

Literature Survey on Healthcare and Economic Growth January 2016

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1. Overview

We know that advances in healthcare are linked to positive economic growth in lower- and middle-income countries. There has been ample research in certain areas of the correlation between poor (or improved) health and productivity, GDP lost due to productivity losses, costs of healthcare, and cost savings from early and preventive health interventions. While there is less data in each of these areas for non-communicable diseases, the evidence for NCDs is still quite robust.

Lesser-studied areas include quality job creation in the health sector, skill needs and gaps, and professional migration related to healthcare. There were two studies that examined the relationship between population health status and foreign direct investment (FDI) and healthcare sector spending and FDI.

We did not encounter significant literature on the types of job creation (real or potential) due to health sector investments, nor the percentage of GDP growth (or capital growth) attributable to healthcare investments.

The tile graphic illustrates our findings. Dark blue areas represent ample research, light blue represents some research, and white represents the absence of reliable research.

This literature survey did not include areas that have already been well researched. Rather, the goal was to seek out data and evidence on less

Productivity: losses, increases, GDP growth/loss	HC investments = durable jobs, % GDP growth & capital growth related to health	Jobs: skills needed, empty positions, out migration of health professionals
Costs: % GDP, per capita, gross, net, etc.	Cost savings: % GDP, per capita, gross, net, etc.	FDI: % FDI=health, increases bc improved health

studied links between healthcare and economic growth. In particular, the kinds of linkages that finance decision-makers would find useful.

We are providing these points of evidence for healthcare sector stakeholders to immediately put to use. Every statement is accompanied by a source citation; *please use the original source as the citation, not this literature survey.*

Several prominent researchers emerged from this survey; their bios are at the end of this paper. AHC should consider engaging them in some way.

2. Top Findings

Note: most text is directly quoted from the relevant study.

The excerpts below represent the most compelling data points we uncovered. AHC will be using these in building the case for healthcare as an economic growth investment, and we encourage other stakeholders to use them as well.

- Although research on the global economic effects of non-communicable diseases is still in a nascent stage, economists are increasingly expressing concern that NCDs will result in long-term macroeconomic impacts on labour supply, capital accumulation and GDP worldwide with the consequences most severe in developing countries.¹
- Our [Bloom, Canning and Sevilla] main result is that health has a positive and statistically significant effect on economic growth. It suggests that a one-year improvement in a population's life expectancy contributes to a 4% increase in output.²
- A 2004 study found that one in four people in Ukraine between the ages of 18 and 65 has an NCD, and that a growing number of young adults are being affected, prompting the conclusion that the country could "lose the next generation" to chronic disease.³

¹ World Economic Forum and Harvard School of Public Health, "The Global Economic Burden of Non-communicable Disease, September 2011.

² David E. Bloom, David Canning and Jaypee Sevilla, "The Effect of Health on Economic Growth: A Production Function Approach," 2004.

³ Ibid.

- In Egypt, a recent study found the aggregate labor supply to be some 19 percent below its potential, driven by lost employment and reduced numbers of hours worked by those reporting chronic conditions, implying an overall production loss of roughly 12 percent of the country's GDP.⁴
- Bolivia: 300% increase in health care spending from 1990-2010 has been associated with a 170% increase in GDP. Health spending has focused on universal access to care, especially maternal and child services.⁵
- Bangladesh: With a 70% decline in maternal and child mortality following heavy investment in health in the 1980's and '90's and policy focused on empowering women, GDP grew at double the global average for this period to 140%.⁶
- Peru: Tripled health care spending coincided with 342% growth in GDP, with numerous programs designed to improve the health of poor and rural populations, improve infrastructure, and increase school enrollment.⁷

3. Useful context

Note: most text is directly quoted from the relevant study.

A review of the literature on the relationship between healthcare and economic growth shows a strong, positive association between health and wealth.⁸

- In general, there are two types of empirical studies on the relationship between health and wealth: individual level and country level.⁹

⁴ David E. Bloom, David Canning and Jaypee Sevilla, "The Effect of Health on Economic Growth: A Production Function Approach," 2004.

⁵ Ibid.

⁶ Ibid.

⁷ Ibid.

⁸ PHE White Paper – Precision Health Economics, "An Examination of the Literature on The Impact of Health on Development: Assessing the Economic and Societal Yield of Investments in Health Care," Authors: Warren Stevens, Mark T. Linthicum, Ashoke Bhattacharjya.

