

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

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# Outline

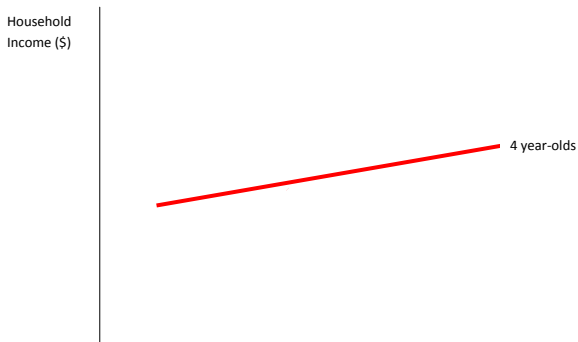
- 1 Background
- 2 Data and Descriptive Statistics
  - Data
- 3 Methods
- 4 Results and Discussion
  - The Gradient: Cross-Sectional Estimates
  - The Role of Chronic Conditions
- 5 Conclusions

# Background

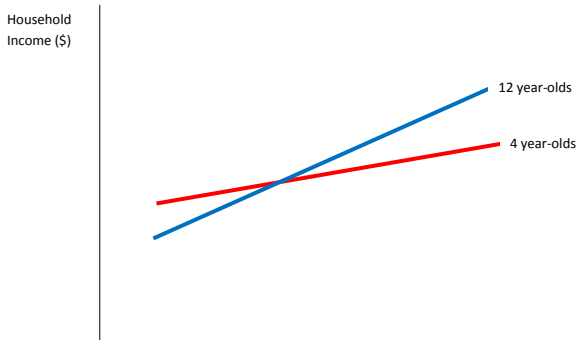
The child health “income gradient” (Case et al. 2002 [US cross-section]) literature to date has been concerned with the questions of

- 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.

# Conceptual Illustration: (“Contemporaneous”) Relationship Hypothesis



# A Conceptual Illustration II: (“Cumulative”) Gradient Hypothesis



# Explaining the Gradient

- Two hypotheses (Currie and Stabile 2003):
  - children from low-income households do not respond as well to health shocks
  - children from low-income household experience more health shocks

# Literature

## Evidence is mixed:

### Three existing panel studies:

- Currie and Stabile (2003, AER [Canadian panel: LSCY]) more shocks, no difference in response
- Murasko (2008, JHE: [US panel MEPS]) evidence of cumulative (baseline health) and contemporaneous income effects
  - but no evidence of role of chronic conditions
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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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## Children with chronic conditions and injury by SES

Table: Children with chronic conditions and injury by SES

SES	Any chronic condition	Asthma	Injury
Low	30.02%	21.13%	14.64%
High	30.05%	18.26%	13.87%
All	29.97%	19.32%	14.50%

Source: *Computed from the Longitudinal Study of Australian Children.*

## Methods (Gradient)

- We estimate the following equation (analog of Case et al. 2002, in cross-section):

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

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

- Our remaining estimation approaches are similar to those of Currie et al. (2003), Murasko (2008) and Condliffe and Link (2008), on panel data.

## Methods (Cumulative and Contemporaneous Effects)

- We estimate

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

- 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.

## Methods (Chronic Conditions - Does Income Mediate?)

- Explore the role of chronic conditions by estimating the following equation:

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

- 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

## Methods (Income, Age and New Health Shocks)

- Whether income protects against the arrival of new conditions is tested via the following equation:

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

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

- The dependent variable,  $Newshock_{it}$ , equals 1 if a child develops a *new condition* between two waves.

# The Income Gradient in Cross-Section

Table 2: The increasing income gradient in child health (binary probit models - no baseline health measures)

Variables	0-3 years old		
	Canada (Currie&Stabile 2003)	USA (Condliffe&Link 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)
Variables	4-8 years olds		
	Canada (Currie&Stabile 2003)	USA (Condliffe&Link 2008)	Australia This paper
Without mother's education	***-0.216 (0.019)	***-0.204 (0.014)	***-0.148 (0.023)
With mother's education	***-0.182 (0.020)	***-0.156 (0.014)	***-0.144 (0.025)

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

## Cumulative Effect Versus Contemporaneous Effect

Table 3: The effects of base line health on current health status (ordered probit models).

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

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

Table 4: The effects of earlier health conditions on probability of being in poor health 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>				
Any Chronic Condition in Wave 1		-0.010		
Asthma in Wave 1				-0.081

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

## New Health Shocks

Table 5: The effects of income and past health shocks on new health shocks (binary probit models)

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 appears to have a protective effect on child health in Australia, although our previous work (Khanam et al. 2009 JHE) shows that the independent influence of income disappears with a richer set of controls
- 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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