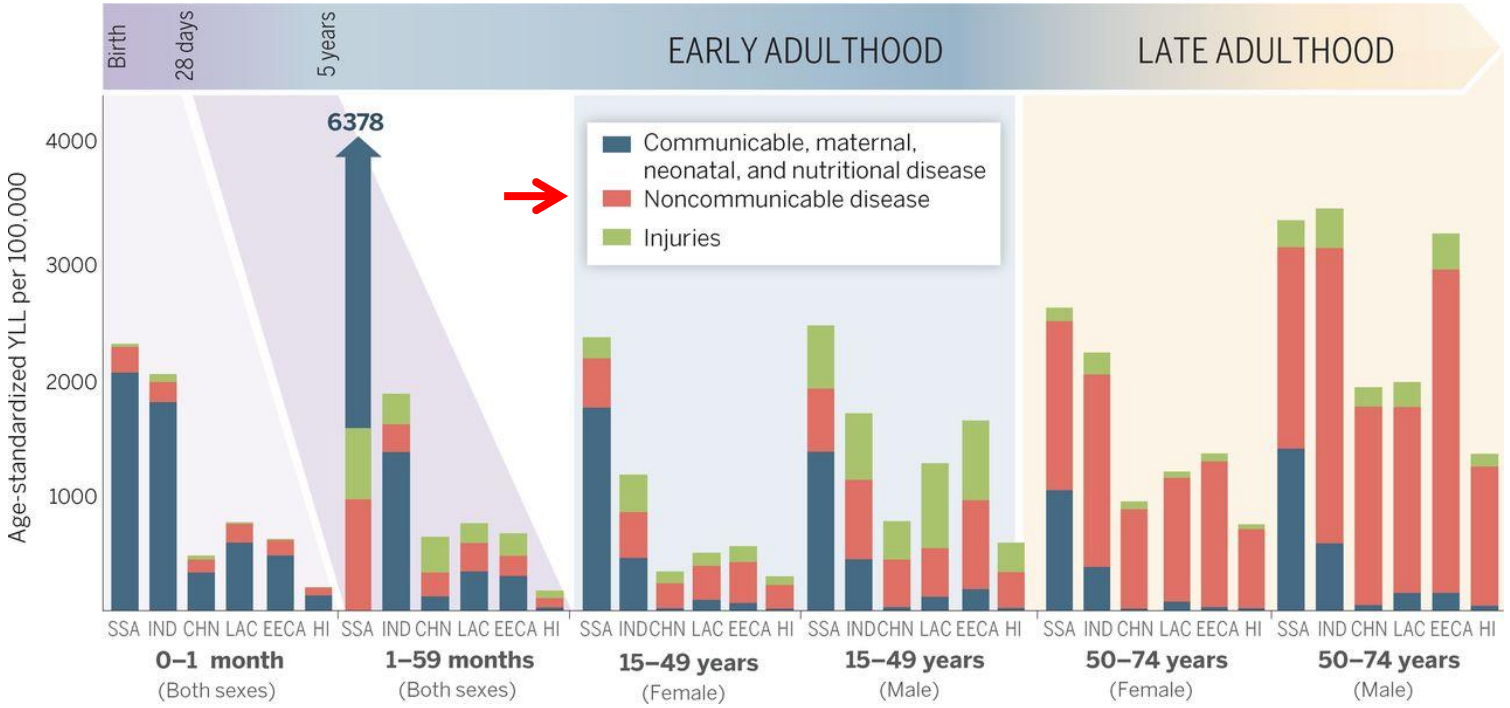
http://dx.doi.org/10.1016/S0140-6736(10)61152-X

Defining the problem for example



The state of global health in 2014

J. Sepulveda and C. Murray, Sci 345:1275, 2014



YLL and DAH

YLL- years of life lost

DAH- Development assistance for health

	Low income		Lower middle income		Upper middle income	
	YLL	DAH	YLL	DAH	YLL	DAH
HIV/AIDS	7.6%	41.6%	3.7%	32.0%	4.8%	41.1%
Malaria	11.2%	14.3%	4.8%	9.6%	0.0%	2.2%
Tuberculosis	3.1%	3.3%	3.5%	6.6%	1.0%	7.0%
Maternal, newborn, and child health	37.8%	17.1%	32.1%	23.7%	8.1%	7.0%
Noncommunicable diseases	20.7%	0.2%	34.0%	1.0%	65.3%	2.9%
Other	19.7%	23.5%	21.9%	27.1%	20.8%	39.8%