⁹ Ibid.

- Individual-level (or micro-level) studies examine the long-term effects of a health-improving intervention on outcomes linked to economic well being in individuals or small groups; for example, a study that examines the effects of childhood malaria prophylaxis on wages later in life. These studies tend to find a large, positive, and significant impact from good or improved health on welfare, income, productivity, and financial security.¹⁰
- Country-level (or macro-level) analyses, the second type of study, generally examine groups of countries with varying levels of health status, usually measured by life expectancy in terms of absolute or relative levels of economic outcomes, such as GDP or GDP growth. The findings from this type of study also suggest a strong association between health and economic growth, but results are less conclusive than in micro-level studies, the strength of the effect tends to be weaker, and its direction is less clear. As a result, considerable debate surrounds the question of whether health improvements cause economic growth or vice versa—or whether some other factor may drive both.¹¹

This highlights the complexity in the relationships between health, wealth, and the various factors that interact with them, and raises an important question: how does such a strong relationship between health and wealth at the individual level become seemingly less so at the country level? The lack of consistent findings in this area suggests that there are flaws either in the theoretical approach to the problem or in the methods of measuring the relationship between health gains and development, or both. Nonetheless, there is general consensus that investing in health improvements—intrinsically a valuable development goal for individuals and societies alike—supports economic growth.¹²

Considerable literature exists on the cost, or burden, of chronic non-communicable diseases (CNCDs), but there is a conspicuous gap in the literature on the economic return on health investments in the area of CNCDs. On the

¹⁰ PHE White Paper – Precision Health Economics, “An Examination of the Literature on The Impact of Health on Development: Assessing the Economic and Societal Yield of Investments in Health Care,” Authors: Warren Stevens, Mark T. Linthicum, Ashoke Bhattacharjya.

¹¹ Ibid.

¹² Ibid.

country level, the effects of decreasing morbidity associated with CNCDS on wealth are not entirely clear. Investments in decreasing morbidity and disability from CNCDS may make it possible for more people to work longer prior to retirement and be more productive in that work. It also would reduce caregiver burden and money previously spent on treatment for investment and spending that could drive economic growth. However, reduced CNCDS and associated morbidity would eliminate numerous health-related jobs and health care spending.¹³

Ultimately, the relationship between health and wealth is not one-directional. Evidence suggests that rising incomes and increasing wealth on the national level may lead to an increasing burden from CNCDS. In this case, the slowing down of gains in both health and wealth in high-income (wealthier) countries may actually foreshadow an inverted-U-shaped return on the wealth curve, where gains in health are actually reversed at the higher levels of wealth, due to increased morbidity. Apart from the fact that older populations suffer much higher levels of morbidity than younger ones, there is evidence to suggest that, even though health outcomes tend to rise as incomes rise in low- and middle-income countries, dividend tends to plateau or fall as countries become even wealthier. If this is true, effective investment in reducing morbidity from CNCDS may be the key to preventing welfare losses in the most economically productive countries.¹⁴

Among the most important recent advances in thinking on international development is the idea that population health has a significant effect on economic performance. Although the effects of individuals' health status on their productivity and earnings are readily observable and widely acknowledged, the consequences of population health for economic performance (at the macro level) and for the well-being of individuals, families, and firms are more difficult to discern and have been, until recently, rather neglected.¹⁵

This insight is relatively new and has significant political implications: Finance ministers whose concerns have been tightly tied to national budgets and staving off crises have a new tool to work with, since devoting resources to health

¹³ PHE White Paper – Precision Health Economics, “An Examination of the Literature on The Impact of Health on Development: Assessing the Economic and Societal Yield of Investments in Health Care,” Authors: Warren Stevens, Mark T. Linthicum, Ashoke Bhattacharjya.

¹⁴ Ibid.

