

RUTGERS

Global Health Institute

Cancer Care and Prevention in Africa: Lessons from HIV/AIDS

Richard Marlink, MD

Henry Rutgers Professor of Global Health

Director, Rutgers Global Health Institute

Bristol-Myers Squibb Foundation Grantee Summit

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THE EPIDEMIC SCORECARD

By Howard Markel and Stephen Doyle
Estimates of disease incidence and mortality are from the World Health Organization

The sudden appearance of an epidemic typically inspires rapid attention, panic and action. Once the crisis subsides, public attention wanes although the threat of contagious continues, especially among the world's poor.

Compare our response to severe acute respiratory syndrome, or SARS, with the more familiar germs that plague us daily. Compare it to the dangers of smoking or getting in a car and heading out on the road. Every life is precious, but when you look at the numbers, SARS just isn't as formidable a threat as we've made it out to be. Its death rate is far lower than that for AIDS or malaria; coronavirus, like the one believed to cause SARS, tend to be most active in the winter and early spring.

In addition to taking the steps necessary to keep SARS at bay—watching out for new cases and isolating people who are contagious to others—we would do well to channel our energies into something more lasting: a permanent, integrated and accountable global public health system for the surveillance and prevention of the microbes that are certain to emerge in the future. Right now, worldwide accounting of disease is incomplete at best, hampered in large measure by sketchy reporting from developing countries. These gaps slowed our containment of SARS and allowed cancer to spread more rapidly than reliable information. When the facts are few, it's easy for fear to fill the vacuum.

Howard Markel, professor of pediatrics and communicable diseases at the University of Michigan, is author of the forthcoming "When Germs Travel."

Tuberculosis

2 MILLION DEATHS A YEAR
8 MILLION NEW CASES A YEAR, AND CLIMBING

ONE THIRD OF THE WORLD'S POPULATION IS INFECTED WITH

MORE THAN 100 DEATHS AN HOUR

BORNE BY MOSQUITOES

Medicines exist to fight many strains of the malaria parasite, but public health workers are concerned about drug-resistant forms of the disease. Prevention (mosquito control) is the most effective.

1 MILLION DEATHS A YEAR
300-500 MILLION NEW CASES A YEAR

MALARIA

1 MILLION DEATHS A YEAR / 10-30 MILLION NEW CASES A YEAR

HEPATITIS B VIRUS

puts you at high risk for cirrhosis, liver cancer, liver failure and death

TRANSMITTED VIA

- Mother to child at birth
- Unsafe injections or transfusions
- Sexual contact

No effective treatment. Vaccine can block chronic infection, but its high cost prevents its widespread distribution in poor nations.

DIARRHEAL DISEASES

(cholera, shigellosis, dysentery, typhoid, E. coli and others)

1.9 MILLION DEATHS A YEAR
mostly infants and young children
2.7 BILLION NEW CASES A YEAR

Within the last hour, 200 people have died of these diseases.

Transmitted by contaminated food or water.

1.5 billion people do not have ready access to clean water

AIDS

3.1 MILLION DEATHS A YEAR
5.5 MILLION NEW CASES A YEAR

42 MILLION PEOPLE ARE H.I.V.-POSITIVE

IN THE LAST HOUR, MORE THAN 300 PEOPLE HAVE DIED OF AIDS

And...
Cardiovascular disease (heart attack and stroke) deaths: 17 million a year
Tobacco-related deaths: 3.3 million a year
Motor vehicle fatalities: 1.26 million a year

Measles

NEARLY 900,000 DEATHS A YEAR
30 MILLION NEW CASES A YEAR

ENTIRELY PREVENTABLE WITH A VACCINE THAT COSTS 20 CENTS AND HAS BEEN AVAILABLE SINCE 1963

mosquito-borne

Dengue Fever

24,000 DEATHS A YEAR
20 MILLION NEW CASES A YEAR

INFLUENZA

250,000 DEATHS A YEAR
1-5 million new cases a year

Entire world affected

YELLOW FEVER

30,000 DEATHS A YEAR
200,000 NEW CASES A YEAR

SARS

353 DEATHS out of 5,492 cases in 100 days

in the last hour, more than 200 people have died of tuberculosis

EACH YEAR 1 PERCENT of the WORLD BECOMES INFECTED with the TB GERM

INFECTIOUS DROPLETS TRANSMITTED BY
+ BREATHING + COUGHING +
+ SNEEZING + EVEN SPEAKING +

TO BE EFFECTIVE, TB DRUGS MUST BE TAKEN FOR SIX TO EIGHT MONTHS

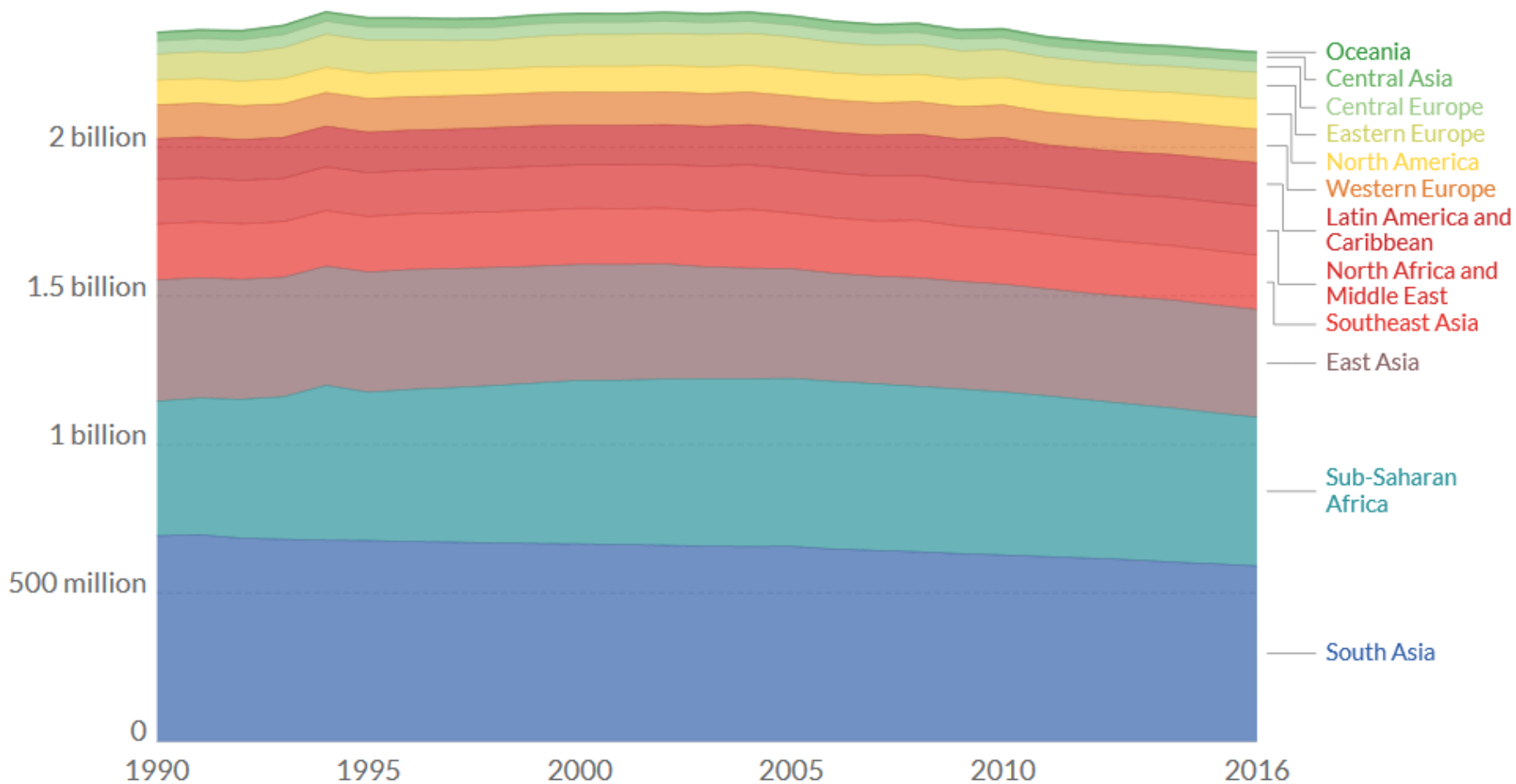
DRUG-RESISTANT STRAINS ARE INCREDIBLE (AND MULTIPLYING)



