
PUBLIC HEALTH THREATS, CHALLENGES AND TRIUMPHS IN ASIA

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DYNAMICS OF A HYPOTHETICAL BIOLOGICAL OUTBREAK OR ATTACK

- | | <u>DATE</u> | <u>CASES</u> |
|---|-------------|---------------------|
| • | 9/12 | 1 |
| • | 9/18 | 6,000 |
| • | 9/23 | 12,000 (700 deaths) |
- In 6 months, 25% of Civilian Population Infected
4% of the Population will die

INFLUENZA, 1918

- Camp Devens, MA , 1918

	<u>Cases</u>
9/12	1
9/18	6,674
9/23	12,604 (727 deaths)
- US. 25% of Civilian Population Infected
4/100 Died
- Global: In 6 months 20 – 40 million deaths
(In 4 years of WWI, 15m deaths)

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(In 4 years of WWI, 15m deaths)
- ***BIRD FLU – WILL IT BE THE NEXT PANDEMIC?***

GLOBAL CONTEXT OF PUBLIC HEALTH

- **Poverty:** 1.2 billion people live on less than US\$1 per day; 2.8b live on less than US\$2 per day; 1 in 6 are chronically hungry.
- **Population:** 6.2 Billion, 200,000 people added each day; In 68 countries >40% of population is under age 15;
- **Environment:** Half of China's cities face water shortages and air pollution; temperature will rise 1-4.5°F this century
- **Civil Society:** 31 Civil and Foreign Wars, 35m Displaced Persons and Refugees, 127 Failed States (1955-1998)

WHAT DOES PUBLIC HEALTH DO?

- Public Health
 - Preventing Disease
 - Populations
 - Process, Metrics and Analysis
 - Environmental Health
 - Health Policy/Finance
- Clinical Medicine
 - Treating Illness
 - Individuals
 - “Great Moments in Medicine”

IMPACT OF DISEASE ON ECONOMIC GROWTH

- Reduced years of healthy life expectancy and productivity due to early death or chronic illness
- Direct Medical Costs
- Reduction in returns to business and infrastructure investment, social cooperation, political stability
- Parental investments in children – the ‘quantity-quality tradeoff’

ESTIMATING THE BURDEN OF DISEASE

- Metrics: Mortality

DALYS – Disability Adjusted Life Years

Aggregate Economic Loss –

Roughly estimated by:

[The annual number of lost life years due to each disease]

X

[a multiple of per capita income]

GLOBAL BURDEN OF DISEASE

	<u>DEATHS</u>	<u>DALYS</u>
Non-communicable Disease	60%	43%
• Cardiovascular	31%	11%
• Cancer	13%	6%
• Neuropsychiatric	--	11%
Infectious/Perinatal	32%	43%
• Malnutrition	1%	3%
Injuries	9%	14%

WHO, WHR, 2001

CHALLENGES OF PUBLIC HEALTH

- THE UNFINISHED AGENDA --- Infectious Diseases
- THE COMING EPIDEMIC --- Chronic Disease
- THE UNNECESSARY EPIDEMIC --- Injuries, Violence, Environmental Health
- DISPARITIES IN HEALTH
- HEALTH SYSTEMS

THE UNFINISHED AGENDA OF INFECTIOUS INFECTIOUS DISEASES



GLOBAL BURDEN OF TB, 2000

- 8.7 million new cases each year
 - 80% in 23 high-burden countries
- 2 million deaths each year
 - Attributable cause of death in 32% of AIDS patients in Africa
- 2 billion people, 1/3 of the world's population infected with the tubercle bacillus
- Case fatality rate = 50% (untreated); 24% globally
- Multi-drug resistant TB is present in 72 countries
 - Estonia, Russia, China, Iran, India, Peru

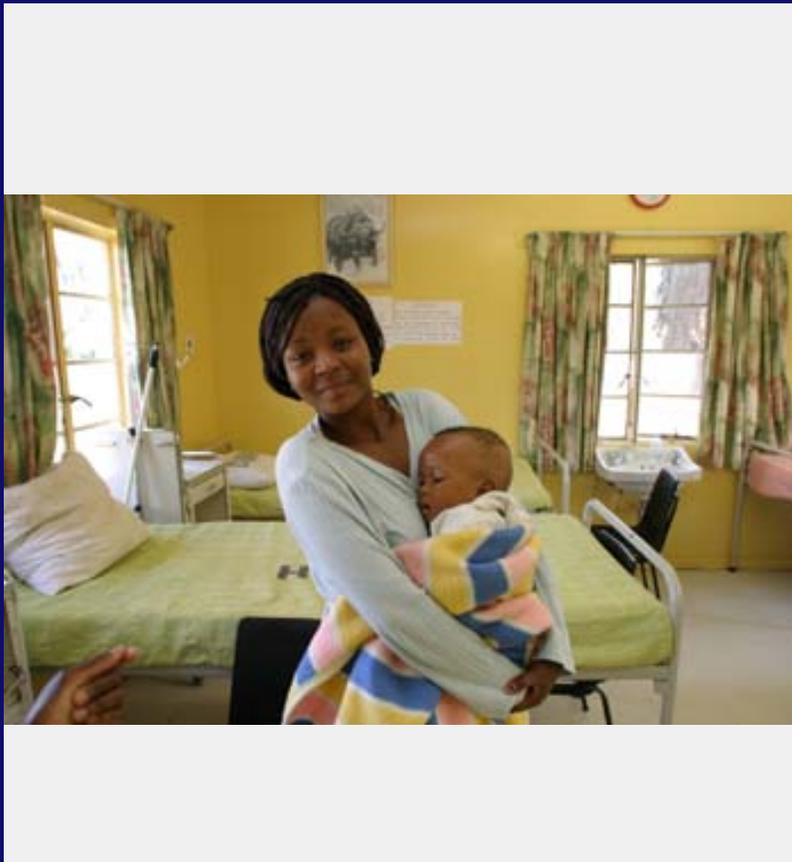
World Health Organization

COSTS OF TB

- Global Economic Burden
Death, Loss of Income, Treatment = \$16 billion
- A 50% Reduction in Deaths would cost \$900m/y.
- The Return on that Investment by 2010 would be:
22 million cures, 16m deaths averted
\$6 billion in Economic Return.

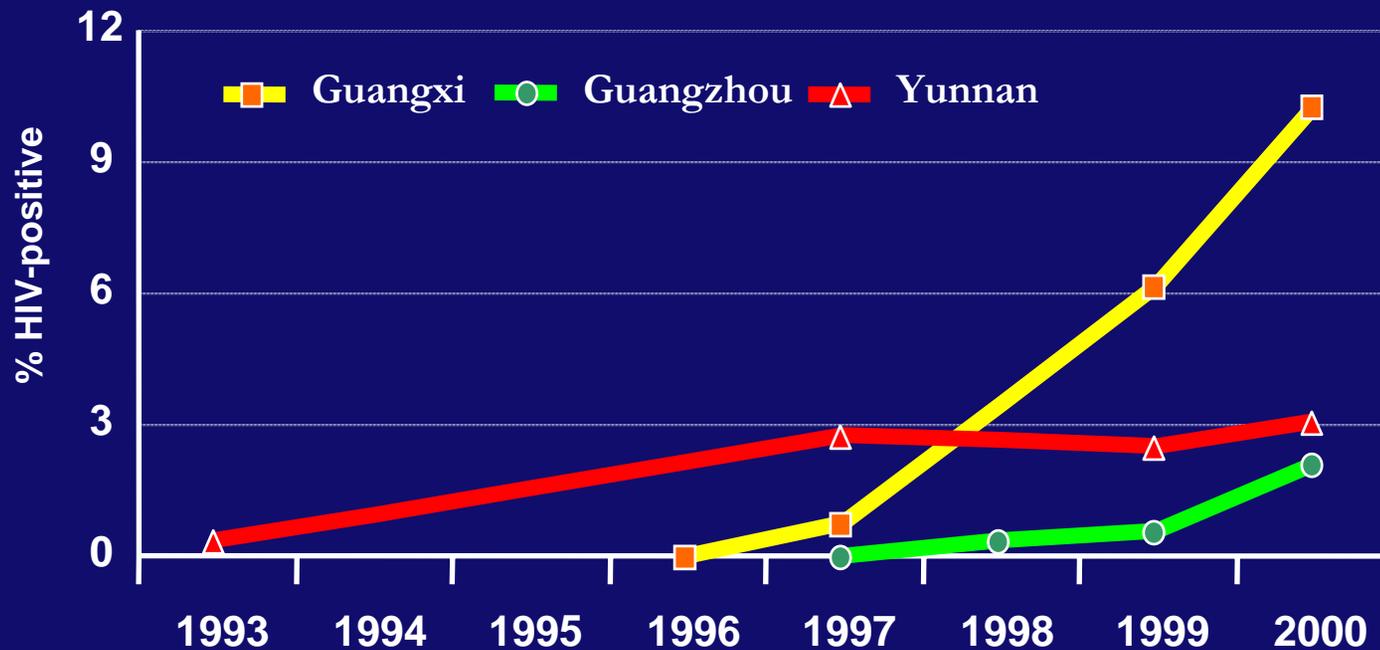
Data from WHO

GLOBAL AIDS BURDEN



- 40 million people living with AIDS
 - 19.2 million women
 - 3.2 million children <15y
- 5 million new infections (3.5m in SSA)
- 3.1 million deaths in 2000 (2.4m in SSA)
- ~30 million cumulative deaths

