
AN UPDATE ON : THE HRC POVERTY PROJECT: **HEALTH CONSEQUENCES, COSTS, AND POLICY INTERVENTIONS**

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BACKGROUND & AIMS

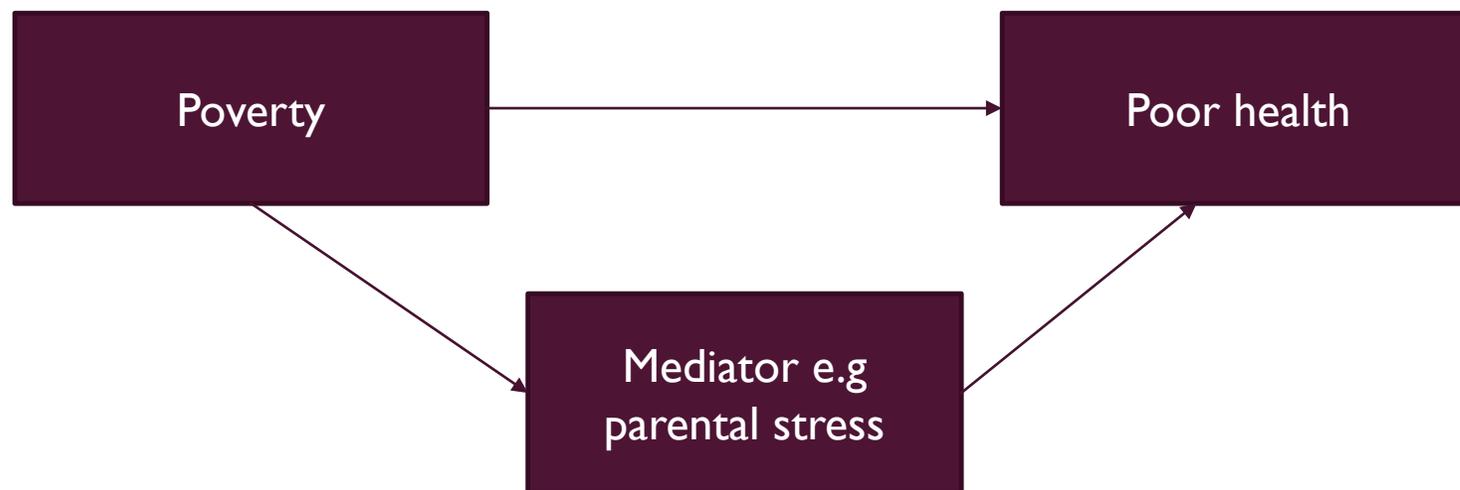
- What we know
 - Poverty high in NZ, and disproportionately affects children
 - Observational associations between poverty and a range of health outcomes; lack of high quality causal studies.
 - Need to know when and how to intervene, and for whom to intervene for maximal impact
 - Reducing child poverty is top priority, but have 'duty of care' to block pathways that lead to poor health for children currently at risk
- This study aims to answer three questions in relation to the health effects of childhood poverty.
 - RQ1: What is the effect of childhood poverty on health, and for which health outcomes?
 - RQ2: Which aspects of poverty dynamics (i.e., timing, duration) have the greatest impact on health outcomes?
 - RQ3: Which factors most strongly mediate the association between child poverty and health, and what are the likely benefits of intervening on these mediators?
- Overall the aim of this project is to provide policy makers with robust evidence of the most effective way to reduce the impact of childhood poverty on health.

