

# **Interactions: Health and Wealth**

Kevin Chan, MD, MPH, FRCPC, FAAP

Assistant Professor, University of Toronto and Hospital  
for Sick Children and Fellow,  
Munk Centre for Global Studies

August 2012

Prepared as part of an education project of the Global Health  
Education Consortium and collaborating partners

# Learning Objectives

This module looks at interactions between health and wealth. In particular, it concentrates on 4 possible mechanisms between wealth to health, and 4 possible mechanisms from health to wealth. It concludes by looking at 3 major diseases, Malaria, TB, and HIV/AIDS, to see what relationships exist between health and wealth. Specific objectives are to look at.....

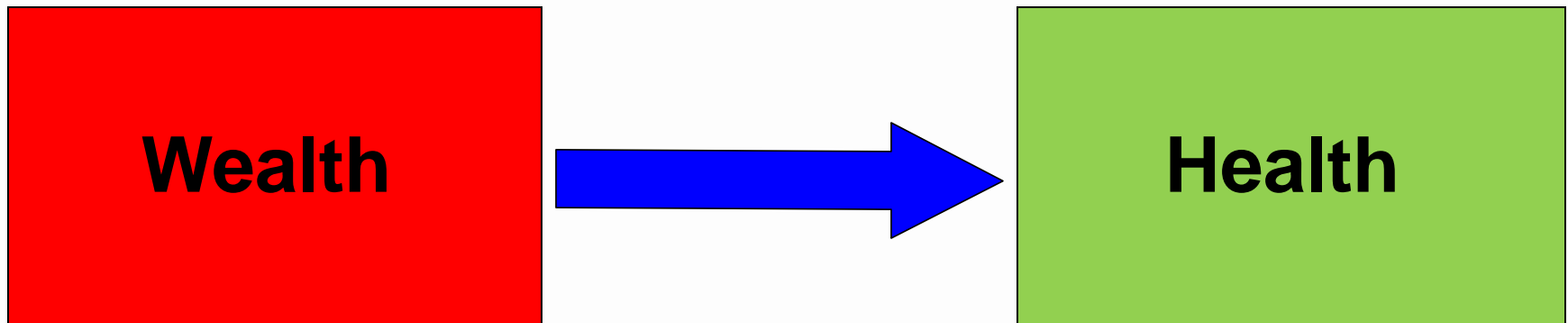
- Relationships between health and wealth via the Preston Curve
- Possible mechanisms of wealth to health
- Possible mechanisms of health to wealth
- Malaria, TB, and HIV/AIDS effects on economic growth and wealth

## Case Study

You are the minister of planning in a sub-Saharan Africa country, ravaged by HIV/AIDS. You feel that growth is inhibited by the problems of HIV/AIDS.

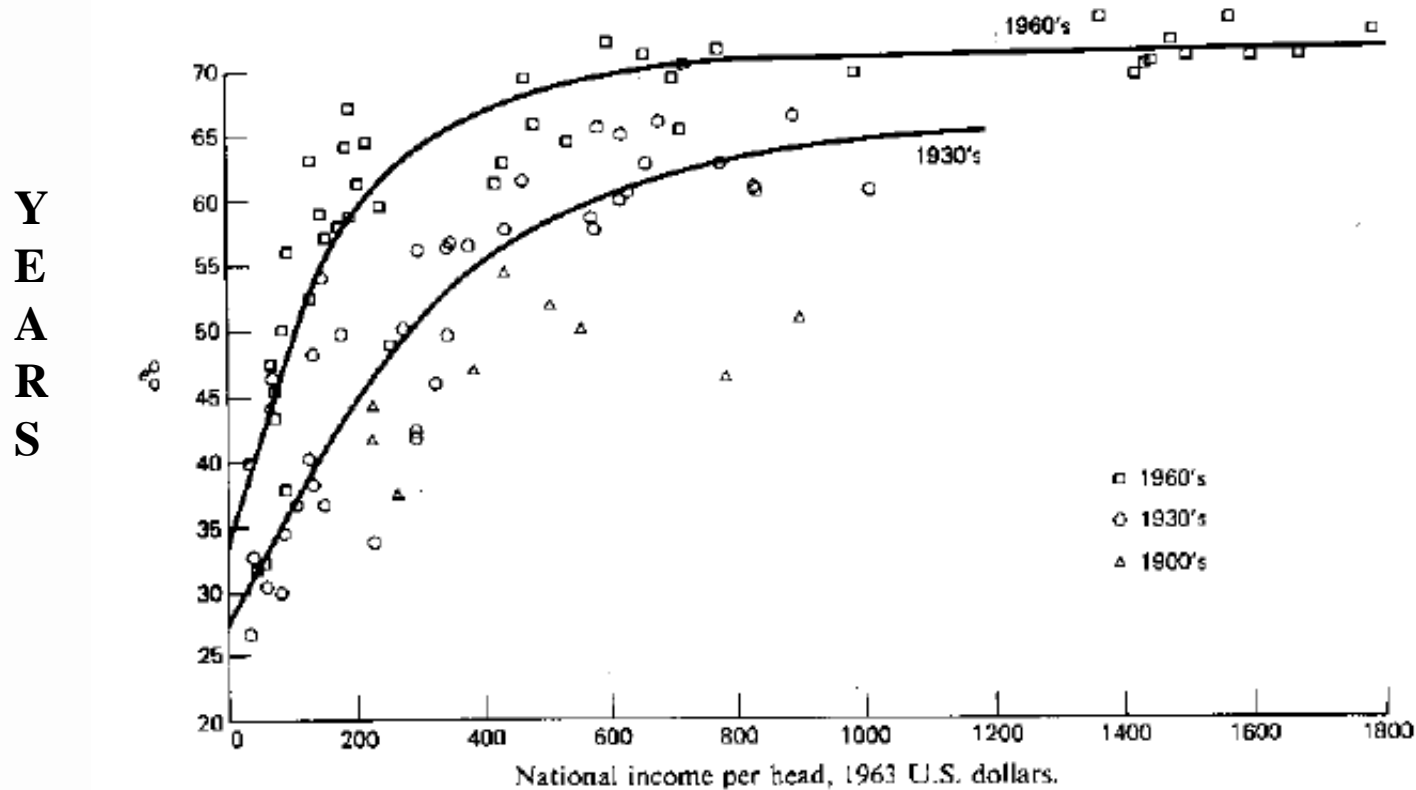
What evidence do you have that could support increasing spending in health to help reduce poverty and increase national economic growth?

# Wealth to Health



# Preston Curve (1975)

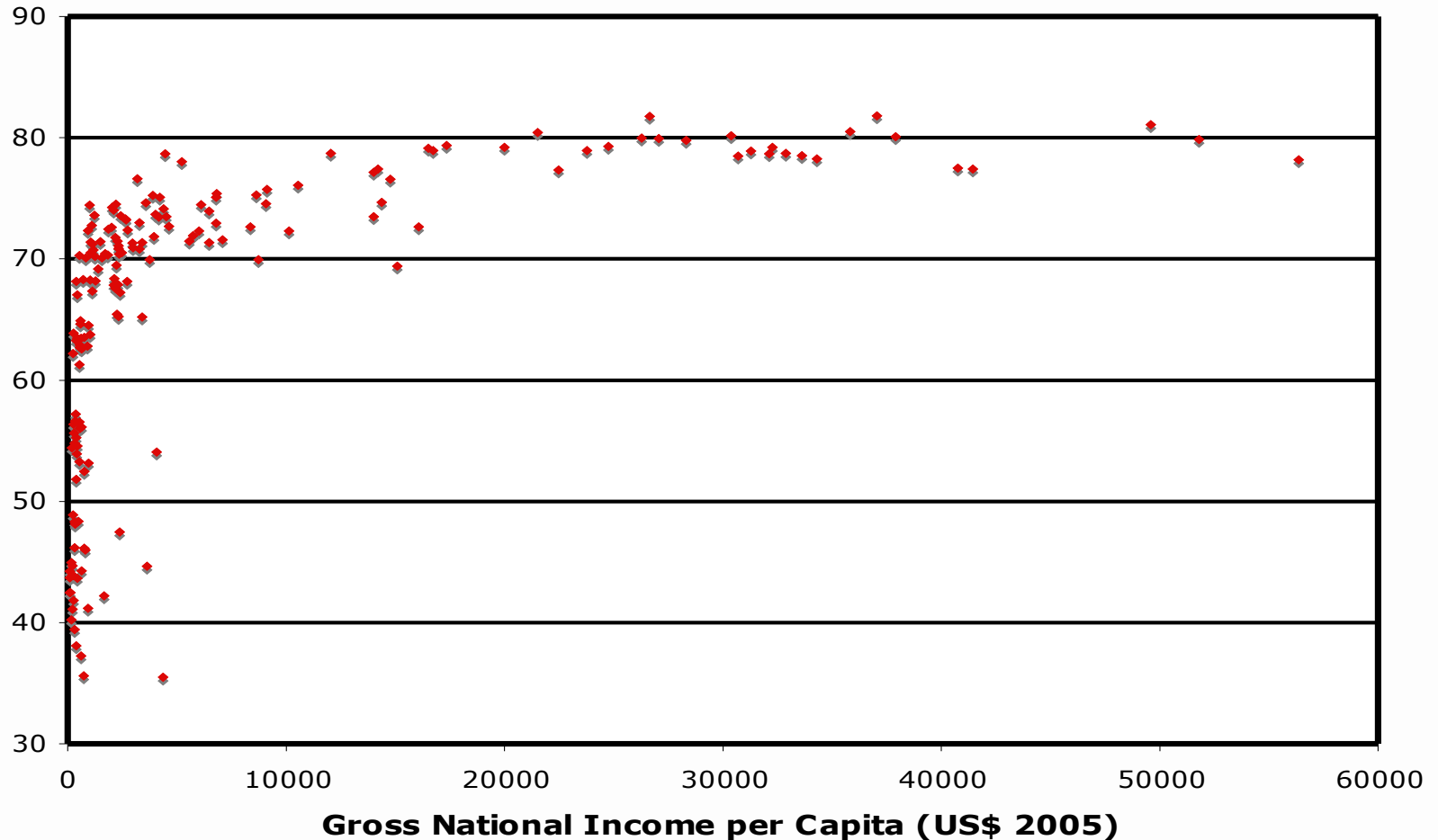
Scatter-diagram of relations between life expectancy at birth ( $e_0$ ) and national income per head for nations in the 1900s, 1930s, and 1960s.



