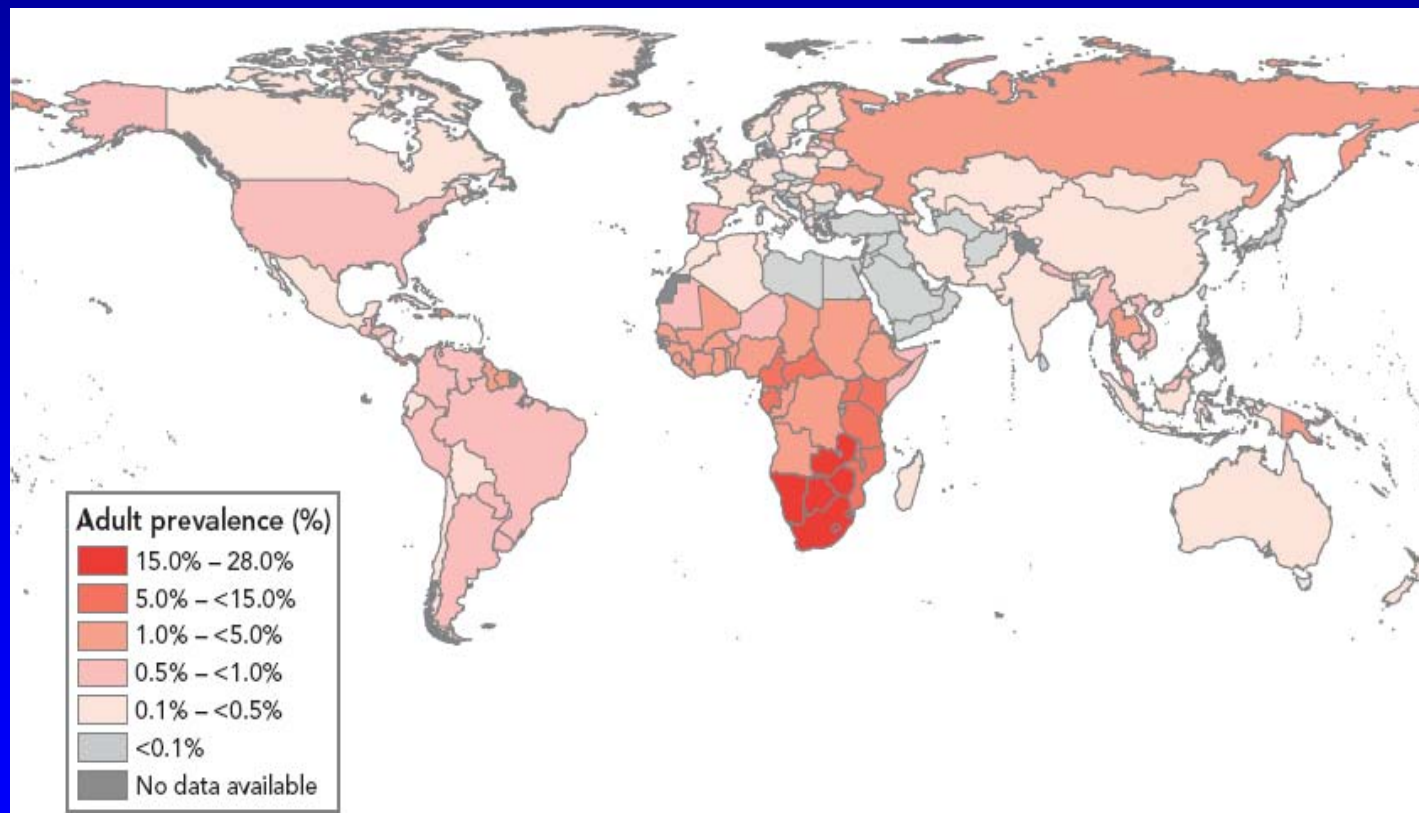


Global Challenges: HIV

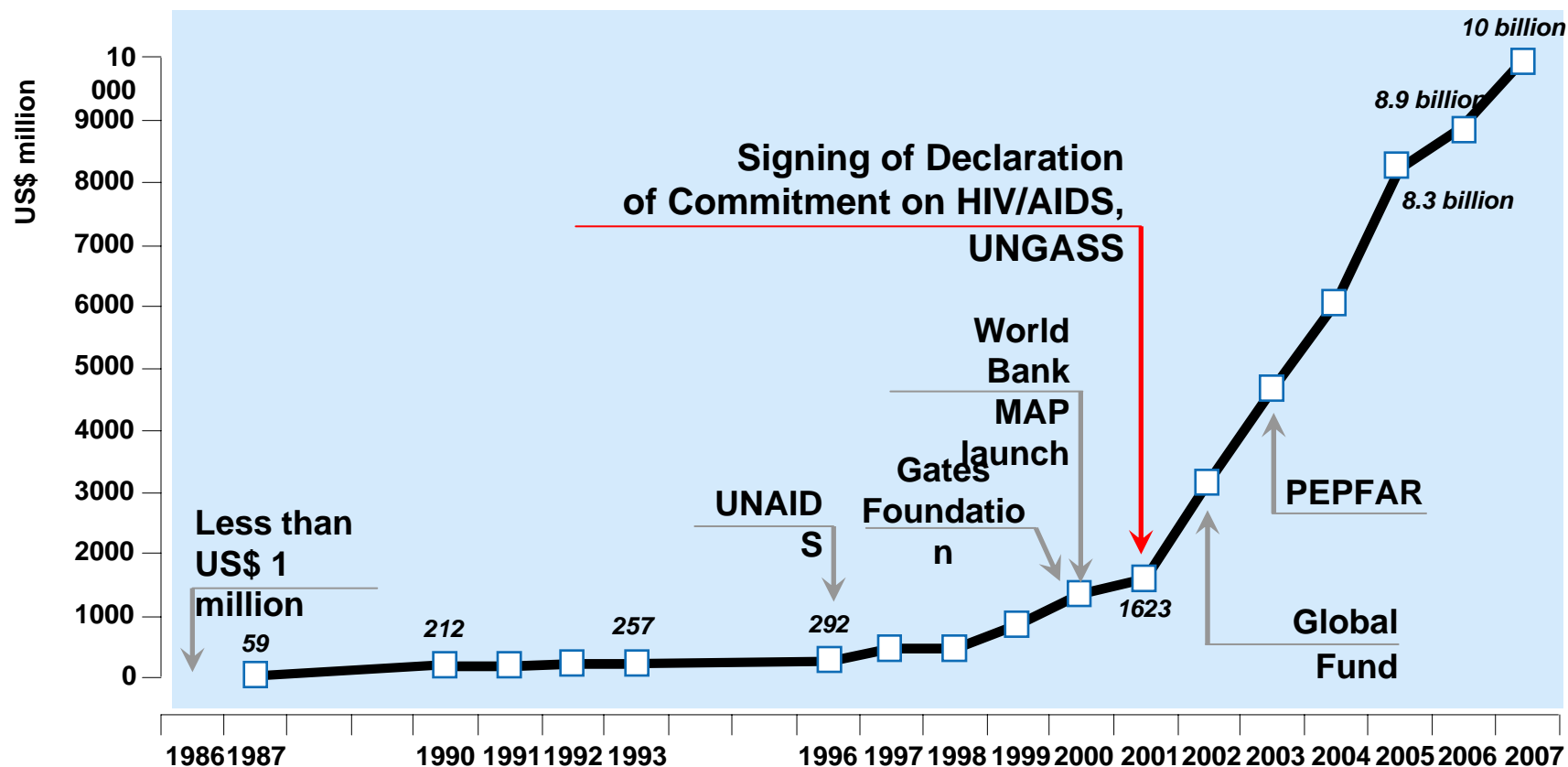
- Epidemiology
- Prevention
- Treatment

A global view of HIV infection

33 million people [30–36 million] living with HIV, 2007



Total annual resources available for AIDS 1986–2007



Notes: [1] 1986–2000 figures are for international funds only; [2] Domestic funds are included from 2001 onwards

[i] 1996–2005 data: Extracted from 2006 Report on the Global AIDS Epidemic (UNAIDS, 2006); [ii] 1986–1993 data: Mann. & Tarantola, 1996

Figure 7.1

Source: UNAIDS & WHO unpublished estimates, 2007

2006 Report on the global AIDS epidemic

Global summary of the AIDS epidemic, December 2007

Number of people living with HIV in 2007

Total	33 million [30 – 36 million]
Adults	30.8 million [28.2 – 34.0 million]
Women	15.5 million [14.2 – 16.9 million]
Children under 15 years	2.0 million [1.9 – 2.3 million]

People newly infected with HIV in 2007

Total	2.7 million [2.2 – 3.2 million]
Adults	2.3 million [1.9 – 2.8 million]
Children under 15 years	370 000 [330 000 – 410 000]

AIDS deaths in 2007

Total	2.0 million [1.8 – 2.3 million]
Adults	1.8 million [1.6 – 2.1 million]
Children under 15 years	270 000 [250 000 – 290 000]