HIV PREVALENCE AMONG SEX WORKERS IN SELECTED PROVINCES IN CHINA: 1993-2000



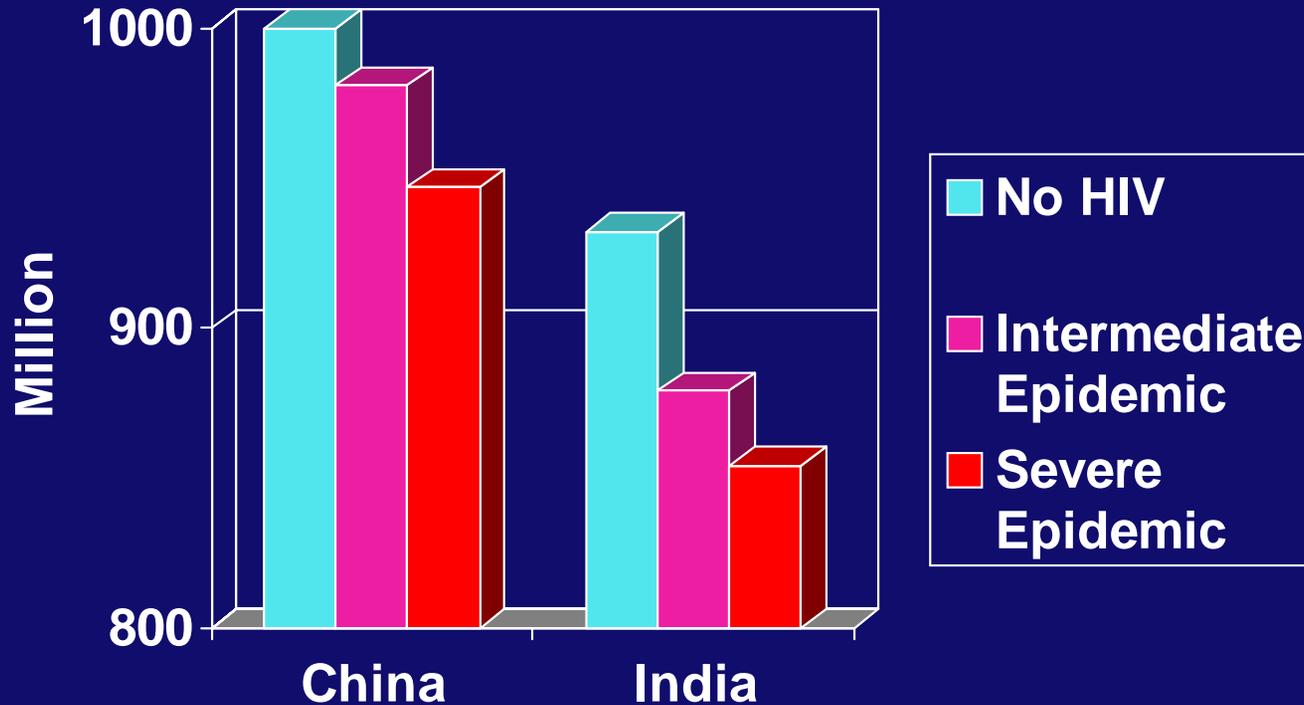
*National AIDS Programme, China (1993-2000)
Data compiled by the US Census Bureau*

AIDS IN CHINA

- Est. > 1 million infected with HIV
- 30% Annual increases since 1998
- By 2010, est. 10 million infected
250,000 orphans

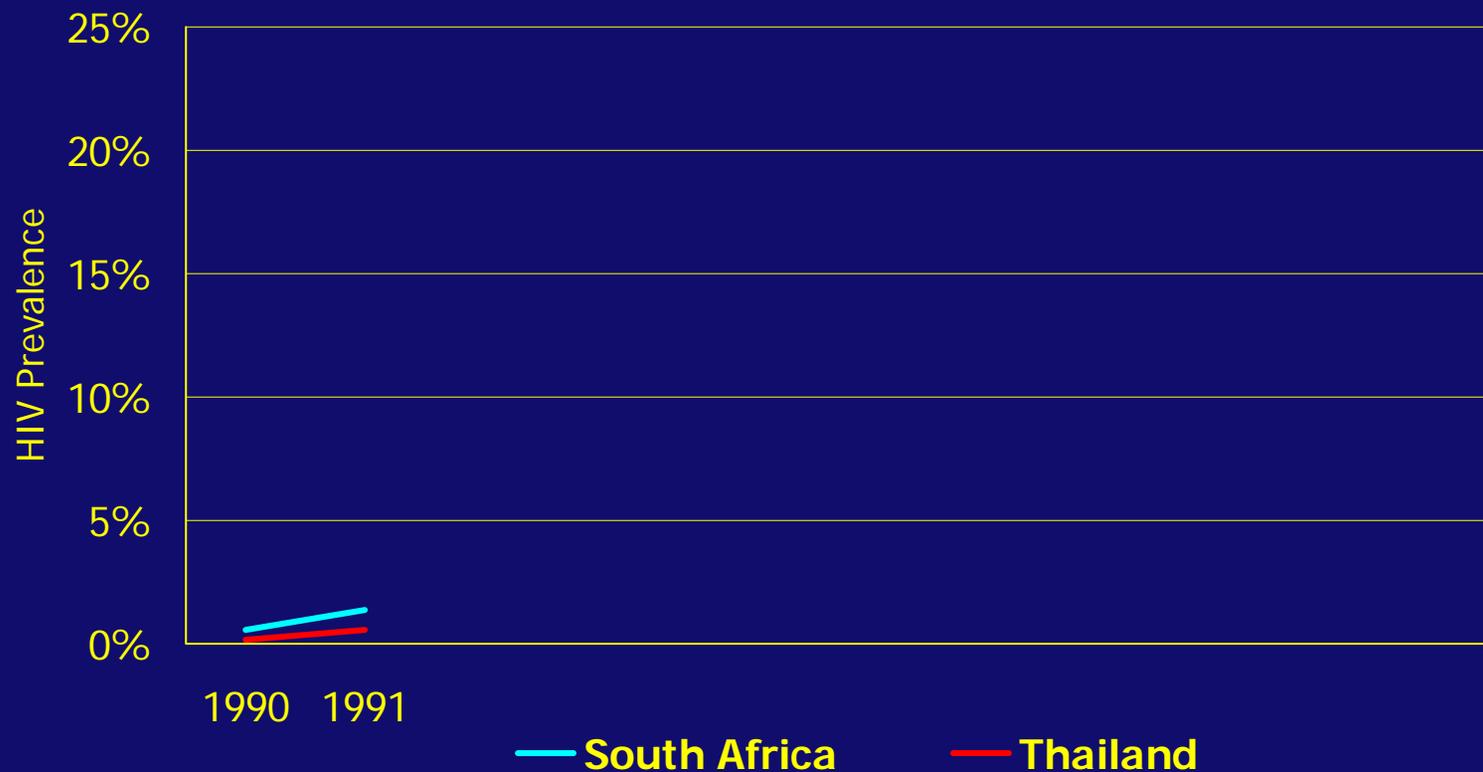
UNAIDS 2002

PROJECTED WORKING AGE POPULATIONS-2025



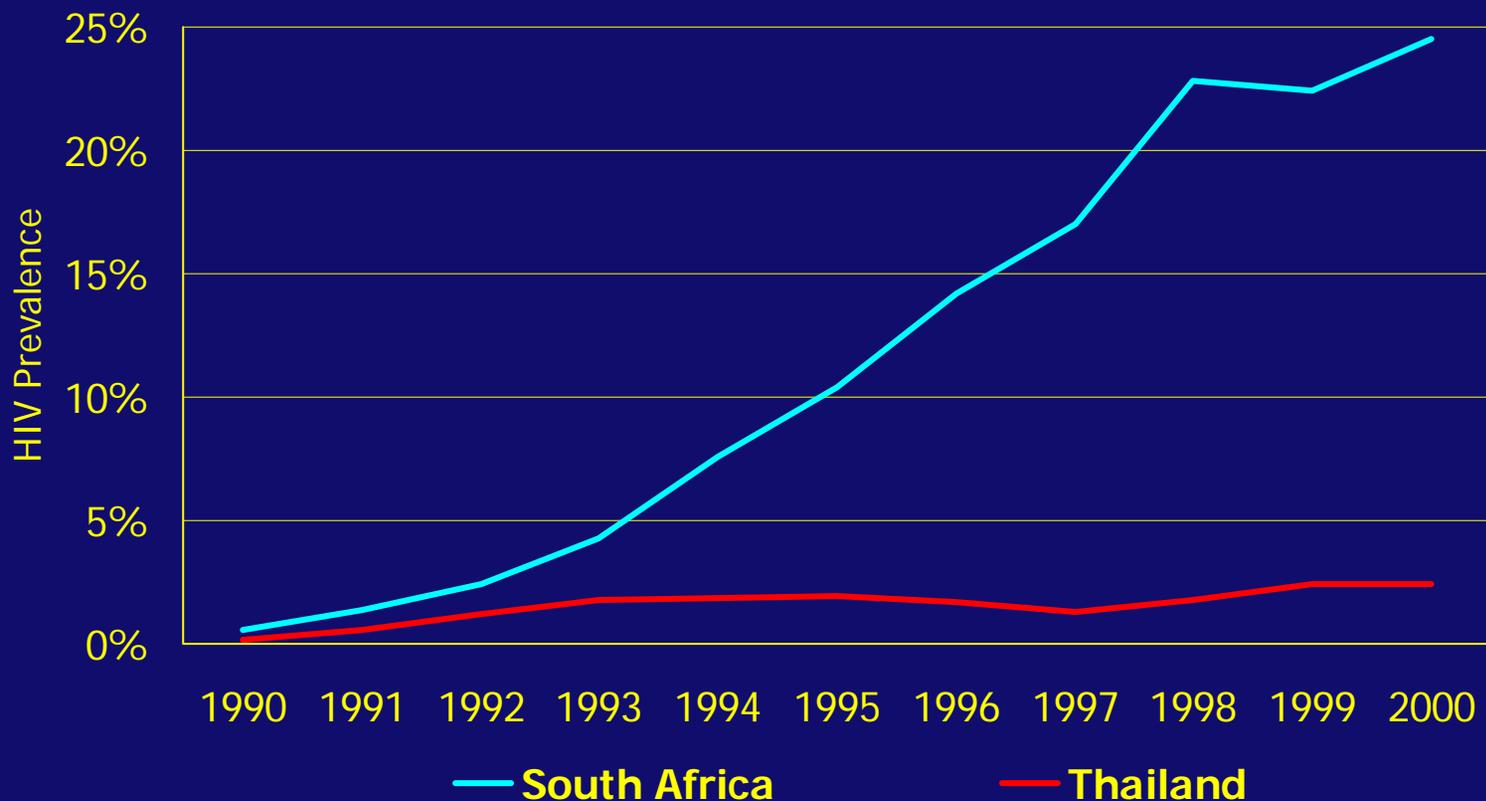
Eberstadt, N. Foreign Affairs 81:22, 2002