## **Preston's Claim:**

**“Economic advance was not an essential prerequisite to a major increase in life expectancy.”**

# Preston Curve Plot (2006)



## **“Wealthier Is Healthier”**

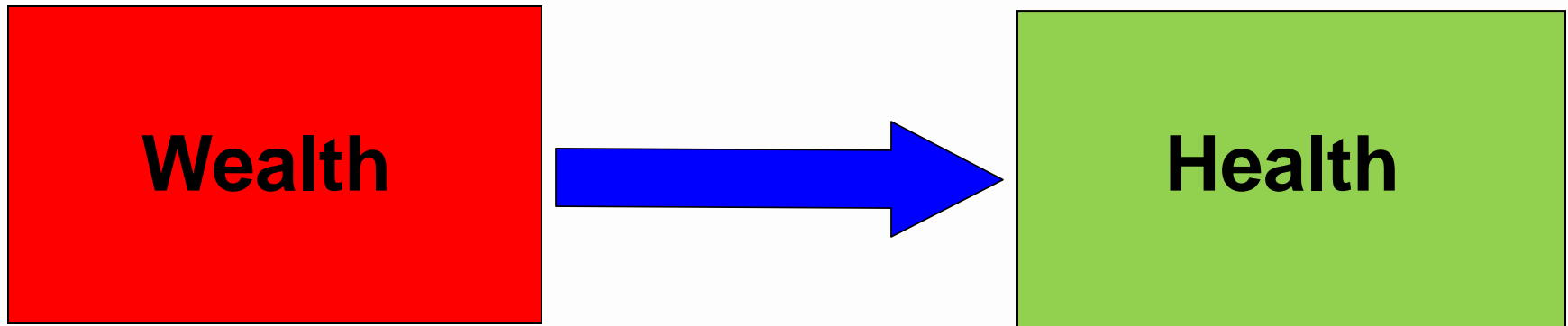
- 1996 article by Lant Pritchett and Larry Summers
- 40% of cross-country differences in mortality is explained by the difference in country's income growth rates
- A 1% increase in income in developing countries would decrease 33,000 infant deaths and 53,000 child deaths annually.



# Income Inequality Can Lead to Poor Health

- Whitehall Study of 10,000 British Civil Servants
  - 3.5 times difference in the mortality between lower grade workers and senior administrators
- Wilkinson
  - High incomes lead to high life expectancy
  - Greater inequality has a negative impact on average life expectancy

## Wealth to Health Mechanisms



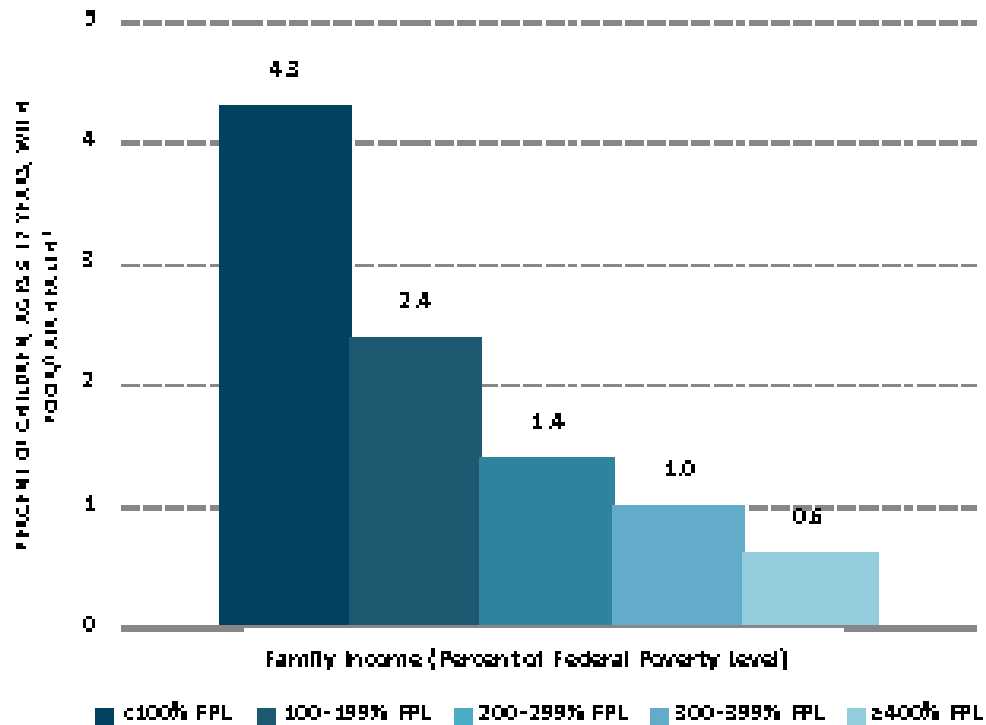
Better Health Care

Better Nutrition

Better Water and Sanitation

Better Housing

# Relationship of Wealth to Health



Source: National Health Interview Survey, 2001-2005. \*Age-adjusted

**Source:** Braveman P, Egerter S, Barclay C. “How Social Factors Shape Health”. Robert Wood Johnson Foundation, 2011. Figure 1. Percentage of Children with Poor/Fair Health per Income Quintile.

## Better Health Care

- For fee for service, can buy health services
- Buy health insurance to get access to hospitals
- Purchase drugs
- Gain access to health education and health prevention/promotion materials



## Better Nutrition

- Wealth can buy more food (increasing calories)
- Lead to better food choices
- For mothers, calories and micronutrient protection
  - Preventing Intergenerational health problems (Barker hypothesis)



Source: [http://www.foodhealth.info/images/organic\\_food.jpg](http://www.foodhealth.info/images/organic_food.jpg)

## Better Water and Sanitation

- More wealth can lead to better water supplies, protection, and to building pits and latrines. These measures will decrease gastroenteritis and many other diseases that are transmitted through water supplies.



# Improved Housing

Improved housing decreases stress and the likelihood of contamination from diseases such as tuberculosis, which can improve overall health. It may also provide strong social networks and communities that can help increase health education, health promotion, and provide social support in times of ill health.