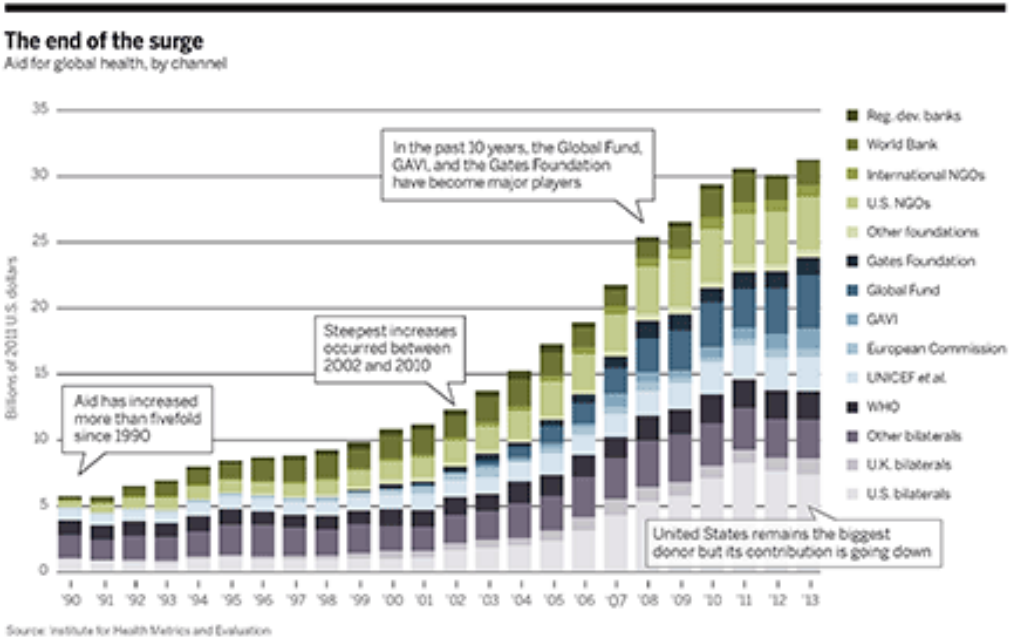
"Need" → 20.7%, 34.0%

"Investment" → 0.2%, 1.0%

After the windfall:

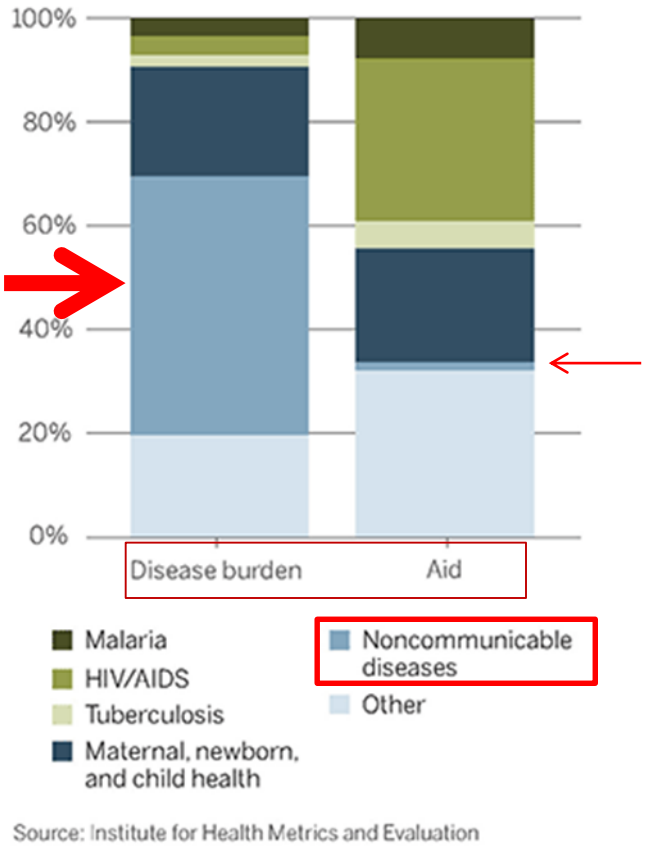
Plateauing budgets for global health sharpen the focus on what really works