HIV PREVALENCE IN THAILAND AND S.AFRICA 1990-1991



Source: UNAIDS

HIV PREVALENCE IN THAILAND AND S.AFRICA 1990-2000



Source: UNAIDS

RETURN ON INVESTMENT IN HIV PREVENTION

30Y Projection Based on Data from Thailand

Rough return on investment in prevention:

- If benefits include only averted medical expenditures – Return = 12-33%
- If averted income losses and medical expenditures included – Return = 37-55%

D. Bloom, Harvard School of Public Health

THAILAND/UGANDA/SENEGAL – KEYS TO SUCCESS

- Good Governance - Leadership of President
- Research and Evidence-based Decisions
- Major Effort to Inform Public
- Target Interventions to High Risk Group
- Recognition of the Role of Women in Health
- Engagement of Communities, esp. the Poor
- Engagement of Business
- Broad Partnerships of Government, NGO's, ODA's
- **Adequate Resources**

SARS

- Total Cases – 8422
 - China - 5327
 - Hong Kong - 1755
- Total Deaths- 1725
- Infection Interval- 6-8d
- Risk of Death from SARS
 - 12.5%-20%,
 - Age-dependent, not children

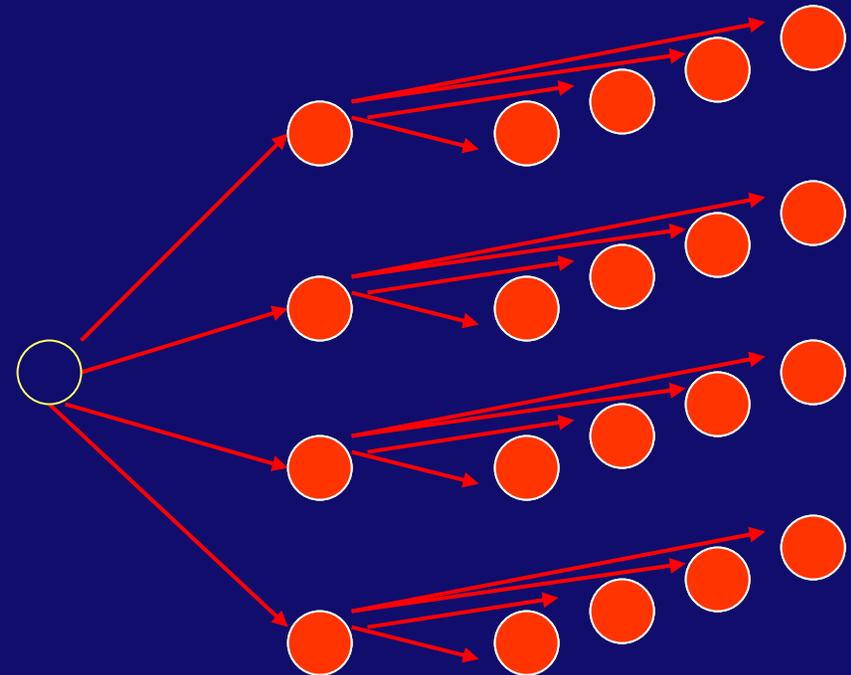
BASIC REPRODUCTIVE NUMBER R_0

R_0 is the expected number of secondary infectious cases generated by each infectious case in a given population.

If $R_0 > 1$, epidemic will spread

If $R_0 < 1$, epidemic will wane

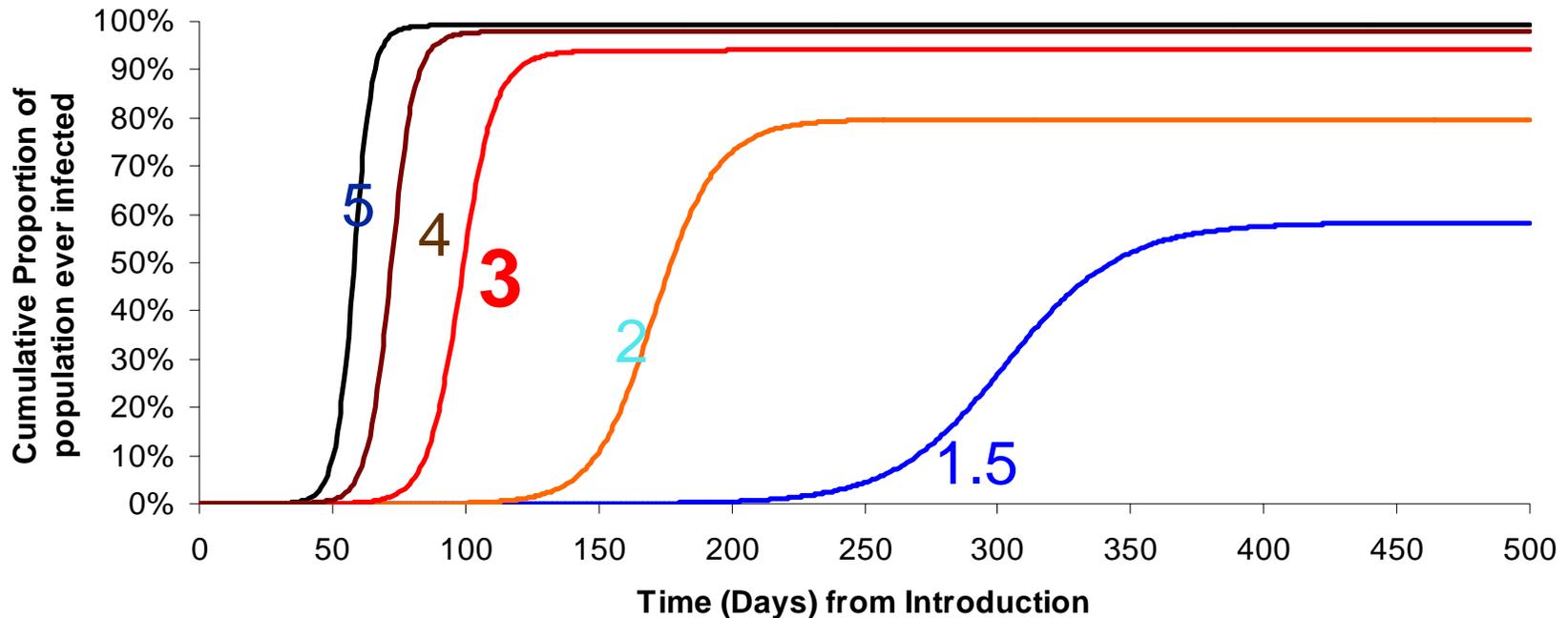
R_0 tells how many but not how fast



$$R_0=4$$

COURSE OF THE EPIDEMIC

Figure 2(b)



PREDICTED BEST INTERVENTIONS

- Isolation (related to infectious period)
- Quarantine Exposed Groups
- Efficient Quarantine and Isolation should reduce R_0 to < 1

ECONOMIC IMPACT OF SARS

- Canada: Hotel Occupancy Dropped 47% = \$100m
- Canada: Cost of SARS = \$30 million a day
- In Hong Kong, retail sales were down ~50%,
 - airline bookings were down by 85%.
- Hotel occupancy in Asia was reduced by 25%,
- Visitors to Singapore were down by 61%.
- Tourism was reduced in China by 40%
- China's GDP in 2nd Quarter 6.7% lower than 2002, and 4.9% below 1st Quarter 2003.
- SARS cost Asian Economies \$16-30 billion.