A SIMPLIFIED EXPLANATION OF THE IDEA: RQ I



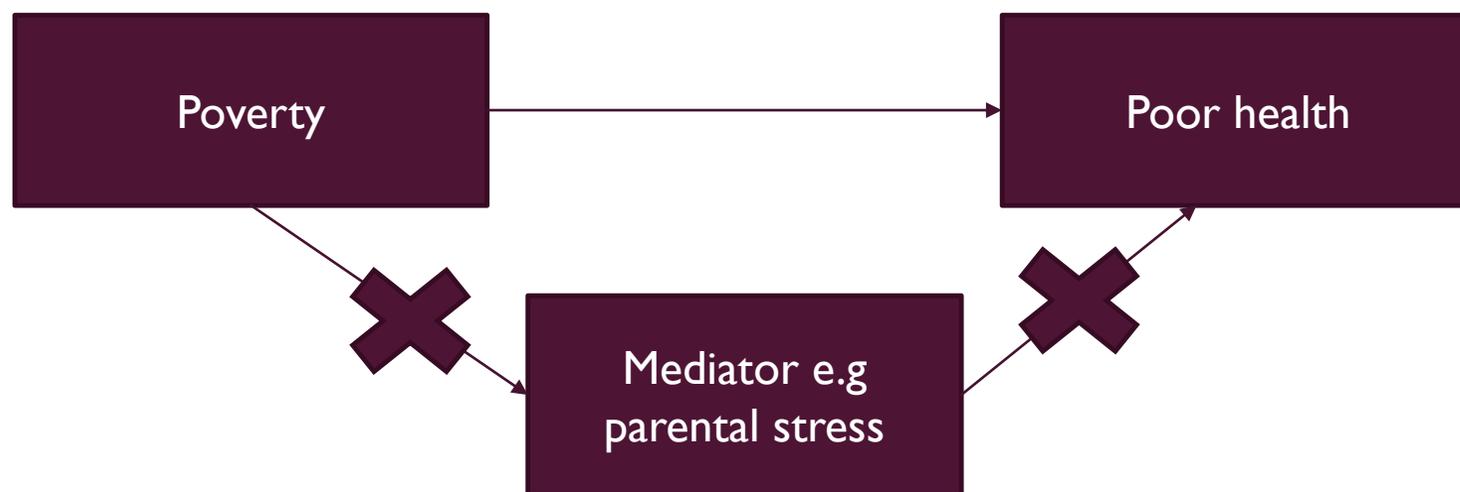
A SIMPLIFIED EXPLANATION OF THE IDEA: RQ3

Imagine a hypothetical situation where 50% of the effect of poverty operated through the effect poverty has on parental stress, and the subsequent impact this has on child health.



A SIMPLIFIED EXPLANATION OF THE IDEA: RQ3

If we were able to block this pathway – so that either poverty no longer increased parental stress, or parental stress no longer influenced child health, we could halve the effect of poverty on poor health.



knowing what to intervene on, how to intervene, the likely impact of intervention and the cost is key.