M. Enserink, Science 354:1258, 2014



Skewed funding For NCDs

The diseases that cause the highest burden—expressed in disability-adjusted life years, or DALYs—don't get most of the international largesse. In 2010, HIV/AIDS



Source: Institute for Health Metrics and Evaluation

Need for rapid scale up of cancer treatment

- Humanitarian need: ~4 million deaths yearly in LMIC could be averted with early detection and treatment, especially in children.
- Need for palliation since many are not curable but could be adequately palliated.
- Prevention strategies, community engagement
- Treatment services: pathology, radiology, pharmacy, chemotherapy, surgery, radiation therapy – many could be tied to existing efforts in infectious diseases or other subspecialties.
- Terrible inequities: almost 80% of the disability-adjusted life-years lost worldwide to cancer are in LMIC but have only about 5% or less in resources.

Preventable Cancers:

- Tobacco cessation: lung, head and neck, bladder cancers
- HPV: cervical and head and neck cancers
- Hepatitis infections: hepatocellular carcinomas

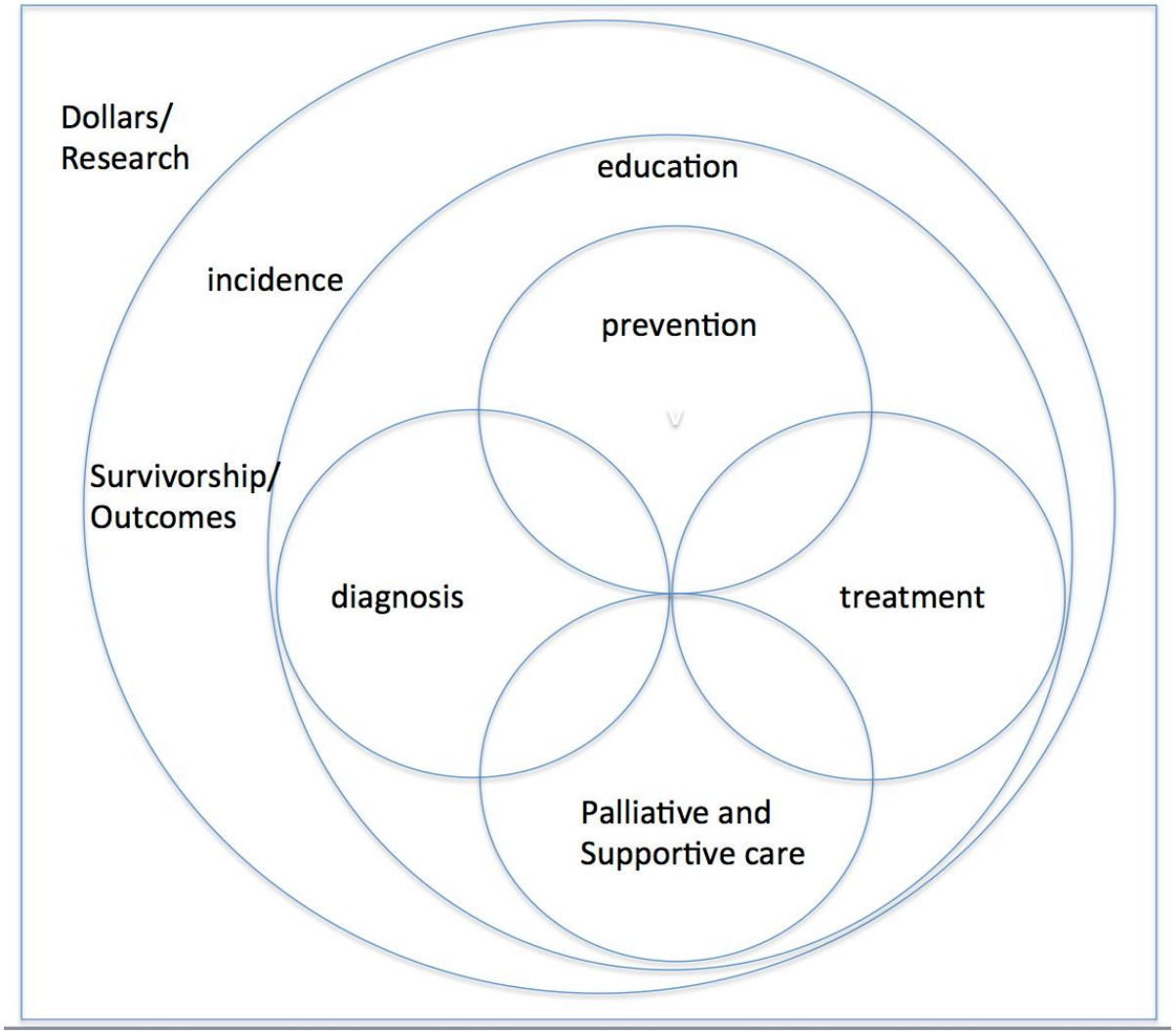
Early Detection and treatment

- Cervical cancer
- Breast cancer
- Colorectal cancer
- Chronic myelogenous leukemia