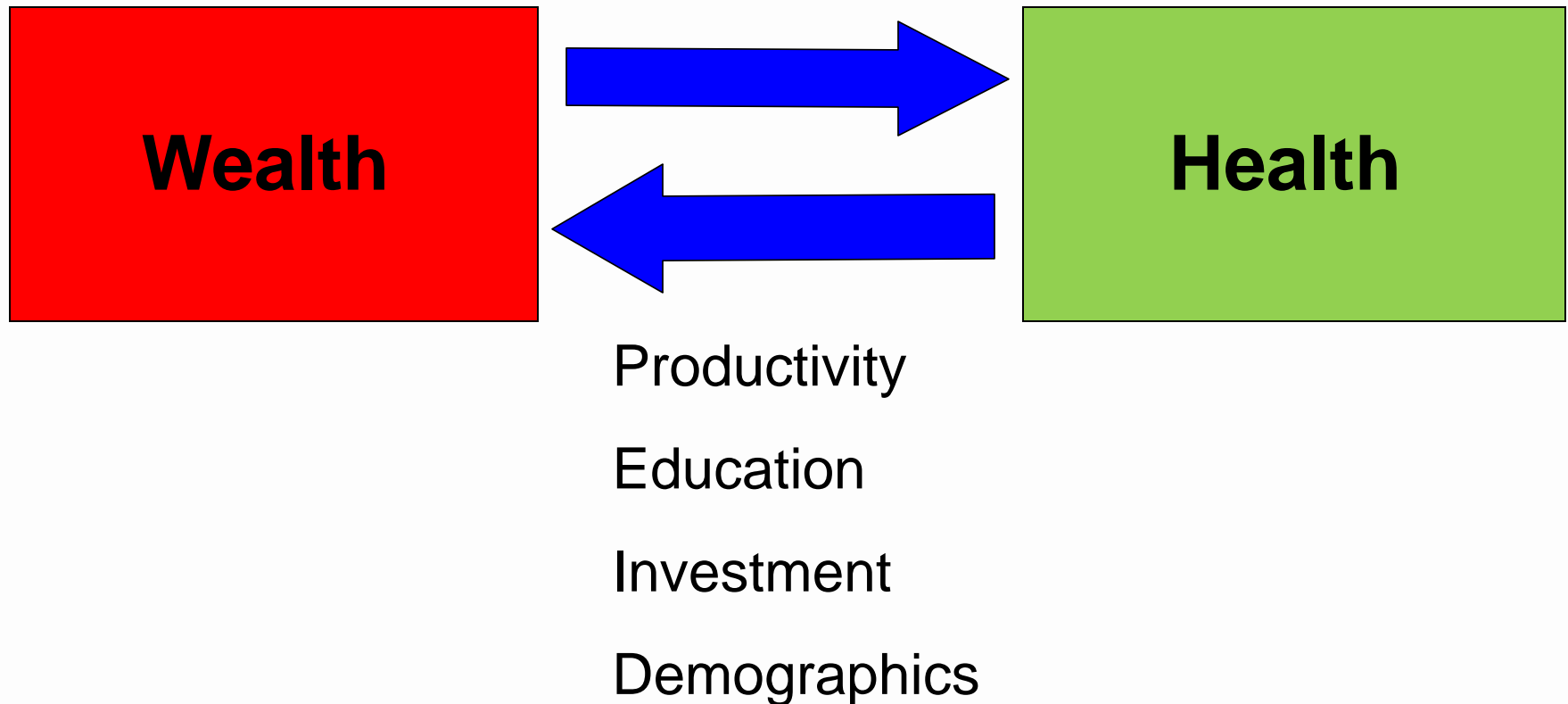
Source: <http://images.jungleboffin.com/image.php?h=300&src=/images/metro/south.africa.house.3.jpg>

# Macroeconomic Commission on Health

- Started in 2000 by WHO, led by Jeffrey Sachs, development economist
- Puts health in the broader context of development
  - Engages Ministers of Finance and Ministers of Planning
- Brings different sectors together
- Focused on how health impacts wealth



# Health to Wealth



# Role of Health in Improving Productivity

- Healthier individuals are more productive
- Less likely to miss work
- Less time needed to take care of ill family members
  
- Challenge in distinguishing genetic versus social components of health.



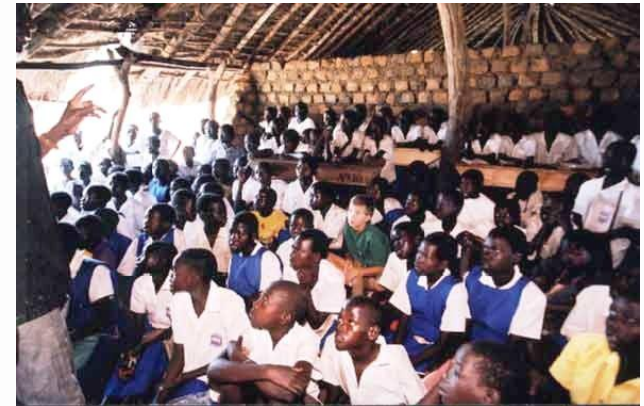
Source: [http://www.darjeelingcuppa.com/wp-content/uploads/2007/03/makaibari\\_tea\\_laborers.jpg](http://www.darjeelingcuppa.com/wp-content/uploads/2007/03/makaibari_tea_laborers.jpg)

# Evidence of Health Increasing Productivity

- Communicable disease in developing countries affects all age groups
  - Non-communicable disease in developed countries, primarily affects the elderly
  - Since developing countries are more labor-intensive, poor health disproportionately hurts developing countries
- Increased BMI and height associated with increased wages
- Increased life expectancy by 1 year, increases gross national income per capita by 4%
- Eradicating hookworm contributed to 45% increase in wages at start of 20th century in the American South

# Increased Investment in Human Capital

- Decreased life expectancy decreases human capital investment
- Sicker children less likely to go to school and/or will miss more days
- Poor health decreases learning capacity
  - Early malnutrition and childhood disease can impact irreversibly brain development
- Sick children start school later
- Males generally healthier
- Poor schooling means poor wages and economic development



Source: [www.ryanswell.ca](http://www.ryanswell.ca)

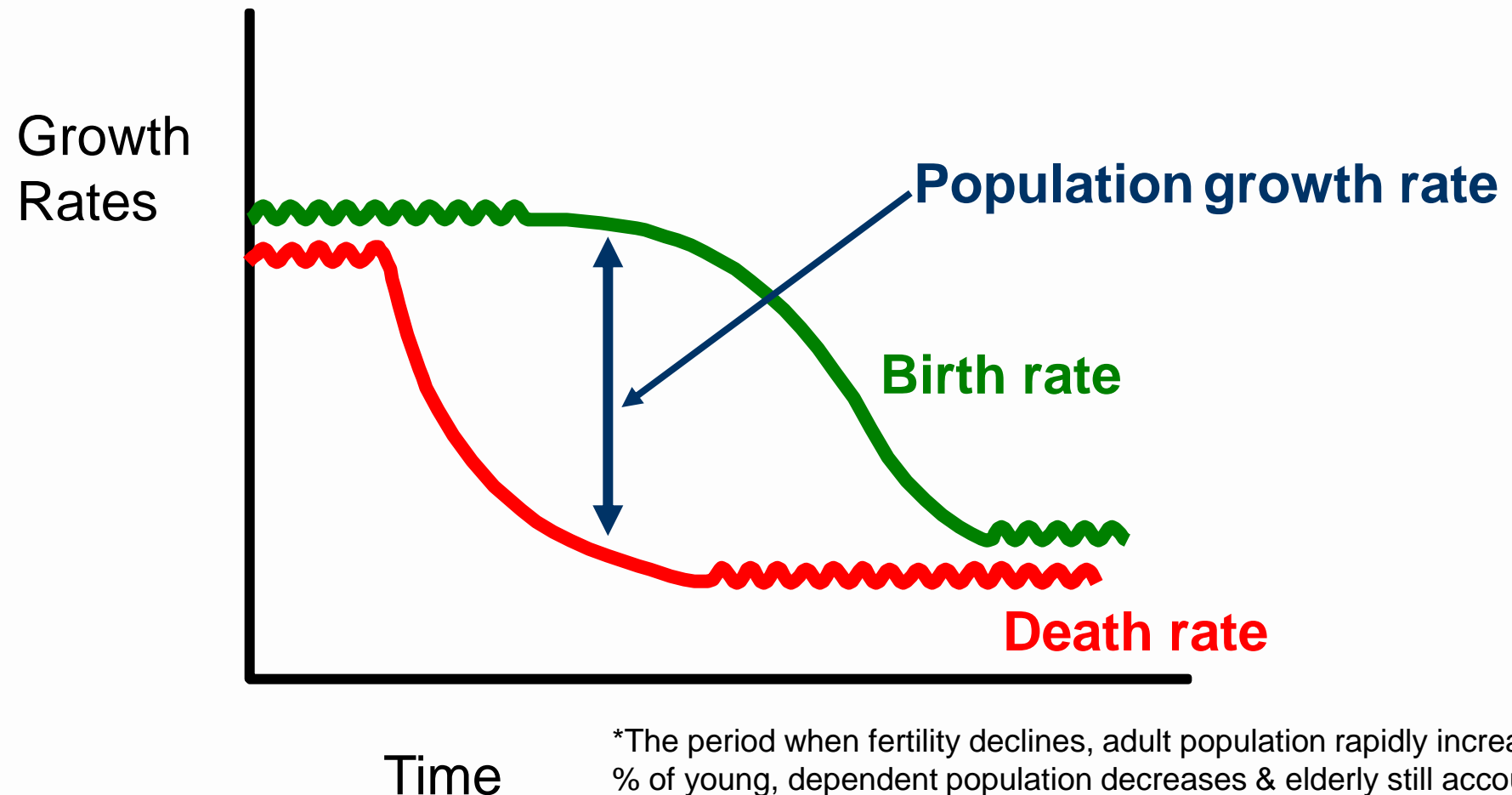
# Increased Investment in Physical Capital