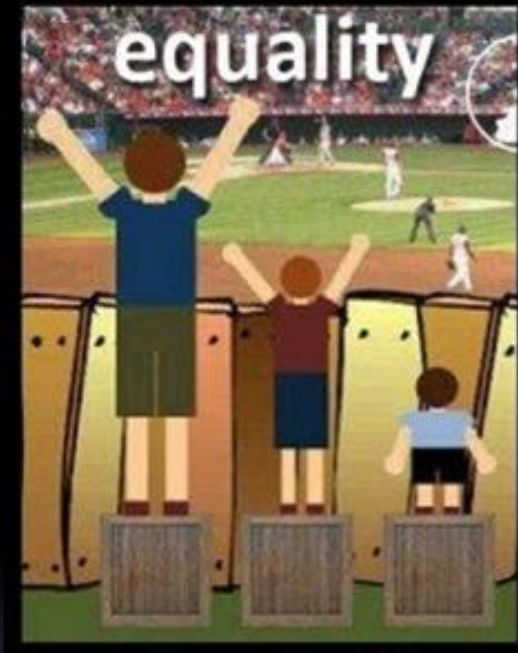
Ebola outbreak 'out of control'

Global disease burden by region

Total disease burden from all causes, disaggregated by region. Total disease burden measured as the number of DALYs (Disability-Adjusted Life Years) per year. DALYs are used to measure total burden of disease - both from years of life lost and years lived with a disability. One DALY equals one lost year of healthy life.



Equality vs. Equity



EQUALITY=SAMENESS

GIVING EVERYONE THE SAME THING → It only works if everyone starts from the same place



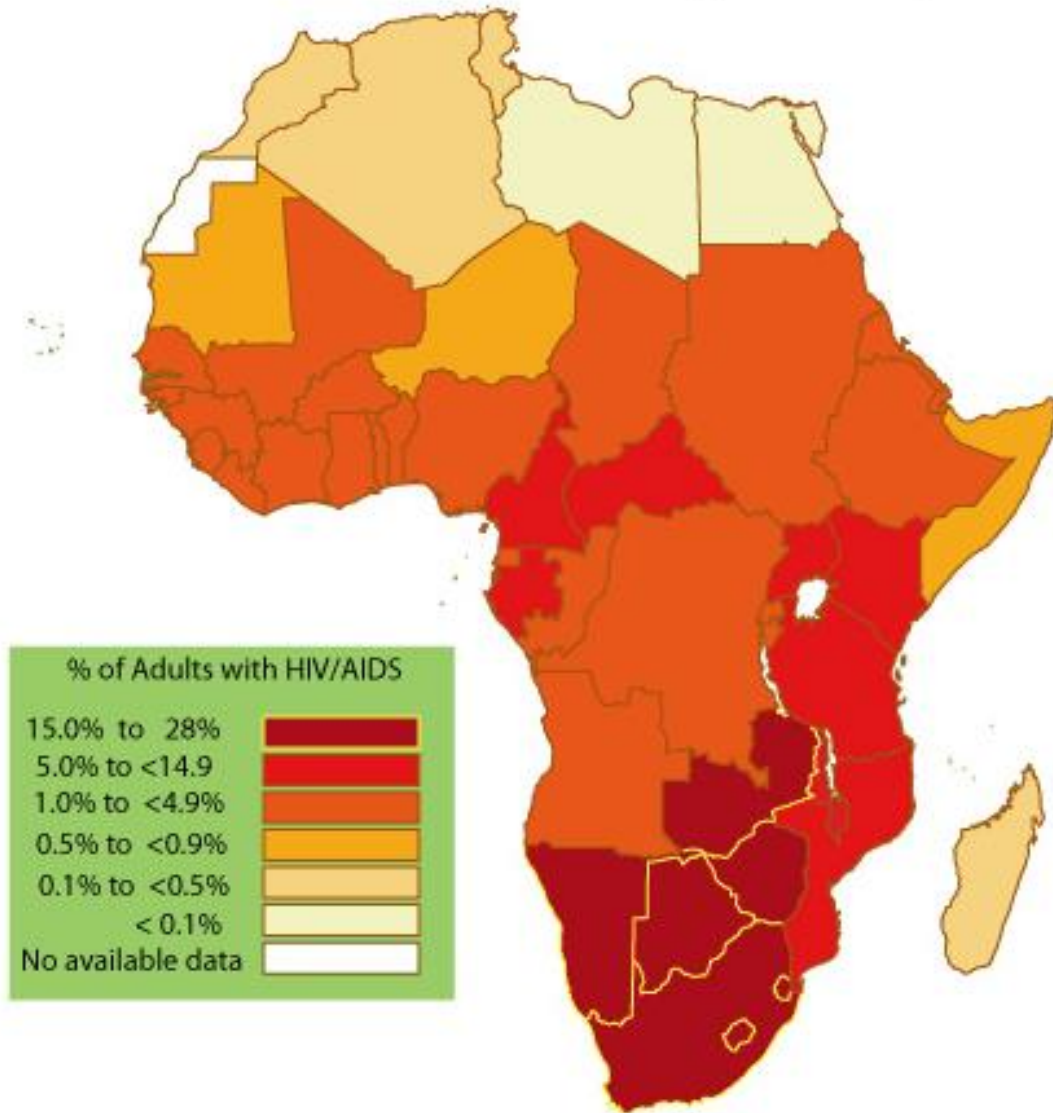
EQUITY=FAIRNESS

ACCESS to SAME OPPORTUNITIES → We must first ensure equity before we can enjoy equality

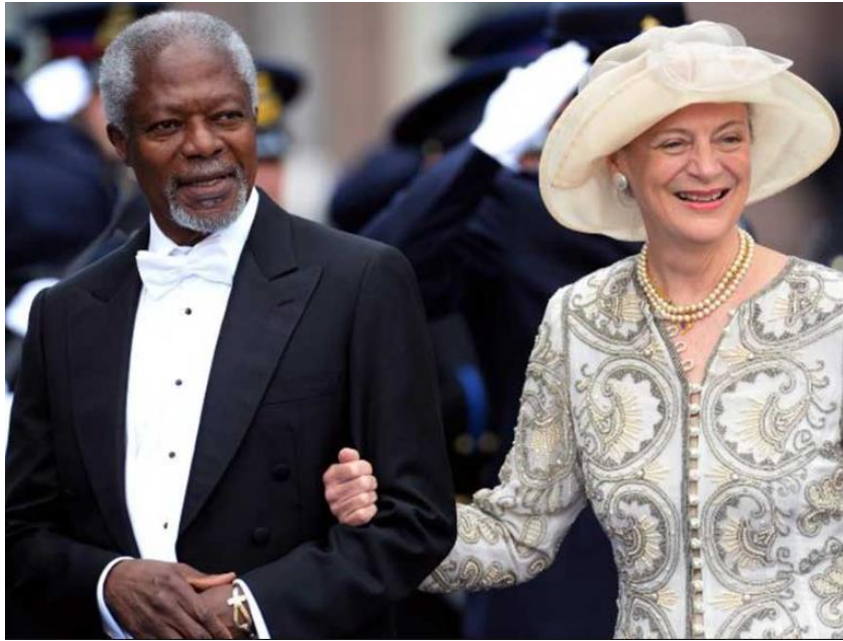
Multidisciplinary Partnerships in AIDS Care and Prevention:

- | | |
|--|------------------|
| 1) Enhancing Care Initiative (ECI) | 1996-2001 |
| 2) Secure the Future (Bristol-Myers Squibb) | 1999-present |
| 3) African Comprehensive HIV/AIDS Partnerships (ACHAP) | 2000- present |
| 4) President's Emergency Plan for AIDS Relief (PEPFAR) | 2003- present |
| > <i>Project HEART, Track 1.0</i> | <i>2004-2012</i> |
| > <i>Harvard PEPFAR Partnerships, Track 1.0</i> | <i>2004-2013</i> |

Estimated HIV Infection in Africa in 2007
 based on statistics from the Joint UN Programme on HIV/AIDS



Secure the Future



Secure the Future

- In 1999, Bristol-Myers Squibb Foundation distinguished itself amongst its peers as the first to make a \$100 million dollar commitment to advancing HIV/AIDS research and community outreach programs
 - > By 2014, the program's 15th anniversary, Secure the Future had committed \$180 million to over 250 projects
- Efforts initially focused in seven African countries: Botswana, Burkina Faso, Lesotho, Namibia, South Africa, Swaziland, and Tanzania
 - > Efforts have expanded to 22 countries



Secure the Future

 U.S. National Library of Medicine

ClinicalTrials.gov

[Find Studies](#) ▼

[Home](#) > [Search Results](#) > Study Record Detail

The Adult Antiretroviral Treatment and Resistance Study (Tshepo)

Sponsor:

Harvard School of Public Health

Collaborators:

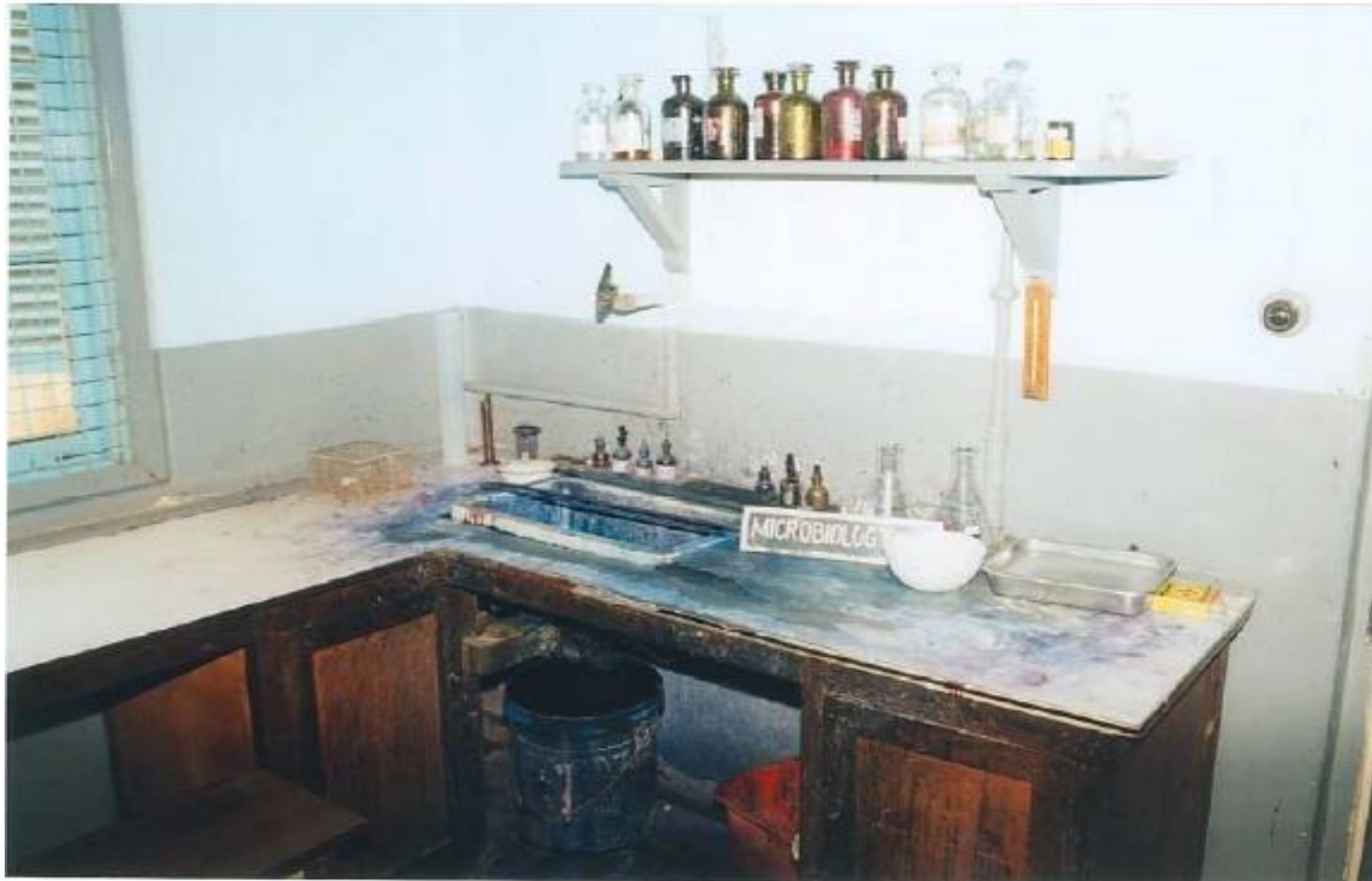
Princess Marina Hospital, Botswana

Botswana Ministry of Health

McGill University Health Center

Bristol-Myers Squibb

Secure the Future



Secure the Future





BOTSWANA
HSPH AIDS Initiative

P A R T N E R S H I P

FOR HIV RESEARCH AND EDUCATION

A collaboration between the Botswana Ministry of Health and
the Harvard School of Public Health AIDS Initiative