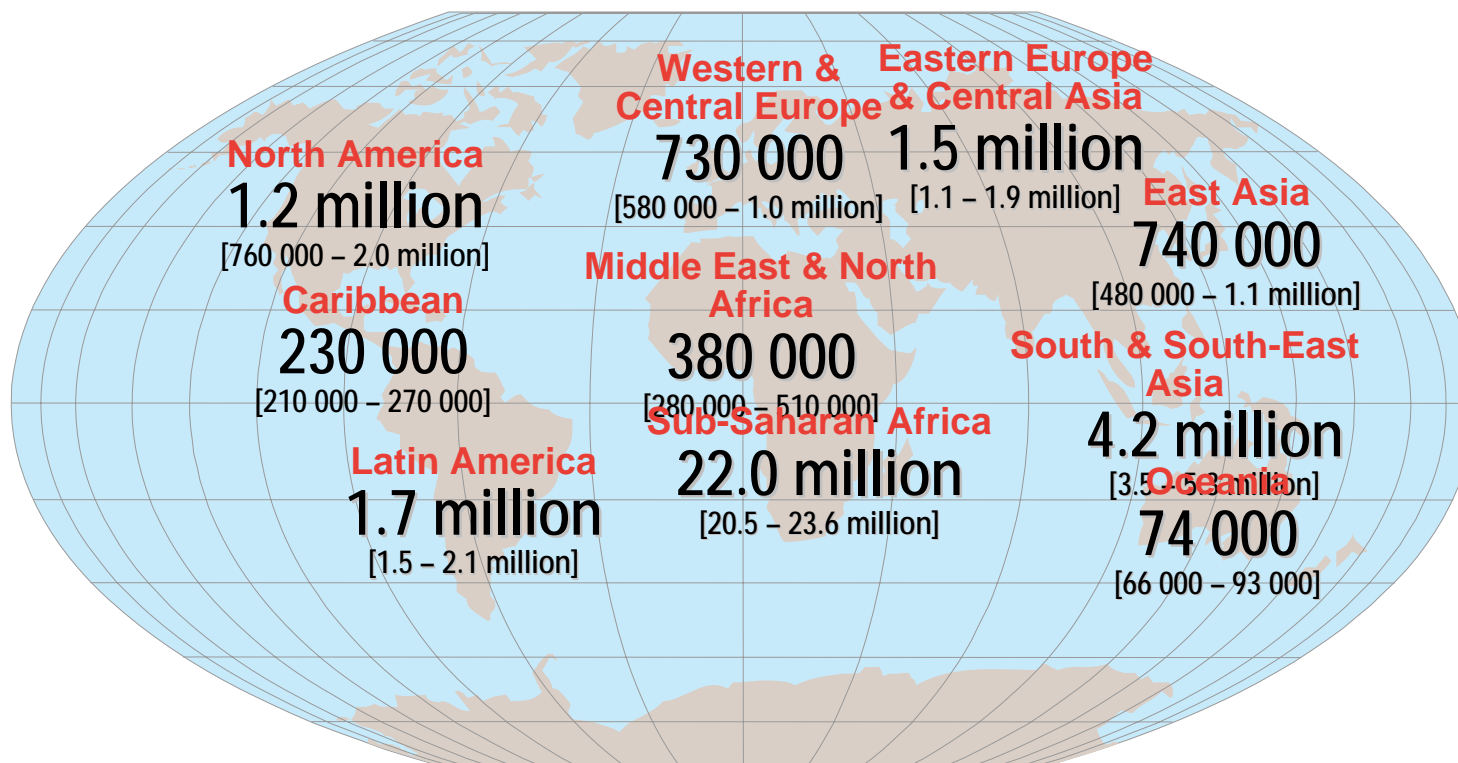
July 2008

Global estimates for adults and children, 2007

- **People living with HIV ----- 33 million [30 – 36 million]**
- **New HIV infections in 2007 ----- 2.7 million [2.2 – 3.2 million]**
- **Deaths due to AIDS in 2007 ----- 2.0 million [1.8 – 2.3 million]**

July

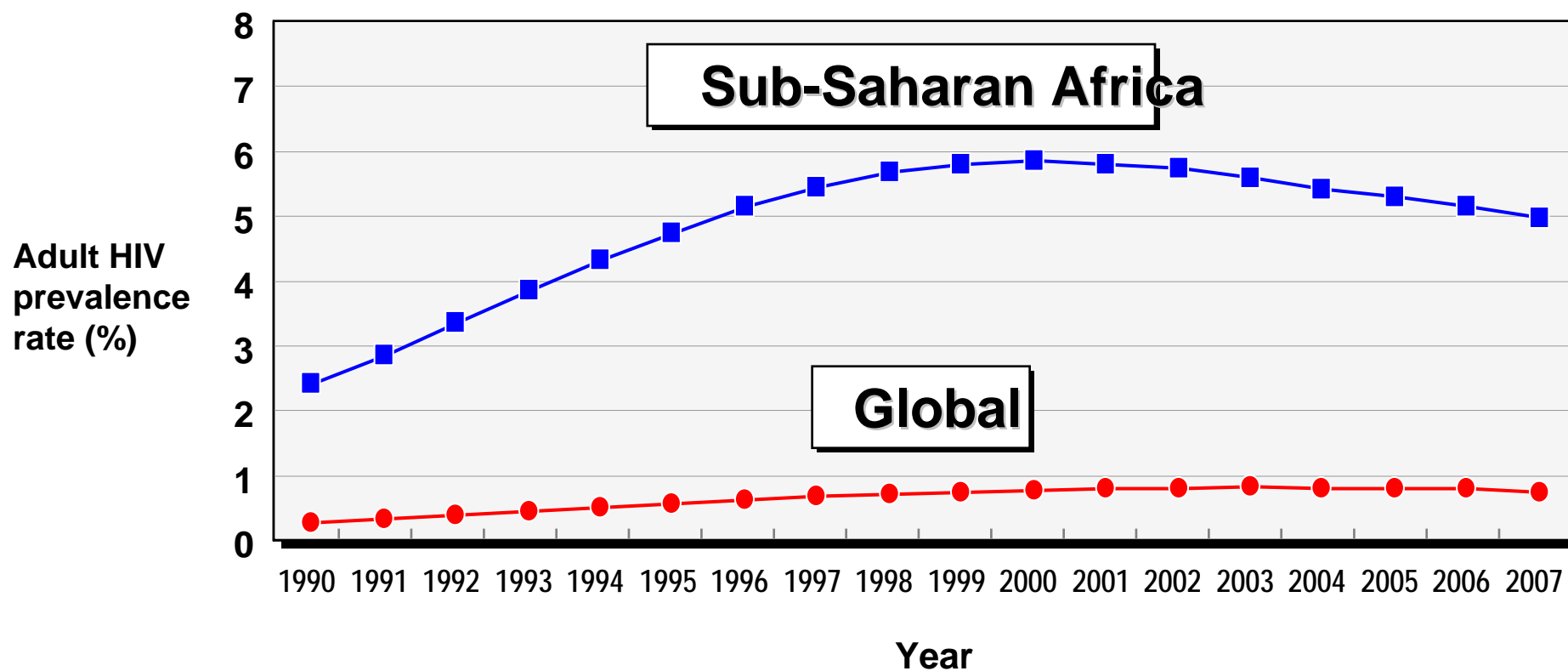
Adults and children estimated to be living with HIV, 2007



Total: 33 million (30 – 36 million)

July

Estimated adult (15–49 years) HIV prevalence rate (%) globally and in Sub-Saharan Africa, 1990–2007