Curable with systemic treatment

- Burkitt's lymphoma
- Diffuse large cell lymphoma
- Hodgkin's lymphoma
- Testicular cancer
- Acute lymphoblastic leukemia
- Soft tissue sarcoma
- Osetosarcoma
- Chronic myelogenous leukemia

What would be needed?



It is feasible and effective

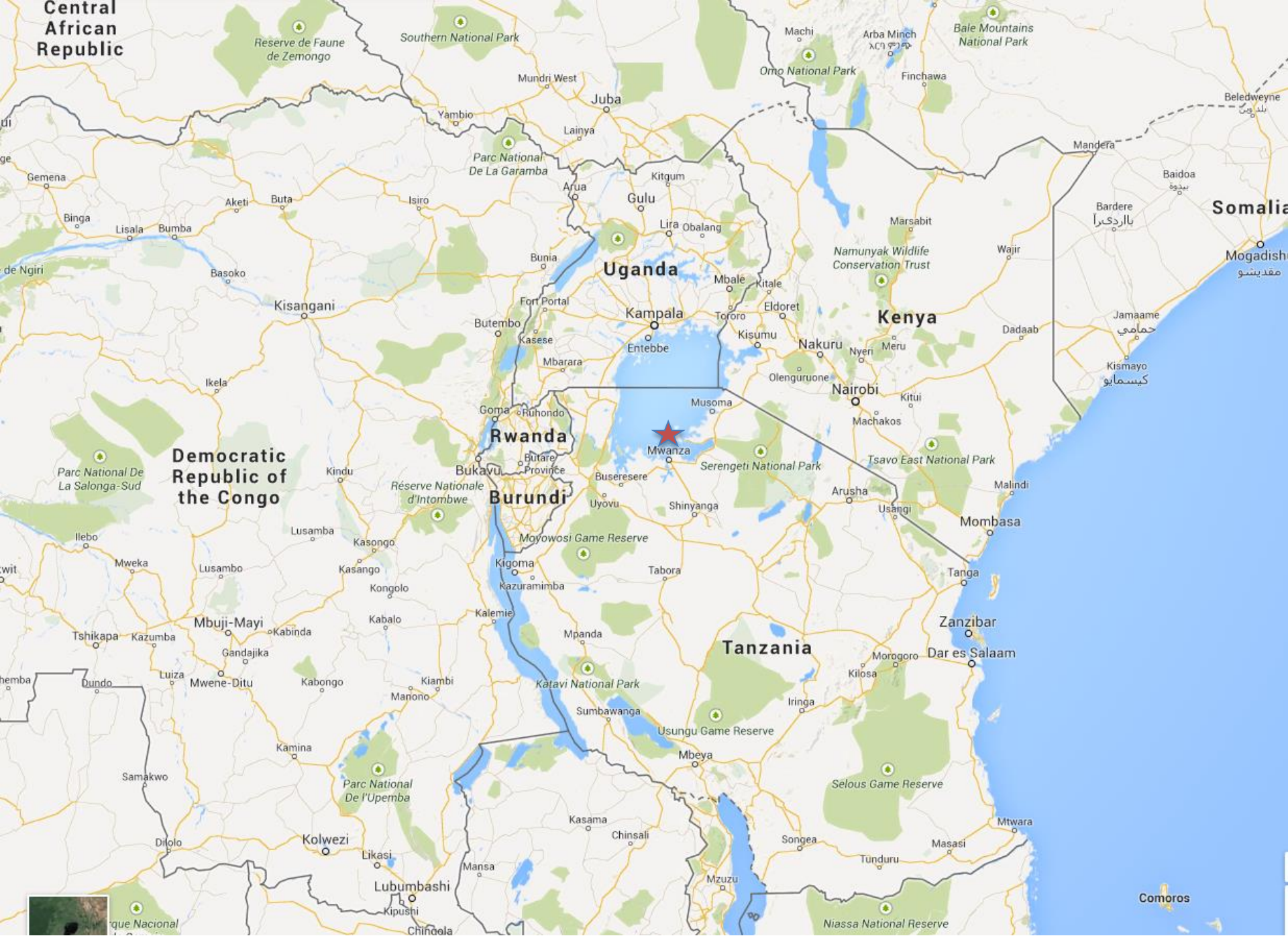
- Much can be done without the latest and most expensive technologies
- Low cost services can be beneficial even in wealthy countries
- The HIV and TB experience demonstrates that complex diseases can be cared for in LMIC
- Bulk purchases can bring prices down dramatically
- Effective diagnosis and treatment can be delivered even in rural areas.