- Short life expectancy reduces time to recuperate investment costs.
- Long life expectancy increases savings and investment
- Costs of identifying and treating disease
- Disease decreases savings
- Threat of poor health can decrease investment and tourism



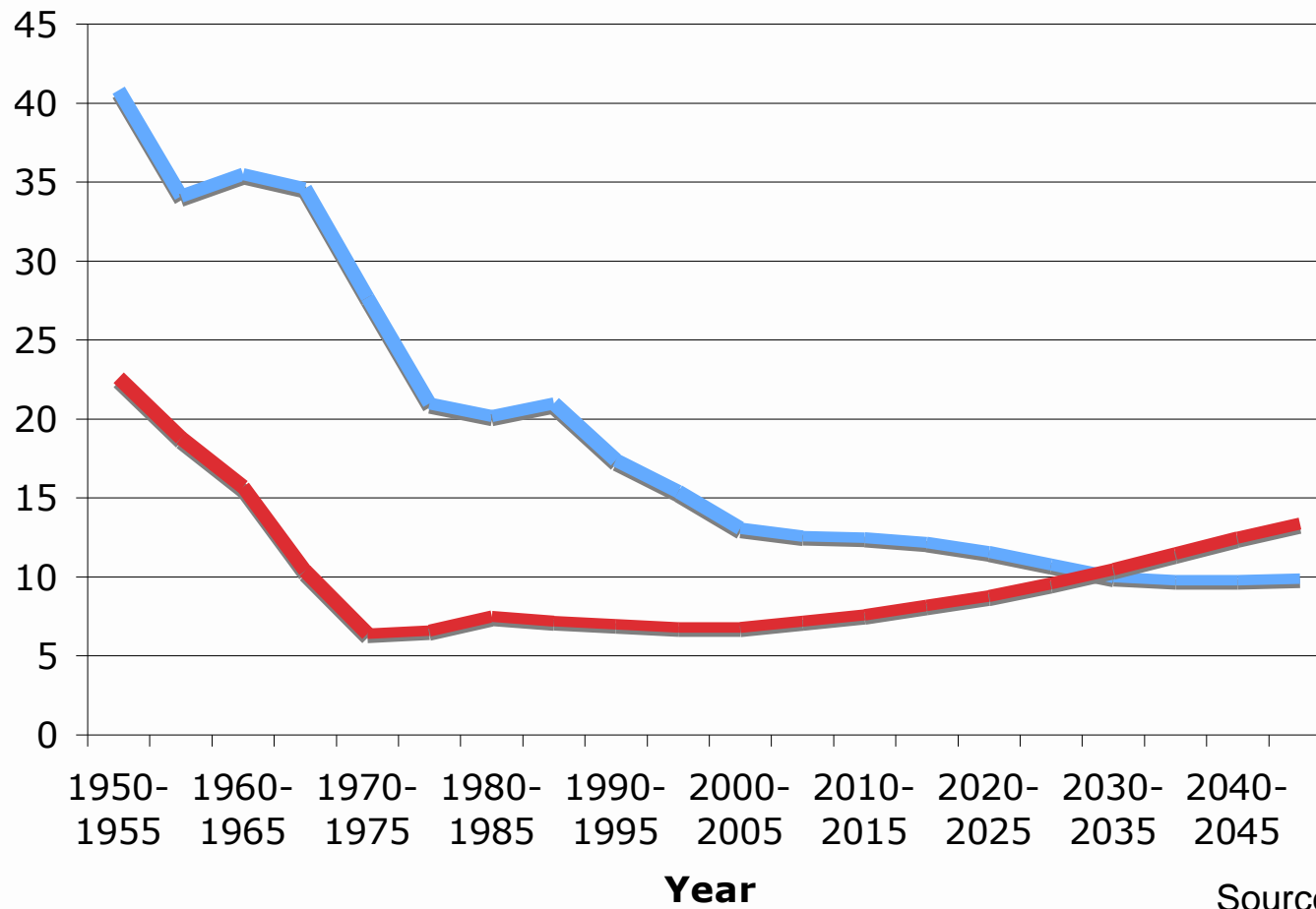
Source: <http://images.jupiterimages.com/common/detail/06/10/22281006.jpg>

# Capturing the Demographic Dividend\*



\*The period when fertility declines, adult population rapidly increases, % of young, dependent population decreases & elderly still account for only a small %

# Crude Birth and Death Rates, East Asia

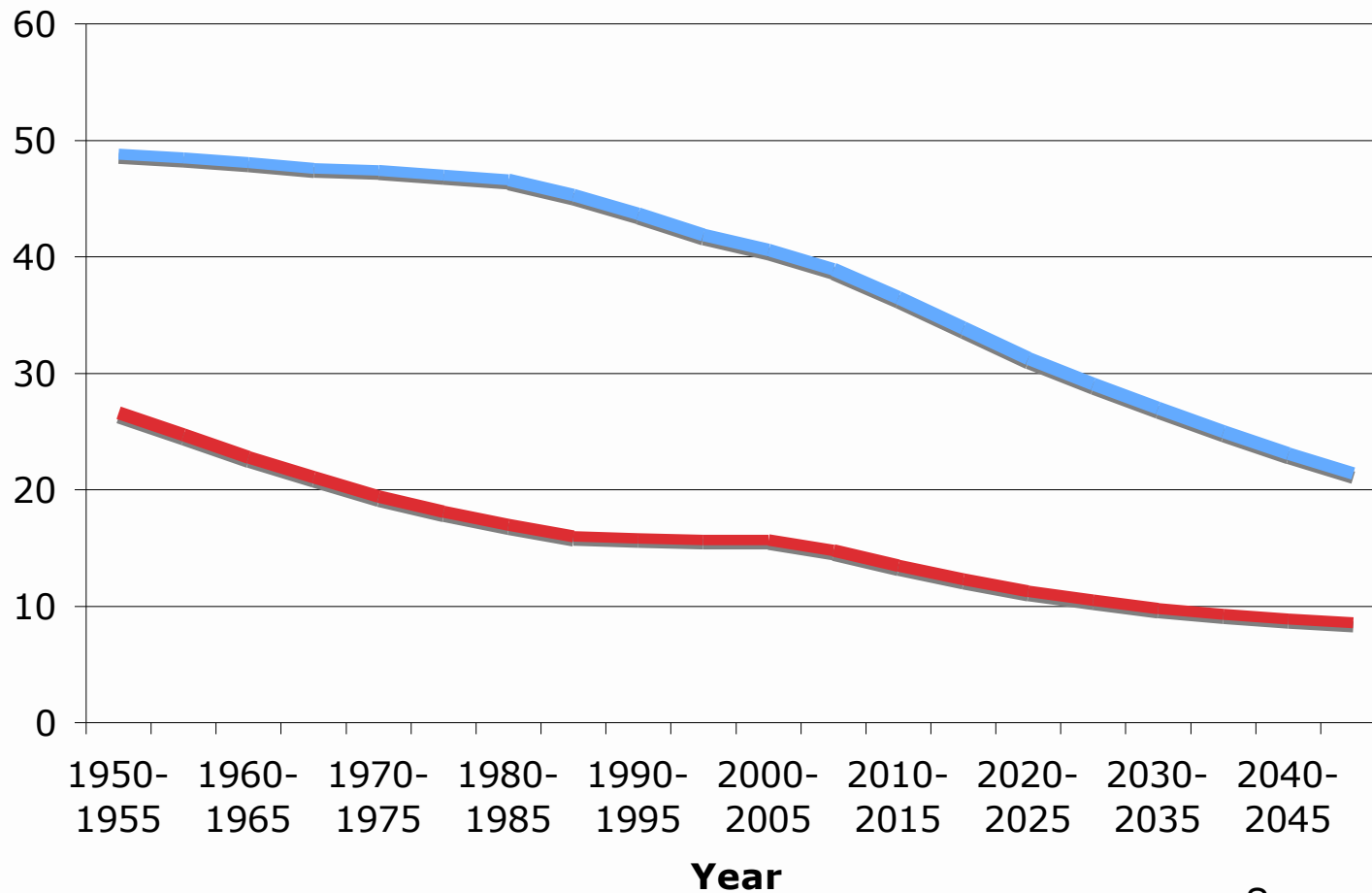


Initially there are more births than deaths but by 2020-30 the gap is closed or even reversed