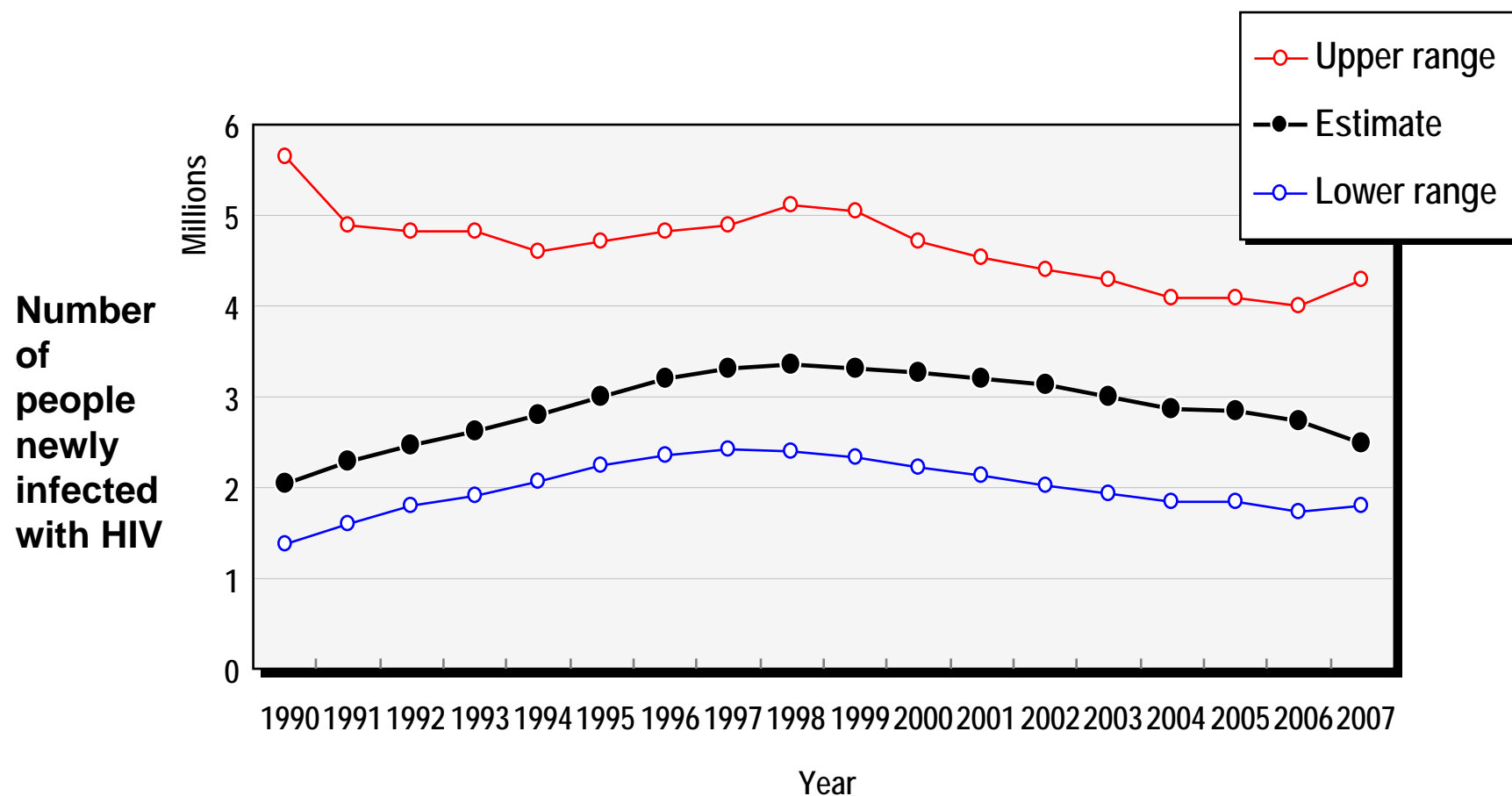


Over 7400 new HIV infections a day in 2007

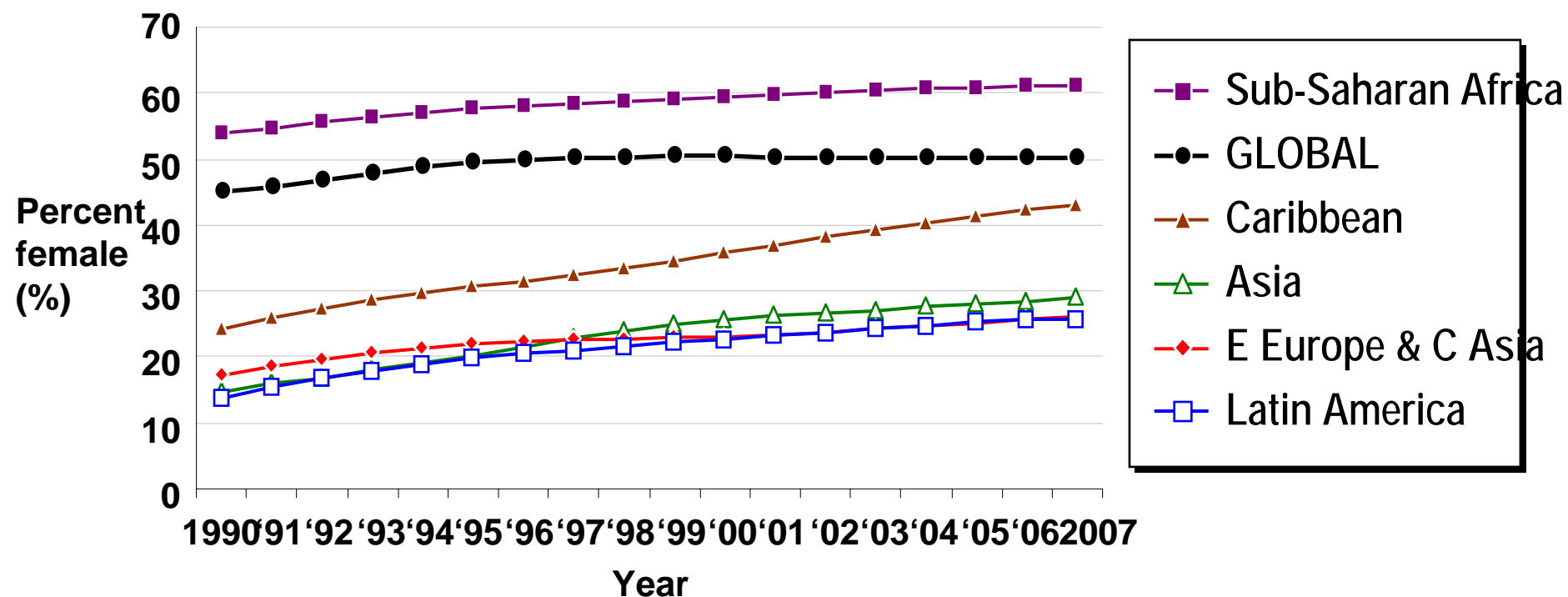
- **More than 96% are in low and middle income countries**
- **About 1000 are in children under 15 years of age**
- **About 6300 are in adults aged 15 years and older of whom:**
 - **almost 50% are among women**
 - **about 45% are among young people (15-24)**

July

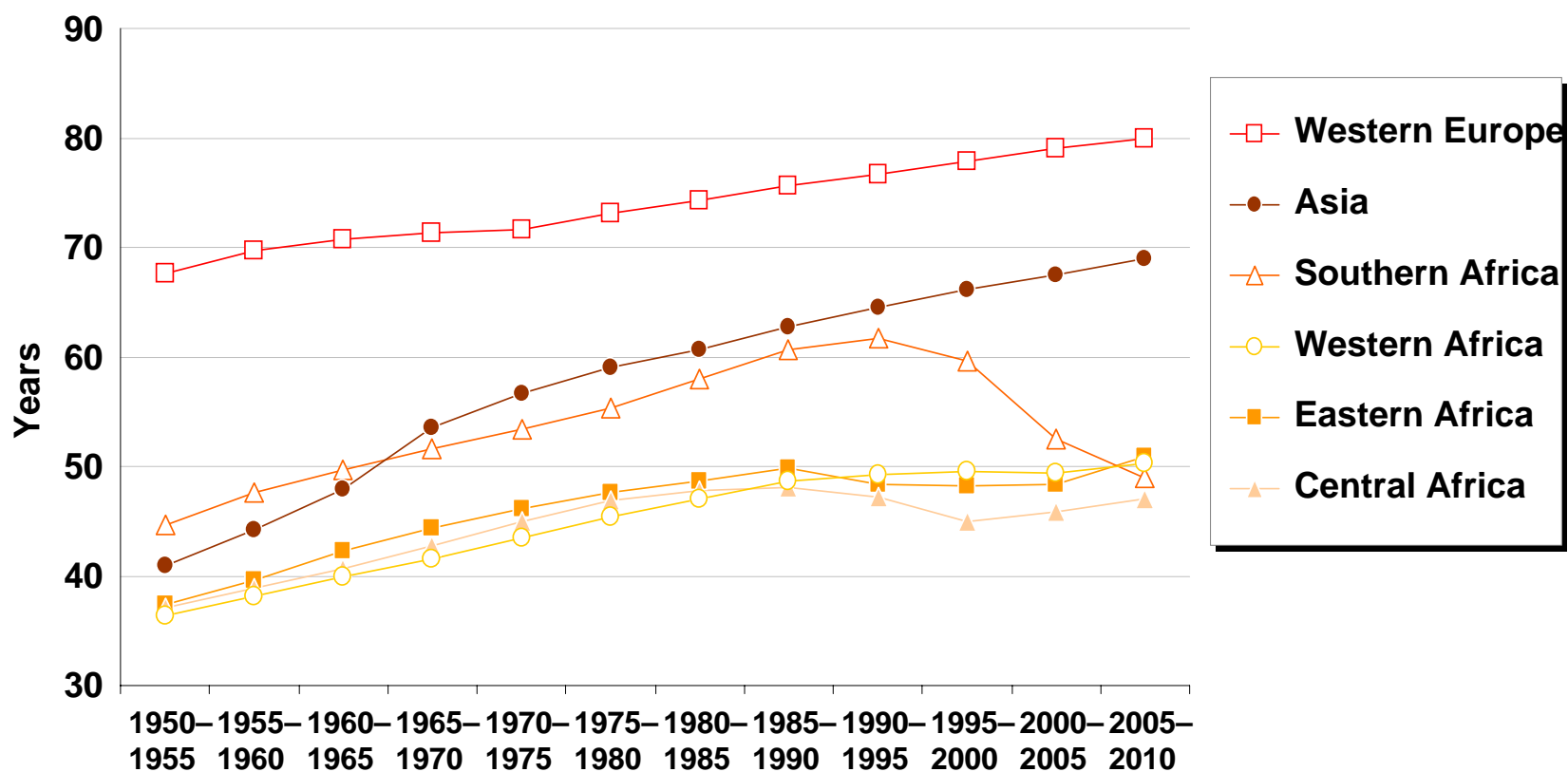
Estimated number of people newly infected with HIV globally, 1990–2007