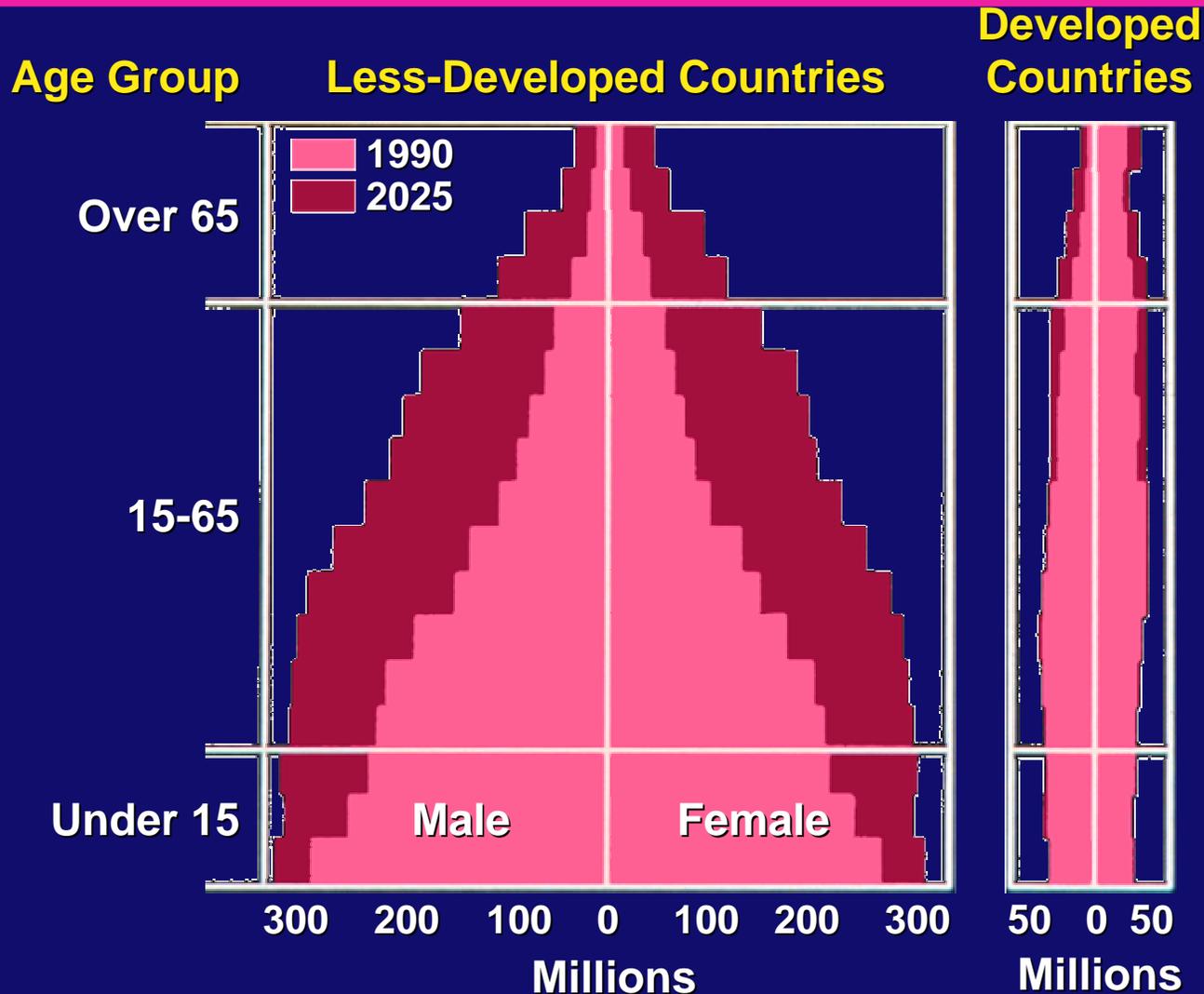
FEER, ADB, NY TIMES, WALL ST JOURNAL

LESSONS FROM SARS

- Infectious diseases do not respect national boundaries - global security depends on the competence of local responses in countries around the world.
- Honest and accurate information is essential for early warning and for making effective health policy.
- Effective Responses depend on well functioning Health Systems
- Creating National and Global Health Surveillance Early Warning and Laboratory Networks must be given high priority.
- Investing in global health, beyond just SARS or AIDS, would protect every country from emerging diseases, save millions of lives, and improve the quality of life of billions of people.

THE DEMOGRAPHIC TRANSITION

Age Distribution of Populations, 1990 and 2025



THE COMING EPIDEMIC OF CHRONIC DISEASE

- Cardiovascular Disease and Stroke
- Cancer
- Neuropsychiatric disease and dementias
- Diabetes
- Pulmonary Disease

THE COMING EPIDEMIC OF OBESITY

The Economist

DECEMBER 13TH-19TH 2003 www.economist.com

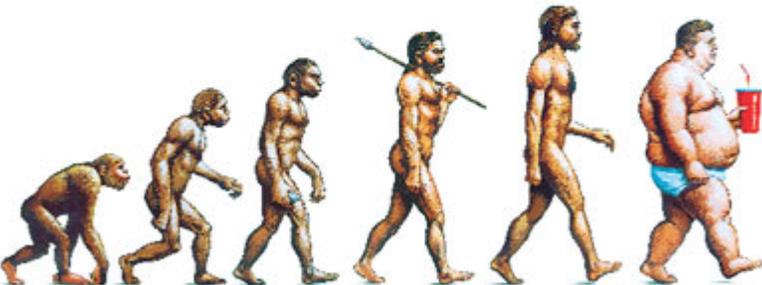
Gore anoints Dean
PAGES 12 AND 33

America's Taiwan test
PAGES 12 AND 29

The future of flight
PAGES 79-81

A SURVEY OF FOOD
AFTER PAGE 52

The shape of things to come



US\$4.95 + C\$6.95

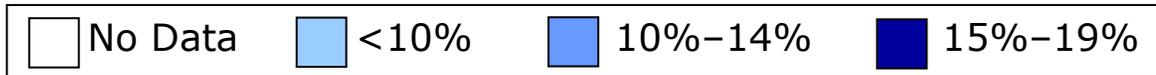
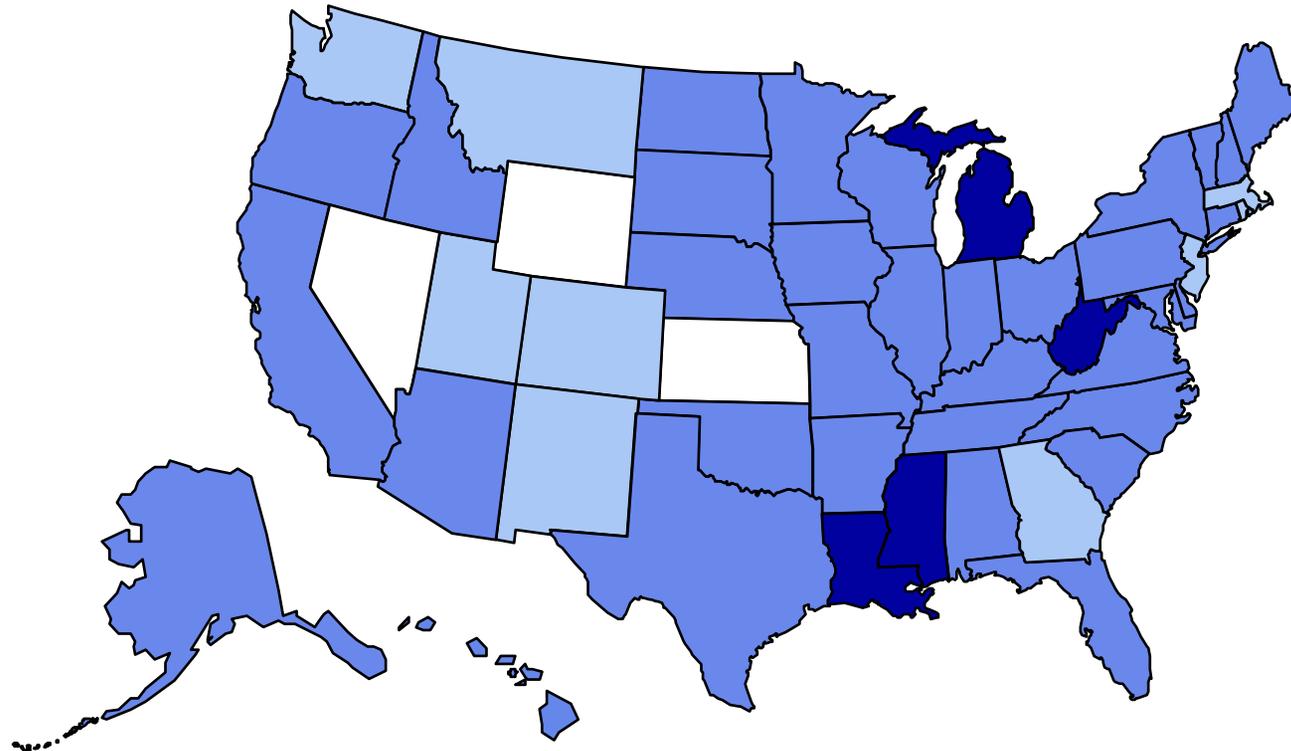
740004 02474

Mexico	US\$4.95	Canada	C\$6.95	Germany	€3.10	Spain	€4.50
Argentina	US\$4.95	China	C\$6.95	France	€3.10	UK	£3.00
Brazil	R\$14.95	India	₹149.50	Italy	€3.10	USA	US\$4.95
Japan	¥149.50	South Africa	R149.50	Poland	zł12.50	South Africa	R149.50

Obesity Trends* Among U.S. Adults

BRFSS. 1991

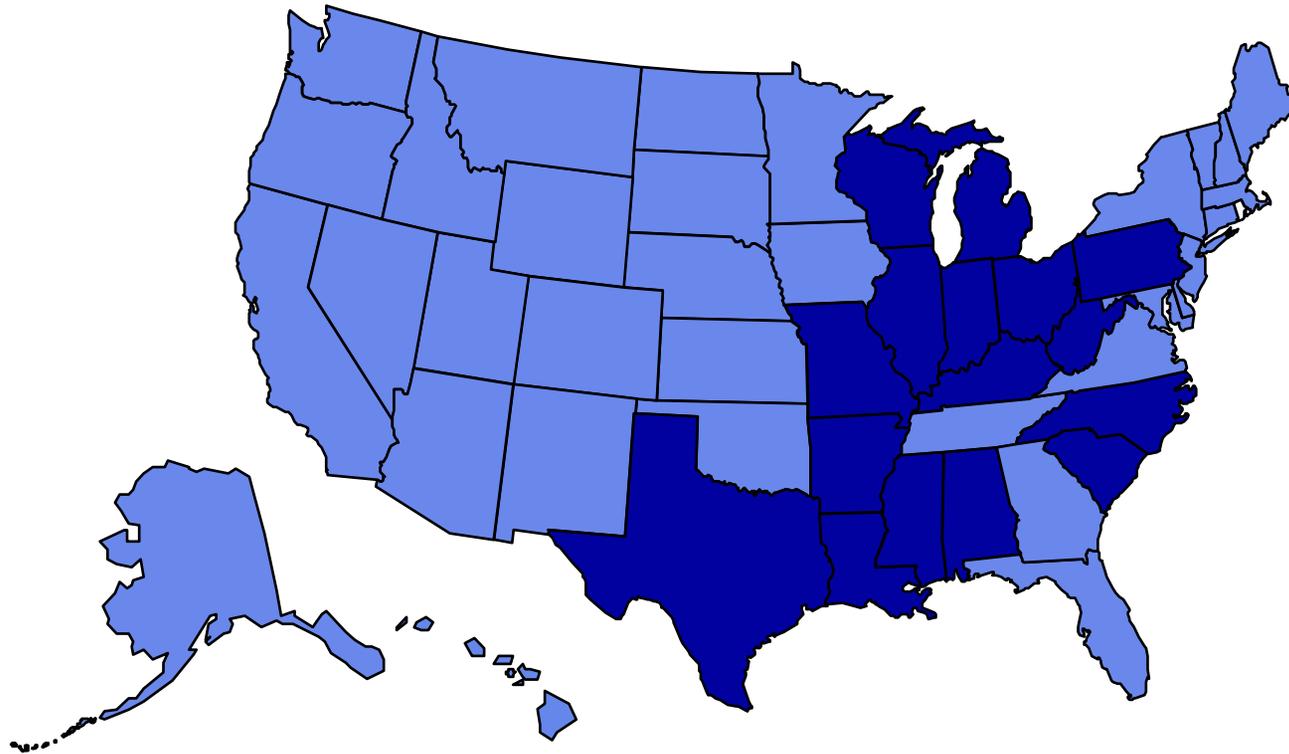
(*BMI ≥ 30 , or ~ 30 lbs overweight for 5'4" woman)