— Crude Death Rate — Crude Birth Rate

Source: World Population Prospects 2006

# Crude Birth and Death Rates, Sub-Saharan Africa



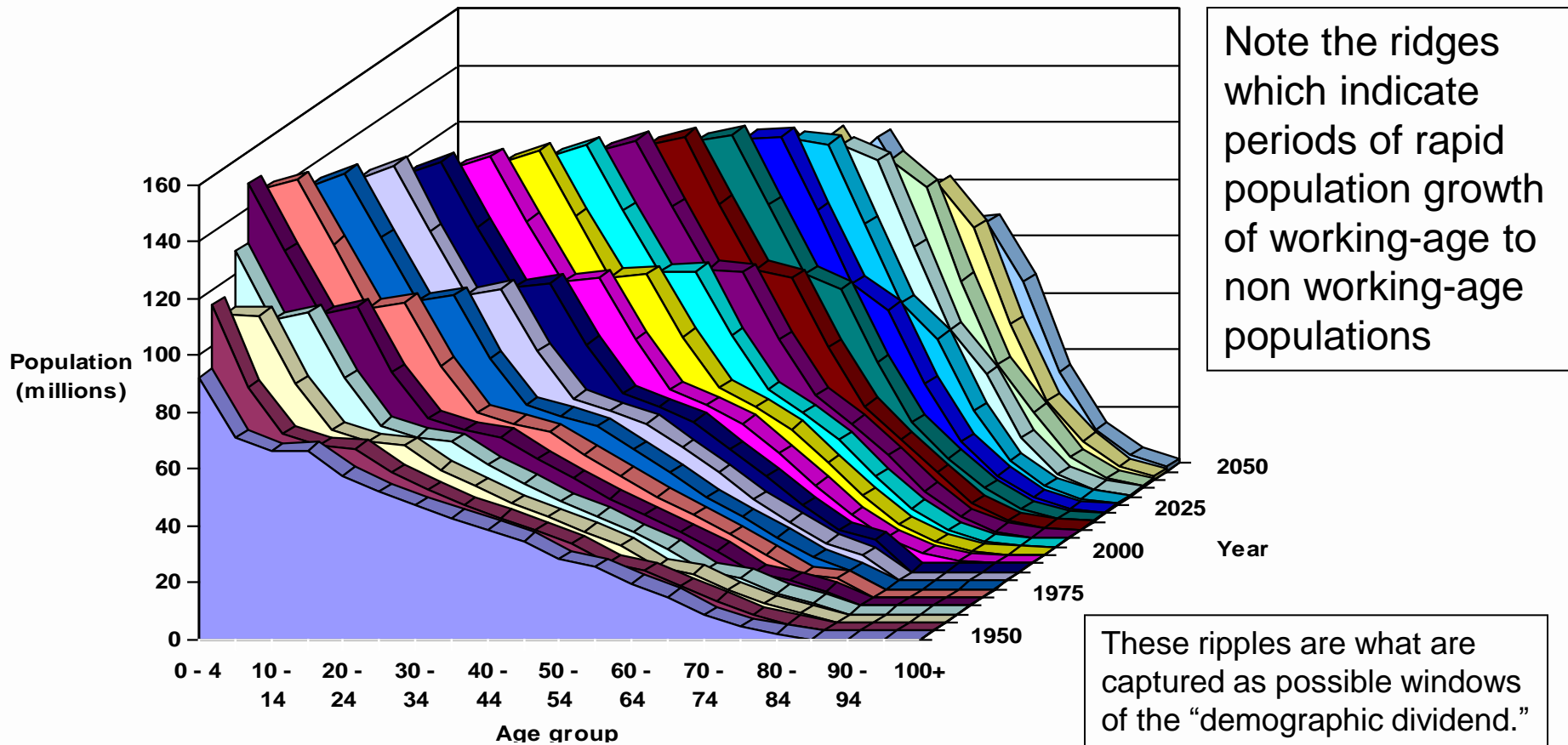
In Sub-Saharan Africa the birth-death gap remains without closure