Global Cancer Care – Low hanging fruit?

Telepathology
Virtual tumor board
Case based seminars
Visiting faculty
Visiting students
Private-public partnerships
Twinning
…

Duke's Approach

- Emphasis on Selected Demonstration Projects
  - Leading with care: Bugando Cancer Center
  - Leading with education: Tata Medical Center training: South-south exchange
  - Leading with research: Barretos Cancer Center
- Plan "Diagonal" Health Care Systems
- Connecting to Established Infrastructure


Central African Republic
Reserve de Faune de Zemongo
Southern National Park
Mundri West
Juba
Yambio
Lainya
Parc National De La Garamba
Arua
Kitgum
Gulu
Lira
Obalang
Machi
Arba Minch
Bale Mountains National Park
Omo National Park
Finchawa
Beledweyne
Mandera
Baidoa
Somalia
Bardere
Marsabit
Wajir
Mogadishu
Namunyak Wildlife Conservation Trust
Gemena
Aketi
Buta
Isiro
Binga
Lisala
Bumba
Basoko
Bunia
Uganda
Mbale
Kitale
Eldoret
Kisangani
Fort Portal
Kampala
Tororo
Kenya
Butembo
Kasese
Entebbe
Kisumu
Nakuru
Nyeri
Meru
Dadaab
Jamaame
Mbarara
Olenguruone
Kismayo
Ikela
Nairobi
Kitui
Goma
Ruhondo
Musoma
Machakos
Rwanda
Mwanza
Democratic Republic of the Congo
Parc National De La Salonga-Sud
Kindu
Bukavu
Butare Province
Serengeti National Park
Tsavo East National Park
Buseresere
Arusha
Malindi
Réserve Nationale d'Intombwe
Burundi
Uyovu
Shinyanga
Usangi
Mombasa
Ilebo
Lusamba
Kasongo
Moyowosi Game Reserve
Mweka
Lusambo
Kasango
Kigoma
Tabora
Tanga
Kongolo
Kazuramimba
Kalemie
Zanzibar
Mbuji-Mayi
Kabalo
Tshikapa
Kazumba
Kabinda
Mpanda
Tanzania
Gandajika
Morogoro
Dar es Salaam
Luiza
Mwene-Ditu
Kabongo
Kiambi
Kilosa
Dundo
Katavi National Park
Manono
Iringa
Sumbawanga
Usungu Game Reserve
Kamina
Mbeya
Samakwo
Parc National De l'Upemba
Selous Game Reserve
Kasama
Mtwara
Chinsali
Songea
Masasi
Dilolo
Kolwezi
Likasi
Tunduru
Mansa
Mzuzu
Lubumbashi
Kipushi
Comoros
Niassa National Reserve
Chingola

Progress

1. Full time faculty (Dr. Kristin Schroeder lives and works in Bugando – currently 6 months each year

2. Adam Olson as a Global Oncology fellow

3. Duke “team” set up and in place (research coordinator, tumor registry, program manager, patient navigator)

4. Supporting partially training for a pediatric oncologist in Italy

5. Planning for a national pediatric tumor network

- 1. Pediatric outcomes:
  - standardized protocols, started a patient navigator system to try to reduce treatment abandonment
  - completed historical data extraction for chart review
  - Poster Abstracts: Pediatric Academic Society 2016; Societe International Oncologie Pediatrique (SIOP 2015 (Cape town), accepted abstract for 2016 as well); CUGH 2016 (San Francisco) ; IPOS/APOA 2016(Calabar, Nigeria)
  - Oral presentation at SDG3 (Emory, 2016); GHOS 2016 (mwanza, TZ) - Mentored Research : Kathryn McHenry (summer research award, Amherst Undergraduate; Fatima Alvi summer research award, Wash University MSII; Jessica McDade (Duke University MS IV)
- 2. Registry:
  - awarded DCI pilot grant 2014 (co-investigator)
  - completed 1st year of registry, enrolled 1,700 patients
  - Accepted publication: Zullig LL, Schroeder K et al. Validation and quality assessment of Kilimanjaro Cancer Registry. JGO 2016
  - submitted P20 (with UCSF, OCRI, etc) --> scored but not awarded, in resubmission