Percent of adults (15+) living with HIV who are female, 1990–2007

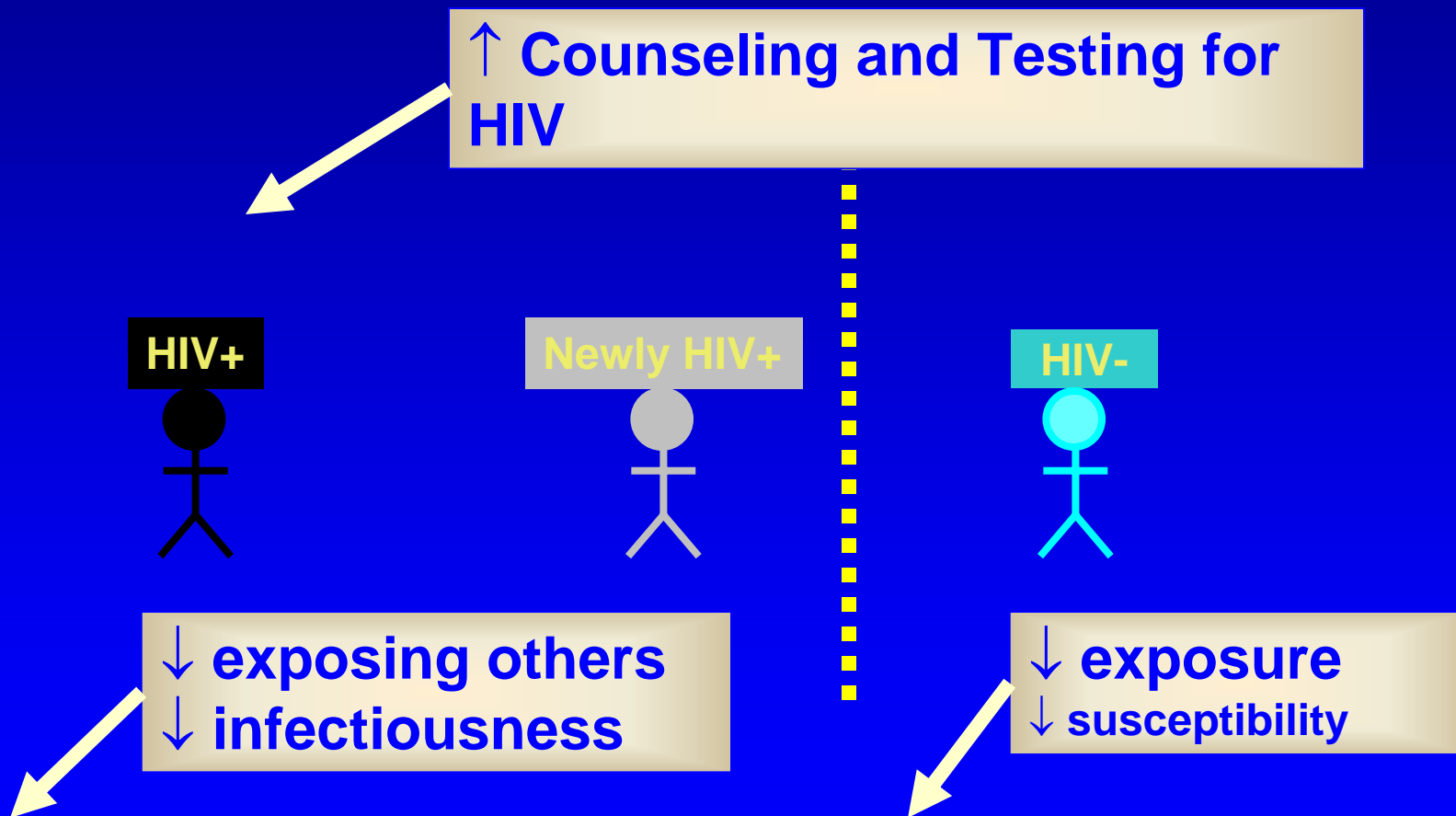


Life expectancy at birth, selected regions, 1950–1955 to 2005–2010



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2006 Revision, <http://esa.un.org/unpp>

Interventions to Control HIV



Slide courtesy of T. Coates

Top 5+ Prevention Interventions

- **HIV prevention is possible and requires radical, not subtle, behavioral change (#1)**
 - Political support and institutional participation
 - Planning, surveillance, and laboratory support
 - Need behavioral options—delay intercourse, reduce partner number, use condoms, reduce needle and syringe sharing
 - Access to VCT, male circumcision, PMTCT, treatment
 - Mobilization and community buy-in
 - Inspirational leaders and community-grown strategies
 - Support for persons with HIV
 - Access to technological advances as they are proven efficacious

Top Prevention Interventions

- **Testing for HIV**
 - Entry point; potential to destigmatize HIV; addresses issues of community support and capacity
- **Testing for HIV: delivery advances (#2)**
 - Rapid testing
 - Routine in medical care
 - Couples
 - Institutions
 - Home-delivered
 - Community-delivered

Success Stories: 076, 012



The
New England
Journal of Medicine

Established in 1827 as THE NEW ENGLAND JOURNAL OF MEDICINE AND SURGERY

VOLUME 331

November 3, 1994

NUMBER 18

**Reduction of Maternal-Infant
Transmission of Human
Immunodeficiency Virus Type
1 with Zidovudine Treatment.
Pediatric AIDS Clinical Trials
Group Protocol 076 Study
Group**

Edward M. Conner, et al.

THE LANCET

Number 9181 • Founded 1823 • Published weekly

Volume 354

4 September 1999

**Intrapartum and Neonatal
Single-Dose Nevirapine
Compared with Zidovudine
for Prevention of Mother-to-
Child Transmission of HIV-1
in Kampala, Uganda: HIVNET
012 Randomised Trial**

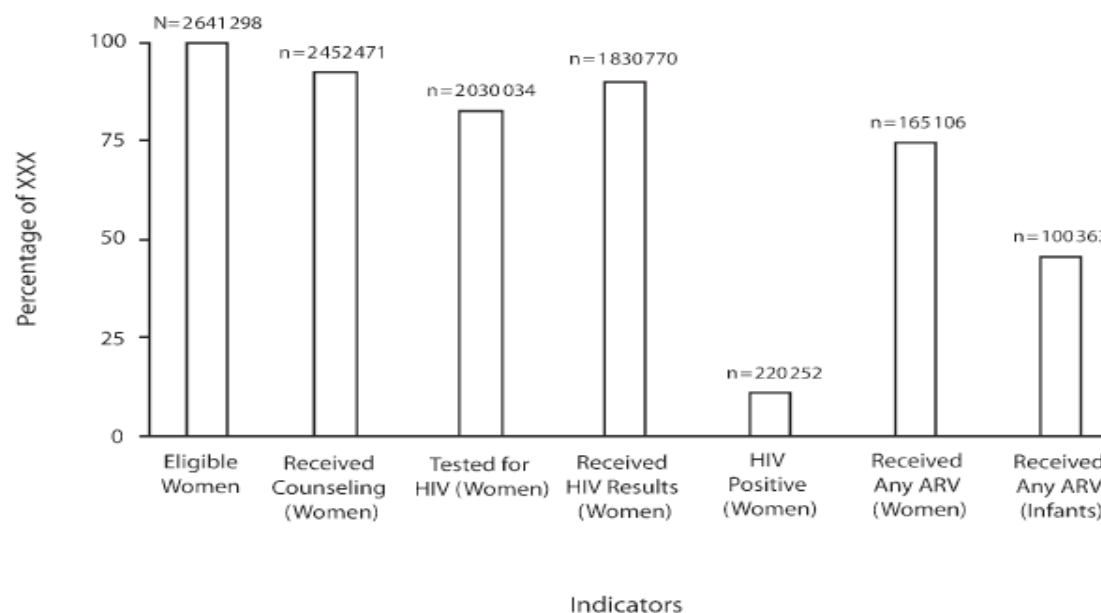
Laura A. Guay et al.

- **Prevention of mother-to-child transmission (#3)**

- Enormous public health success in resource-rich countries
- Most infections to infants can be prevented when the mother's HIV disease is treated adequately
- Goal should be to prevent infection and also to ensure the longevity of the mother
- Opportunities for reaching women, addressing family planning and reproductive health

Preventing Mother-to-Child Transmission of HIV in Resource-Limited Settings: The Elizabeth Glaser Pediatric AIDS Foundation Experience

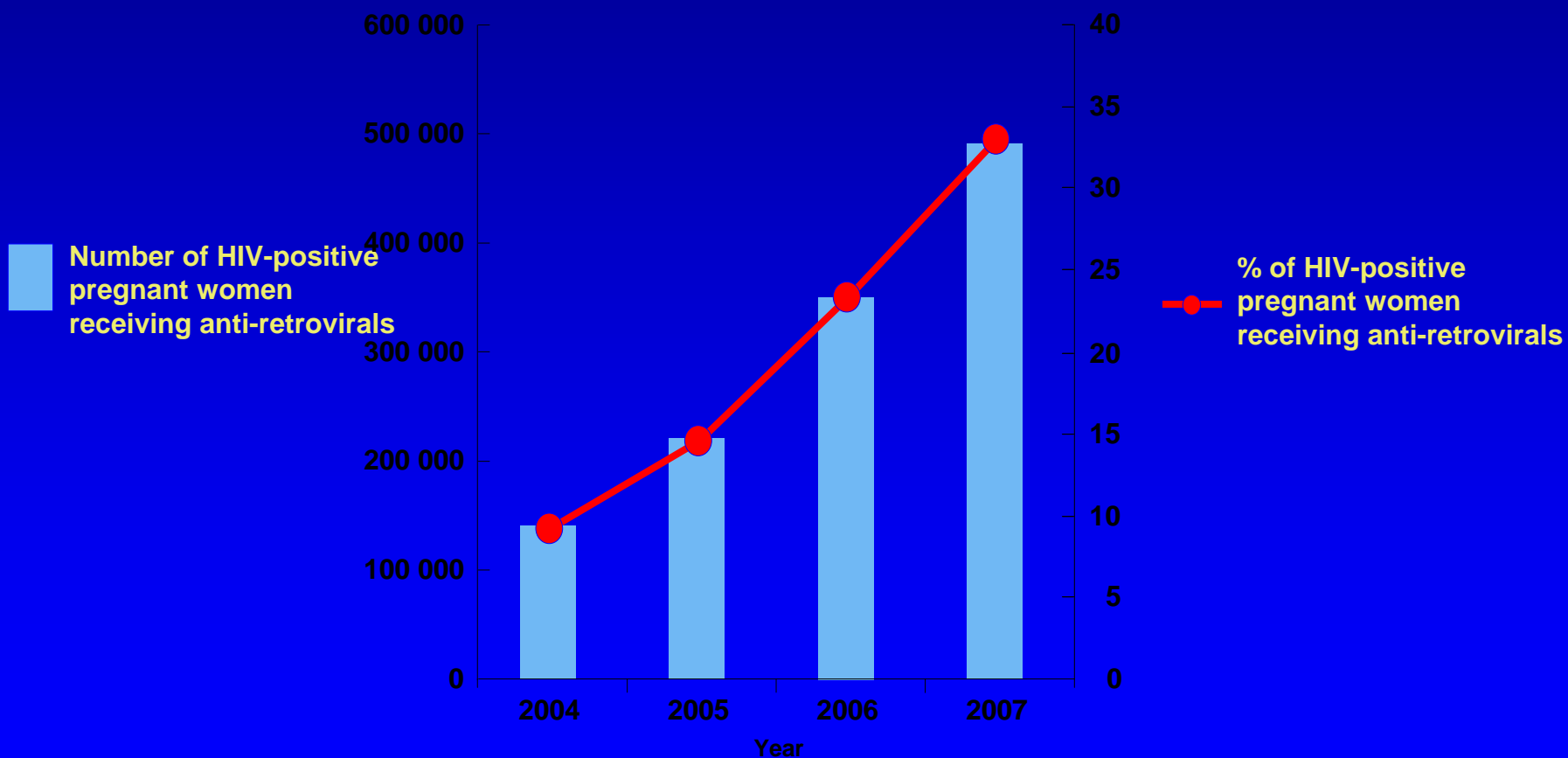
Allison Spensley, MPH, MSW, Tabitha Sripipat and Catherine Wilfert, MD, for The Elizabeth Glaser Pediatric AIDS Foundation



