ECON B225: ECONOMIC DEVELOPMENT

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Health

Heath and Public Health Policy Introduction

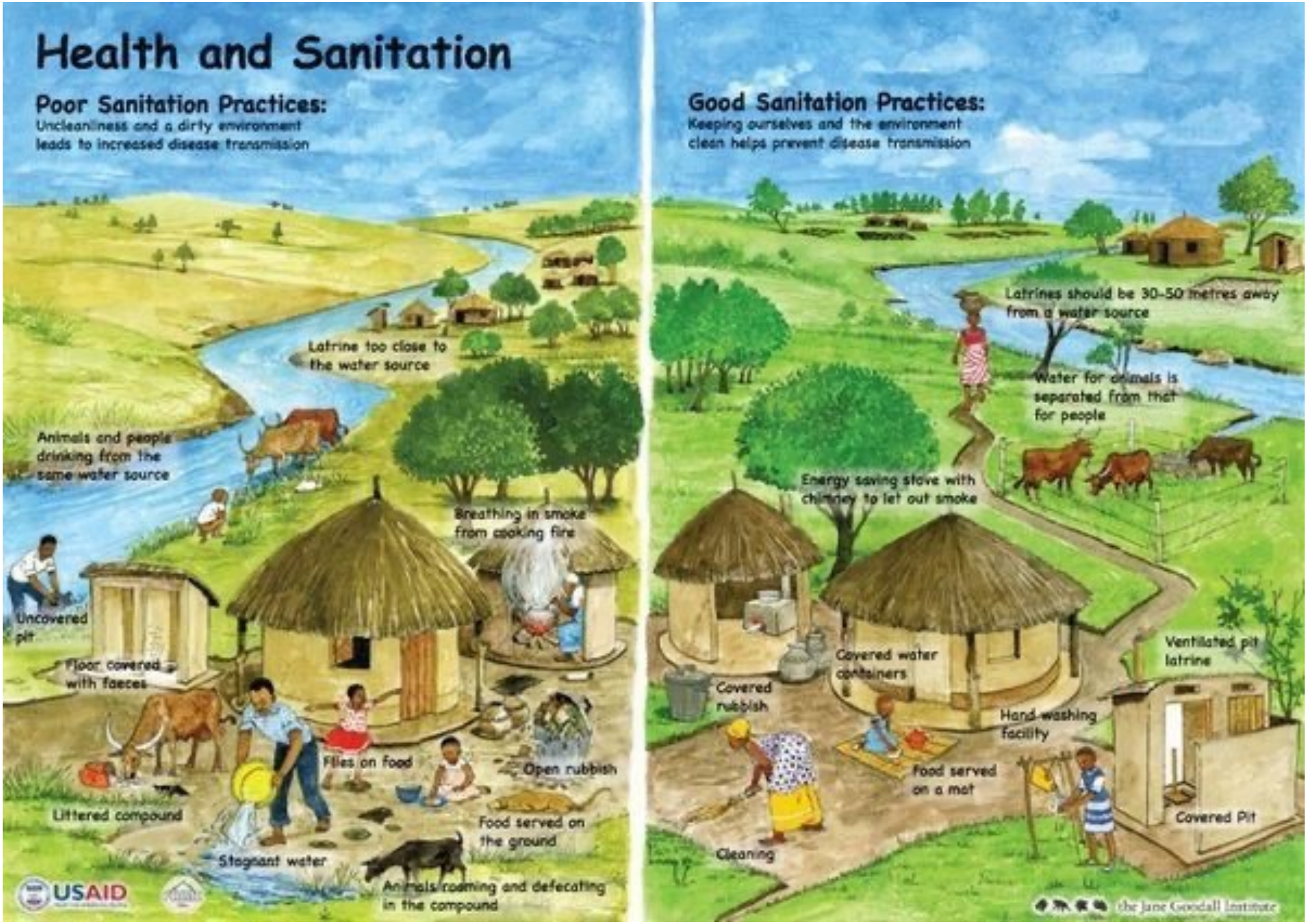
- **This is a huge topic of research**
- **Connection to development economics:**
  - Health affects one's ability to
    - Work (direct effect on productivity)
    - Go to school (accumulate human capital)
  - So there are development economists that focus on this area
  - Also a lot of people who are public health researchers study poor countries
    - Hard to tell these people apart, and they often work together