Obesity Trends* Among U.S. Adults

BRFSS. 1994

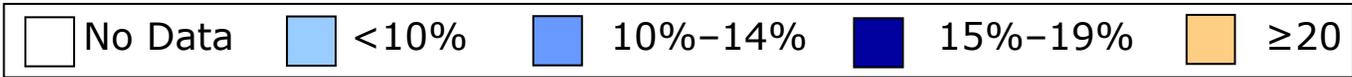
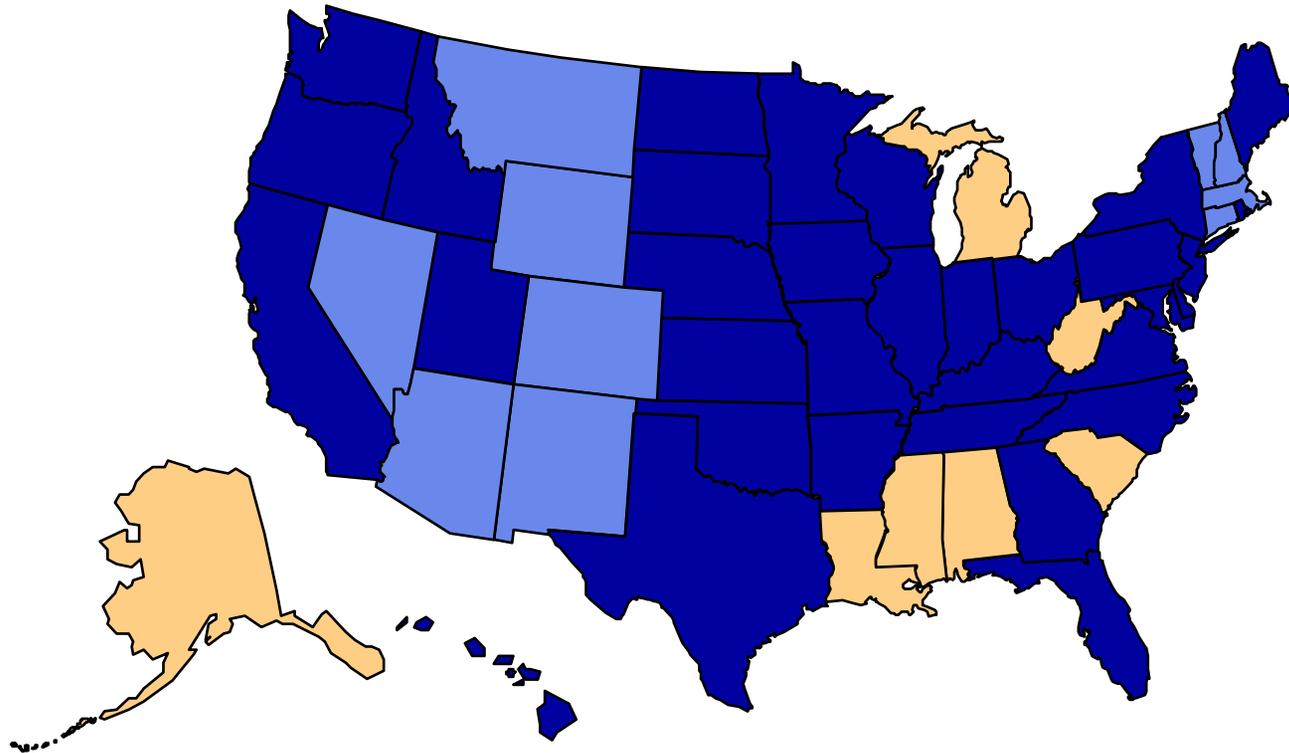
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Obesity Trends* Among U.S. Adults

BRFSS. 1998

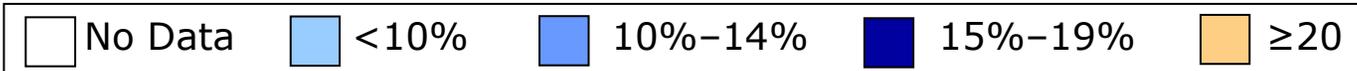
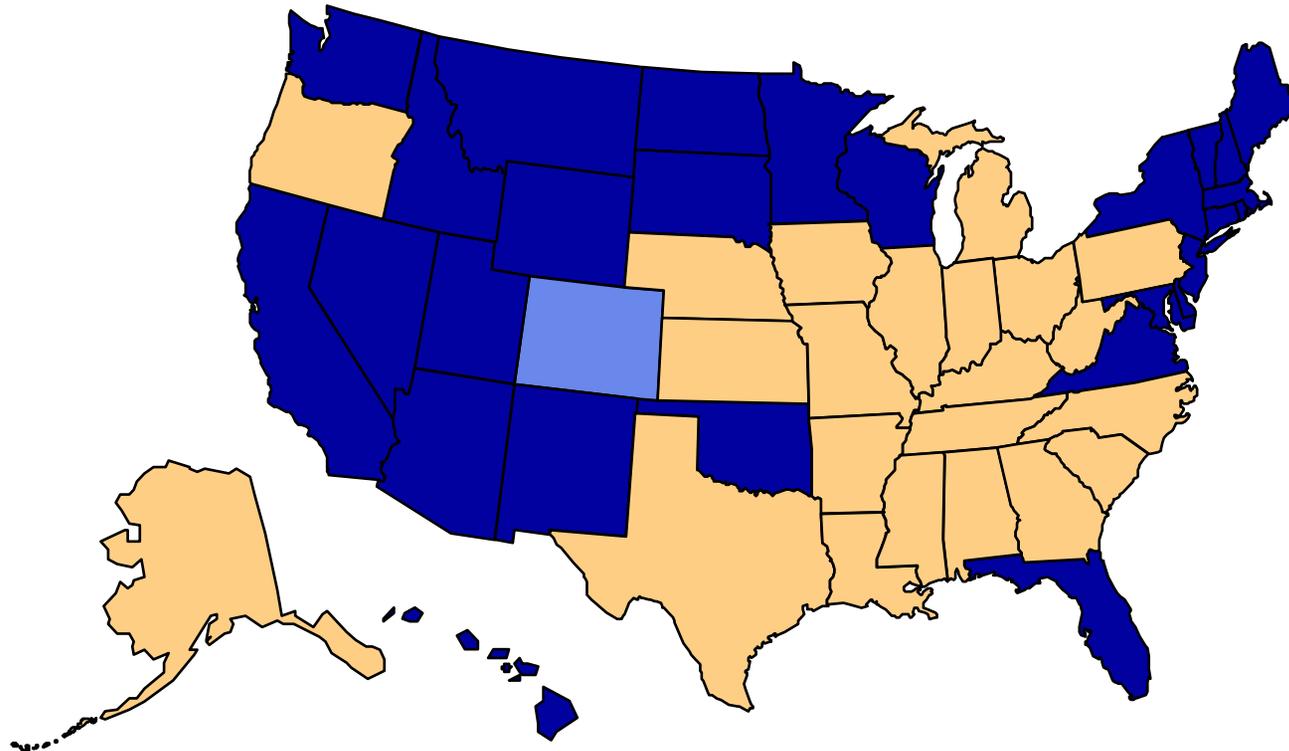
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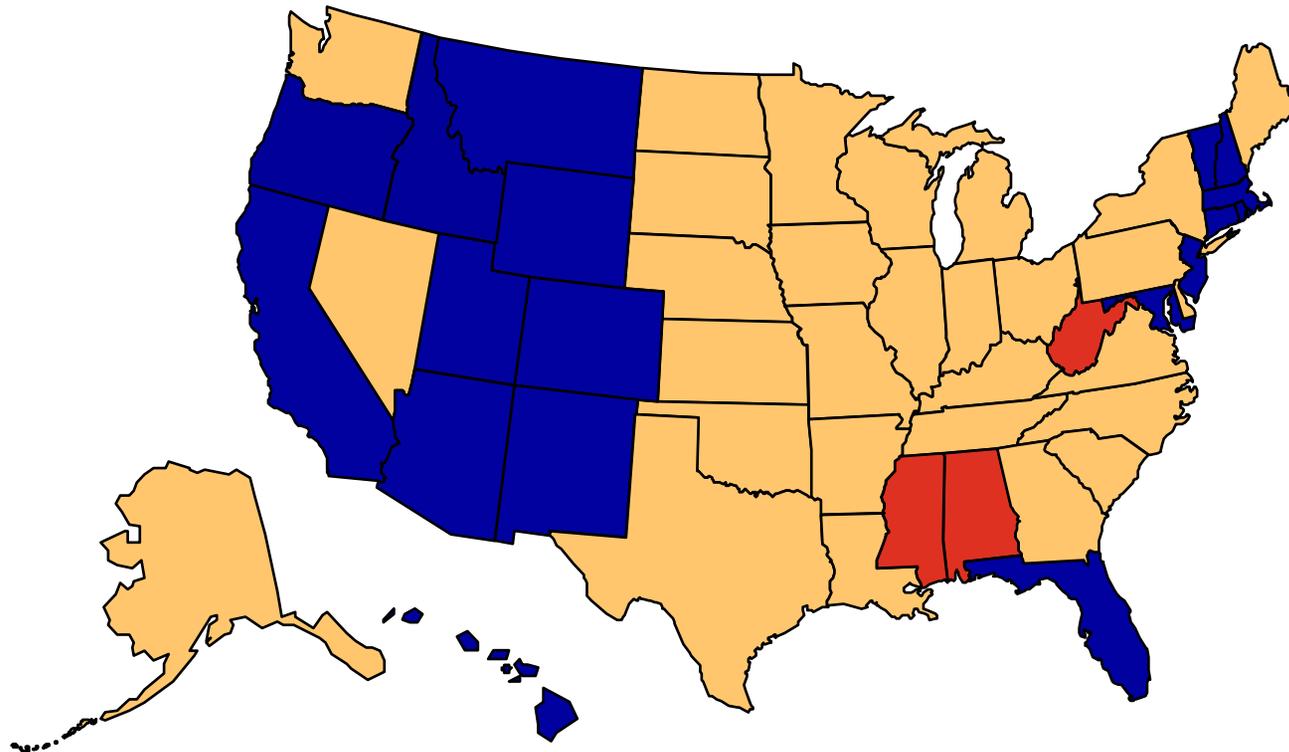
BRFSS. 2000