¹⁵ Marcella Alsan, David E. Bloom, David Canning, and Dean Jamison, “The Consequences of Population Health for Economic Performance,” 2006.

improvements can be a powerful means of abetting economic growth and mitigating poverty.¹⁶

Hence, better health does not have to wait for an improved economy; rather, measures to reduce the burden of disease, to give children healthy childhoods, to increase life expectancy etc. will in themselves contribute to creating richer economies.¹⁷

The correlation between health and economic performance is extremely robust across communities and over time. Many factors exogenous to income play an important role in determining health status, including a number of geographical, environmental, and evolutionary factors. This suggests the existence of simultaneous impacts of health on wealth and wealth on health. Potential health impacts on national economic performance are explored, and some important unanswered questions are identified.¹⁸

4. NCD prevention and contribution to GDP

If NCDs were completely eliminated, the estimated GDP for India in a year such as 2004, using two different assumptions, would have been 4-10 percent higher. Per capita GDP would also be higher. The primary driver of these results on GDP is the change in life expectancy at birth.¹⁹

Although research on the global economic effects of non-communicable diseases is still in a nascent stage, economists are increasingly expressing concern that NCDs will result in long-term macroeconomic impacts on labour supply, capital accumulation and GDP worldwide with the consequences most severe in developing countries.²⁰

¹⁶ Marcella Alsan, David E. Bloom, David Canning, and Dean Jamison, "The Consequences of Population Health for Economic Performance," 2006.

¹⁷ Muhammad Jami Husain (September 2009), Contribution of Health to Economic Development: A Survey and Overview No. 2009-40.

¹⁸ Amar A. Hamoudi and Jeffrey D. Sachs, Economic Consequences of Health Status: A Review of the Evidence, Harvard University, 1999.

¹⁹ World Bank, Ajay Mahal, Anup Karan, Michael Engelgau, Health Nutrition and Population (HNP) Discussion Paper, "The Economic Implications of Non-Communicable Disease for India," January 2010.

²⁰ World Economic Forum and Harvard School of Public Health, "The Global Economic Burden of Non-communicable Disease, September 2011.

5. NCDs impact on labor supply

The potential cost of NCDs to economies, health systems, households and individuals in middle- and lower-income countries is high. In many middle- and lower-income countries, NCDs are affecting populations at younger ages, resulting in longer periods of ill health, premature deaths and greater loss of productivity that is so vital for development.²¹

The rise of NCDs amongst younger populations may jeopardize many countries' "demographic dividend", including the economic benefits expected to be generated during the period when a relatively larger part of the population is of working age.²²

For example, a recent study found that one in four people in Ukraine between the ages of 18 and 65 has an NCD, and that a growing number of young adults are being affected, prompting the conclusion that the country could "lose the next generation to chronic disease."²³

In Egypt, a recent study found the aggregate labor supply to be some 19 percent below its potential, driven by lost employment and reduced numbers of hours worked by those reporting chronic conditions, implying an overall production loss of roughly 12 percent of the country's GDP.²⁴

Half of those who die of chronic non-communicable diseases are in the prime of their productive years, and thus, the disability imposed and the lives lost are also endangering industry competitiveness across borders.²⁵

NCDs are front and center on business leaders' radar. The World Economic Forum's annual Executive Opinion Survey (EOS), which feeds into its Global Competitiveness Report, shows that about half of all business leaders surveyed

²¹ World Bank, "The Growing Danger of Non-Communicable Diseases - Acting Now to Reverse Course," September 2011 (Conference Edition).

²² Ibid.

²³ Ibid.

²⁴ Ibid.

²⁵ World Economic Forum and Harvard School of Public Health, "The Global Economic Burden of Non-communicable Disease, September 2011.

worry that at least one NCD will hurt their company's bottom line in the next five years, with similarly high levels of concern in low-, middle- and high-income countries – especially in countries where the quality of healthcare or access to healthcare is perceived to be poor. These NCD-driven concerns are markedly higher than those reported for the communicable diseases of HIV/AIDS, malaria and tuberculosis.²⁶

6. Investment in NCD prevention

A recent World Health Organization report underlines that population-based measures for reducing tobacco and harmful alcohol use, as well as unhealthy diet and physical inactivity, are estimated to cost US\$ 2 billion per year for all low- and middle-income countries, which in fact translates to less than US\$ 0.40 per person.²⁷

7. Health and GDP gains or losses

Global Examples of Economic and Societal Yield of Investments In Health Care, 1990-2010. Countries With High Health Gains:²⁸

- Mozambique: With better infrastructure and higher social mobility, 13% HALE growth and a 109% GDP growth (both per capita) represents one of the highest returns on health.²⁹
- Bolivia: 300% increase in health care spending from 1990-2010 has been associated with a 170% increase in GDP. Health spending has focused on universal access to care, especially maternal and child services.³⁰

²⁶ World Economic Forum, The Global Competitiveness Report 2011 - 2012, <http://reports.weforum.org/global-competitiveness-2011-2012/>.