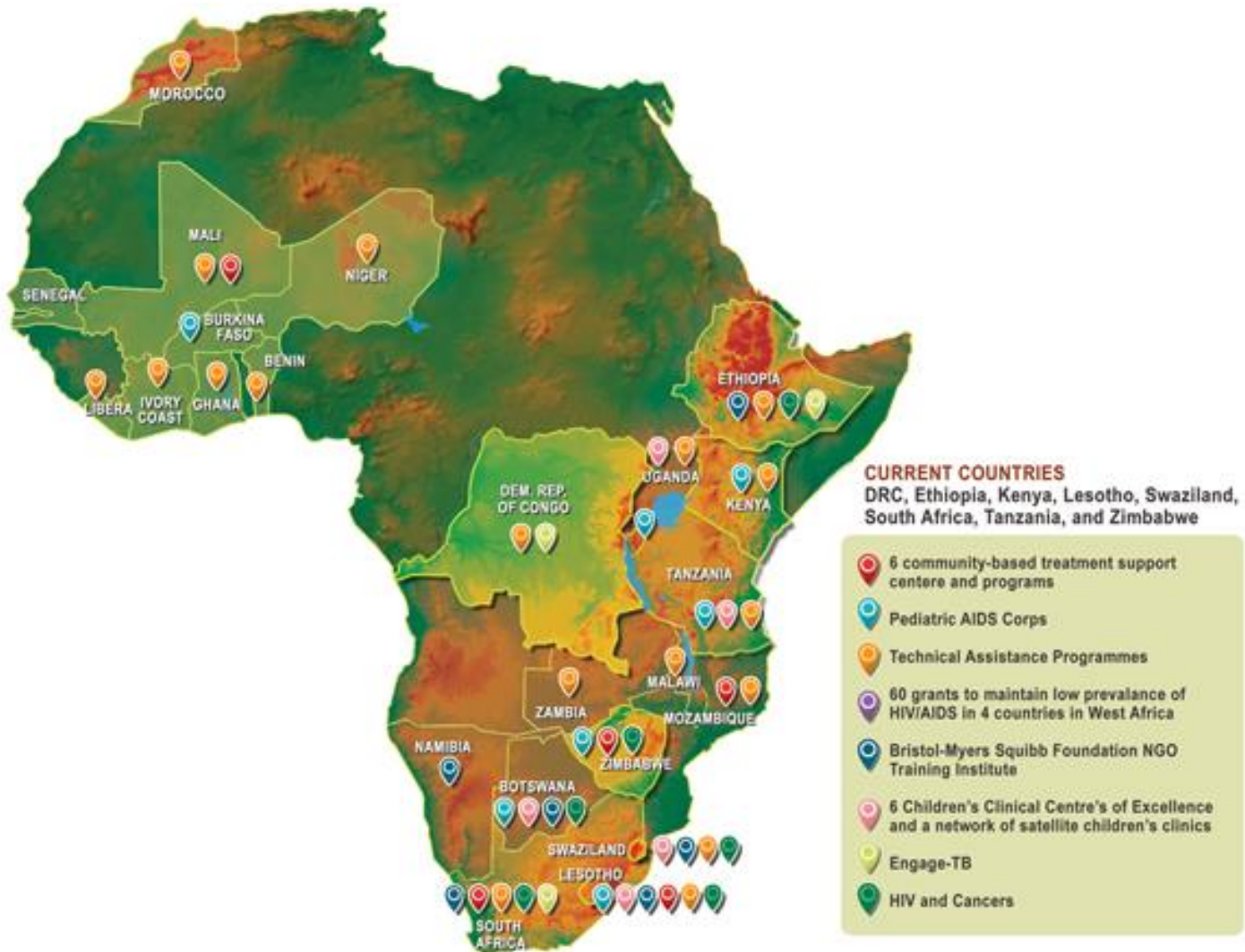
Secure the Future

The Tshepo Study

- First large-scale antiretroviral treatment study in southern Africa, founded by Bristol-Myers Squibb Foundation's Secure the Future initiative
- Foundational clinical trial that evaluated different antiretroviral treatment options, their efficacy, and drug resistance among Botswana AIDS patients



Secure the Future



What Works and Why

- Partnerships – The actual work getting done
- Monitoring - What is happening?
- Evaluation - Why?

PEPFAR

1

- United States Leadership against HIV/AIDS, Tuberculosis, and Malaria Act of 2003
 - > *FY 2004 - FY 2008*
- \$15 billion (\$3 billion/year)
 - > *\$1 billion for Global Fund in FY 2004 (and such sums as necessary for FY 2006-2008)*
- Monitoring and evaluation resources **not** encouraged
 - > *The word “research” actively **not** allowed to be used*

PEPFAR

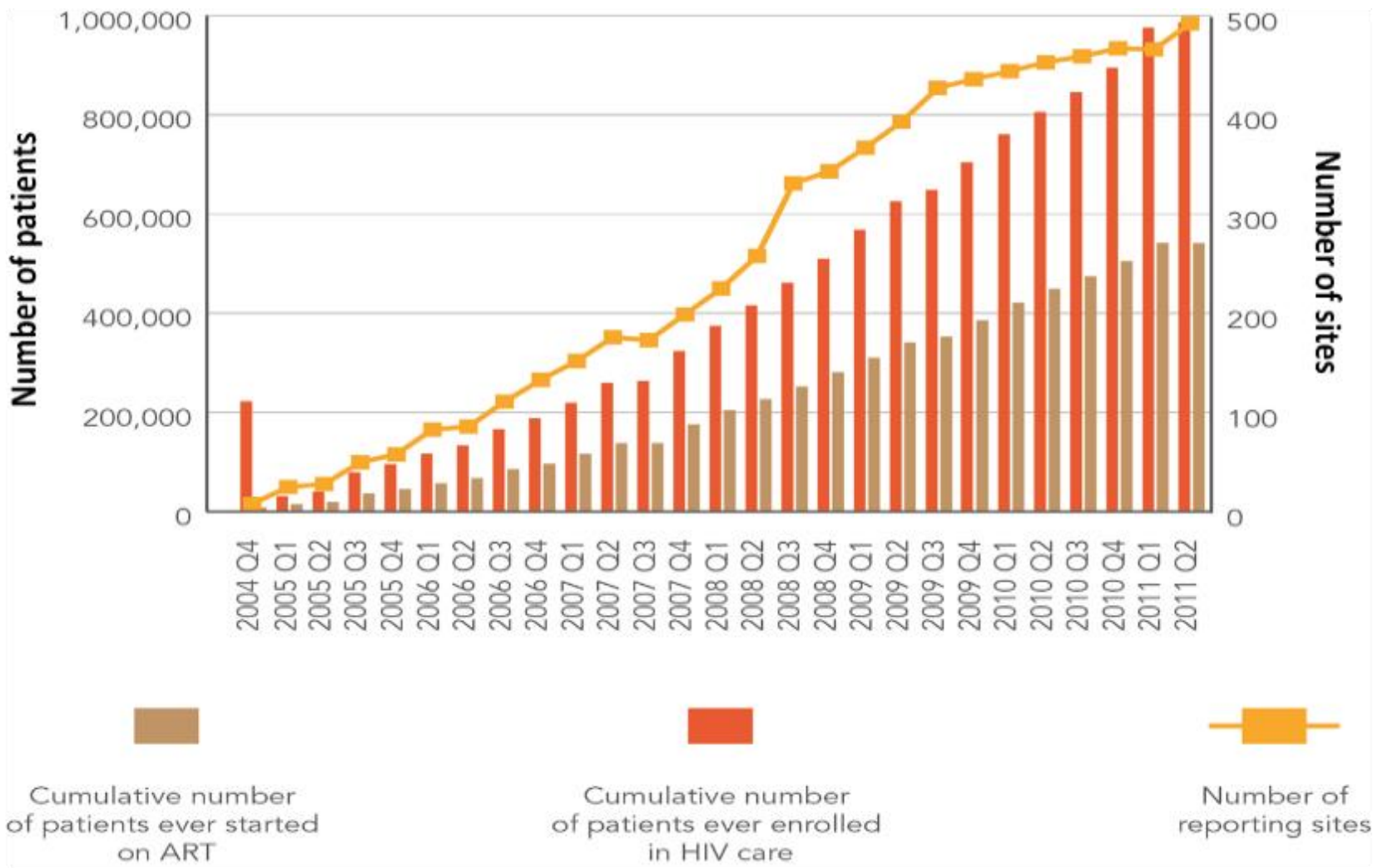
2

- Tom Lantos and Henry J. Hyde United States Leadership against HIV/AIDS, Tuberculosis, and Malaria Act of 2008
 - > *FY 2009 - FY 2013*
- \$48 billion (in total)
 - > *\$2 billion for Global Fund in FY 2008 (and such sums as necessary for FY 2010-2013)*
 - > *\$4 billion for tuberculosis (in total)*
 - > *\$5 billion for malaria (in total)*
- IOM studies require data evaluation plan, performance assessment, and impact evaluations

