

## Chronic Conditions and Child Health: Does Income Mediate?

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# Introduction

The child health “income gradient” (Case et al. 2002 [JHE]) literature to date has been concerned with the questions of

- whether or not children from low- and high-income households have systematic differences in (parent-reported) health status
- and, if so, whether that relationship widens as children age.

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- and, if so, whether that relationship widens as children age.

# Explaining the Gradient

## If a gradient exists, why does it exist?

- Currie and Stabile (2003, AER)'s study was the first that provided some explanation of increasing income-child health gradient.
- First hypothesis: low-SES children are less able to respond to a given health shock, so that the negative effects of health shocks persist and accumulate over time
- Second hypothesis: low-SES children respond to health shocks in a way that is similar to high-SES children, but are subject to more health shocks.

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## Previous Works

Evidence is mixed:

Three existing panel studies:

- Currie and Stabile (2003, AER [Canadian panel: LSCY]): more shocks, no difference in response
- Condliffe and Link (2008, AER [US panels: MEPS, PSID]); more shocks, differential response
- On the other hand Murasko (2008, JHE: [US panel MEPS]) proposed that baseline health can explain much of the increasing gradient
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## Source of Data

- We use data from the Longitudinal Study of Australian Children (LSAC)
- Two waves of data for children born between March 2003 and February 2004 (B-Cohort), and between March 1999 and February 2000 (K-Cohort).
- The data were collected using a two-stage clustered sampling design, where postcodes were used as the primary sampling unit (PSU) and children (one child per family) as the secondary sampling units
- Sample attrition approx 10% for both cohorts; mostly at random, but slightly higher for primary care-giver young male, rented accommodation, and lower SES (Mission and Siphthorp 2007).

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## Measuring Child Health

- General health status of child is constructed from a question that was asked to the child's primary care-giver "In general, how would you say the child's current health is?"
  - The responses were recorded on a five-point Likert scale in which 1 is "Excellent" 2 is "Very good"; 3 is "Good"; 4 is "Fair" and 5 is "Poor"
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## Method

- We estimate the following equation:

$$health_{it} = \alpha_0 + \alpha_1 \ln(inc)_{it} + \alpha_2 age_{it} + \alpha_3 X_{it} + \varepsilon_{it} \quad (1)$$

- $X_{it}$  is a set of exogenous variables that include a set of dummies for mother education, wave dummies, cohort dummies, log of family size, a dummy variable for the sex of the child, a dummy variable for having a primary care giver (*person responding to the survey questions*) that is not the biological mother, a dummy variable for having a female care giver, a dummy variable for having two biological parents in the household, and the mother's age at birth.
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## Method (cont.)

- To test the 'cumulative' and 'contemporaneous' effect of income, we propose the following model for child health:

$$health_{it} = \beta_0 + \beta_1 \ln(inc)_{it} + \beta_2 age_{it} + \beta_3 health_{it-1} + \beta_4 X_{it} + \varepsilon_{it} \quad (2)$$

- Rationale:  $health_{it-1}$  represents the cumulative effect of income, and  $\ln(inc)_{it}$  the contemporaneous effect
  - estimating across age groups should result in a stronger  $\beta_1$  for older children if contemporaneous effects dominate
    - if the cumulative effect is dominant,  $\beta_1$  should be fairly flat across age groups.

## Method (cont.)

- Now we proceed to test the two hypothesis proposed by Currie and Stabile (2003) and evidenced by Condliffe and Link (2008) by exploiting panel data of LSAC. We estimate the following equation:

$$health_{it} = \gamma_0 + \gamma_1 \ln(inc)_{it} + \gamma_2 age_{it} + \gamma_3 shock_{i(t-1)} + \gamma_4 \ln(inc)_{it} * shock_{it-1} + \gamma_5 X_{it} + \varepsilon_{it}$$