— Crude Birth Rate — Crude Death Rate

Source: World Population Prospects 2006

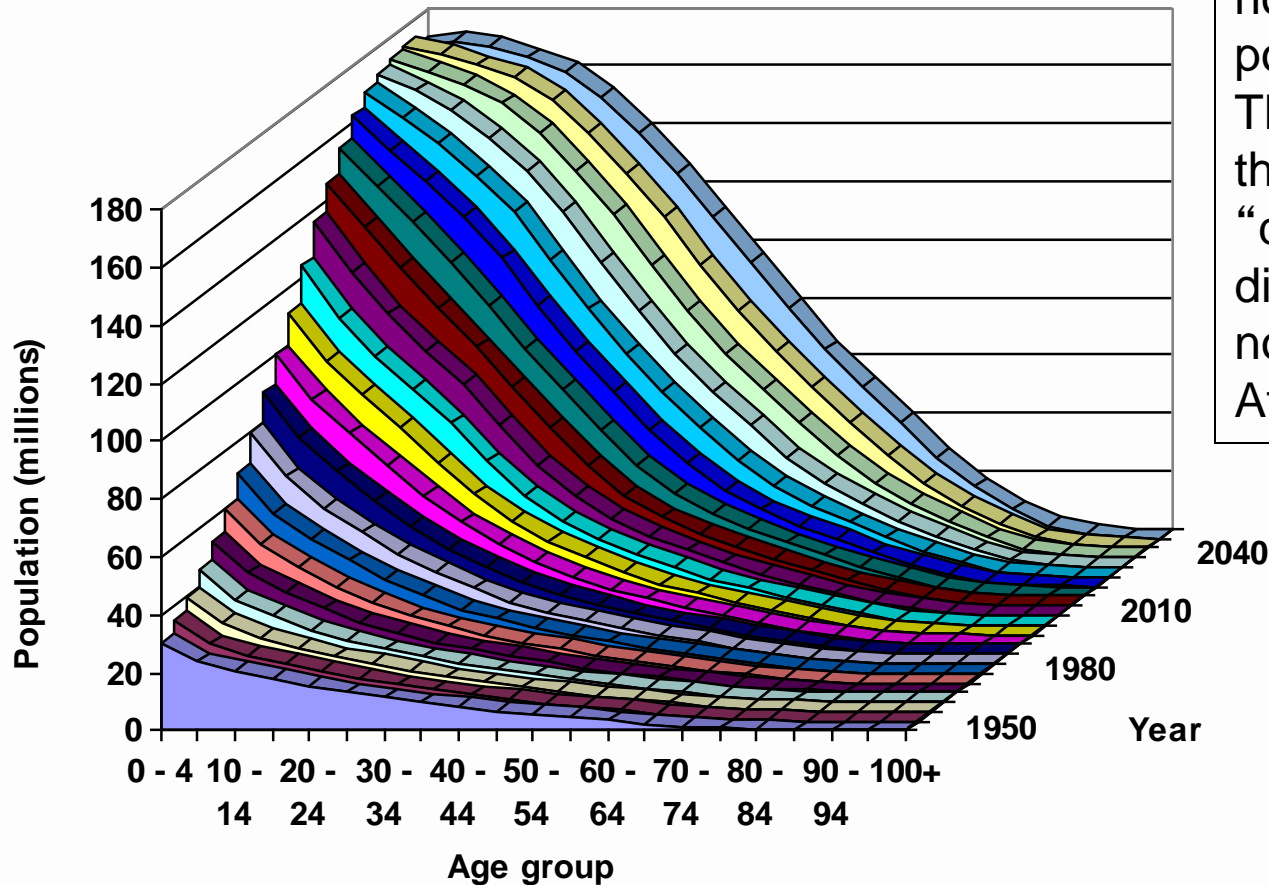


# East Asia's Population



Source: UN, World Population Prospects: The 2000 Revision

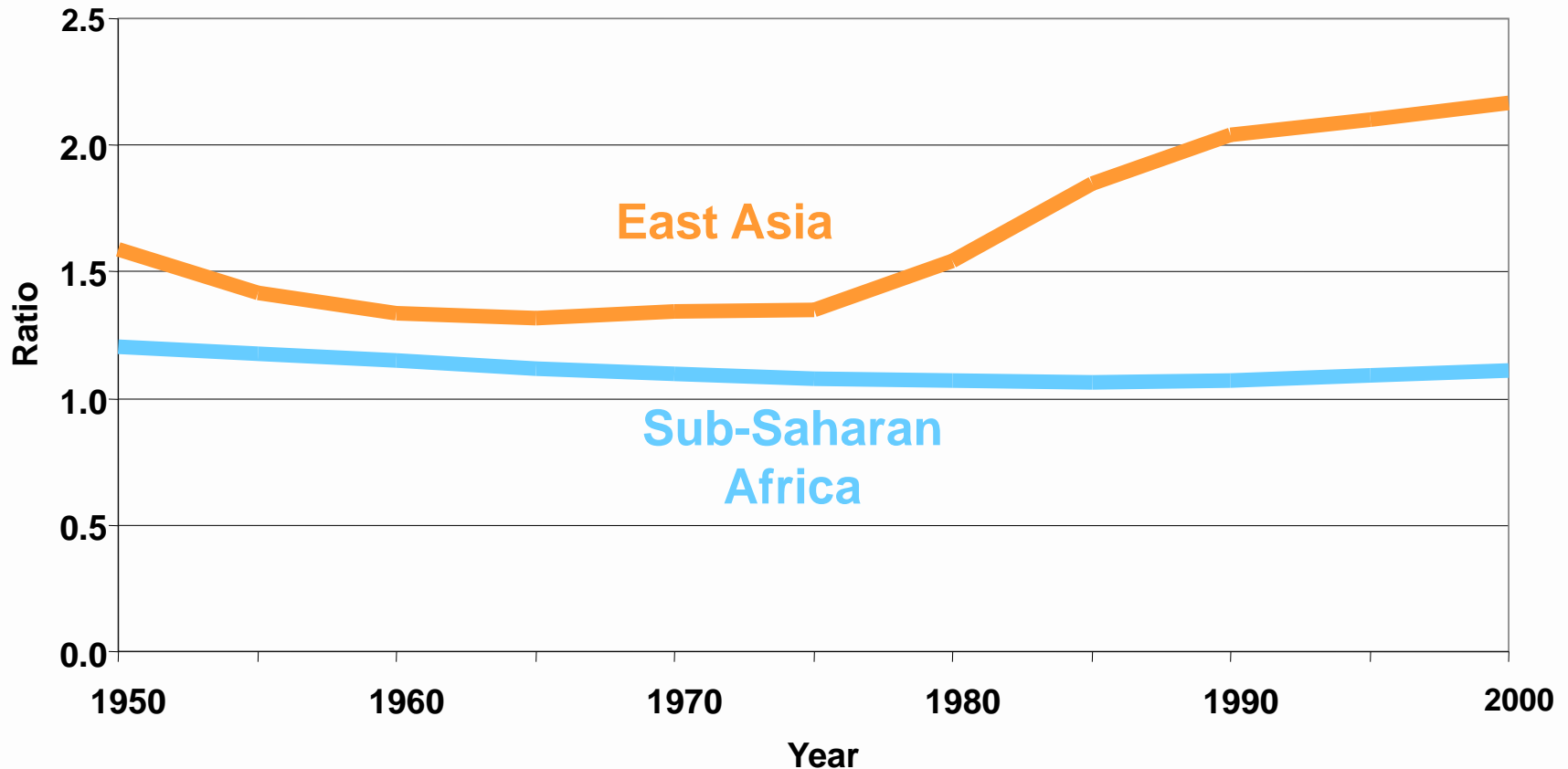
# Sub-Saharan Africa's Population



Note the lack of ridges implying no bursts of rapid population growth. This implies that the capture of the “demographic dividend” is not now possible in Africa.

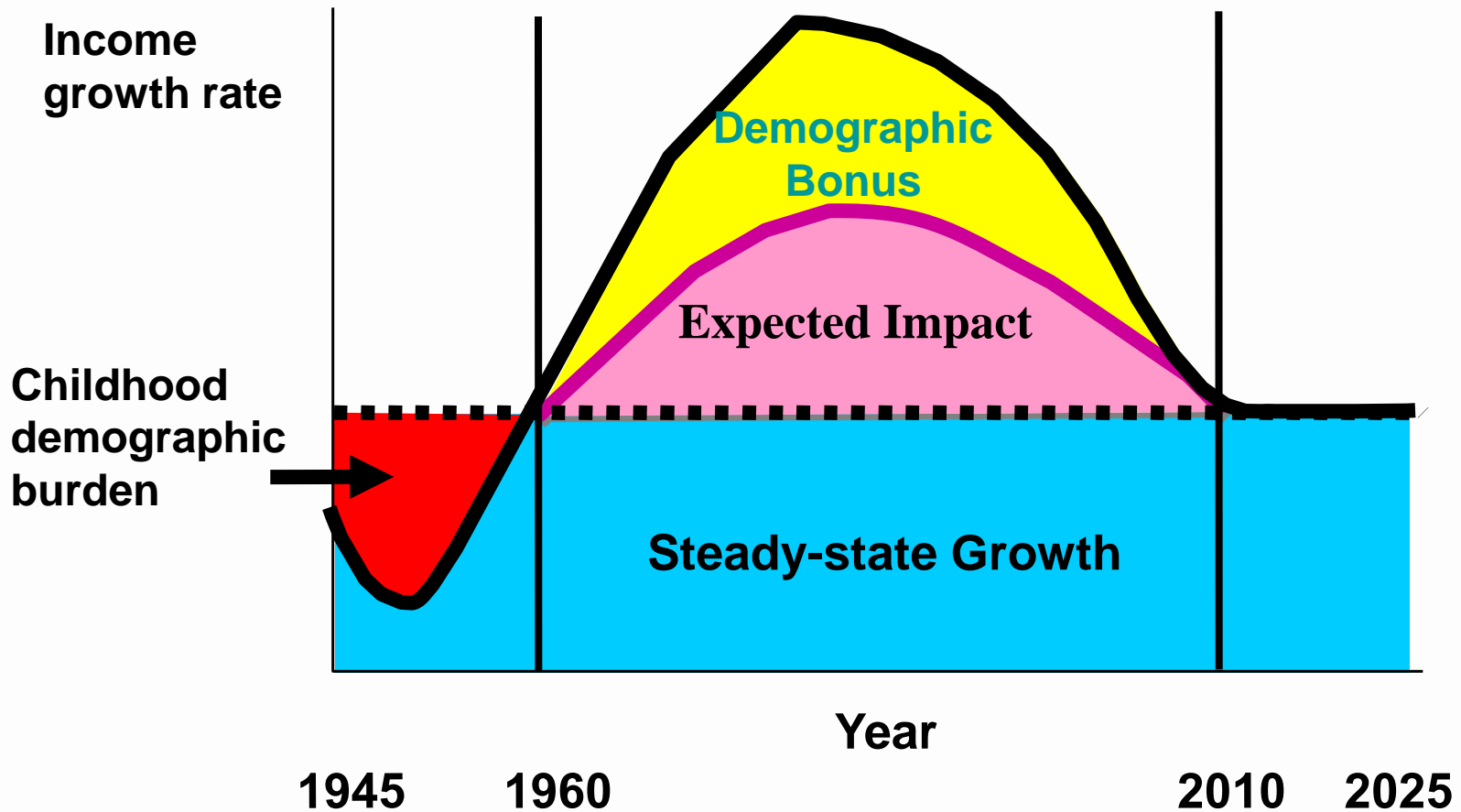
Source: UN, World Population Prospects: The 2000 Revision