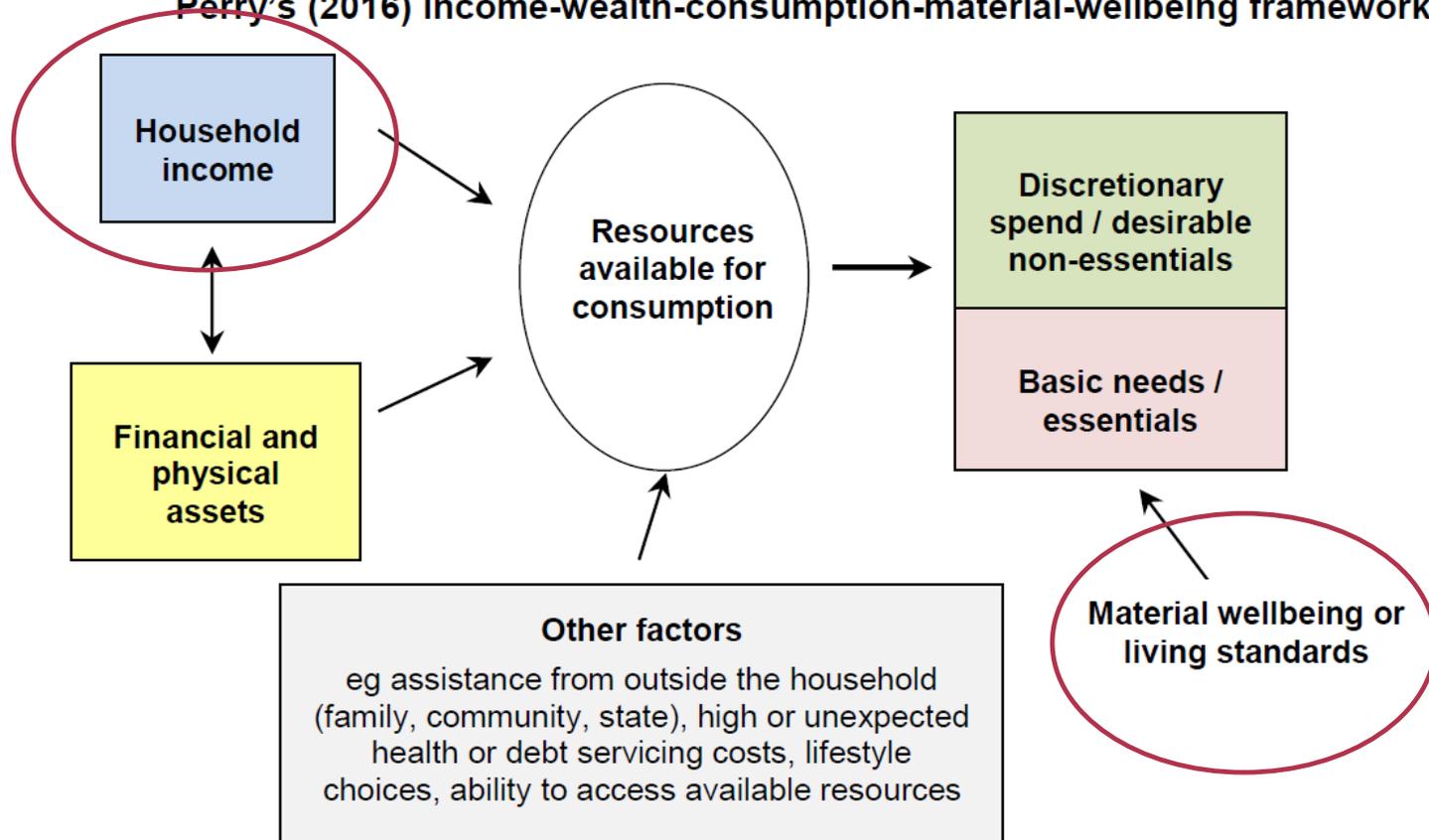
We will use information from RCTs to provide estimates of change in measured mediators. The costs of different interventions, and the health related cost savings of intervening will be compared to the costs of “doing nothing”

THE DATA

- Child cohort study within IDI Survey of Families, Income and Employment (SOFIE)
 - 8 waves of socio-economic and household data
 - Existence of children in household
- 9277 children
 - (aged <15, or 15-17 and dependent), in the IDI spine, were eligible and responded.
- Exposure: Income poverty (**Massive thanks to Trinh Le for code sharing**)
- Mediators: household crowding, food insecurity, parental psychological distress & parental smoking

MEASURING OF POVERTY

Perry's (2016) income-wealth-consumption-material-wellbeing framework



First run of analysis focussed on BHC income, but we have also started AHC.

Source (Perry 2016)

THE DATA

- Children linked to health outcomes data within IDI
 - Hospitalisations:
 - Total health costs (*still working on coding this*)

	Overall	Wave1	Wave2	Wave3	Wave4	Wave5	Wave6	Wave7	Wave8
n (sample)	39459	6258	5646	5127	4833	4683	4437	4278	4197
number of household	21759	3423	3090	2823	2670	2568	2472	2394	2316
Hospitalisations	%	%	%	%	%	%	%	%	%
All hospitalisations	7.3	8.1	7.3	6.7	6.9	6.7	7.3	7.2	7.5
Preventable	3.1	3.9	3.3	2.9	2.9	2.9	3.0	2.7	2.8
Respiratory	1.0	1.1	0.9	0.9	0.9	0.9	1.1	0.9	0.9
Infectious	3.0	3.7	3.2	2.8	2.9	2.9	3.1	2.8	2.8
Oral Health	0.5	0.5	0.4	0.5	0.6	0.5	0.5	0.3	0.4
Otitis Media	0.6	0.7	1.0	0.6	0.5	0.6	0.5	0.5	0.5