(*BMI ≥ 30 , or ~ 30 lbs overweight for 5'4" woman)



Obesity* Trends Among U.S. Adults

BRFSS, 2002

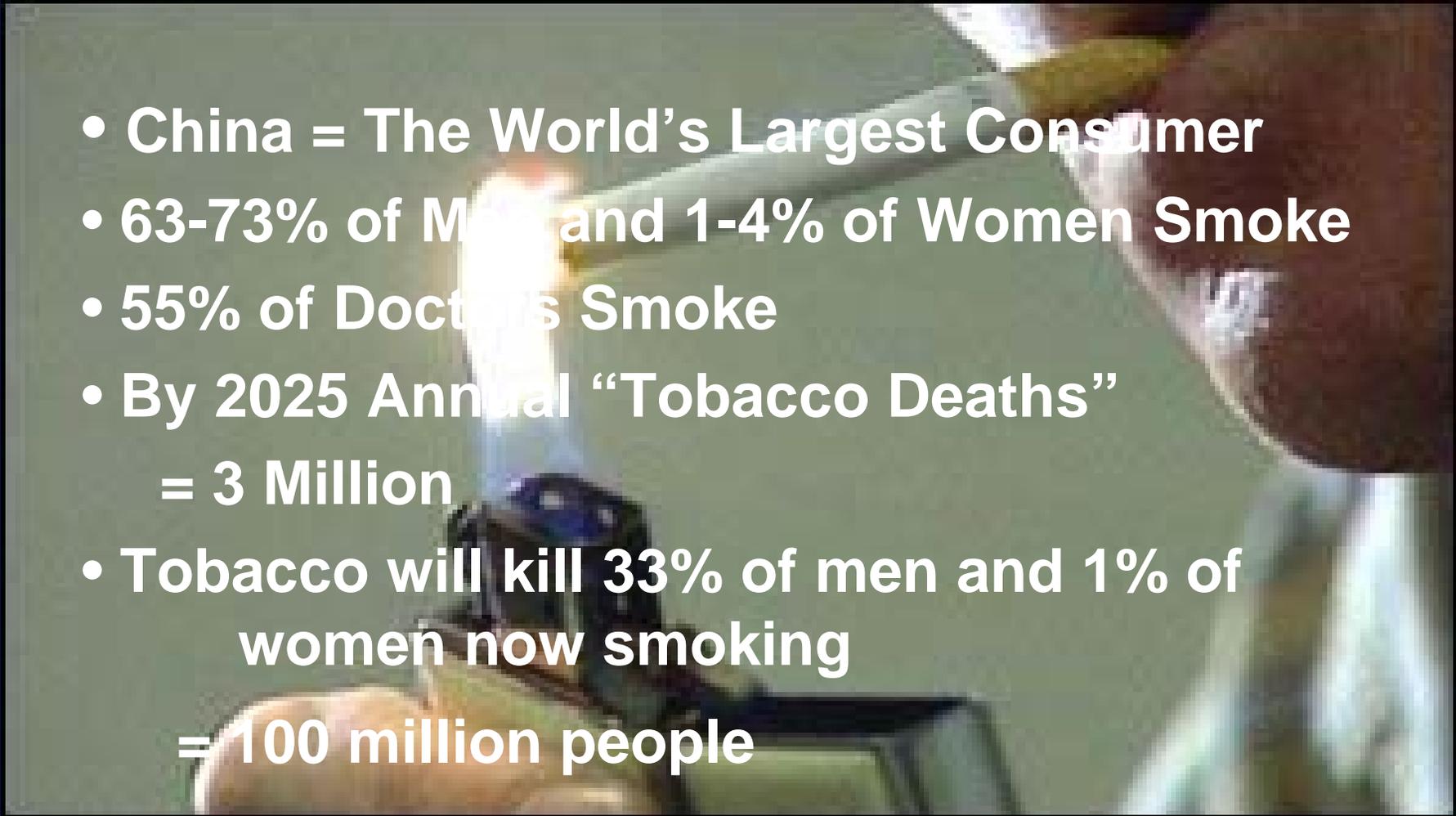


Source: Behavioral Risk Factor Surveillance System, CDC

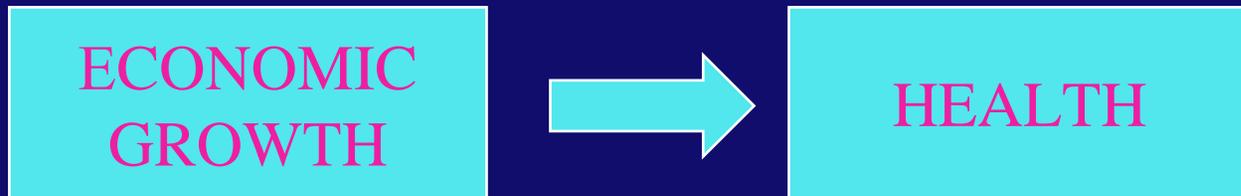
COST OF OBESITY AND TYPE 2 DIABETES – US

- Estimated 400,000 deaths per year
- Increases the risk for coronary heart disease, type 2 diabetes, and certain cancers.
- Total economic cost of obesity is \$117 billion per year (incl \$50 billion in avoid-able medical costs)
- = >5 percent of total annual health care expenditures

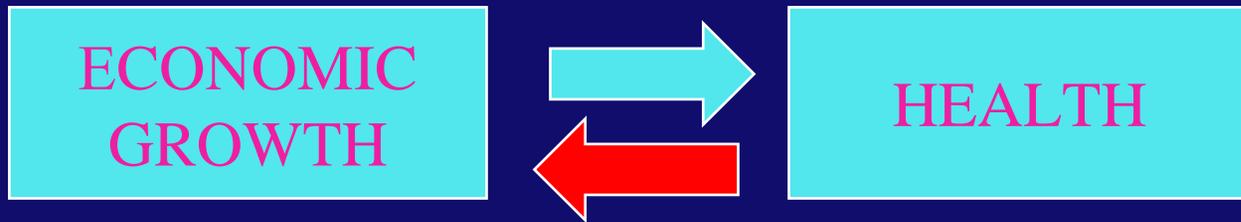
SMOKING - CHINA'S MAJOR EPIDEMIC

- 
- China = The World's Largest Consumer
 - 63-73% of Men and 1-4% of Women Smoke
 - 55% of Doctors Smoke
 - By 2025 Annual "Tobacco Deaths"
= 3 Million
 - Tobacco will kill 33% of men and 1% of women now smoking
= 100 million people