Note. Data shown (left to right) are as follows: women eligible for PMTCT services in antenatal care (ANC) and in labor and delivery ward; women receiving counseling; women tested for HIV; women receiving their test results; women who were HIV positive; women receiving antiretroviral (ARV) prophylaxis; infants receiving ARV prophylaxis.

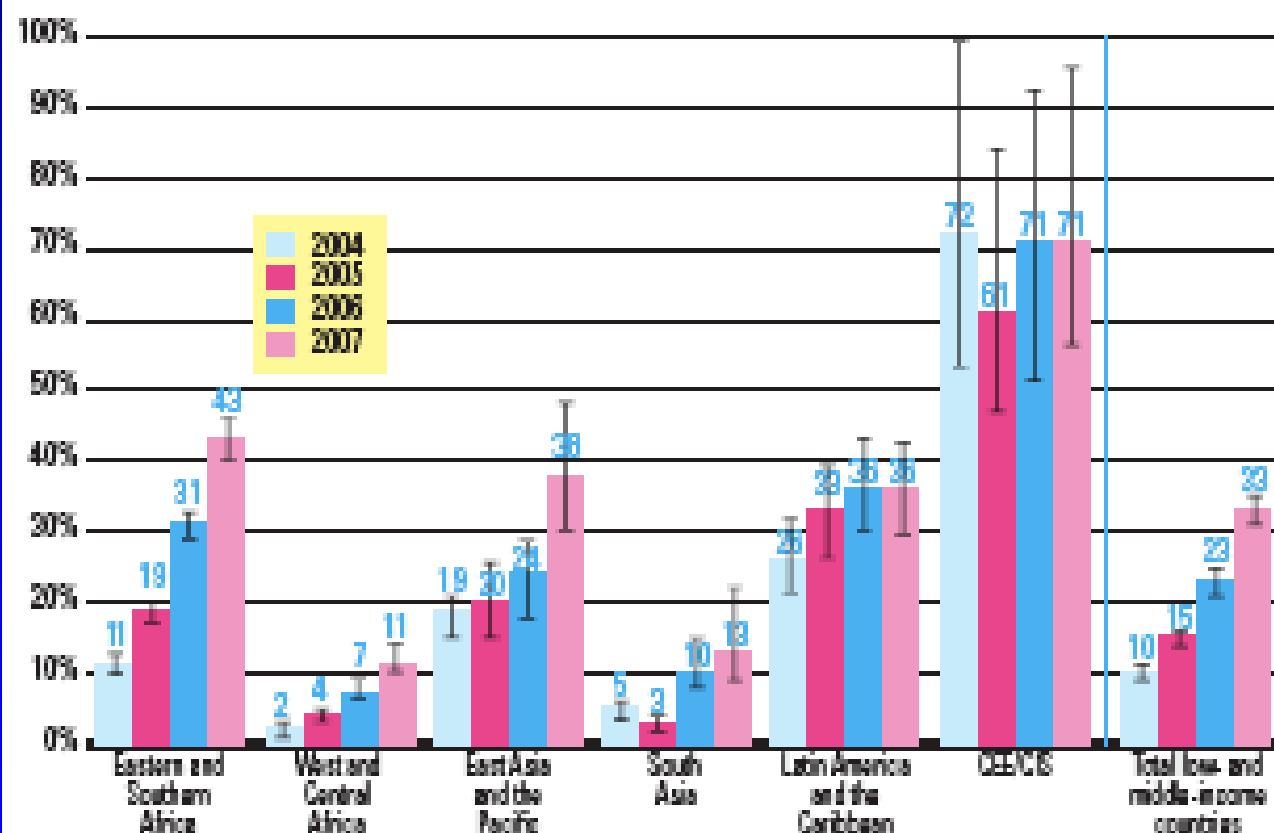
FIGURE 1—Selected indicators showing cumulative results of the Elizabeth Glaser Pediatric AIDS Foundation's program for the prevention of mother-to-child transmission (PMTCT) of HIV, through June 30, 2006.

Number and percentage of HIV-positive pregnant women receiving antiretroviral prophylaxis, 2004–2007



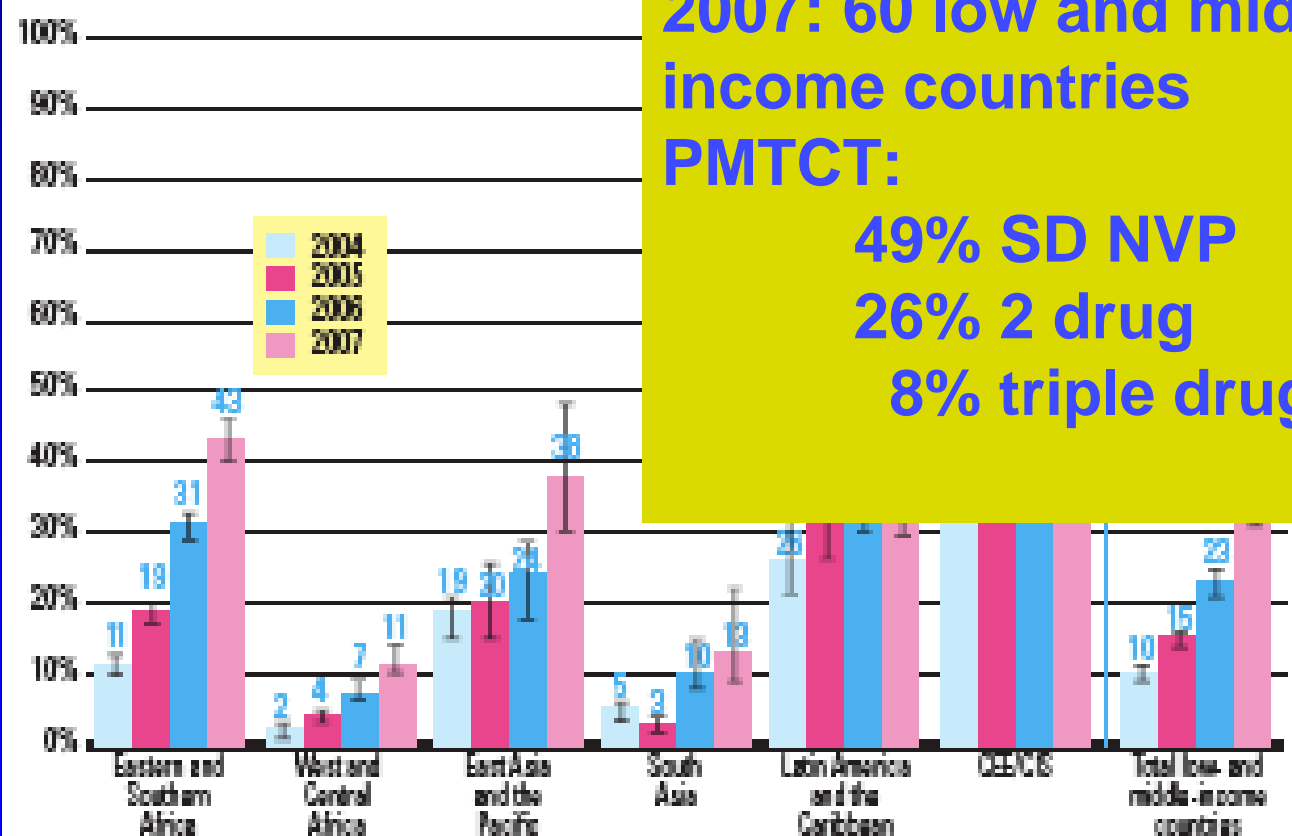
Progress in PMTCT

Figure 3. Percentage of HIV-infected pregnant women who received antiretrovirals for PMTCT, 2004–2007



Progress in PMTCT

Figure 3. Percentage of HIV-infected pregnant women who received antiretrovirals for PMTCT, 2004–2007