SELF REPORTED INCOME IN SOFIE

- Income reported in spells
 - these are converted into the annual reference period - 12 months prior to enumeration date.
- Income consists of:
 - Regular taxable – wages, student allowance, NZ Super, WINZ benefit...
 - Irregular taxable – wins from gambling, income from overseas, income from hobbies...
 - Non taxable regular – child tax credit, family tax credit, child disability allowance, accommodation supplement....
 - Non taxable irregular – inheritance, lump sum insurance payments, cash gifts.....
- Equivalised household income – $0.6 \times \text{median}$ for each wave (also tested $0.5 \times \text{median}$)
- Hospitalisations are for 12 months following enumeration date

	not in poverty	in poverty	Relative risk	Absolute diff
Otitis Media (%)	0.60	0.62	1.1 (0.8, 1.4)	0.02
Oral Health (%)	0.45	0.53	1.2 (0.9, 1.7)	0.07
Infectious (%)	2.96	3.37	1.1 (1.0, 1.3)	0.42
Respiratory (%)	0.92	1.05	1.1 (0.9, 1.4)	0.13
Preventable (%)	3.04	3.34	1.1 (1.0, 1.2)	0.30
All (%)	7.23	7.49	1.0 (1.0, 1.1)	0.26

ASSOCIATION
BETWEEN
INCOME
POVERTY AND
HEALTH
OUTCOMES

BHC poverty = 25% of sample

ATTRITION PROBLEM?

WHAT ABOUT IN EARLIER WAVES ONLY?

	Overall	Wave1	Wave2	Wave8
All				
hospitalisations	1.1 (1.0, 1.1)	1.1(0.9, 1.3)	1.1(0.9, 1.3)	1.2(0.9, 1.5)
Preventable	1.1 (1.0, 1.3)	1.0(0.7, 1.3)	1.1(0.8, 1.6)	1.1(0.7, 1.6)
Infectious	1.1 (1.0, 1.3)	1.1(0.9, 1.5)	1.0(0.7, 1.4)	1.2(0.8, 1.8)
Respiratory	1.2 (0.9, 1.5)	0.9(0.5, 1.6)	0.8(0.4, 1.6)	1.2(0.6, 2.4)
Oral Health	1.3 (0.9, 1.8)	1.0(0.5, 2.2)	1.3(0.6, 3.1)	1.1(0.4, 3.2)
Otitis Media	1.1 (0.8, 1.5)	0.8(0.4, 1.6)	0.9(0.5, 1.7)	1.0(0.4, 2.9)

HOSPITALISATIONS VARY WITH AGE - WHAT ABOUT SPECIFIC AGE GROUPS?

	Overall	0 - 4 yrs	5 - 10 yrs	11 - 17 yrs
All hospitalisations	1.1 (1.0, 1.1)	1.0(0.9, 1.1)	1.1(0.9, 1.2)	1.0(0.9, 1.2)
Preventable	1.1 (1.0, 1.3)	1.0(0.9, 1.2)	1.2(0.9, 1.5)	1.1(0.8, 1.6)
Infectious	1.2 (1.0, 1.3)	1.1(0.9, 1.3)	1.3(1.1, 1.7)	1.0(0.7, 1.4)
Respiratory	1.2 (0.9, 1.5)	1.2(0.9, 1.5)	0.9(0.5, 1.7)	1.0(0.4, 2.4)
Oral Health	1.3 (0.9, 1.8)	0.9(0.6, 1.6)	1.2(0.7, 1.9)	2.6(1.0, 6.5)
Otitis Media	1.1 (0.8, 1.5)	0.8(0.5, 1.2)	1.5(0.9, 2.4)	1.1(0.3, 3.3)

INCOME IS VOLATILE - RANDOM MEASUREMENT ERROR?