²⁷ World Economic Forum and Harvard School of Public Health, "The Global Economic Burden of Non-communicable Disease, September 2011.

²⁸ PHE White Paper – Precision Health Economics, "An Examination of the Literature on The Impact of Health on Development: Assessing the Economic and Societal Yield of Investments in Health Care," Authors: Warren Stevens, Mark T. Linthicum, Ashoke Bhattacharjya.

²⁹ Ibid.

³⁰ Ibid.

- Bangladesh: With a 70% decline in maternal and child mortality following heavy investment in health in the 1980's and '90's and policy focused on empowering women, GDP grew at double the global average for this period to 140%.³¹
- Peru: Tripled health care spending coincided with 342% growth in GDP, with numerous programs designed to improve the health of poor and rural populations, improve infrastructure, and increase school enrollment.³²
- Brazil: Universal health care and investment in public health led to a 9% increase in average HALE from 1990 to 2010. GDP growth also grew rapidly at 7% per year between 2000 and 2010, over double the average for middle-income countries.³³
- Russia: One of few countries where HALE did not rise from 1990-2010; health care spending remained at 5.3% of GDP (compared to 9.3%, the current OECD average), while its economy contracted.³⁴
- India: Improvement in key health areas such as childhood malnutrition and parasitic diseases have contributed to a 6.3% increase in HALE from 1990 to 2000. The following decade then saw a 51% increase in per capita GDP and further increases in HALE.³⁵
- China: Spending on health rose 13% per year while coverage of basic health services was expanded to the whole country, with the greatest improvements in rural communities. Along with similar investments in

³¹ PHE White Paper – Precision Health Economics, “An Examination of the Literature on The Impact of Health on Development: Assessing the Economic and Societal Yield of Investments in Health Care,” Authors: Warren Stevens, Mark T. Linthicum, Ashoke Bhattacharjya.

³² Ibid.

³³ Ibid.

³⁴ Ibid.

³⁵ Ibid.

education, improved population health has supported a 73% increase in per capita GDP.³⁶

- South Africa: The HIV epidemic had devastating effects on health, driving down HALE by 8% from 1990-2010, despite a recovery since 2000. The economy grew by zero percent, compared to triple digit rates for similarly sized economies unaffected by HIV.³⁷

Whether public investments in medical care affect health hinges on the quality of health institutions. In much of the developing world, factors such as chronic absenteeism among public providers, poor budget execution, ineffective management, and virtually no accountability weaken public efforts. Institutional issues are central in efforts to enhance public health investments, which in turn have a direct impact on the population's welfare and, perhaps over the long term, improvements in national income.³⁸

Estimates suggest that the health effect on GDP is large: one extra year of life expectancy raises steady state GDP by about 4 percent.³⁹

Our main result is that health has a positive and statistically significant effect on economic growth. It suggests that a one-year improvement in a population's life expectancy contributes to a 4% increase in output.⁴⁰

This paper evaluated the causality and long-run relationship existence between economic growth (GDP) and health care expenditures (HC) in 20 developing countries. The findings indicated that there is a short-run causality from GDP to

³⁶ PHE White Paper – Precision Health Economics, “An Examination of the Literature on The Impact of Health on Development: Assessing the Economic and Societal Yield of Investments in Health Care,” Authors: Warren Stevens, Mark T. Linthicum, Ashoke Bhattacharjya.

³⁷ Ibid.

³⁸ William Jack, Maureen Lewis, World Bank, “Health Investments and Economic Growth: Macroeconomic Evidence and Microeconomic Foundations,” March 2009.

³⁹ Bloom, David, and David Canning, “Health as Human Capital and Its Impact on Economic Performance,” 2003.

⁴⁰ David E. Bloom, David Canning and Jaypee Sevilla, “The Effect of Health on Economic Growth: A Production Function Approach,” 2004.

health care spending, while it is not observed any short-run causality from health spending to economic growth.⁴¹

Studied the causality and co-integration relationships between economic growth and health care expenditures in developing countries during 1990-2009:⁴²

- The findings revealed that there is a short-run causality from GDP to health care spending, while it is not observed any short-run causality from health spending to economic growth.⁴³
- Likewise, there is a bilateral causality and long-run relationship between economic growth and health spending. In other words, the findings indicated that income is an important factor across developing countries in the level and growth of health care expenditure, in long-run.⁴⁴