2007: 60 low and middle income countries

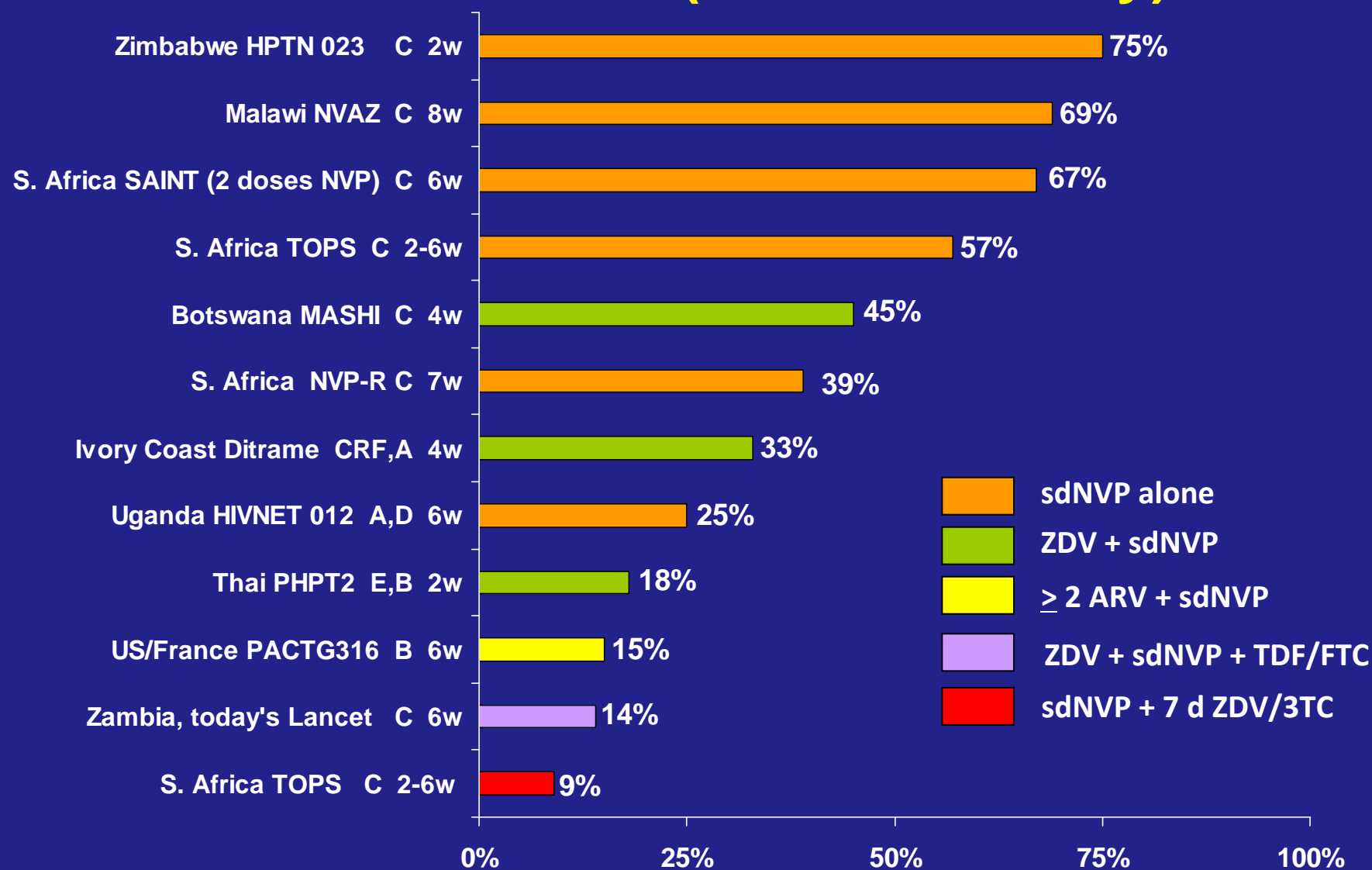
PMTCT:

49% SD NVP

26% 2 drug

8% triple drug

Proportions of mothers with NVP resistance after SD NVP (standard assay)



Proportion with resistant virus

Study Design

- Women in two concurrent Trials were randomized to one of two ART regimens:
 - NVP + tenofovir/emtricitabine (TDF/FTC) OR
 - Lopinavir/ritonavir (LPV/r) + (TDF/FTC)

**Trial 1: 240 women with
prior SD NVP**

**LPV/r +
TDF/FTC
n=120**

**NVP +
TDF/FTC
n=120**

**Trial 2: 500 women with NO
prior SD NVP**

**LPV/r +
TDF/FTC
n=250**

**NVP +
TDF/FTC
n=250**

Slide 22

JC2

could make this slide build so one study desing

Judith Currier, 2/3/2009

JC3

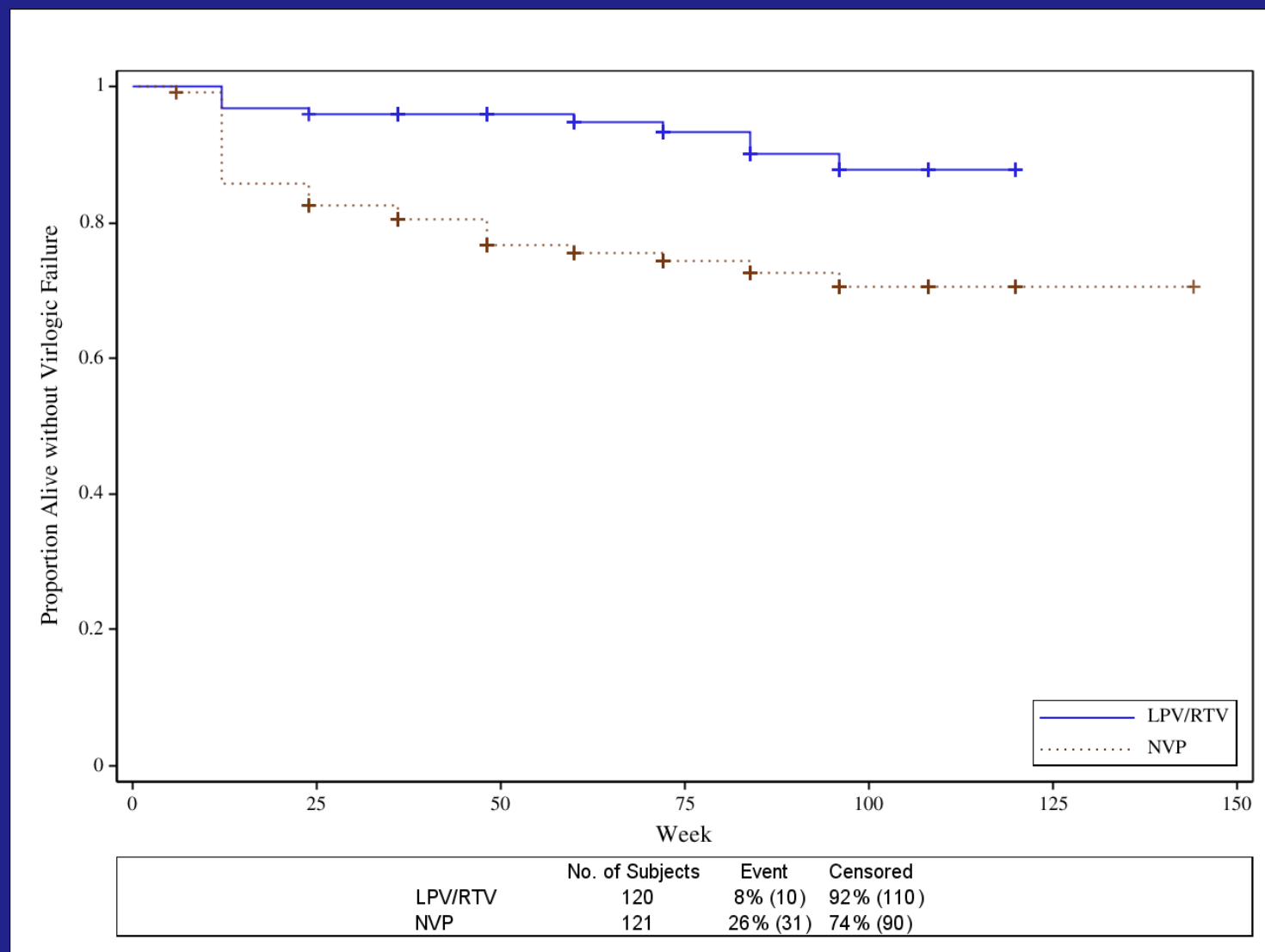
could make this build so one Trial 1 and trial 2 come up one at a time with mouse click.

Judith Currier, 2/3/2009

Study Participants

- HIV-1-infected women
 - CD4 < 200 cells/mm³ in past 90 days
 - No prior ART
 - Trial 1: prior SD NVP for preventing MTCT
 - Patient recall of SD NVP ingestion
 - Last SD NVP at least 6 months previously
 - Up to 10 weeks of prior zidovudine allowed
 - Estimated creatinine clearance \geq 60 mL/min
 - Not pregnant or breastfeeding

KM Plot of Time to Primary Endpoint (Virologic Failure or Death)



PMTCT Challenges

- **Interventions not being accessed by large numbers of women in resource limited settings**
- **Intervention strategies evolving:**
 - **Single dose NVP- simple, safe, but associated with maternal resistance**
 - **More complex regimens with short course therapy strategies**
 - **Maternal HAART**
 - **Should pregnancy be an indication to treat?**

PMTCT: Is the current approach on target?

- **Progress**

- HIV testing in pregnancy with use of ART to reduce transmission
- Interventions to reduce breast feeding transmission (maternal vs infant prophylaxis)

- **Pitfalls**

- Women who test negative in pregnancy are not routinely re-tested
- Botswana study- half of infected infants were born to women who tested negative in pregnancy (Creek, CCROI 2009)

Adult Male Circumcision Significantly Reduces Risk of Acquiring HIV

THE LANCET

Founded 1823 Published weekly

Volume 369

Issue 9562

24 February 2007

Male Circumcision for HIV Prevention in Young Men in Kisumu, Kenya: a Randomised Controlled Trial

RC Bailey et al.

Male Circumcision for HIV Prevention in Men in Rakai, Uganda: a Randomised Trial

RH Gray et al.