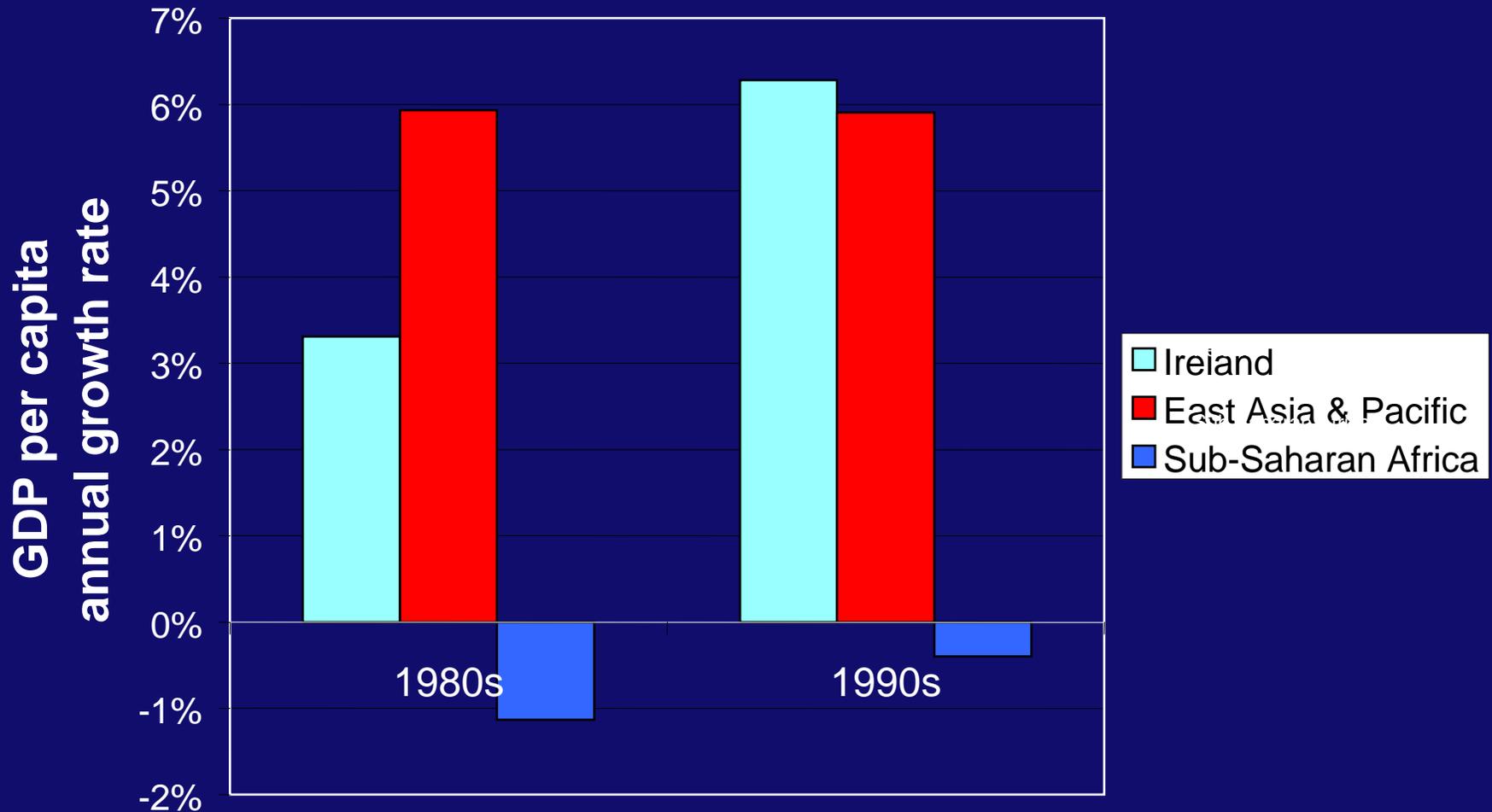
STANDARD ECONOMIC MODEL



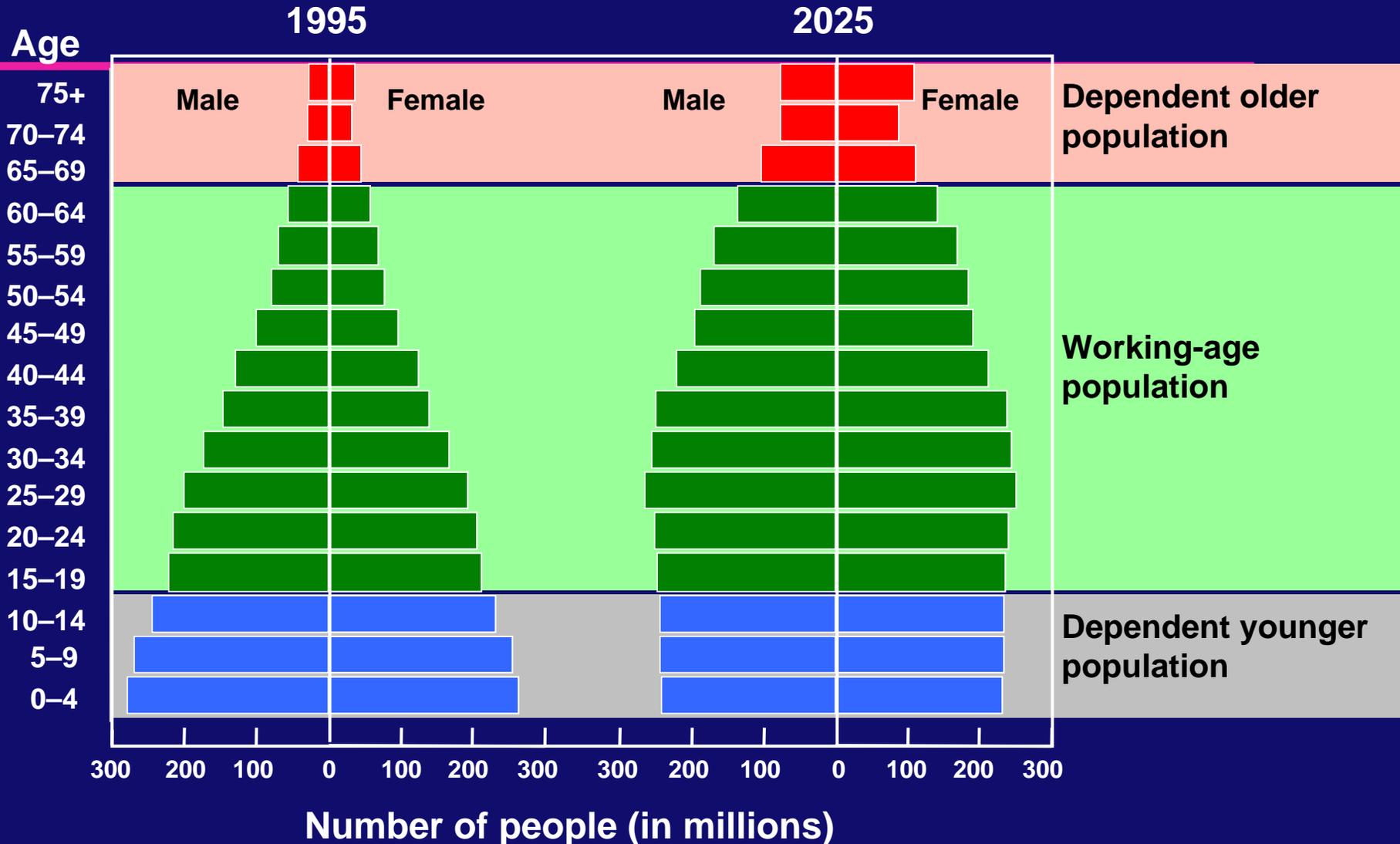
NEW ECONOMIC MODEL



ECONOMIC MIRACLES AND DEBACLES

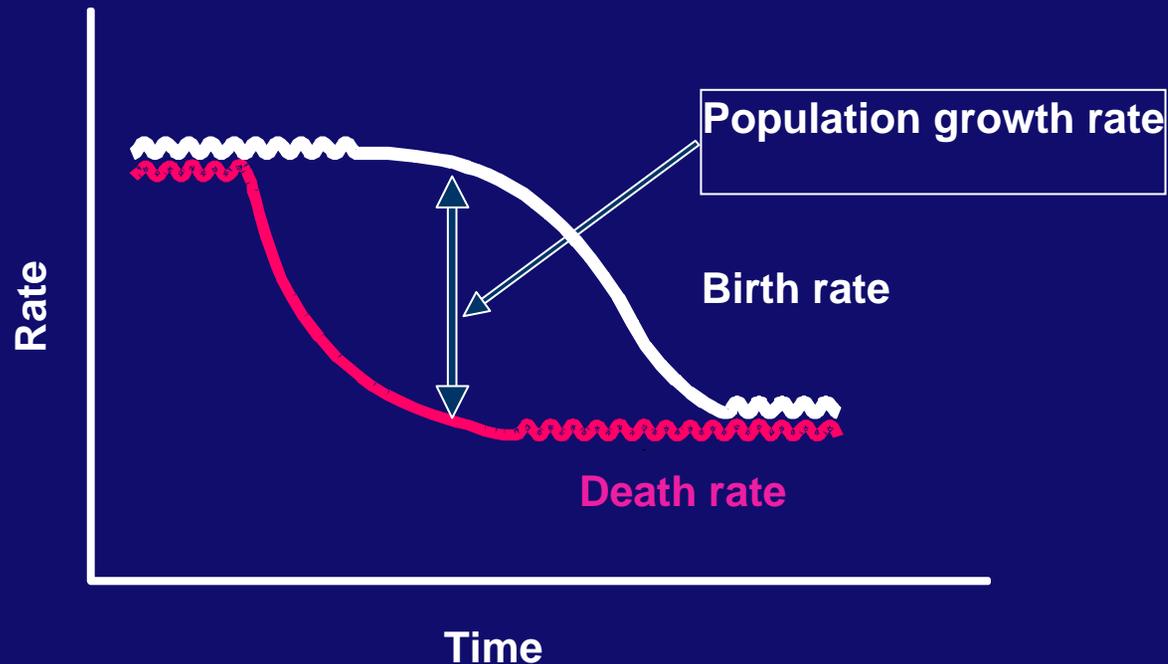


THE DEMOGRAPHIC TRANSITION PRODUCES A “BOOM” GENERATION

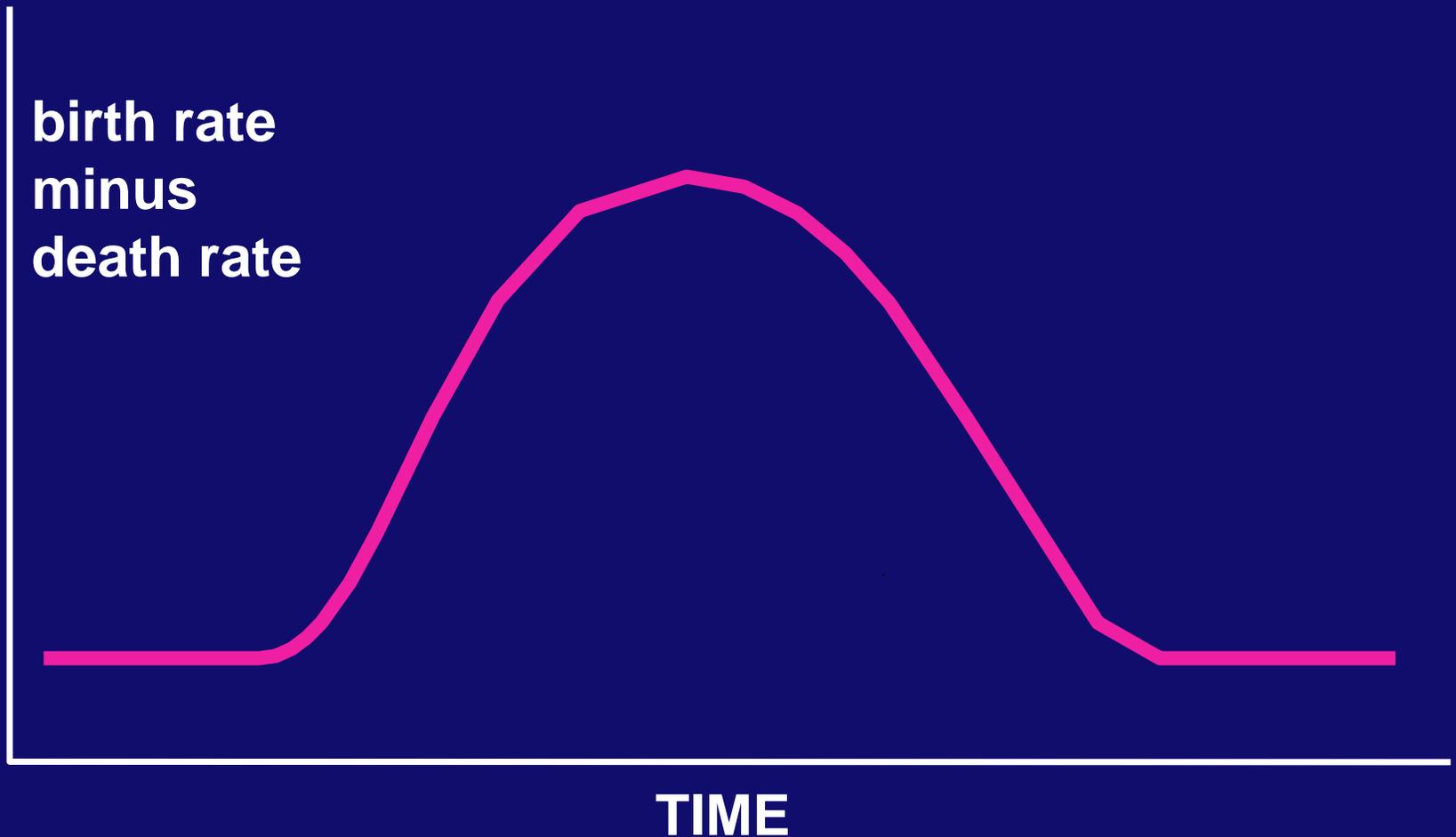


SOURCE: UN, World Population Prospects, 2000; low-fertility estimates for 2025.