- 3. lymphadenopathy among HIV infected patients
  - Award: DCI pilot grant 2015 (co-PI), CFAR no cost extension for 2015 (PI)

- 4. Burkitt Lymphoma
  - submitted P01 (co-investigator, Ann Moorman PI)
  - Submitted P30 supplement (Co-PI) - awarded

- 5. AMC (AIDS Malignancy Consortium)
  - application to AMC to be clinical trial site, accepted as provisional site

- 6. Palliative Care
  - Mentored Research: Emily Esmaili MD, MS (Duke Masters in Bioethics and Science Policy, thesis work product, Palliative care beliefs among oncology staff and parents of children with cancer at Bugando Cancer Centre)

Punjab
Ambala City
Patiala
Uttarakhand
Rorkee
Panipat
Haryana
Meerut
Narela
New Delhi
Bareilly
Uttar
Pradesh
Alwar
Mathura
Jaipur
Agra
Lucknow
Kanpur
Gwalior
Lakhimpur
Kheri
Bahraich
Sitapur
Faizabad
Gorakhpur
Deoria
Raebareli
Jaunpur
Allahabad
Varanasi
Jhansi
Shivpuri
Kota
Chittorgarh
Sarolakala
Guna
Chhatarpur
Satna
Ramnagar
Damoh
Katni
Madhya
Pradesh
India
Indore
Satpura National Park
Seoni
Chhattisgarh
Gondia
Nagpur
Raipur
Bhilai Nagar
Jalgaon
Dhule
Amravati
Akola
Aurangabad
Maharashtra
Nanded
Ahmednagar
Latur
Solapur
Gulbarga
Telangana
Karimnagar
Pamunuru
Khammam
Raichur
Nallamala Forest
Hubli-Dharwad
Vijayawada
Tenali
Chirala
Ongole
Bhimavaram
Kakinada
Gokavaram
Visakhapatnam
Srikakulam
Narayanpur - Jagdalpur - Gadchiroli Range
Brahmapur
Puri
Bhubaneshwar
Odisha
Balangir
Sambalpur
Angul
Rourkela
Balasore
Ranchi
Jharkhand
Dhanbad
Durgapur
West Bengal
Kolkata
Chuadanga
Khulna
Gaya
Patna
Bihar
Darbhanga
Nepal
Birendranagar
Annapurna
Conservation Area
Kathmandu
Biratnagar
Sikkim
Bhutan
Jigme Dorji National Park
Xigaze
日喀则地区
Lhasa
拉萨市
Nyingchi
林芝地区
Dibang Wildlife
Sanctuary
Arunachal
Pradesh
Wakro
Tinsukia
Dibrugarh
Assam
Jorhat
Golaghat
Guwahati
Nagaland
Meghalaya
Rangpur
Rajshahi
Bogra
Sylhet
Bangladesh
Dhaka
Agartala
Manipur
Churachandpur
Barisal
Chittagong
Cox's Bazar
Maungdaw
Sittwe
Kyaukhtu
Pakokku
Myanmar
(Burma)
Mandalay
Naypyitaw
Yenangyaung
Thayet
Taungoo
Pyay
Pathein
Yangon
Bogale
Mawlamyine
Ashu Igha
Hpakan
Myitkyina
Lashio
Deqen
迪庆藏族
自治州
Lijiang
丽江市
Nujiang
怒江傈僳
族自治州
Dali
大理白族
自治州
Baoshan
保山市
Lincang
临沧市
Yunnan
Pu'er
普洱市
Panzhihua
攀枝花市
Chuxiong
楚雄彝族
自治州
Xishuangbanna
西双版纳
傣族自治州
Keng Tung
Chiang Mai
Lamphun
Phitsanulok
Tak
Nakhon Sawan
Thailand

Progress

1. Full time trainee Eli Mkwizu in Tata Medical Center learning and being treated as a registar, highly rated by the medical director

