Worms: Identifying Impacts on Education and Health in the Presence of Treatment Externalities

Edward Miguel and Michael Kremer

Presented by:
Jake Morgan

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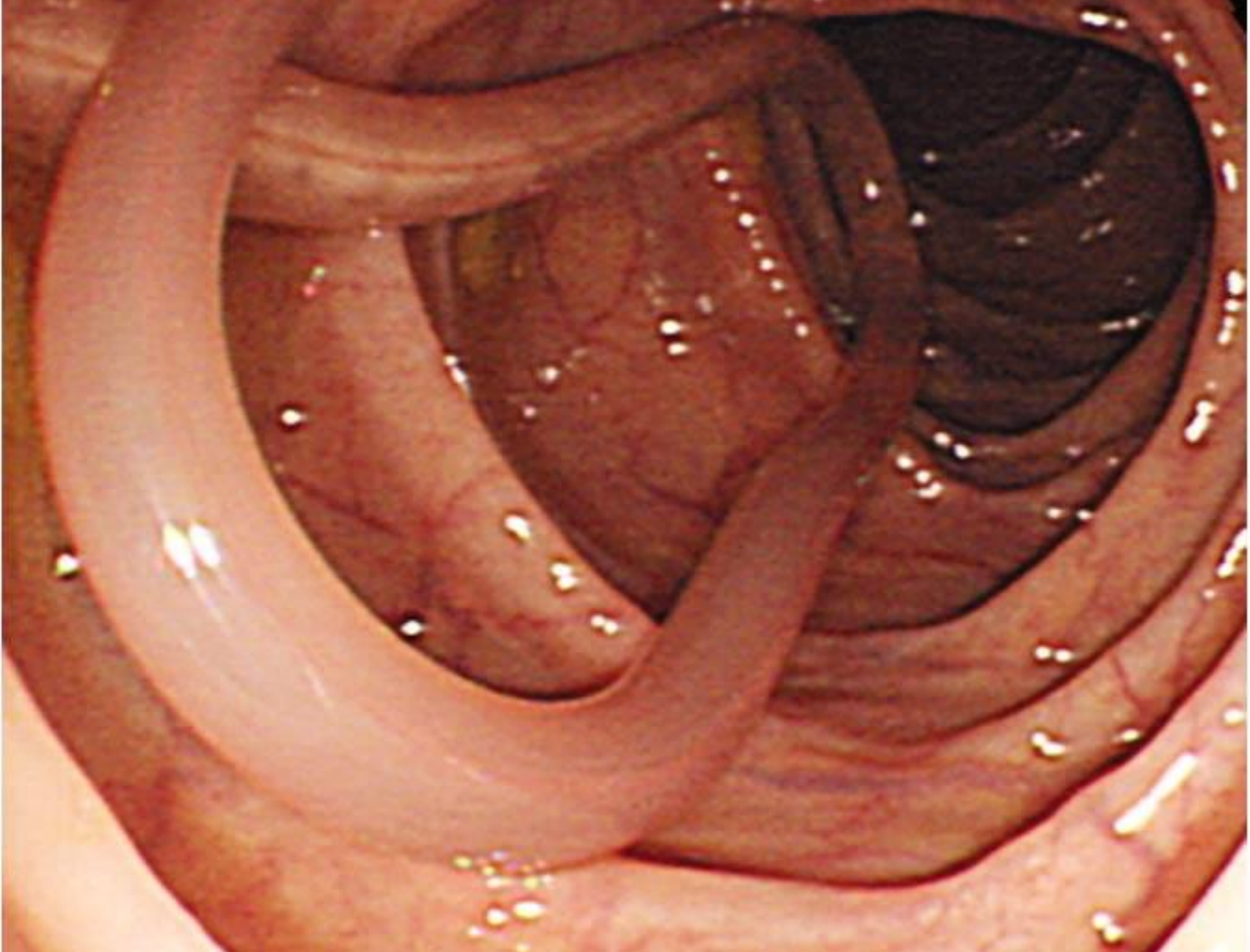
Background

- Worms (hookworm, roundworm, whipworm, schistosomiasis) infect 1 in 4 people world wide
- Reinfection common
- Intervention in schools
  - Is cost justified? How?



Setting

- Kenya – random treatment of schools over several years (1998-2001)
  - Groups 2 and 3 (treated in 1999 and 2001) serve as control in 1998 when group 1 is treated.
- Groups are similar
- Treatment plan: dose every 6 mos or 1 year depending on worm type to prevent reinfection. Also education

Simple Deworming Results

	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)

Simple Spillover Results

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)
Panel C: Worm Prevention Behaviors			
Clean (observed by field worker), 1999	0.59	0.60	−0.01
			(0.02)
Wears shoes (observed by field worker), 1999	0.24	0.26	−0.02
			(0.03)
Days contact with fresh water in past week (self-reported), 1999	2.4	2.2	0.2
			(0.3)

Econometric Specification

- Comparing across school, ability to control for within-school externalities (peer effects, etc).
- Innovation – across school externalities (sibling attend different schools)

Estimation Results

	Any moderate-heavy helminth infection, 1999		
	(1)	(2)	(3)
Indicator for Group 1 (1998 Treatment) School	−0.25***	−0.12*	−0.09
	(0.05)	(0.07)	(0.11)
Group 1 pupils within 3 km (per 1000 pupils)	−0.26***	−0.26***	−0.11
	(0.09)	(0.09)	(0.13)
Group 1 pupils within 3–6 km (per 1000 pupils)	−0.14**	−0.13**	−0.07
	(0.06)	(0.06)	(0.14)
Total pupils within 3 km (per 1000 pupils)	0.11***	0.11***	0.10**
	(0.04)	(0.04)	(0.04)
Total pupils within 3–6 km (per 1000 pupils)	0.13**	0.13**	0.12*
	(0.06)	(0.06)	(0.07)
Received first year of deworming treatment, when offered (1998 for Group 1, 1999 for Group 2)		−0.06*	
		(0.03)	
(Group 1 Indicator) ∗ Received treatment, when offered		−0.14*	
		(0.07)	
(Group 1 Indicator) ∗ Group 1 pupils within 3 km (per 1000 pupils)			−0.25*
			(0.14)
(Group 1 Indicator) ∗ Group 1 pupils within 3–6 km (per 1000 pupils)			−0.09
			(0.13)
Grade indicators, school assistance controls, district exam score control	Yes	Yes	Yes

Implications

- Authors suggest that deworming reduces absenteeism by 25%
  - Literature has been mixed
- Measure of interest was attendence measured by NGO
  - How good is this?
- No effect on test scores

School Attendance

	OLS (1)	OLS (2)	OLS (3)
Moderate-heavy infection, early 1999			
Treatment school (T)	0.051***		
	(0.022)		
First year as treatment school (T1)		0.062***	0.060***
		(0.015)	(0.015)
Second year as treatment school (T2)		0.040*	0.034*
		(0.021)	(0.021)
Treatment school pupils within 3 km (per 1000 pupils)			0.044**
			(0.022)

What does it all mean

- Cheap way to increase attendance ($0.50/child – 0.14 of a year)
  - Human capital investment. With this magnitude? U.S. did it in the South
  - Net present wages up by $30 (at a cost of $9 w/teacher)
  - Externalities = $15

Behavioral Economist

- How heavy is the cost of infection when many treatments (prevention) are free?
  - And what does this say about the education we want to increase?
- Is there some underweighting of the future? Influence of lower life expectancy? Inertia?

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