# Working-Age to Non-Working-Age People

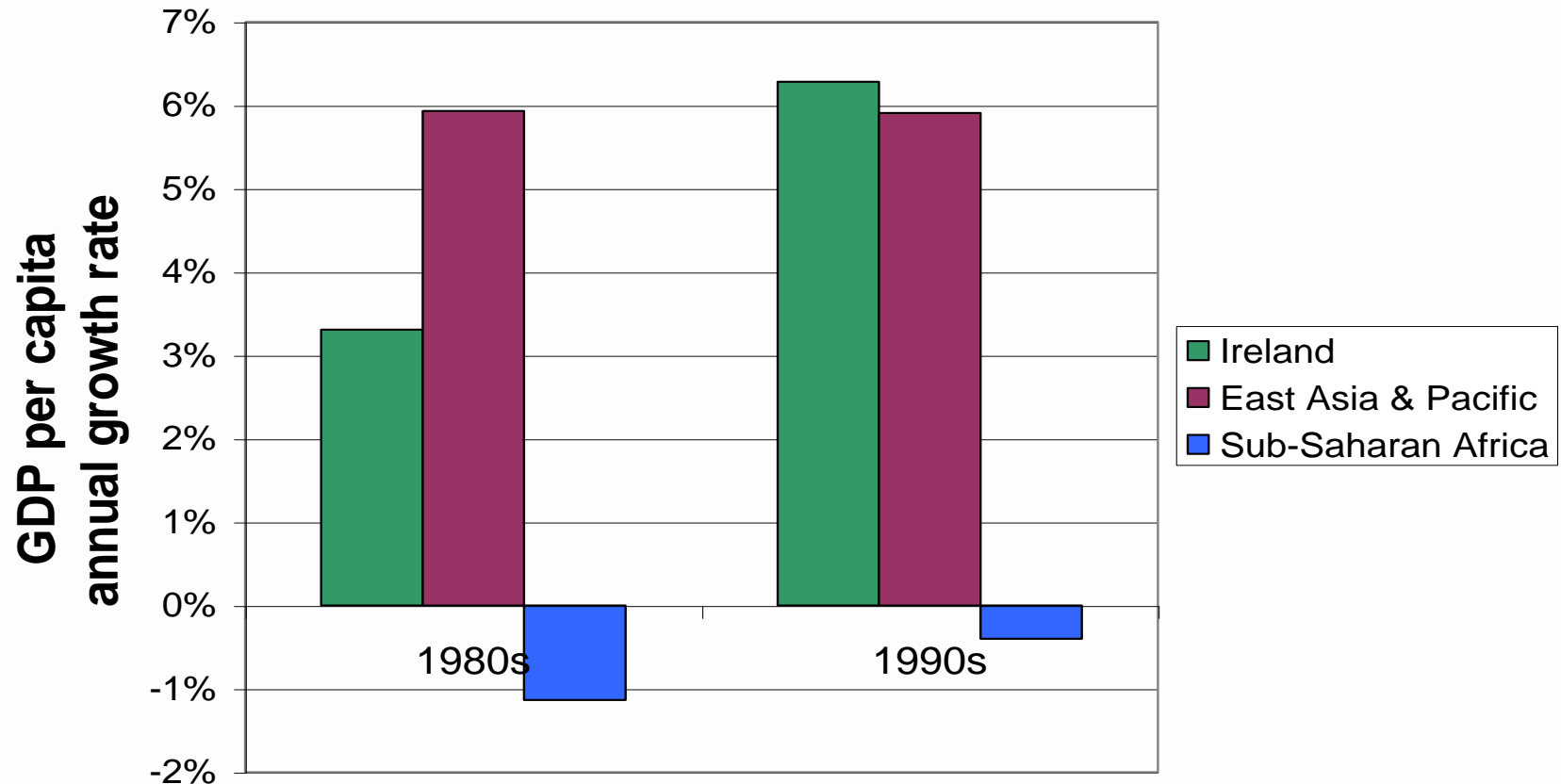


Source: United Nations, World Population Prospects: The 2000 Revision

# Growth and the Demographic Transition



# Economic Miracles and Debacles



There are two prime areas which have taken the demographic dividend. The first is the East Asian Tigers in the 1980s, and the second is Ireland in the 1980s/1990s. On the other hand, sub-Saharan Africa has seen consistent negative growth.

## Key points about the demographic dividend

- Getting the “demographic dividend” due to a population bulge in the productive years and a decrease in the % of young, dependent population, is not automatic
- Improving health can start the demographic transition
- Good population policy can increase the demographic dividend
- Good governments get better returns on the demographic dividend
- Bad health can lead to a demographic tax

# Malaria

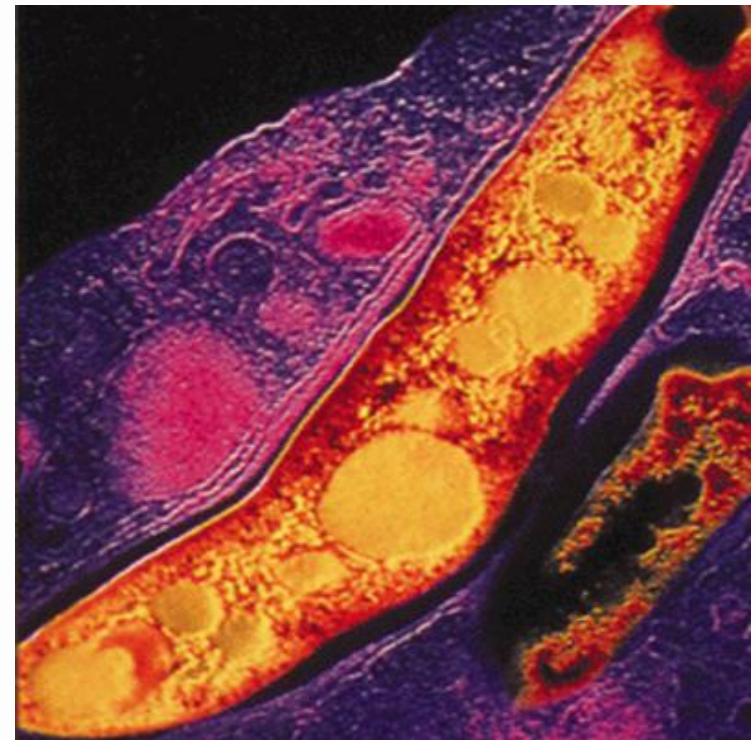
- 1.3% lower rates of economic growth in countries with malaria
- Private & Public medical costs to prevent, diagnosis and treat malaria
- Lost productivity of working population
- Effect on childhood productivity
- Social costs on school, demography, migration and savings
- Can spur foreign direct investment (seen in Greece, Portugal and Spain in the 1950s)



<http://static.howstuffworks.com/gif/mosquito6a.jpg>

# Tuberculosis

- Crowded conditions spread TB
- Sale of assets to pay for drugs
- Reduce food intake and educational opportunities for children



<http://www.kimicontrol.com/microorg/Mycobacterium%20tuberculosis.jpg>



# HIV/AIDS

- Decreases investment in human capital
- Downward “death spiral”
- Impacts demographic dividend
- Affects working age individuals
- Destroys social network, thus slowing down growth
- Affects economic and intellectual elites
  - Health workers infected in similar proportions to rest of population



# Summary

- There has long been a recognized relationship between health and wealth, as seen by the Preston curve.
- Income inequality can lead to poor health.
- Wealth to Health mechanisms go through better health care, nutrition, housing and water and sanitation
- Health to Wealth is increasingly seen as more important, through productivity, education, investment, and demographic dividends.
- Demographic dividends require the right conditions to be captured.

# Quiz

- Now for a short quiz. Note on a piece of paper your answers to the following five questions. Then proceed to the answers at the end of this module.

1. Which of these are NOT a finding from Samuel Preston's paper to lead him to conclude that "economic advance was not an essential prerequisite to a major increase in life expectancy."?
  - A. Mortality is associated with the standards of living.
  - B. There is a point where a nation's level of income does not reduce mortality.
  - C. Income growth accounts for 10-25% of growth in life expectancy between 1930-19
  - D. The relationship between life expectancy and national income per head has shifted upwards from 1930 to 1960
  - E. They were all reasons that Samuel Preston used to base his conclusion.