Some Broad Challenges and Areas of Research

- **Infectious diseases**
  - Ways to expand use of known technologies (bed nets, boiling water, etc.)
  - Effects of intestinal worms
- **Nutrition and Food Security**
  - Effects of policies (example: cash transfers) on health measures related to food
- **Sanitation**
  - How to expand sanitary practices
- **Many others!**

Background: Focus on Sanitation

- **Sanitation is often a challenge in poor countries**
  - **Water infrastructure cannot preserve purity of water and carries pathogens**
  - **Modern sewage infrastructure not present**
    - Use of pit latrines is common
    - Defecating in rivers, ponds, and other sources of drinking water is common
  - **Sinks with soap and water are not common**
    - Effective hand washing is less common
  - **Sewage storage is often rudimentary**
    - Sometimes pits close to population centers (insects can carry pathogens from pits easily to population centers)
    - Ground not treated, allowing toxins to seep into the groundwater
  - **Close human proximity to animals and animal waste**


Health and Sanitation
Poor Sanitation Practices:
Uncleanliness and a dirty environment leads to increased disease transmission
Latrine too close to the water source
Animals and people drinking from the same water source
Breathing in smoke from cooking fire
Uncovered pit
Floor covered with faeces
Flies on food
Open rubbish
Littered compound
Food served on the ground
Stagnant water
Animals roaming and defecating in the compound
USAID
Good Sanitation Practices:
Keeping ourselves and the environment clean helps prevent disease transmission
Latrines should be 30-50 metres away from a water source
Water for animals is separated from that for people
Energy saving stove with chimney to let out smoke
Covered water containers
Covered rubbish
Hand washing facility
Food served on a mat
Ventilated pit latrine
Covered Pit
Cleaning
the Jane Goodall Institute

Straightforward Solutions

- **Some of this requires large infrastructure investment**
  - Sewage and sinks, etc.
- **BUT much of this is behavior change that is relatively low cost**
  - Boil water or add diluted chlorine
  - Spatial separation of human and animal habitation
  - Spatial separation between human habitation and agricultural areas that use human waste fertilizer
  - Moving latrines away from water sources
  - Moving human waste away from homes and water sources
  - No defecating in drinking water sources

Consequences and Motivation for Miguel and Kremer (2004)

- **Intestinal worms are transmitted easier due to the lack of sanitation**
  - Hookworm – walking barefoot on contaminated soil
  - Roundworm/whipworm/Schisto – ingesting fecal matter
- **Wide Impacts:**
  - Hookworm/roundworm affect 1.3 billion people
  - Whipworm affects 900 million people
- **Worry that related ailments leads to poor performance in school and school attendance**
  - Motivation for Miguel and Kremer (2004)

Easy Solution and Evidence Base

- **Administer "deworming" medication en masse**
  - Cheap (40 cents per person), generally safe and extremely effective
- **Hypothesis that symptoms from intestinal worms are holding people back from being productive (missed work, missed school, etc.)**
- **As of 2004, the experimental literature was flawed**
  - Did not account for externalities
    - Why would this matter?
  - Generally only focus on cognitive performance
  - Based on bad data

Experimental Design

- **January 1998:** 75 Schools in Busia, Western Kenya chosen
  - **Group 1:** 25 schools received free deworming medication in 1998 and 1999 (always treated)
  - **Group 2:** 25 schools received free deworming medication in 1999 (control in 1998, treated in 1999)
  - **Group 3:** 25 received treatment in 2001 (always control)

Basic Results w/o Accounting for Externalities

TABLE V

JANUARY TO MARCH 1999, HEALTH AND HEALTH BEHAVIOR DIFFERENCES BETWEEN GROUP 1 (1998 TREATMENT) AND GROUP 2 (1998 COMPARISON) SCHOOLS[a]

	Group 1	Group 2	Group 1 – Group 2
Panel A: Helminth Infection Rates			
Any moderate-heavy infection, January–March 1998	0.38	–	–
Any moderate-heavy infection, 1999	0.27	0.52	−0.25***
			(0.06)
Hookworm moderate-heavy infection, 1999	0.06	0.22	−0.16***
			(0.03)
Roundworm moderate-heavy infection, 1999	0.09	0.24	−0.15***
			(0.04)
Schistosomiasis moderate-heavy infection, 1999	0.08	0.18	−0.10*
			(0.06)
Whipworm moderate-heavy infection, 1999	0.13	0.17	−0.04
			(0.05)
Panel B: Other Nutritional and Health Outcomes			
Sick in past week (self-reported), 1999	0.41	0.45	−0.04**
			(0.02)
Sick often (self-reported), 1999	0.12	0.15	−0.03**
			(0.01)
Height-for-age Z-score, 1999 (low scores denote undernutrition)	−1.13	−1.22	0.09*
			(0.05)
Weight-for-age Z-score, 1999 (low scores denote undernutrition)	−1.25	−1.25	−0.00
			(0.04)
Hemoglobin concentration (g/L), 1999	124.8	123.2	1.6
			(1.4)
Proportion anemic (Hb < 100g/L), 1999	0.02	0.04	−0.02**
			(0.01)

