

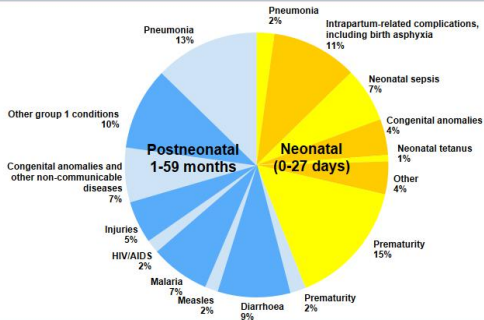
Water, Sanitation and Human Capital

Marcella Alsan
Stanford and NBER

IGC January 2016

One Compelling Reason to Invest in Water and Sanitation

Causes of deaths among children under 5 years, 2013



Source: CHERG-WHO methods and data sources for child causes of death 2000-2013 (Global Health Estimates Technical Paper WHO/HIS/HSI/GHE/2014.6.2)

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Why Doesn't Capital Flow from Rich to Poor Countries?

By ROBERT E. LUCAS, JR.*

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$$(1) \quad y = Ax^\beta,$$

where y is income per worker and x is capital per worker. Then the marginal prod-

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This paper examines whether the Solow growth model is consistent with the international variation in the standard of living. It shows that an augmented Solow model that includes accumulation of human as well as physical capital provides an excellent description of the cross-country data. The paper also examines the

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Let the production function be

$$(8) \quad Y(t) = K(t)^\alpha H(t)^\beta (A(t)L(t))^{1-\alpha-\beta},$$

What is Human Capital?

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- Economists- in utero health (nice identification); "fetal origins" starting to expand their time frame

Early Economic Evidence (Almond: "Is the 1918 Influenza Pandemic Over?")

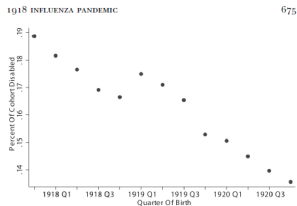


FIG. 2.—1980 male disability rates by quarter of birth: presented from work by a physical disability.

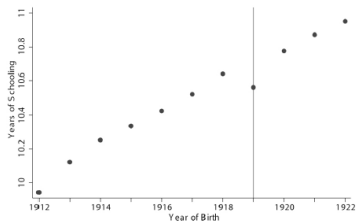


FIG. 3.—1960 average years of schooling: men and women born in the United States



Maternal and Child Undernutrition 2

Maternal and child undernutrition: consequences for adult health and human capital

*Cesar G Victora, Linda Adair, Caroline Fall, Pedro C Hallal, Reynaldo Martorell, Linda Richter, Harshpal Singh Sachdev, for the Maternal and Child Undernutrition Study Group**

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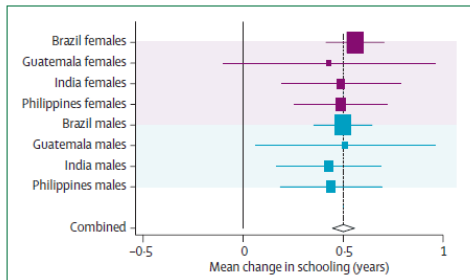


Figure 3: Forest plot for effect of height-for-age at 2 years on attained schooling

Child Nutrition and WASH (1)

WASH-related infections contribute to undernutrition:

50% of undernutrition is associated with repeated diarrhoea or intestinal worm infections caused by unsafe and inadequate water, sanitation and hygiene (WASH).



Frequent **diarrhoea** prevents the body from absorbing nutrients.



Parasitic worms transmitted through contaminated soil and water, such as hookworm, can cause blood loss and undernutrition.



Frequent faecal-oral transmission of pathogens is thought to lead to **environmental enteropathy**, which permanently damages the intestine.

Child Nutrition and WASH (2)

How undernutrition affects children

Undernutrition compromises children's ability to fight disease and can lead to irreversible growth and developmental delays.



Stunting — caused by chronic undernutrition — leads to cognitive impairment and increases vulnerability to infection.



Undernutrition in childhood can lead to a host of lifelong problems, such as:



Reduced educational and economic opportunities due to cognitive impairment.



Obstructed labour — a major risk factor for maternal and newborn morbidity and mortality — which is more common in women who are stunted.



Adequate sanitation, access to safe water and good hygiene practices help prevent undernutrition.