2. Six oncology nurses are due to arrive in September to spend 6 weeks in training in the DCI


Barreiras
Bahia
Feira de Santana
Alagoinhas
Salvador
Santo Antônio de Jesus
Valença
Jequié
Guanambi
Vitória da Conquista
Itabuna
Ilhéus
Itapetinga
Vilhena
Mato Grosso
Tangará da Serra
Parque Nacional Noel Kempff
Cuiabá
Primavera do Leste
Barra do Garças
State of Goias
Brasilia
Luziânia
Unaí
Janaúba
Cáceres
Rondonópolis
Goiânia
Montes Claros
Porto Seguro
Paracatu
Teixeira de Freitas
Mineiros
Jataí
Rio Verde
Caldas Novas
Minas Gerais
Teófilo Otoni
Parque Nacional do Pantanal Matogrossense
Catalão
Itumbiara
Patos de Minas
Parque Nacional Marinho dos Abrolhos
Curvelo
Governador Valadares
Corumbá
Uberlândia
Ituiutaba
Ipatinga
Linhares
Uberaba
Araxá
Belo Horizonte
Colatina
Santa Fé do Sul
Divinópolis
Betim
Vitoria
Defensores del Chaco
Campo Grande
Sao Jose do Rio Preto
Franca
Cachoeiro de Itapemirim
Três Lagoas
Araçatuba
Ribeirão Preto
Mato Grosso do Sul
Juiz de Fora
Campos
Presidente Prudente
São Carlos
Pousada Vicollo Nostro
Nova Friburgo
Dourados
Marilia
São Paulo
Nova Andradina
Assis
Campinas
Rio de Janeiro
Macaé
Pedro Juan Caballero
Taubaté
Paranavaí
Londrina
Cabo Frio
Paraguay
Horqueta
Maringá
São Paulo
Apucarana
Umuarama
Santos
Campo Mourão
Cascavel
Parana
Ponta Grossa
Asuncion
Coronel Oviedo
Ciudad del Este
Guarapuava
Curitiba
Itaugua
Villarrica
Francisco Beltrão
Paranaguá
Formosa
Joinville
Presidencia Roque Sáenz Peña
Pato Branco
Blumenau
Chapecó
Resistencia
Posadas
Santa Catarina
Florianopolis
Erechim

Progress

1. Full time trainee Dr. Laura Musselwhite spent one year as a global health fellow conducting research in cervical cancer.
This effort has resulted in:
a. Three abstracts that have been presented
b. Two manuscripts in preparation
c. A Gates Grand Challenges Exploration grant to this team for a urine cervical cancer screening tool.
d. R-01 submission on cervical cancer screening

2. Nimmi Ramanujam research in cervical cancer to be expanded to Barretos (and to Tanzania [KCMC] in addition to sites in Peru, Kenya and Zambia.

3. The third biannual Duke Global Cancer Symposium to be held in Barretos in 2017

Progress

- China efforts:
  - Held interest group meeting March 2016 and second planned for October 2016
  - Multiple groups have individual efforts on going
  - Duke leads with Beijing military hospital on an international phase III trial of microtransplantation for acute leukemia
  - Interest in Kushan for possible smoking prevention studies

Unique Role for Duke: People, Expertise, Programs, and Vision

- Duke is well-positioned to partner with developing world stakeholders to investigate how to build cancer care health systems
- Resulting analytic model could be applied to any NCD and any country
- Cross-disciplinary training of physicians and others in global health is unique to the US and specifically to Duke; gives us the skills to catalyze development efforts for global health systems

Potential Contributors From Duke Programs and Initiatives

- Duke Cancer Institute: clinical expertise and health services, population science, and outcomes group
- Duke Global Health Institute: Regional expertise, epidemiologists, economists, Global Health Major, MSc Students, Doctoral Scholars
- Bass Connections
- School of Medicine, School of Nursing, Sanford School of Public Policy, Fuqua School of Business, Nicholas School of the Environment
- Social Entrepreneurship and Global Health (eg. CASE, SEAD, and IPIHD)

Ingredients of a “Duke” Approach

Answering Key Questions in Global Oncology

- Leverage Technical Expertise
- Support Regional Partners

Research on How to Expand Impact/Sustainability

- Scaling successful innovations to more rapidly build cancer care systems in different settings
- Integrate with Duke’s programmatic strengths in social entrepreneurship and scaling social impact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