EGPAF: Project HEART Countries and Number of Sites, 2004-2011



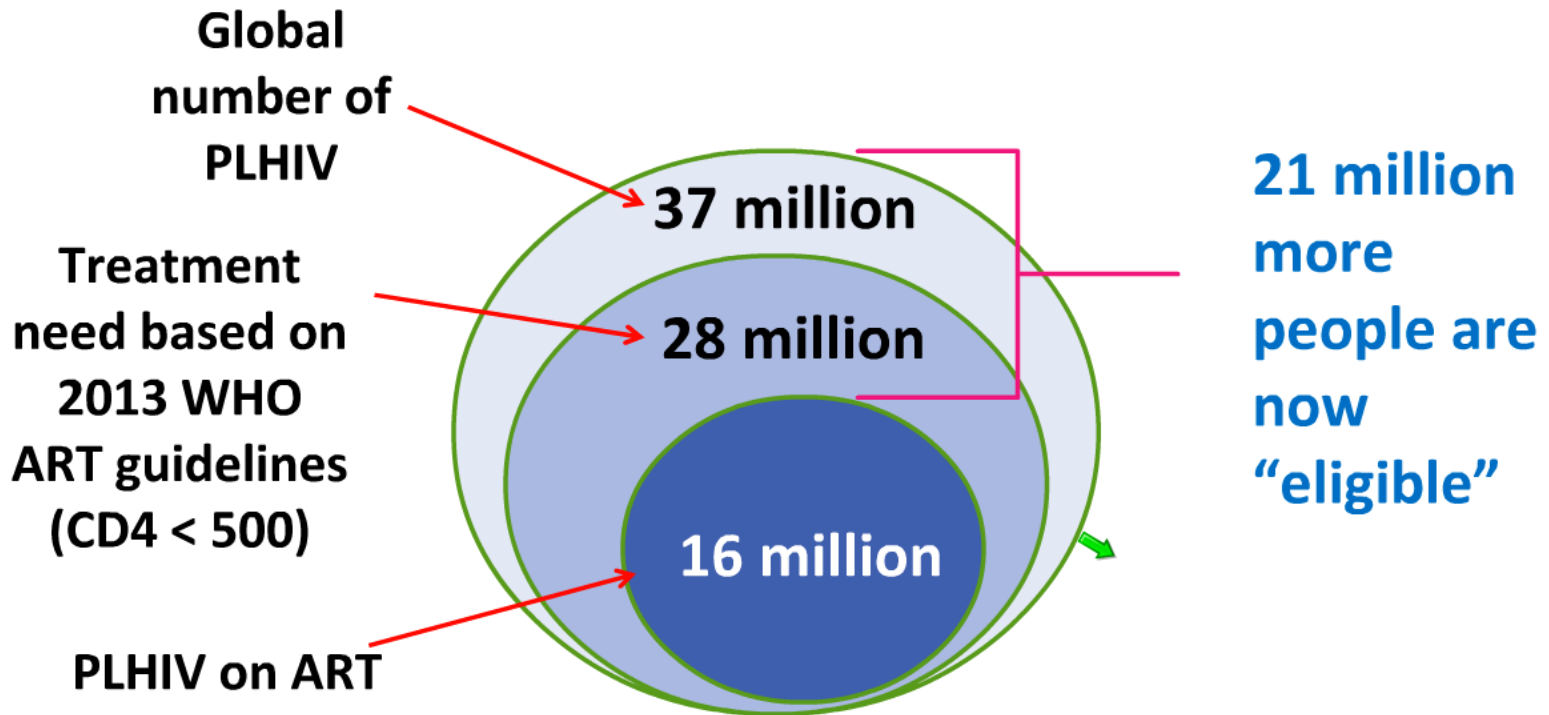
EGPAF: Project HEART Care and Treatment Results 2004-2011



“Ending AIDS by 2030”

- Success in the global campaign to treat HIV/AIDS in the last decade has led to the development of a Fast-Track strategy to “end” the AIDS epidemic by 2030
- One of the challenges to achieve this goal is mobilization of the essential resources
- **A Winning “Trifecta” of Global Health Studies**
 - > **2006 – The SMART Study: “The virus is worse than the drugs”**
 - > **2011 – The HPTN 052 Study: “Treatment as Prevention” really works better than we thought**
 - > ***2015 – The START Study: “Get on the drugs as soon as you know you are infected with HIV”***

HIV TREATMENT



HIV TREATMENT TARGET



90%

diagnosed



90%

on treatment



90%

virally suppressed

* The 90–90–90 target provides that by 2020: (a) 90% of all people living with HIV will know their HIV status; (b) 90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy; and (c) 90% of people receiving antiretroviral therapy will achieve viral suppression.

How do Botswana's Results Compare to UNAIDS Targets?

HIV positive who know their status

Currently on ART (among HIV+ who know status)

Virologically suppressed (among persons on ART)

Virologically suppressed (among all HIV-positive)

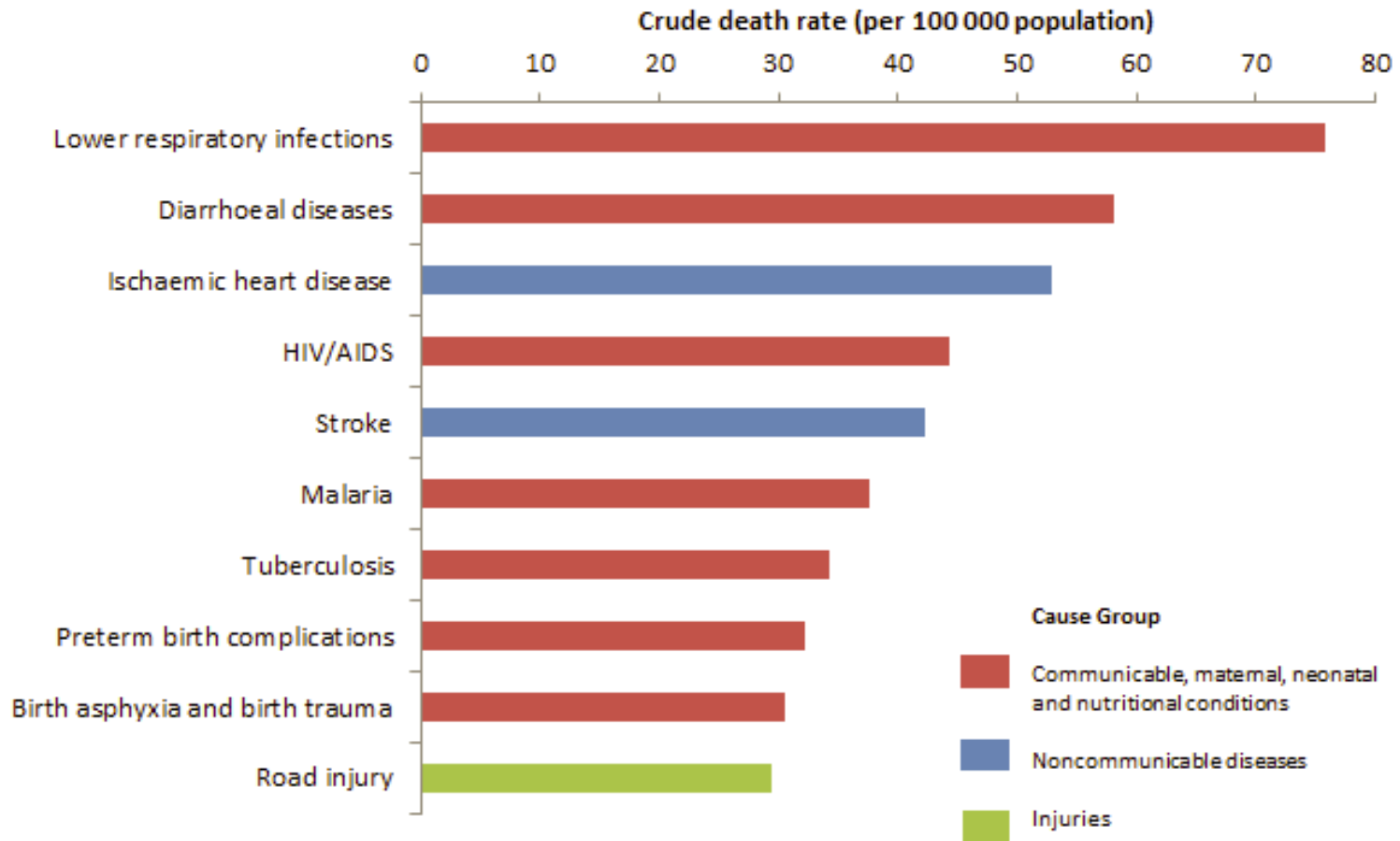
UNAIDS Targets:

$$90\% \times 90\% \times 90\% = 73\%$$

Current status in Botswana Communities:

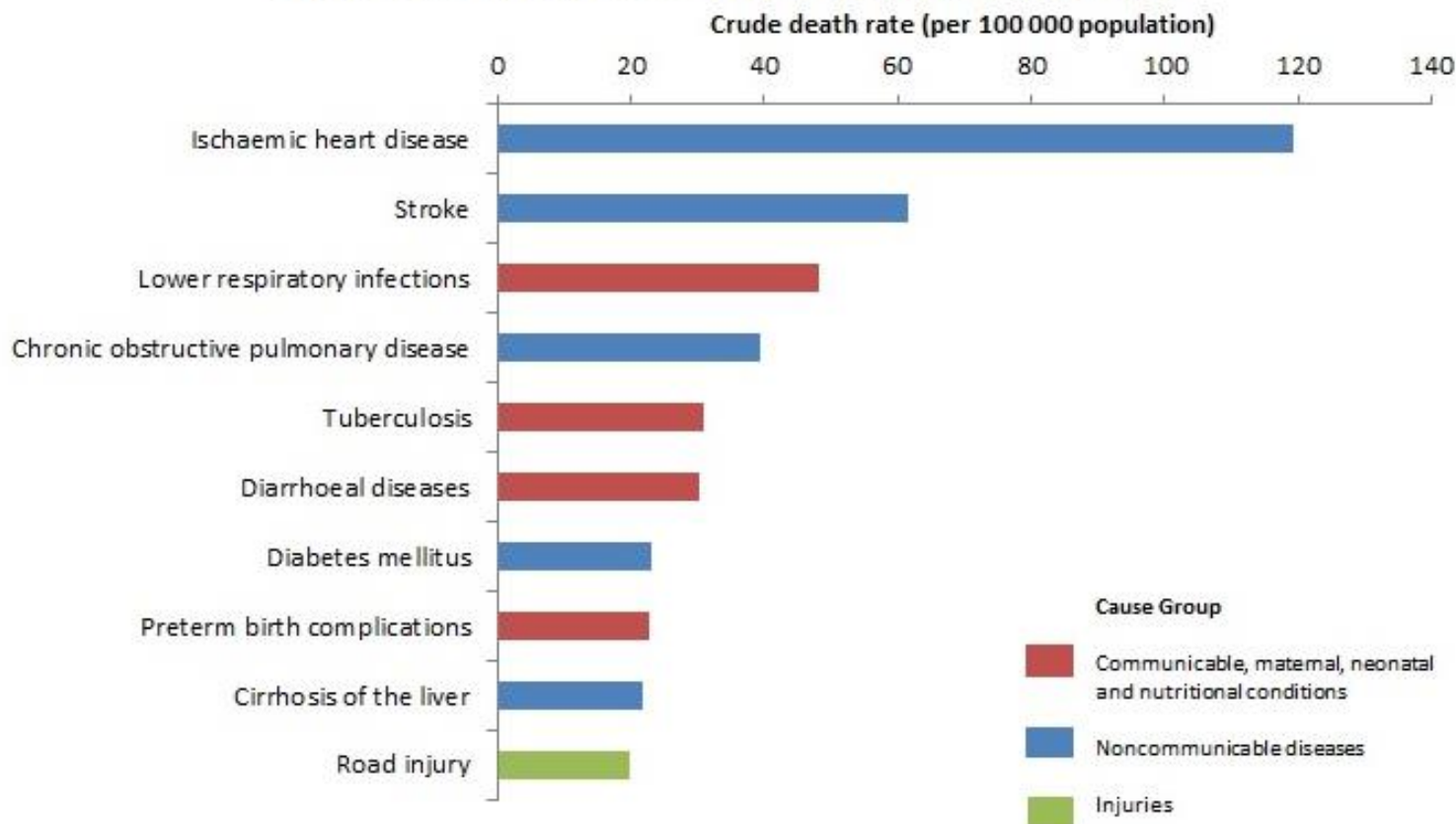
$$83\% \times 87\% \times 96\% = 70\%$$

Top 10 causes of deaths in low-income countries in 2016



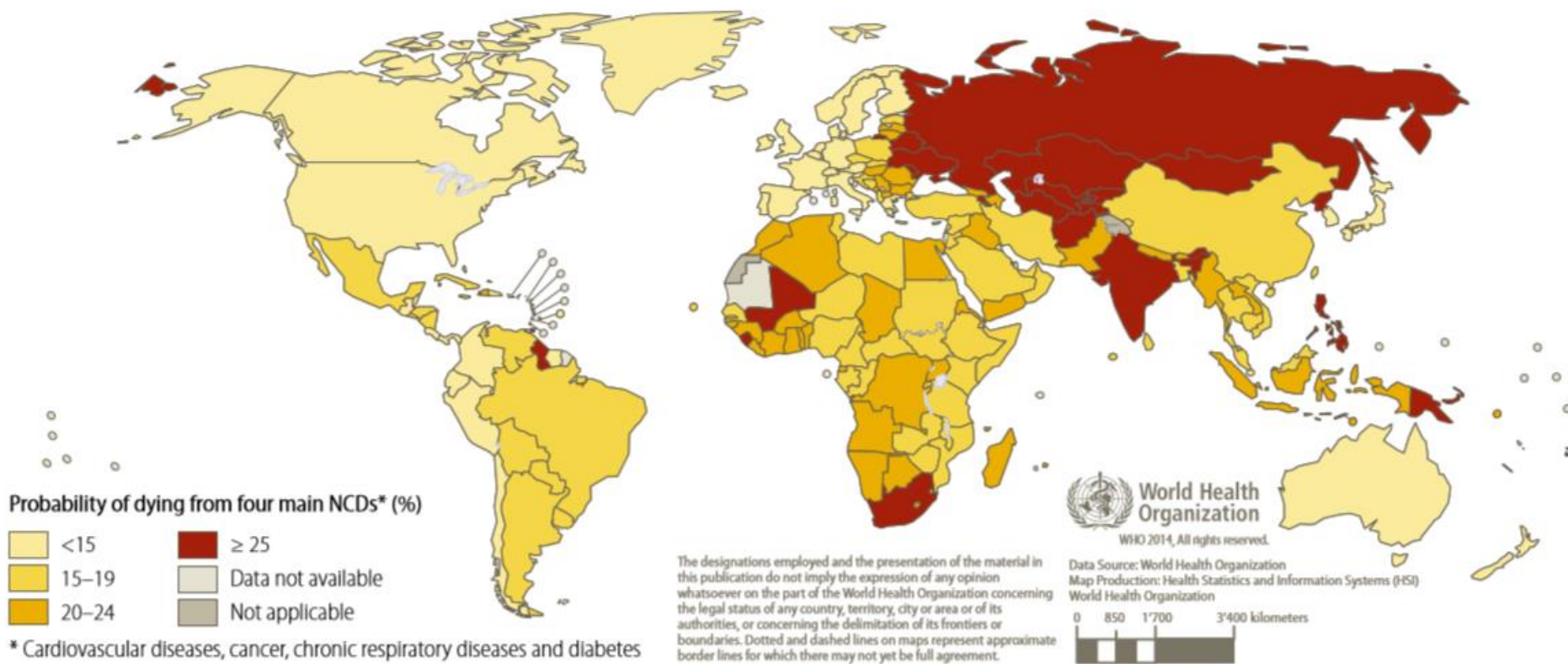
Source: Global Health Estimates 2016: Deaths by Cause, Age, Sex, by Country and by Region, 2000-2016. Geneva, World Health Organization; 2018.
World Bank list of economies (June 2017). Washington, DC: The World Bank Group; 2017 (<https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>).