2. What is a common mechanism of wealth to health?
  - A. Increased Physical Capital
  - B. Capturing the demographic dividend
  - C. Buying health care
  - D. Increased education
  - E. The Preston Curve

3. What program started in the year 2000 helped shape the health to wealth argument?
  - A. The Millennium Development Conference
  - B. The Commission on Africa
  - C. The Harvard International Development Conference
  - D. Macroeconomic Commission on Health
  - E. The Health to Wealth Conference

4. Which of the below is NOT evidence that health improves productivity?
- A. An increase in body mass index increases wages
  - B. Wealthier individuals buy more health care.
  - C. Increase in a country's life expectancy increases economic output by 4%
  - D. Eradication of hookworm increases wages.
  - E. Since developing countries are labor-intensive, poor health tends to affect developing countries more

5. What is true about the demographic dividend?

- A. Government policies have no impact on the demographic dividend
- B. Improving children's health is not a valuable investment to trigger the demographic dividend
- C. Sub-Saharan Africa has captured the demographic dividend
- D. The demographic dividend occurs when there is an increase in the working-age to non-working age population
- E. Population policies do not affect the demographic dividend

**See answers on the next slides**



1. Which of these are NOT a finding from Samuel Preston's paper to lead him to conclude that "economic advance was not an essential prerequisite to a major increase in life expectancy"?
  - A. Mortality is associated with the standards of living.
  - B. There is a point where a nation's level of income does not reduce mortality.
  - C. Income growth accounts for 10-25% of growth in life expectancy between 1930-19
  - D. The relationship between life expectancy and national income per head has shifted upwards from 1930 to 1960
  - E. They were all reasons that Samuel Preston used to base his conclusion. - CORRECT**

## 2. What is a common mechanism of wealth to health?

- A. Increased Physical Capital – Incorrect - This is a mechanism from health to wealth.
- B. Capturing the demographic dividend      Incorrect - This is a mechanism from health to wealth.
- C. Buying health care - CORRECT**
- D. Increased education - Incorrect - This is a mechanism from health to wealth.
- E. The Preston Curve – Incorrect - The Preston Curve shows a relationship between life expectancy and income per capita

3. What program started in the year 2000 helped shape the health to wealth argument?
- A. The Millennium Development Conference
  - B. The Commission on Africa
  - C. The Harvard International Development Conference
  - D. Macroeconomic Commission on Health - CORRECT**
  - E. The Health to Wealth Conference

4. Which of the below is NOT evidence that health improves productivity? (A,C,D,E are all evidence that health improves productivity)
- A. An increase in body mass index increases wages
  - B. Wealthier individuals buy more health care - CORRECT**
  - C. Increase in a country's life expectancy increases economic output by 4%
  - D. Eradication of hookworm increases wages.
  - E. Since developing countries are labor-intensive, poor health tends to affect developing countries more

## 5. What is true about the demographic dividend?

- A. Government policies have no impact on the demographic dividend – **Incorrect** - Government policies are extremely important, because without the right conditions, the demographic dividend may not be captured.
- B. Improving children's health is not a valuable investment to trigger the demographic dividend - **Incorrect** - Children's health can certainly lower infant and childhood mortality, triggering the demographic dividend.
- C. Sub-Saharan Africa has captured the demographic dividend - **Incorrect** - The evidence is that Sub-Saharan Africa still hasn't gone through the demographic dividend.
- D. The demographic dividend occurs when there is an increase in the working-age to non-working age population – CORRECT**
- E. E. Population policies do not affect the demographic dividend - **Incorrect** - Population policies, such as contraception in Ireland, can trigger the demographic dividend.

# Acknowledgements

- David Bloom, Chair, Population and International Health, Harvard School of Public Health for the teaching on the health to wealth and wealth to health nexus.
- References:

## Papers

- Ainsworth M, Over M. “AIDS and African Development.” *The World Bank Research Observer*. 1994; 9(2): 203-240.
- Arndt C, Lewis JD. “The HIV/AIDS pandemic in South Africa; Sectoral impacts and unemployment.” *Journal of International Development*. 2001; 13: 427-449.
- Bleakley H. “Disease and development: evidence from the American South.” *Journal of the European Economic Association*. 2003; 1(2-3): 376-386.
- Bloom DE, Canning D, Sevilla J. “The effect of health on economic growth: a production function approach.” *World Development*. 2004; 32 (1): 1-13.
- Blumenshine P, Egeter S, Barclay CJ, Cubbin C, Braveman PA. “Socioeconomic disparities in adverse birth outcomes: a systematic review.” *American Journal of Preventive Medicine*. 2010; 39(3): 263-272.
- Braveman P, Marchi K, Egeter S, et al. “Poverty, near-poverty and hardship around the time of pregnancy.” *Maternal and Child Health Journal*. 2009; 14(1): 20-35.
- Braveman P, Cubbin C, Egeter S, Williams DR, Pamuk E. “Socioeconomic disparities in health in the United States: What the patterns tell us.” *American Journal of Public Health*. 2010; 14 (1): 20-35.

## Papers

- Case A, Lubotsky D, Paxson C. “Economic status and health in childhood: The origins of the gradient.” *American Economic Review*. 2002; 92: 1308-1334.
- Engle PL, Black MM. “The effect of poverty on child development and educational outcomes.” *Annals of New York Academy of Sciences*. 2008; 1136: 243-256.
- Hajat A, Kaufman JS, Rose KM, Siddiqi A, Thomas JC. “Long-term effects of wealth on mortality and self-rated health status.” *American Journal of Epidemiology*. 2011; 173 (2): 192-200.
- Kaplan GA, Shema SJ, Leite CM. “Socioeconomic determinants of psychological well-being: the role of income, income change and income sources during the course of 29 years.” *Annals of Epidemiology*. 2008; 18 (7): 531-537.
- Kawachi I, Adler NE, Dow WH. “Money, schooling and health: Mechanisms and causal evidence.” *Annals of New York Academy of Sciences*. 2010; 1186: 56-68.
- Leslie J, Jamison DT. “Health and nutrition consideration in education planning: educational consequences of health problems among school-age children.” *Food and Nutrition Bulletin*. 1990; 12: 204-214.
- Marmot MG, Smith GD, Stansfeld S et al. “Health inequalities among British civil servants: the Whitehall II study.” *Lancet*. 1991; 337: 1387-1393.



## Papers

- Preston SH. “The Changing Relation between Mortality and Level of Economic Development.” *Population Studies*. 1975; 29 (2): 231-248.
- Sachs JD, Malaney P. “The economic and social burden of malaria.” *Nature*. 2002; 415: 680-685.
- Schultz TP. “Productive Benefits of Improving Health: Evidence from Low-Income Countries.” 2001 (monograph).
- Thomas D, Strauss J. “The micro-foundations of the links between health, nutrition and development.” *Journal of Economic Literature*. 1998; 36: 766-817.
- Victorino CC, Gauthier AH. “The social determinants of child health: variations across health outcomes – a populations-based cross-sectional analysis.” *BMC Pediatrics*. 2009; 9: 53.
- Wilkinson RG. “Income distribution and mortality – a natural experiment.” *Health and Illness*. 1990; 12: 391-412.

## Books

- Bloom DE, Bloom LR, Steven D, Weston H. Business and HIV/AIDS: Who me? Davos: World Economic Forum. 2003; 1-9.
- Bloom DE, Canning D, Chan KJ. Higher Education and Economic Growth in Africa. Washington DC: World Bank, 2006.
- Bonnel R. HIV/AIDS. Does It Increase or Decrease Growth? Washington DC: World Bank, 2000.
- Braveman P, Egerter S, Barclay C. Exploring the Social Determinants of Health. Income, Wealth and Health, Robert Wood Johnson Foundation. April 2011.  
<http://www.rwjf.org/vulnerablepopulations/product.jsp?id=72474> (Last accessed: August 20, 2012)
- Dye C, Floyd K. Tuberculosis. In: Jamison DT, Breman JG, Meashem AR et al. (Eds.) *Disease Control Priorities in Developing Countries. 2nd Edition.* Washington DC: World Bank, 2006.
- Gallup JL, Sachs JD. The economic burden of malaria. CID Working Paper No. 52. Cambridge: Center for International Development, Harvard University, 2000.
- Haacker M. The Economic Consequences of HIV/AIDS in Southern Africa. IMF Working Paper WP/02/38. 1-41, 2002.
- ING Barings. Economic Impact of AIDS in South Africa. A Dark Cloud on the Horizon. Johannesburg: ING Barings, 2000.
- Murray CJL. "Epidemiology and demography of tuberculosis." In: Timaeus IM, Chackiel J, Ruzieka L, (Eds.) *Adult mortality in Latin America.* Oxford: Clarendon Press, 1996.

The Global Health Education Consortium and the Consortium of Universities for Global Health gratefully acknowledge the support provided for developing teaching modules from the:

***Margaret Kendrick Blodgett Foundation***  
***The Josiah Macy, Jr. Foundation***  
***Arnold P. Gold Foundation***



This work is licensed under a  
[Creative Commons Attribution-Noncommercial-No Derivative Works 3.0  
United States License.](https://creativecommons.org/licenses/by-nc-nd/3.0/us/)