Reduction in relative risk of HIV infection associated with male circumcision (intent-to-treat analysis):

Kenya (n=2,784): 53%

Uganda (n=4,996): 51%

- **Male circumcision (#4)**
 - Benefits are for reducing risk (for men) clear from observational studies and clinical trials; Demonstration projects underway to demonstrate population impact
 - Cultural barriers, in many places, are not what some predicted
 - Major issue involves whether or not to include HIV testing and potential dangers from circumcising HIV+ men
 - Reaches men, opportunities for messaging and counseling, requires VCT and community outreach

Slide courtesy of T. Coates

- **Treatment for HIV (# 5)**

- Experience in resource-rich countries demonstrates the degree to which virus can be suppressed and mortality decreased
- Ecological experience in British Columbia and San Francisco pointing to low incidence in the presence of increasing risk behaviors
- Has potential to destigmatize HIV, normalize HIV testing, and prevent transmission; build health systems and new delivery models
- Can address family planning
- Need adequate diagnostics and earlier treatment

Impact of small reductions in plasma HIV RNA levels on the risk of heterosexual transmission and disease progression

Kayvon Modjarrad^a, Eric Chamot^b and Sten H. Vermund^a

	Risk ratio per log ₁₀ Δ HIV RNA		
	0.3	0.5	1.0
Quinn <i>et al.</i> [23] ^a	1.31 (1.20, 1.42)	1.56 (1.36, 1.80)	2.45 (1.85, 3.26)
Fideli <i>et al.</i> [24] ^b			
Female-to-male	1.3 (1.1, 1.5)	1.6 (1.2, 2.0)	2.5 (1.5, 4.0)
Male-to-female	1.2 (1.0, 1.4)	1.3 (1.1, 1.7)	1.8 (1.2, 2.8)
Hisada <i>et al.</i> [25] ^a	1.14 (0.97, 1.36)	1.19 (0.98, 1.20)	1.31 (0.94, 1.84)
Tovanabutra <i>et al.</i> [26] ^c	1.19 (1.09, 1.31)	1.34 (1.15, 1.57)	1.81 (1.33, 2.48)
Weighted mean	1.2 (1.1, 1.4)	1.4 (1.2, 1.7)	2.0 (1.4, 2.8)

The Next Ten Years: A Role for Pre-Exposure Chemoprophylaxis of HIV Infection?

JAMA
THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Volume 296 No. 7
August 16, 2006

Preexposure Prophylaxis for HIV: Unproven Promise and Potential Pitfalls

AY Liu, RM Grant & SP Buchbinder

Volume 194
October 1, 2006

The Journal of
**Infectious
Diseases**

Chemoprophylaxis of HIV Infection: Moving Forward with Caution

RM Grant & MA Wainberg

- **Pre-Exposure Prophylaxis (# 6)**

- Animal studies and experience with PMTCT point strongly to the potential success of this strategy
- Financing and implementation issues are paramount but should be addressed now so that we are ready to implement when clinical trials are completed
- Issue is how to get it to the people most in need of prevention services

Progress in Microbicides: PRO-2000 gel

Microbicides have potential to offer female controlled HIV prevention

PRO-2000 prevents entry of HIV into cells in vitro

BufferGel- lowers vaginal pH

Efficacy in preventing HIV examined in randomized trial of 3,099 women

Rate of HIV reduced by 30% in PRO-2000 group

BufferGel had no effect

Results not statistically significant; larger study of 10,000 women ongoing

First potentially beneficial result of a microbicide trial to date.

How Can We Make HIV Prevention Interventions Work?

HIV prevention has been approached unsystematically and has not been afforded the same sense of urgency as treatment.

Sound management principles based on the use of information and evidence need to be applied to HIV-prevention efforts.

Combination Prevention

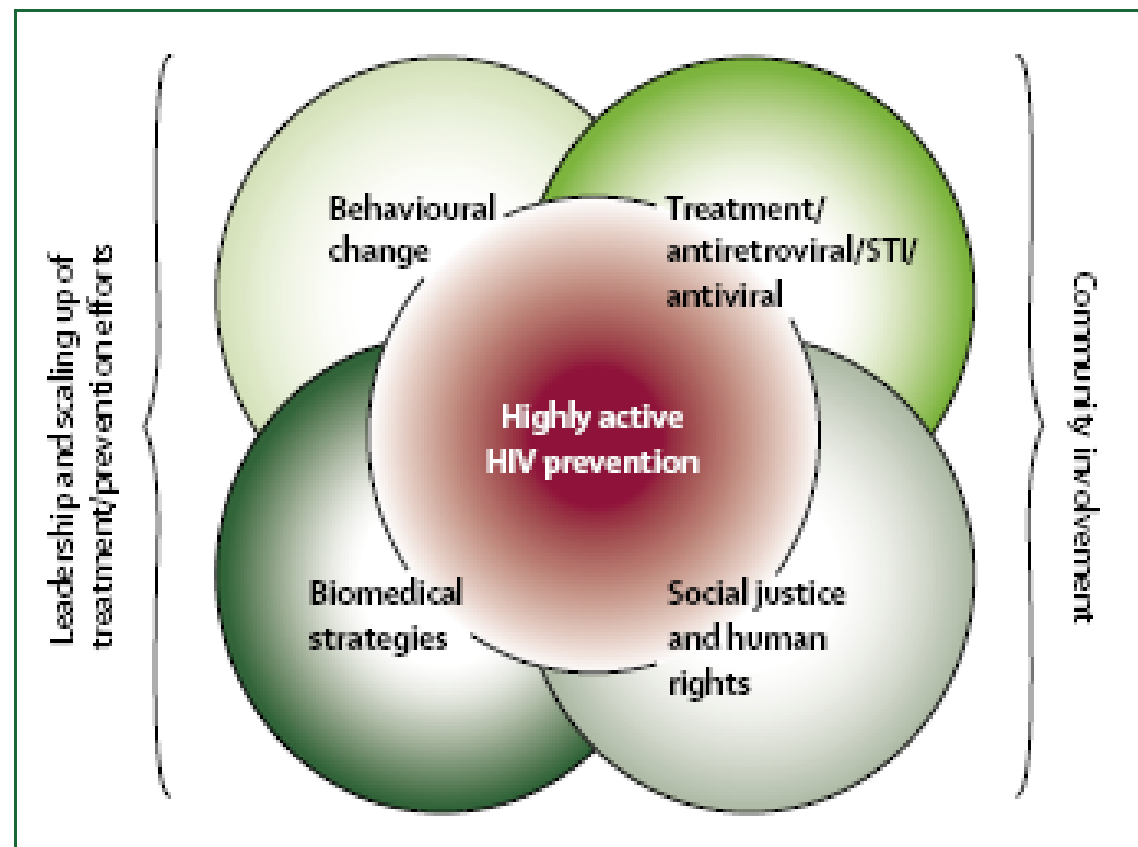


Figure 1: Highly active HIV prevention

This term was coined by Prof K Holmes, University of Washington School of Medicine, Seattle, WA, USA.³ STI=sexually transmitted infections.

Global Access Programs

- **UNAIDS Global Fund for HIV, TB and Malaria**
- **U.S. President's Emergency Plan For AIDS Relief (PEPFAR)**
- **National Plans – Ministries of Health**

Scale up of antiretroviral coverage over time select group of generalized and concentrated epidemic countries, 2004 to 2007

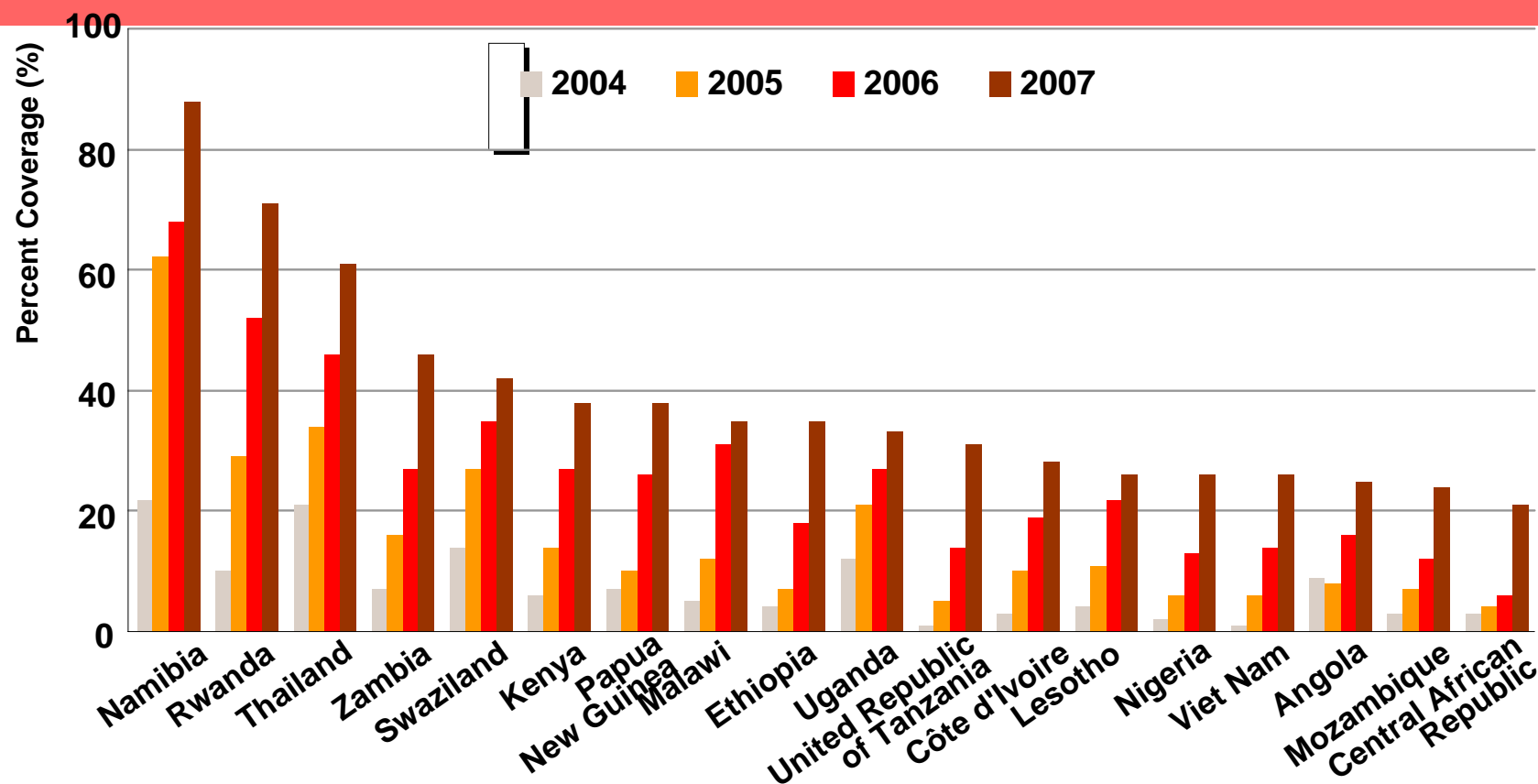


Figure 5.4

Source: UNGASS Country Progress Reports 2008.