The estimated effects of an increase in the life expectancy (expressed in log terms) economic growth from various studies are the followings: 4.2% in Barro, 1996; 7.3% in Barro and Lee (1994); 5.8% in Barro and Sala-i-Martin (1995); 6.3% Bloom, Canning, and Malaney (2000); 2.7% in Bloom and Malaney (1998); 3.7% in Bloom and Sachs (1998); 4% in Bloom and Williamson (1998); 0.1% in Caselli, Esquivel, and Lefort (1996); 3% in Gallup and Sachs (2000); and 7.2% in Hamoudi and Sachs (1999).⁴⁵

Although these studies differ substantially in terms of country samples, time frames, control variables, functional forms, data definitions and configurations, and estimation techniques, the parameter estimates of the effects of life expectancy and age structure on economic growth have been reasonably comparable across studies.⁴⁶

⁴¹ Zahra Mila Elmi and Somayeh Sadeghi, "Health Care Expenditures and Economic Growth in Developing Countries: Panel Co-Integration and Causality," 2012.

⁴² Ibid.

⁴³ Ibid.

⁴⁴ Ibid.

⁴⁵ Muhammad Jami Husain (September 2009), Contribution of Health to Economic Development: A Survey and Overview No. 2009-40.

⁴⁶ Ibid.

In 1965, an increase of life expectancy of one percent accounted for an acceleration of GDP/capita growth of over 3% each year for the subsequent quarter century. In addition, health and demographic variables explained over half of the difference in growth rates between Africa and the rest of the world over the period 1965-1990, and the proportion of land area between the Tropics— a geographical variable which operates largely by impacting human health— accounts for an additional 16% of this gap.⁴⁷

Research found that the five countries with the largest rise in health-adjusted life expectancy over the past two decades (Ethiopia, Bangladesh, Mozambique, Peru, and Bolivia) also demonstrated impressive economic growth. This growth appeared to depend on the existence of an economic and social environment that allowed for a healthier population to translate these gains into improved productivity and incomes. Specifically, the translational institutions with the greatest impact were gender equity, education and literacy, communications and infrastructure, and the freedom of social mobility.⁴⁸

In 1996, Barro examined the role of health in economic growth, finding that improvement in life expectancy was positively associated with a country's economic growth. Specifically, an increase in life expectancy from 50 to 70 years should lead to an economic growth rate of 1.4 percentage points per year.²⁷ A 2001 study modeled the effect of adult survival rates (ASR) on economic growth, finding a small but significant effect. For the poorest countries, a 1 percent increase in ASR was associated with a 0.05 percent increase in the growth rate. The results also reveal that the effects of change in ASR were large and significant for poorer countries, but the estimated effect on growth rates was negative in highly developed countries, such as the United States, France, and Switzerland.⁴⁹

Swift found that among 13 Organisation for Economic Cooperation and Development (OECD) countries during the past two centuries, a 1 percent

⁴⁷ Amar A. Hamoudi and Jeffrey D. Sachs, *Economic Consequences of Health Status: A Review of the Evidence*, Harvard University, 1999.

⁴⁸ PHE White Paper – Precision Health Economics, “An Examination of the Literature on The Impact of Health on Development: Assessing the Economic and Societal Yield of Investments in Health Care,” Authors: Warren Stevens, Mark T. Linthicum, Ashoke Bhattacharjya.

⁴⁹ Ibid.

increase in life expectancy resulted in “an average 6 percent increase in total GDP and 5 percent increase in GDP per capita in the long run.”⁵⁰

8. Health and FDI

In another study, Aslan and co-authors examined the link between population health and foreign direct investment (FDI), which is important to economic growth. They find that a one-year improvement in life expectancy is associated with a 9 percent increase in gross FDI inflows to low- and middle-income countries.⁵¹

We conduct a panel data analysis of 74 countries over 1980 -2000 to investigate whether population health affects foreign direct investment inflows.⁵²

- This paper provides empirical evidence that health is indeed a positive and statistically significant determinant of FDI inflows to low- and middle-income countries. These results are robust to adding control variables, such as education, infrastructure, and income per capita.⁵³
- By contrast, improved health does not appear to contribute significantly to the attractiveness of high-income countries to foreign investors. Our findings support the results of Bhargava et al., (2001), who find diminishing returns to health as a factor in economic growth. Our results are also consistent with those of Blonigen and Wang (2004), who argue that the underlying factors that determine the level of FDI activity vary systematically across countries at different stages of development.⁵⁴
- Our main result is that a one-year improvement in life expectancy contributes to about a 9% increase in gross FDI inflows to low- and

⁵⁰ PHE White Paper – Precision Health Economics, “An Examination of the Literature on The Impact of Health on Development: Assessing the Economic and Societal Yield of Investments in Health Care,” Authors: Warren Stevens, Mark T. Linthicum, Ashoke Bhattacharjya.