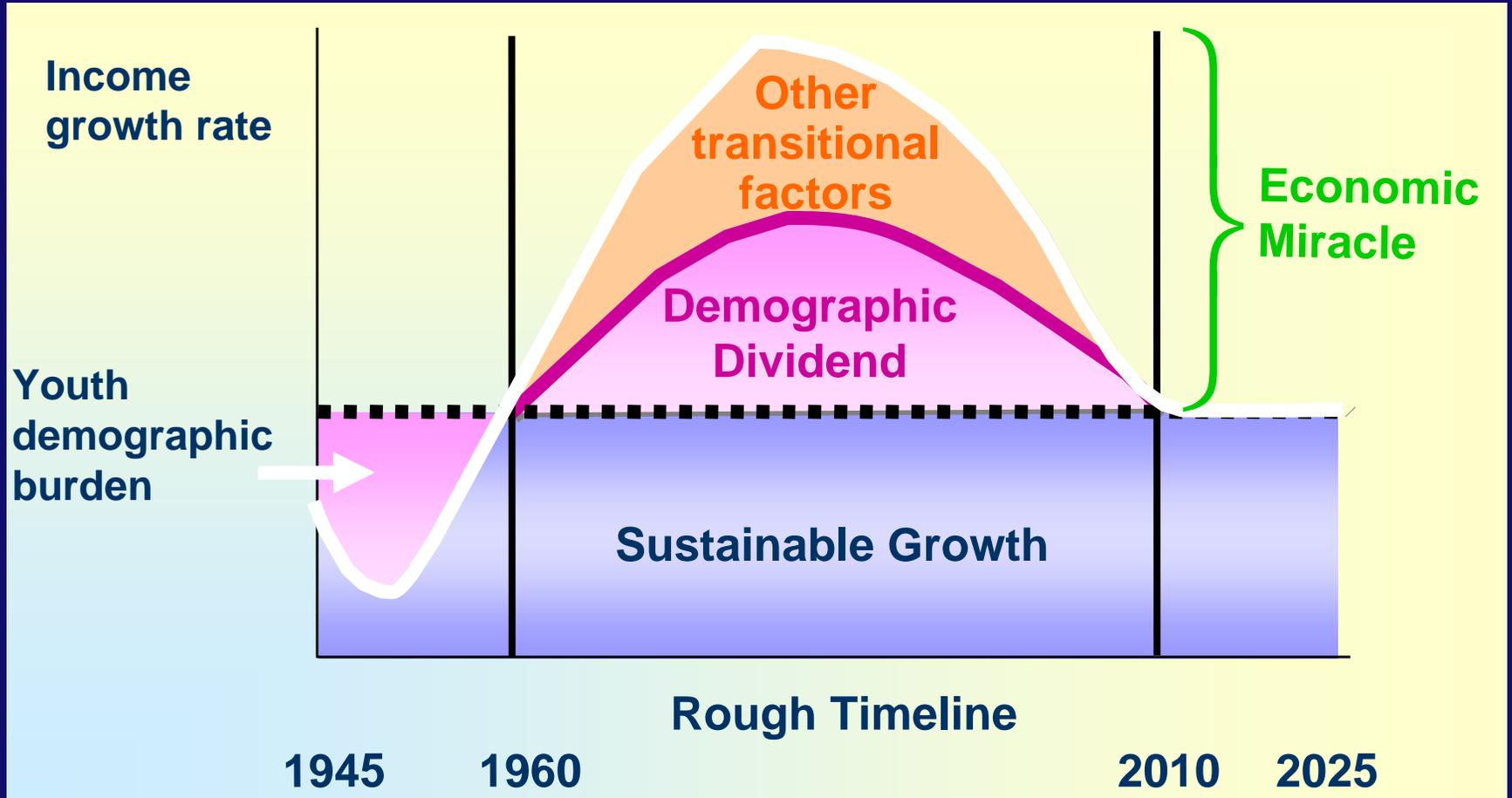
THE DEMOGRAPHIC TRANSITION: FALLING MORTALITY PRECEDES DECLINE IN FERTILITY

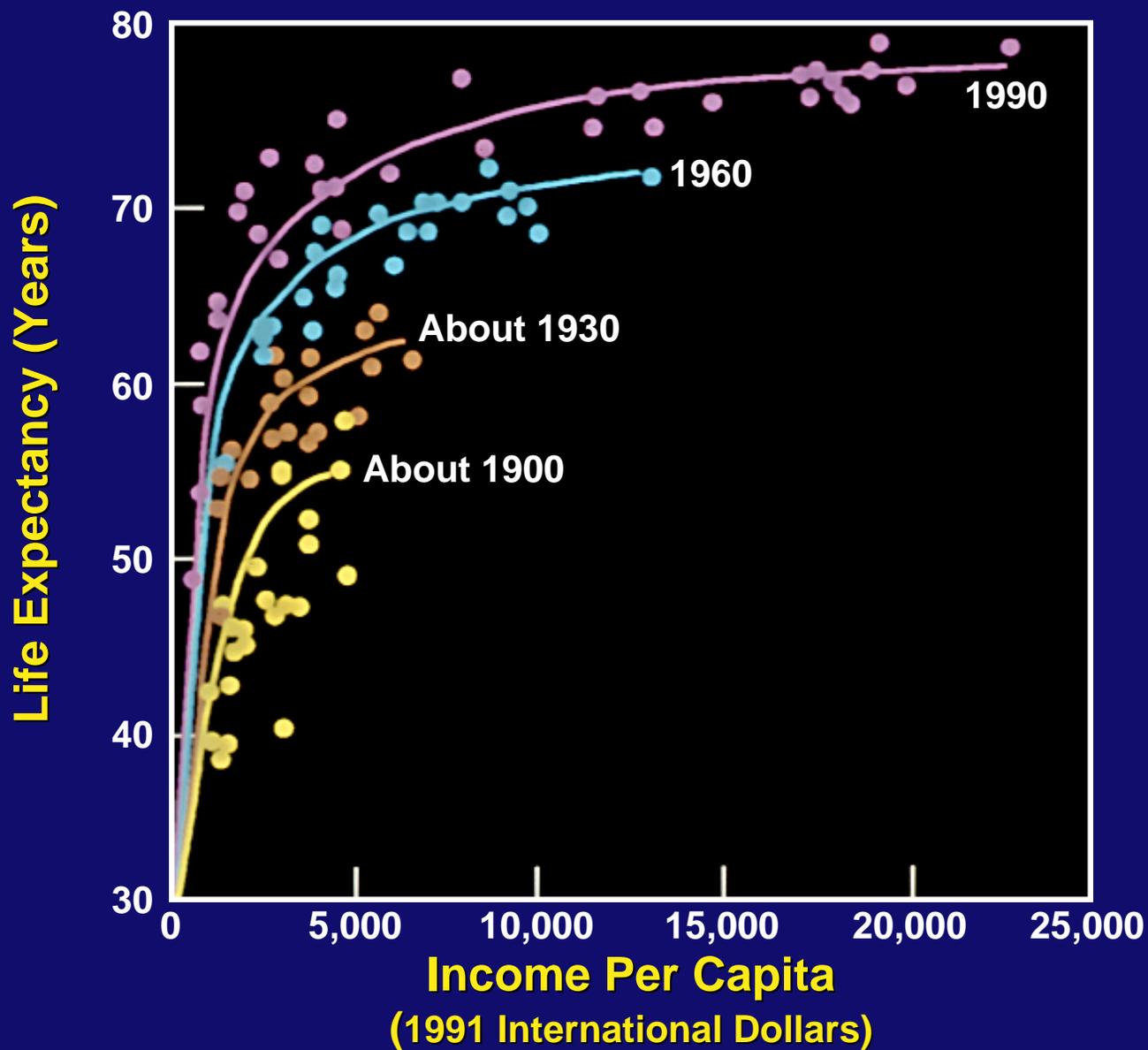


POPULATION GROWTH RATE OVER THE COURSE OF THE DEMOGRAPHIC TRANSITION



STYLIZED MODEL OF ECONOMIC GROWTH AND THE DEMOGRAPHIC TRANSITION





(International dollars are derived from national currencies by assessment of purchasing power, not by exchange rates. This measurement returns higher incomes for poorer countries.)

Source: *World Development Report 1993* p. 34.

THE BLACK DEATH, 1348

- Killed 50-70% of Europe's Urban Population
- Reduced Marginal Labor
- Increased and Stabilized Wages
- Forced Increased Productivity
- Stimulated new technology
- Led to the Founding of the Great Universities
- Killed 50-75% of Europe's Urban Population

Herlihy: The Black Death and the Transformation of Europe

“The GNP tells you everything about a country that is not important.

It does not inform about the beauty of the countryside, the joy and value of its music and art --- or the health of its children...”

*Margaret Catley-Carlson,
UN Children’s Summit, 1990*

HARVARD UNIVERSITY COMMITMENT TO GLOBAL HEALTH

“There are two major issues the world must address in the next 30 years.

- One is the expanding knowledge of the life sciences, which promises understanding of mechanisms of disease, of means to prevent and treat disease, and of functioning of the brain and ultimately the mind.
- The second is the increasing disparities in quality of life between and within countries.
- Global Health stands as the fulcrum linking these global agendas.”

Lawrence H. Summers

President, Harvard University