Number of people receiving antiretroviral drugs in low- and middle-income countries, 2002–2007

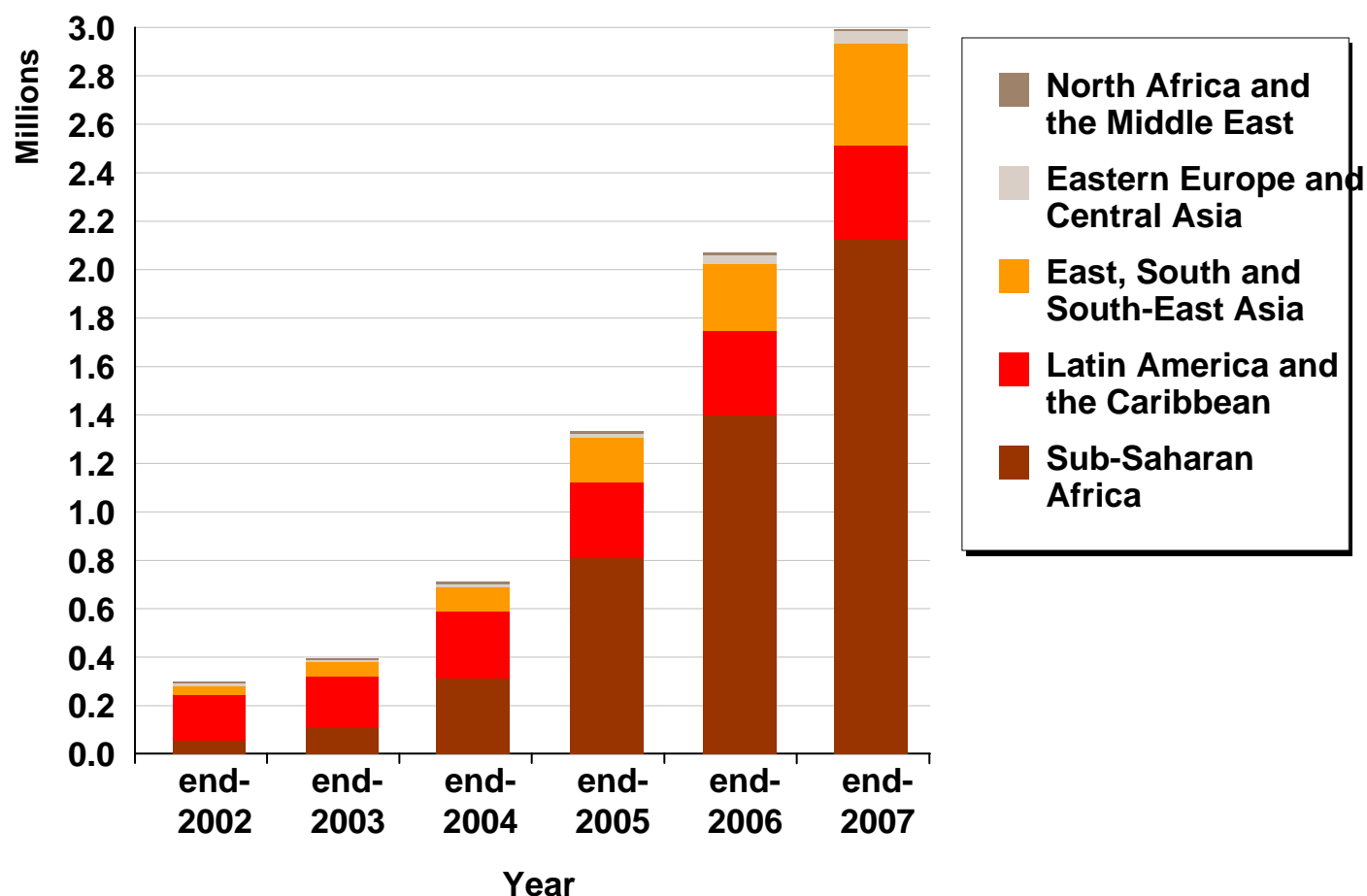


Figure 5.2

Source: Data provided by UNAIDS & WHO, 2008.

Comparison of 2005 and 2007 percentage coverage of antiretroviral therapy for people with advanced HIV and percentage coverage of antiretroviral drugs for HIV positive pregnant women by

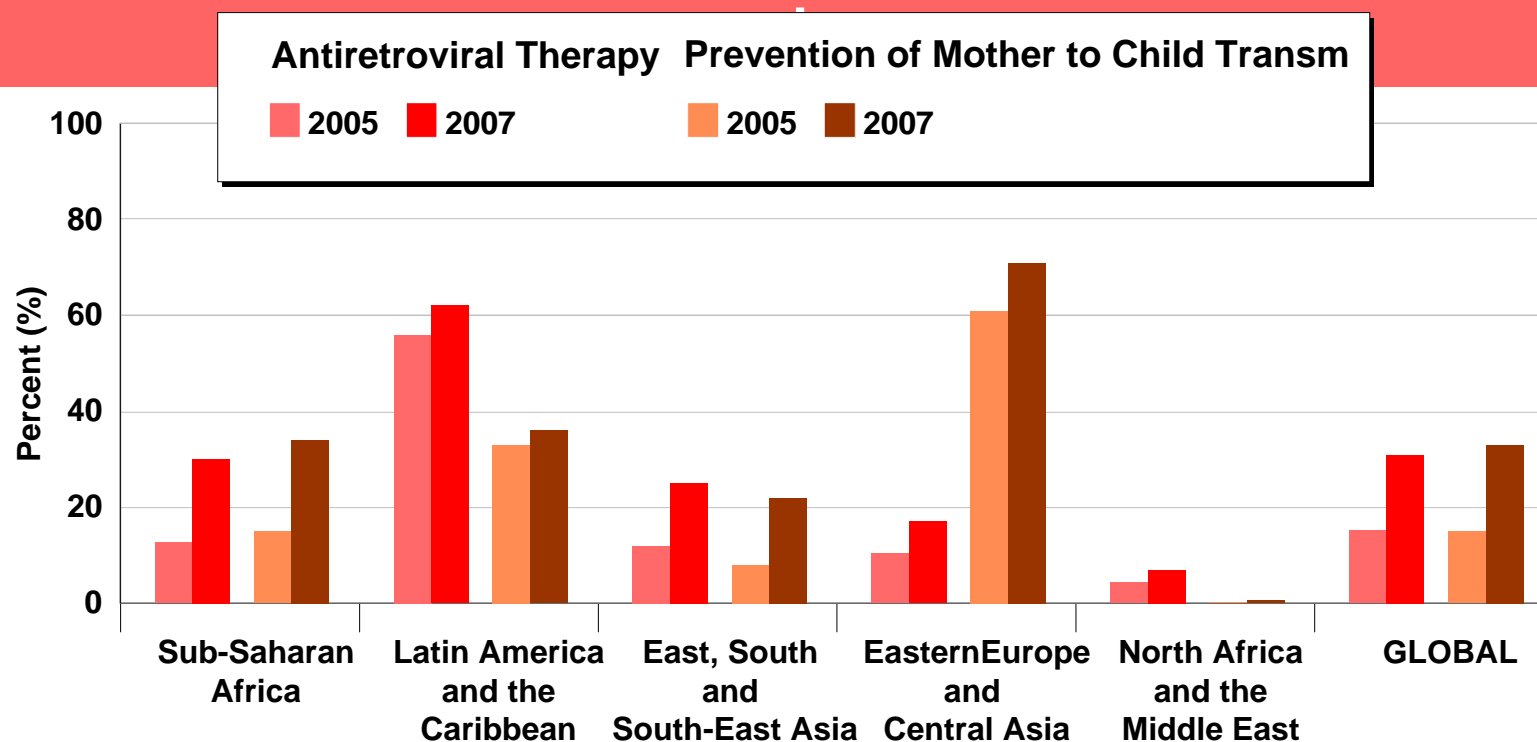


Figure 7.2

Source: UNAIDS/UNICEF/WHO.

2008 Report on
the
global AIDS
situation

Global HIV Summary

- **Huge Challenge**
- **Solutions require well trained individuals, leadership and multidisciplinary approach**
- **Integration of prevention and treatment needed**
- **Progress is slow, but possible**

Acknowledgements

- Tom Coates, PhD. UCLA Program in Global Health