⁵¹ Ibid.

⁵² Marcella Alsan, David E. Bloom and David Canning, “The Effect of Population Health on Foreign Direct Investment,” June 2004. NBER.

⁵³ Ibid.

⁵⁴ Ibid.

middle-income countries. Our findings are consistent with the literature that links health to increased worker productivity and suggest that the payoff to population health improvements should also include an elevated rate of FDI inflows.⁵⁵

We find that the level of health in a country impacts, to a small extent, the effects of FDI on growth. The cross product of FDI and health is two percentage points higher than FDI on its own, at a high level of significance.⁵⁶

India has received USD 132,837 million as aggregate FDI from April 2011 and specifically hospital and diagnostic centers have received FDI of USD 1030.05 million from April 2000 up to April 2011 constituting 0.78 % of the total FDI in to India.⁵⁷

The Indian Government has accorded priority in its 2014-2015 budget to the health care sector. Key recommendations that will have a direct impact on enhancing health care access include a rise in foreign direct investment (FDI) limit in the medical insurance business to 49 percent; four more medical institutions of the status of All India Institute of Medical Sciences (AIIMS); 12 more medical colleges in the public sector; and broadband connections in rural areas to expand the reach of telemedicine. In addition, a \$1.7 billion fresh fund allocation to encourage start-ups and another scheme for establishing biotech clusters will help to develop innovative health care technologies. Finally, the budget provisions also aim to address the infrastructure deficit by establishing institutions like AIIMS in all states and setting up 15 model rural health research centers to bridge the rural-urban divide.⁵⁸

Moreover, Turkey was able to attract an impressive level of FDI for its health and social work sector. FDI inflows to the industry increased at a CAGR (Compound

⁵⁵ Marcella Alsan, David E. Bloom and David Canning, "The Effect of Population Health on Foreign Direct Investment," June 2004. NBER.

⁵⁶ Jaimen Perez, Erik Suarez, Taylor Thorns, Silviano Valdez, "Reexamining the Effect of Foreign Direct Investment on Economic Growth in Developing Countries," Center for Health Policy, University of New Mexico, 2014.

⁵⁷ Sunitha L F, Ajil Babu R, "Role of FDI in India's Health Care Sector: Major Issues and Challenges," International Journal of Humanities and Social Science Invention, 2013.

⁵⁸ Deloitte, "2015 health care outlook India."

Annual Growth Rate) of 39% from 2008 to 2012, reaching USD 545 million in 2012. (\$545 million / \$12.5 billion = 4% of total FDI in 2012).⁵⁹

9. Role of the private sector

The Economist Intelligence Unit (EIU) briefing paper highlights several effective approaches particular countries have adopted in response to funding challenges, and also shines a light on companies that have implemented programmes supporting their employees:⁶⁰

- As a basis for the research, the conducted a global survey in May and June 2015 to explore the impact of health on society and businesses.⁶¹
- The survey tapped the opinions of 300 executives and managers: 150 from the private sector and 150 working in government and non-governmental organisations (NGOs).⁶²
- Respondents were based in North America (90), Asia-Pacific (90, with 30 from China and 30 from India) and Europe (90), with the remaining 30 hailing from the rest of the world. To complement and further explore the survey data, the EIU conducted in-depth interviews with experts from across the world.⁶³

Given that companies have increasingly robust wellness policies and are exploring their broader role in population health, closer collaboration between governments and the private sector could also yield promising results. The corporate approach to health and wellness is also aligned with a shift in

⁵⁹ Deloitte/Investment Support and Promotion Agency of Turkey, “Healthcare Industry in Turkey, 2014.”

⁶⁰ The Economist Intelligence Unit, Financing the future: Choices and challenges in global health (Johnson & Johnson), 2015.

⁶¹ Ibid.

⁶² Ibid.