Top 10 causes of deaths in lower-middle-income countries in 2016



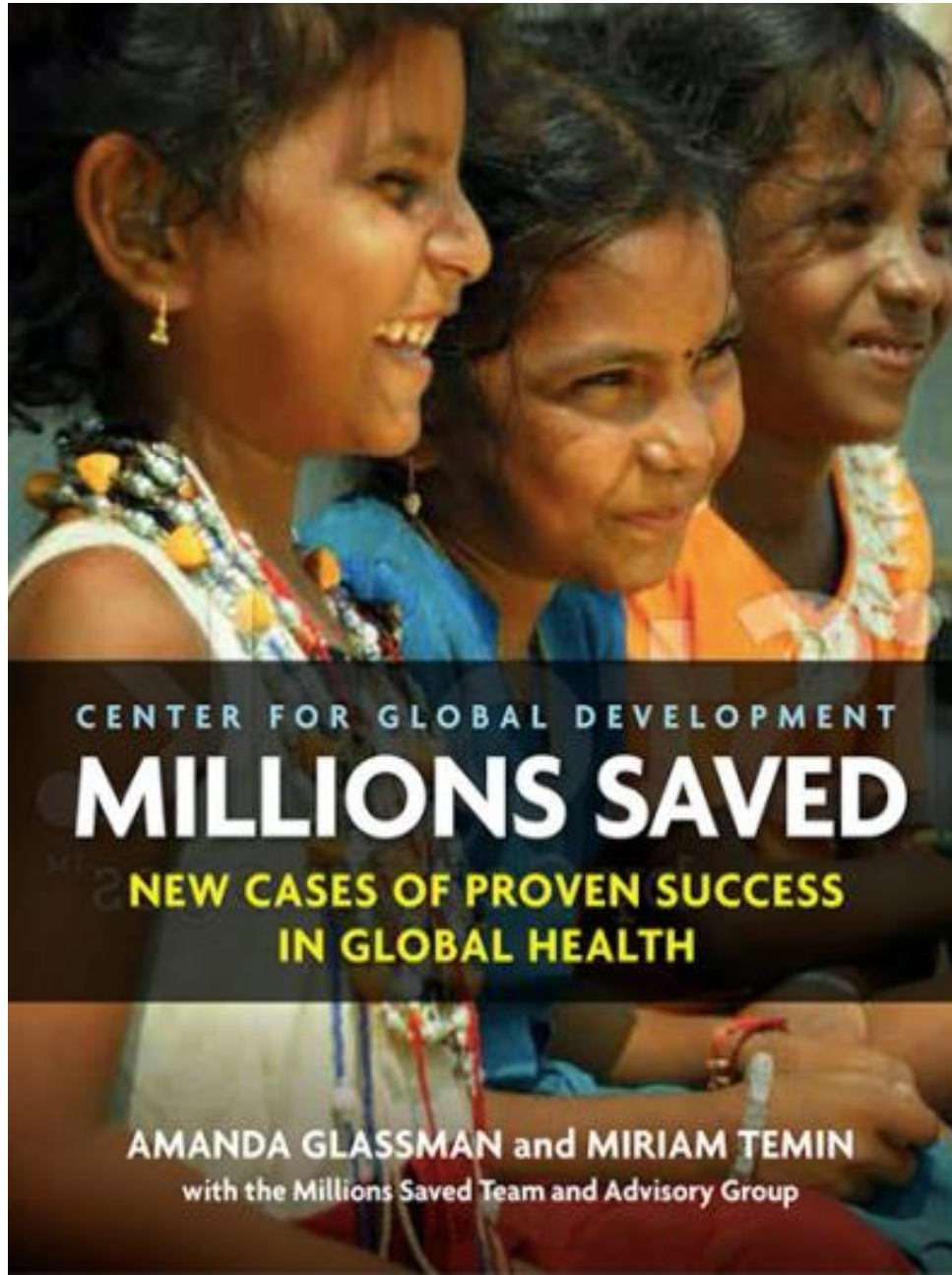
Source: Global Health Estimates 2016: Deaths by Cause, Age, Sex, by Country and by Region, 2000-2016. Geneva, World Health Organization; 2018.
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Fig. 1.5a Probability of dying from the four main noncommunicable diseases between the ages of 30 and 70 years, comparable estimates, 2012



What Works and Why

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CENTER FOR GLOBAL DEVELOPMENT

MILLIONS SAVED

NEW CASES OF PROVEN SUCCESS
IN GLOBAL HEALTH

AMANDA GLASSMAN and MIRIAM TEMIN
with the Millions Saved Team and Advisory Group

Key Lessons from “Millions Saved”

The Center for Global Development pulled the following key lessons from the 22 cases with 18 million years of lives saved “at a remarkably low cost”:

- In nearly all cases, country government led the way
- Incentives matter for health results
- What works: efficacy is not the same as effectiveness
- Some health programs assess health impact, but many do not, and many needed types of data are unavailable – such as cost-effectiveness data
- Evidence requires its own advocacy; good evaluation is not enough
- Evidence must be translated into advocacy that results in policy change

Global Cancer: Data and Projections

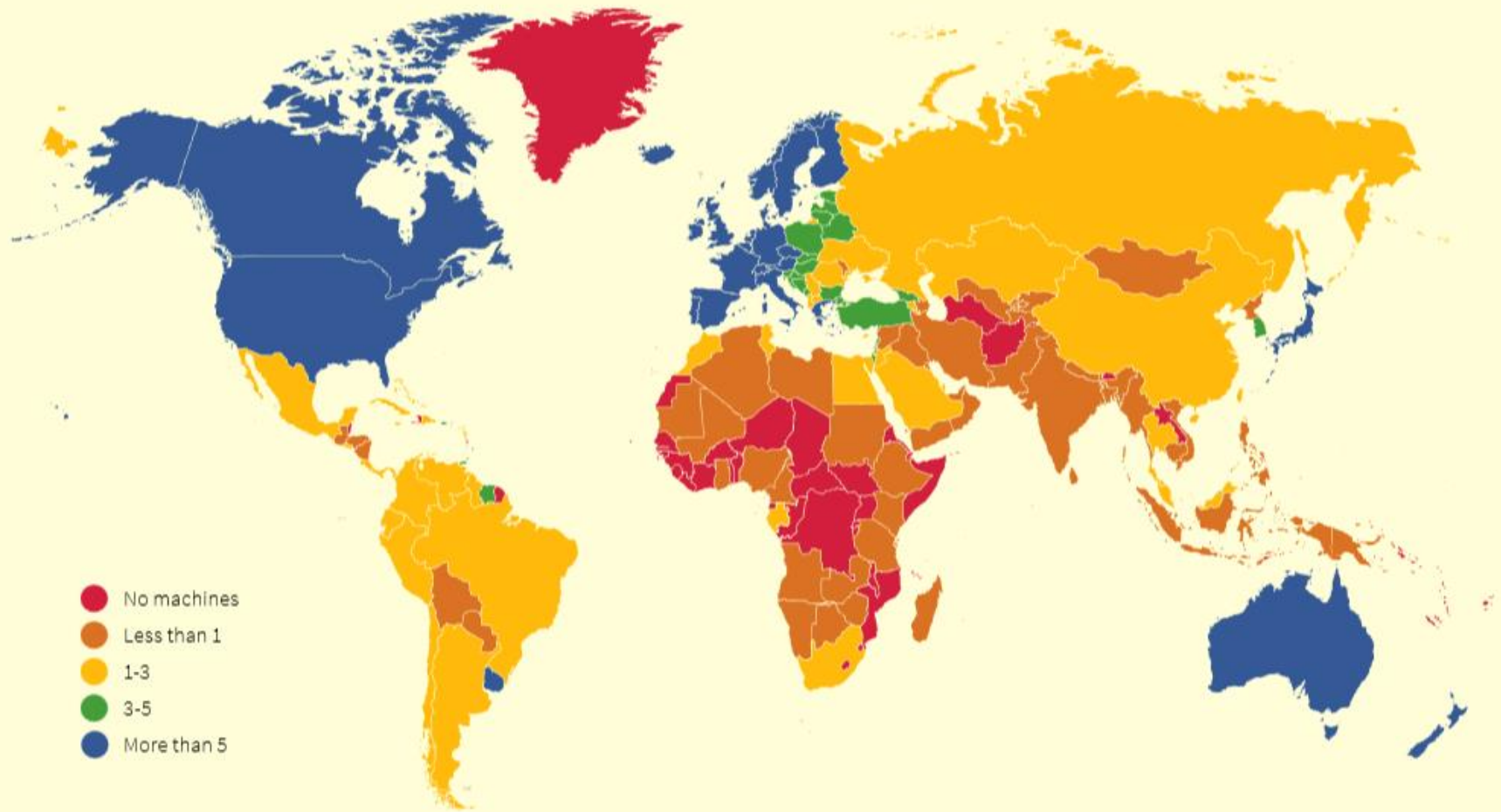
- In 2018, 18.1 million new cases and 9.6 million deaths were estimated
 - > Top 3 cancers: lung, breast, prostate
 - > 30% of cancer deaths are preventable
- More than 2/3 of all cancer deaths occur in low- and middle-income countries
- By 2040, the global burden of cancer is expected to grow to 27.5 million new cancer cases and 16.3 million cancer deaths
- Worldwide, one in 5 men and one in 6 women develop cancer during their lifetime