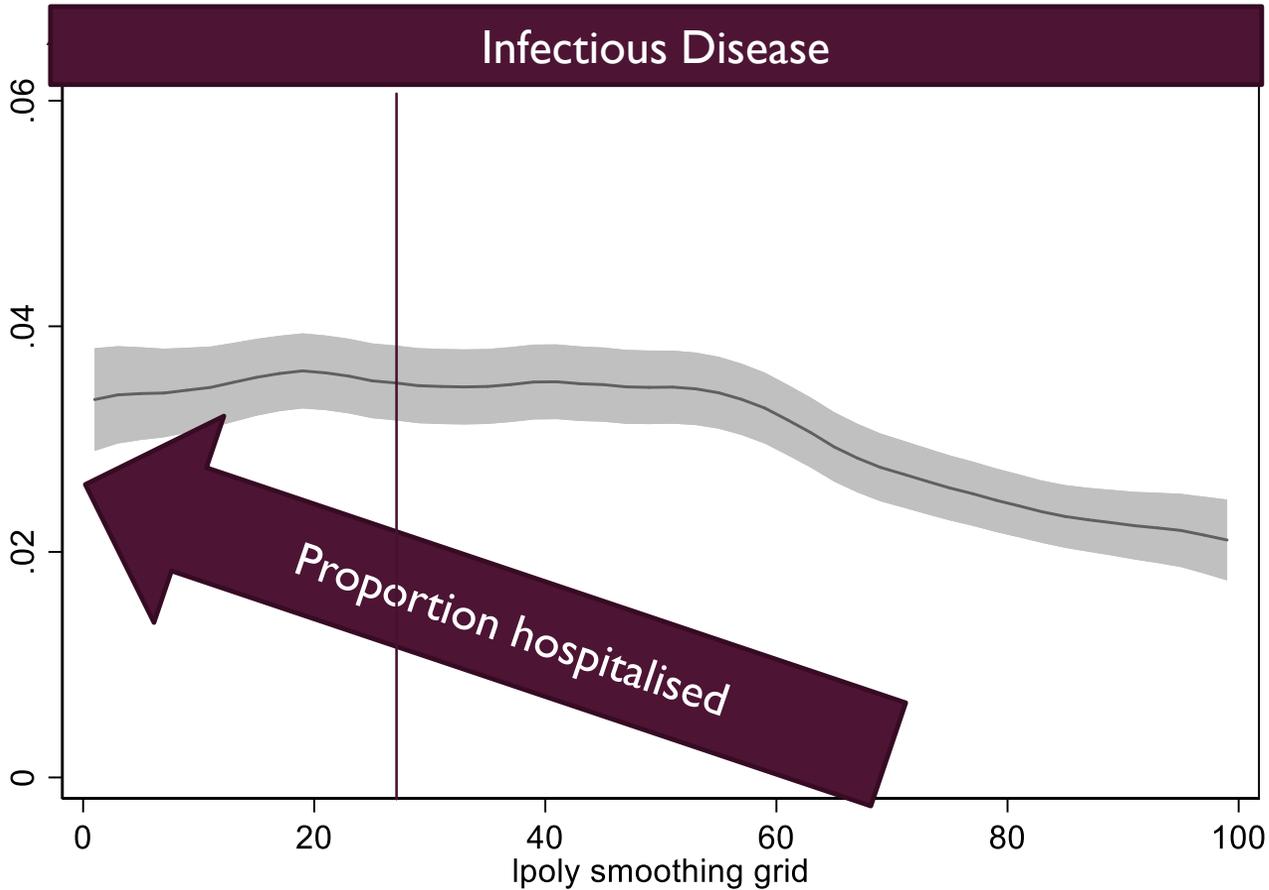
1

Created rolling averages of income (over 2,3 and 4 waves) and constructed poverty based on these averages

2

Looked at association between poverty and hospitalisations in current wave and previous (up to 4 waves) waves (0 never, 1=1 wave, 2=2 waves, 3=3waves, 4=all 4 waves)

WHAT ABOUT CONTINUOUS INCOME – IS THERE SOMETHING WRONG WITH THE THRESHOLD WE ARE USING?