⁶³ Ibid.



healthcare systems from reactively curing disease and fixing broken bones to promoting preventive healthcare.⁶⁴

10. Researcher Biographies

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Dr. David E. Bloom is Clarence James Gamble Professor of Economics and Demography in the Department of Global Health and Population, Harvard School of Public Health. Dr. Bloom is an economist whose work focuses on health, demography, education, and labor. In recent years, he has written extensively on primary, secondary, and tertiary education in developing countries and on the links among health status, population dynamics, and economic growth. Dr. Bloom has published over 300 articles, book chapters, and books.

Dr. Bloom has previously been a member of the public policy faculty at Carnegie-Mellon University, and the economics faculty at Columbia University and Harvard University. He currently serves as a Faculty Research Associate at the National Bureau of Economic Research, and is a member of the Board of Directors of PSI and of the Board of Trustees of amfAR, the Foundation for AIDS Research. Dr. Bloom also serves as Director of Harvard's Program on the Global Demography of Aging. In April 2005 Dr. Bloom was elected Fellow of the American Academy of Arts and Sciences. Dr. Bloom received a BS in Industrial and Labor Relations from Cornell University in 1976, and a PhD in Economics and Demography from Princeton University in 1981.

Ph.D., Economics and Demography, Princeton University, January 1981

M.A., Economics, Princeton University, June 1978

B.Sc., Industrial and Labor Relations, New York State School of Industrial and Labor Relations, Cornell University, May 1976

⁶⁴ The Economist Intelligence Unit, Financing the future: Choices and challenges in global health (Johnson & Johnson), 2015.



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Stevens studied at the London School of Hygiene and Tropical Medicine, where he received a PhD, and subsequently taught both there and at the London School of Economics and Political Science. From there he took the opportunity to head up the Health Economics Research program at the UK Medical Research Council Center for Research into Tropical Diseases in the Gambia.

He has also acted as Principal Technical Advisor on health economics and policy programs for various international health policy and healthcare delivery organizations including the World Bank, the Global Alliance on Improving Nutrition, the Global Fund and UNICEF, working in twelve countries across four continents. In this time he published over forty articles in peer-reviewed journals.

He is currently leading a number of domestic and international health economic research projects for Precision Health Economics. Most of his work is in international health systems comparisons, social value estimation for new health care technologies and policies and in the development of models to estimate the role of health investment in economic development and the improvement of economic and social well being across populations.

Examples of the models he is working on are a CVD Policy Model for China, to help predict the value of future primary and secondary prevention policies, and a model that estimates the potential future economic and social value of health care investment in low and middle-income countries.

Ashoke S. Bhattacharjya, PhD, Executive Director, Health Policy and Economics, Johnson & Johnson Medical, Asia-Pacific.

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In this capacity, he is responsible for a broad range of economic analyses and strategic activities in support of health and innovation policy as well as reimbursement issues facing Johnson & Johnson and the health care industry at large. Dr. Bhattacharjya is engaged in projects related to the policy analyses of international health systems, the economics of innovation as well as evidence-based medicine. He has also held a variety of positions within Johnson & Johnson's Corporate Policy group and Janssen Pharmaceutica's research, medical affairs and business development units. Prior to joining Johnson &



Johnson in 1996, he worked as an economist in Pfizer's Corporate Strategic Planning and Policy Division. Dr. Bhattacharjya was Lecturer in the Economics Department of Columbia University as well as Instructor at NYU's Stern School of Business at various times from 1990 to 1994. He received his PhD in Economics from Columbia University. He has published several papers in the fields of the economics of innovation, product diffusion and competition as well as health care financing in leading peer-reviewed journals. He is currently a member of the scientific advisory committee of the International Health Economics Association, InHealth, Washington D.C., and ISPOR's Asia-Pacific Medical Devices Advisory Council. Dr. Bhattacharjya has received several academic honors, including the President's Fellowship at Columbia University, 1987-90 and National Merit Scholarships in India.

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Canning holds a Ph.D. in economics from Cambridge University and is deputy director of the Program on the Global Demography of Aging. Before assuming his role at the Harvard School of Public Health, Canning held faculty positions at the London School of Economics, Cambridge University, Columbia University, and Queen's University Belfast, where he received his B.A. in economics and mathematics.

Canning has served as a consultant to the World Health Organization, the World Bank, and the Asian Development Bank. He was also a member of Working Group One of the World Health Organization's Commission on Macroeconomics and Health.

Canning's research on demographic change focuses on the effect of changes in age structure on aggregate economic activity, and the effect of changes in longevity on economic behavior. In terms of health, the research focuses on health as a form of human capital and its effect on worker productivity.