Accounting for Externalities

- **The γ_d estimates will produce give the effect of having more treated students around you at certain distances from the treated school**

Total number of students within distance d of school i

Treated in 1998

Total number of students within distance d of TREATED school i

Treated in 1999

$$Y_{ijt} = a + \beta_1 \cdot T_{1it} + \beta_2 \cdot T_{2it} + X'_{ijt}\delta + \sum_d (\gamma_d \cdot N^T_{dit}) + \sum_d (\phi_d \cdot N_{dit}) + u_i + e_{ijt}.$$

Results

TABLE VII

DEWORMING HEALTH EXTERNALITIES WITHIN AND ACROSS SCHOOLS, JANUARY TO MARCH 1999[a]

	Any moderate-heavy helminth infection, 1999			Moderate-heavy schistosomiasis infection, 1999			Moderate-heavy geohelminth infection, 1999		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Indicator for Group 1 (1998 Treatment) School	−0.25***	−0.12*	−0.09	−0.03	−0.02	−0.07	−0.20***	−0.11**	−0.03
	(0.05)	(0.07)	(0.11)	(0.03)	(0.04)	(0.06)	(0.04)	(0.05)	(0.09)
Group 1 pupils within 3 km (per 1000 pupils)	−0.26***	−0.26***	−0.11	−0.12***	−0.12***	−0.11**	−0.12*	−0.12*	−0.01
	(0.09)	(0.09)	(0.13)	(0.04)	(0.04)	(0.05)	(0.06)	(0.07)	(0.07)
Group 1 pupils within 3–6 km (per 1000 pupils)	−0.14**	−0.13**	−0.07	−0.18***	−0.18***	−0.27***	0.04	0.04	0.16
	(0.06)	(0.06)	(0.14)	(0.03)	(0.03)	(0.06)	(0.06)	(0.06)	(0.10)
Total pupils within 3 km (per 1000 pupils)	0.11***	0.11***	0.10**	0.11***	0.11***	0.13***	0.03	0.04	0.02
	(0.04)	(0.04)	(0.04)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)
Total pupils within 3–6 km (per 1000 pupils)	0.13**	0.13**	0.12*	0.12***	0.12***	0.16***	0.04	0.04	0.01
	(0.06)	(0.06)	(0.07)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)
Received first year of deworming treatment, when offered (1998 for Group 1, 1999 for Group 2)		−0.06*			0.03**			−0.04**	
		(0.03)			(0.02)			(0.02)	
(Group 1 Indicator) ∗ Received treatment, when offered		−0.14*			−0.02			−0.10***	
		(0.07)			(0.04)			(0.04)	
(Group 1 Indicator) ∗ Group 1 pupils within 3 km (per 1000 pupils)			−0.25*			−0.04			−0.18**
			(0.14)			(0.07)			(0.08)
(Group 1 Indicator) ∗ Group 1 pupils within 3–6 km (per 1000 pupils)			−0.09			0.11			−0.15
			(0.13)			(0.07)			(0.10)
Grade indicators, school assistance controls, district exam score control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	2328	2328	2328	2328	2328	2328	2328	2328	2328
Mean of dependent variable	0.41	0.41	0.41	0.16	0.16	0.16	0.32	0.32	0.32

[a]Grade 3–8 pupils. Probit estimation, robust standard errors in parentheses. Disturbance terms are clustered within schools. Observations are weighted by total school population. Significantly different than zero at 99 (***), 95 (**), and 90 (*) percent confidence. The 1999 parasitological survey data are for Group 1 and Group 2 schools. The pupil population data is from the 1998 School Questionnaire. The geohelminths are hookworm, roundworm, and whipworm. We use the number of girls less than 13 years old and all boys (the pupils eligible for deworming in the treatment schools) as the school population for all schools.