Case Fatality Rates

Region	Case Fatality Rate
Africa	66%
Eastern Africa	70%
Middle Africa	72%
Northern Africa	63%
Southern Africa	56%
Western Africa	67%
Northern America	37%
Europe	46%
Northern Europe	44%
Southern Europe	48%
Western Europe	45%
Australia/New Zealand	36%

Figure 5. Number of Radiotherapy Machines per 1 Million People, 2017



Source: Directory of Radiotherapy Centers (DIRAC). International Atomic Energy Agency, 2017.

What Works and Why

- Partnerships – The actual work getting done
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Botswana



Cancer Care and Prevention in Botswana



Republic of Botswana



- **70%** of deaths from cancer occur in low- and middle-income countries
- People with cancer go undiagnosed or untreated
- Health systems lack personnel, training, and resources to provide chronic health care
- Comprehensive care and treatment is lacking

The fight against cancer urgently needs equitable and global approaches.

Cancer Care and Prevention in Botswana

Botswana-Rutgers Partnership

Joint effort of the Government of Botswana, the University of Botswana, and Rutgers University

- specialty medical training
- health care workforce capacity building
- biomedical engineering education



Leadership and Commitment

- Presidential leadership on combatting HIV/AIDS
- Commitment to prevention HIV infection and caring for those affected across Ministries and sectors of Batswana society



Partnership

- National culture to partner to overcome epidemic, while maintaining control and guiding priorities



Innovation

- New HIV/AIDS therapies demonstrated dramatic results
- Innovative partnerships and financing – with Botswana also a fiscal partner
- New diagnostics and disease monitoring helped expand HIV/AIDS treatment
- Innovative, national training programs applying new technologies, expanded task sharing, and responsive, standardized evaluation were utilized
- Social marketing and media campaigns, in addition to investment in known, traditional communication forms were used



Program Components

- *Evidence-based HIV/AIDS components*: covering known prevention, care, and treatment interventions
- Importance of the existing clinic- and district-based leadership and management realized
- Patient-centered approach is implemented, allowing differentiated care and prevention efforts
- National scaling up of training, laboratory capacity, clinical capacity, pharmacy and supply chain management
- Simple or basic guidelines, messages, or other components so national scalability and consistency possible
- *Monitoring*: EMR for HIV/AIDS patients actually implemented, which also could monitor program outcomes and supply needs
- *Evaluation*: Eventually evaluations of both patient and program outcomes and impact were achieved, with findings used to advance program improvements

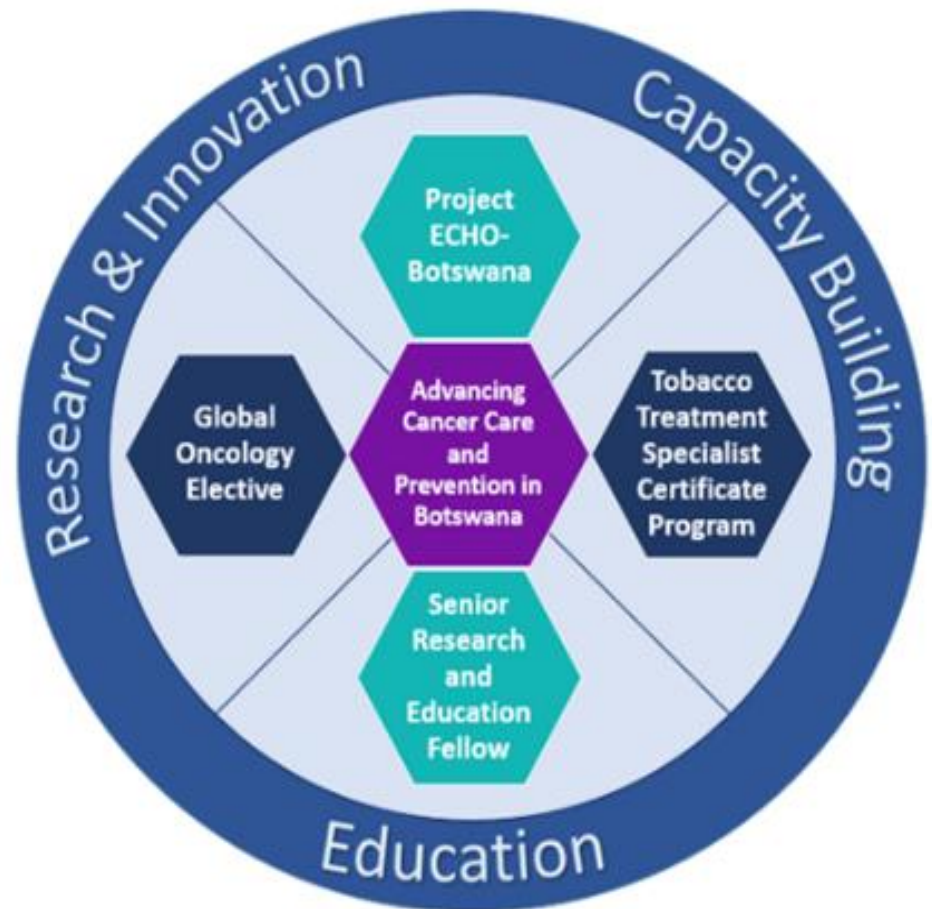
Communication

- Engagement of and communication with multiple sectors of society were critical
- New tools for communication developed, especially for health care training and specialized training
- HIV/AIDS program able to effectively communicate its successes and failures
- Media and private sector marketing were utilized to better tell the stories needed to communicate what the program meant and how the people could benefit
- Stigma reduction was a key goal in the communications activities

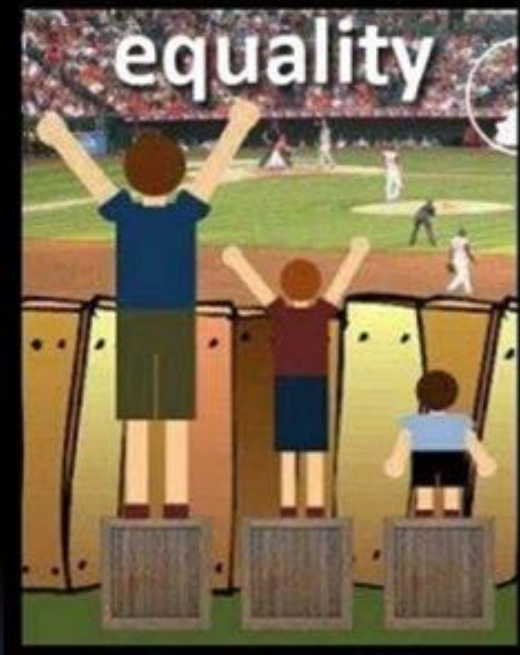
Cancer Care and Prevention in Botswana

Three initial initiatives:

1. Global oncology fellowship program
2. Tobacco cessation program
3. Project ECHO - a distance, case-based mentoring program for specialty care and training



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GIVING EVERYONE THE SAME THING → It only works if everyone starts from the same place



EQUITY=FAIRNESS

ACCESS to SAME OPPORTUNITIES → We must first ensure equity before we can enjoy equality