- where  $shock_{i(t-1)}$  indicates that the child was reported to have a chronic condition or injury in the previous LSAC wave
- the  $\ln(inc)_{it} * shock_{it-1}$  interaction is used to test the hypothesis that lower- and higher-income children respond differently to a health shock.
  - if this is the case,  $\gamma_4$  will be negative and statistically significant

## Method (cont.)

- The second hypothesis is tested by the following equation:

$$\begin{aligned} \text{Newshock}_{it} = & \delta_0 + \delta_1 \ln(\text{inc})_{it} + \delta_2 \text{age}_{it} + \delta_3 \ln(\text{inc})_{it} * \text{age}_{it} \\ & + \delta_4 \text{shock}_{t-1} + \delta_5 X_{it} + \varepsilon_{it} \end{aligned}$$

where,  $\text{Newshock}_{it}$  refers to number of new conditions in wave 2 and other variables are defined as above.

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Table 1: The increasing income gradient in child health (ordered probit models)

Variables	0-3 years old		
	Canada (C&S, 2003)	USA (C&L, 2008)	Australia This paper
Without mother's education	***-0.151 (0.026)	***-0.136 (0.018)	***-0.078 (0.027)
With mother's education	***-0.132 (0.027)	***-0.093 (0.018)	***-0.083 (0.027)
	4-8 years olds		
	Without mother's education	***-0.216 (0.019)	***-0.204 (0.014)
With mother's education	***-0.182 (0.020)	***-0.156 (0.014)	***-0.144 (0.025)

Note: (i) Robust standard errors are in parentheses. (2) \*\*\*Significant at the one per cent level.

## Cumulative Effect Versus Contemporaneous Effect

**Table 2:** The effects of base line health on current health status.

Variables	0-3 years		4-8 years	
	United States	Australia	United States	Australia
	Murasko(2008)	This Paper	Murasko(2008)	This Paper
<b>Ordered probit estimates</b>				
Log of income	-0.025	-0.066	***-0.059	***-0.123
Health <sub><i>t-1</i></sub> =1 (excellent)		-0.276		***-2.140
Health <sub><i>t-1</i></sub> =2 (very good)	***0.523	0.182	***0.585	***-1.490
Health <sub><i>t-1</i></sub> =3 (good)	***0.851	0.500	***0.962	** -1.076
Health <sub><i>t-1</i></sub> =4 (fair)	***1.335	0.644	***1.368	-0.758
N	7596	3323	10352	4520

## Is There Any Differential Response by SES to Past Health Shocks?

Table 3: The effects of earlier health conditions on poor health today (in 2006) (binary probit models)

Variables	(1)	(2)	(3)	(4)
Log of income	***-0.143	***-0.140	***-0.245	***-0.225
Chronic Condition in Wave 1 ( 2004)	***0.307	0.414		
Asthma in Wave 1 ( 2004)			***0.431	1.319
<i>Interactions of the logs of average income with:</i>				
Chronic Condition in Wave 1		-0.010		
Asthma in Wave 1				-0.081

Notes: (i) Significant levels are \*\*= 1%, \*\*\*=5%, and \* =10%

## Do Low-SES Children Face More Health Shock?

Table 4: The effects of income and past health shocks on new health shocks

Variables	(1)	(2)	(3)	(4)
Log of family income	0.022 (0.025)	0.032 (0.054)	0.029 (0.054)	0.299 (1.006)
Interaction of age and income		-0.0001 (0.001)	-0.0001 (0.001)	-0.004 (0.012)
Chronic condition in previous period			***0.124 (0.031)	
Asthma in the previous period				***0.180 (0.050)
N	8957	8957	8957	4381

Notes: (i) Robust standard errors are in parentheses. (ii) Significant levels are \*\*\*=1%, \*\*=5%, and \*=10%

# Conclusions

The following findings are noteworthy:

- Income has a protective effect on child health
  - although our previous work (Khanam et al. 2009, JHE) shows that the independent influence of income disappears with a richer set of controls
- However, our results do not provide any evidence that low-income households respond less effectively to a health shock than high-income households.
- We also do not find any convincing evidence that low-SES Australian children are subject to more health shocks.

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