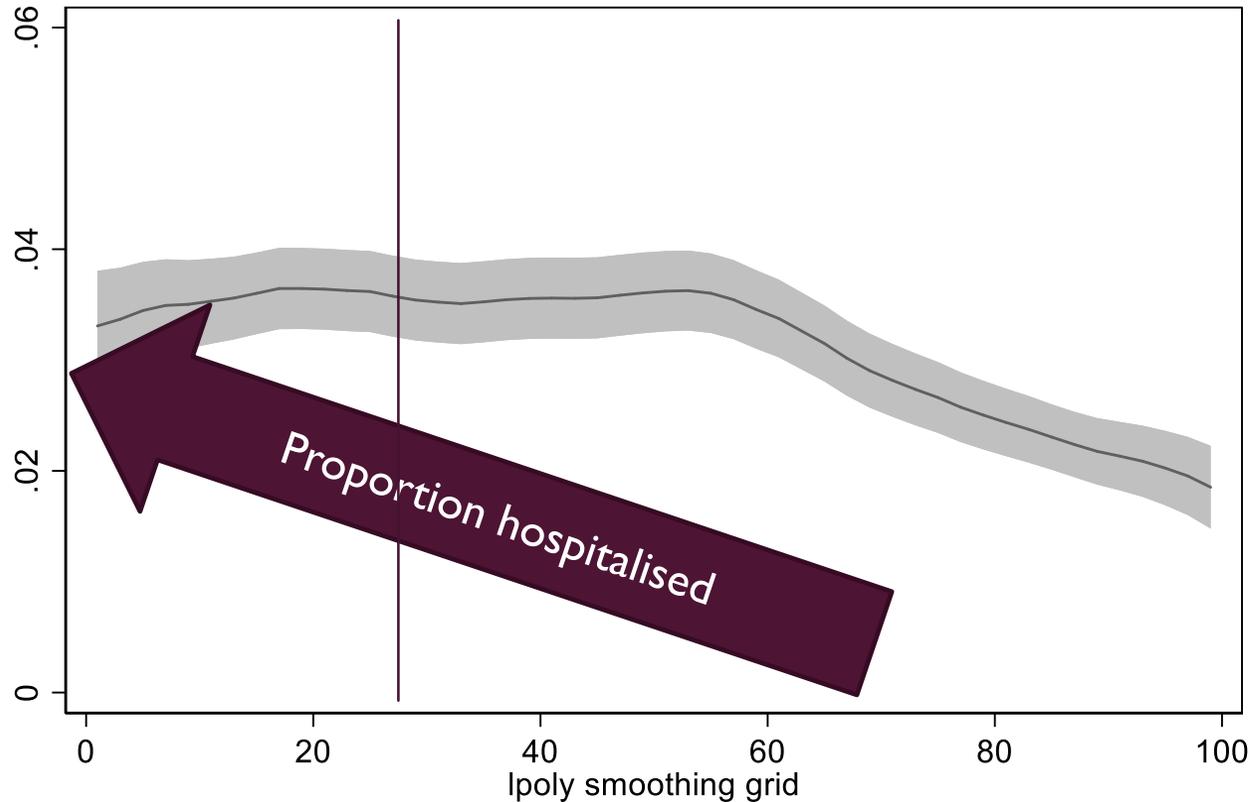


- Quintiles
- Continuous income (in various forms – logged, percentiles)

Percentile of Income 0 - 100

WHAT ABOUT CONTINUOUS INCOME – IS THERE SOMETHING WRONG WITH THE THRESHOLD WE ARE USING?

Preventable Admissions



- Quintiles
- Continuous income (in various forms – logged, percentiles)

Percentile of Income 0 -100

WHAT ABOUT AFTER HOUSING COSTS POVERTY INCOME?



Correlation between BHC and AHC poverty = 0.95

- Housing costs include: Rates, Land rates, Body Corporate fees, mortgage, rent, water rates (some rates include other rates e.g. body corp can include water rates – this is taken into account).
- Overall slightly stronger association (RR between 1.1 and 1.3)
- When we look at first wave only/across age groups only significant association for hospital admission in wave 1 and 0-4.

	not in poverty	in poverty	Relative risk	Absolute diff
Otitis Media (%)	0.57	0.73	1.3	0.16
Oral Health (%)	0.46	0.52	1.1	0.06
Infectious (%)	2.88	3.50	1.2	0.62
Respiratory (%)	0.90	1.12	1.3	0.23
Preventable (%)	2.93	3.55	1.2	0.62
All (%)	7.05	7.86	1.1	0.82

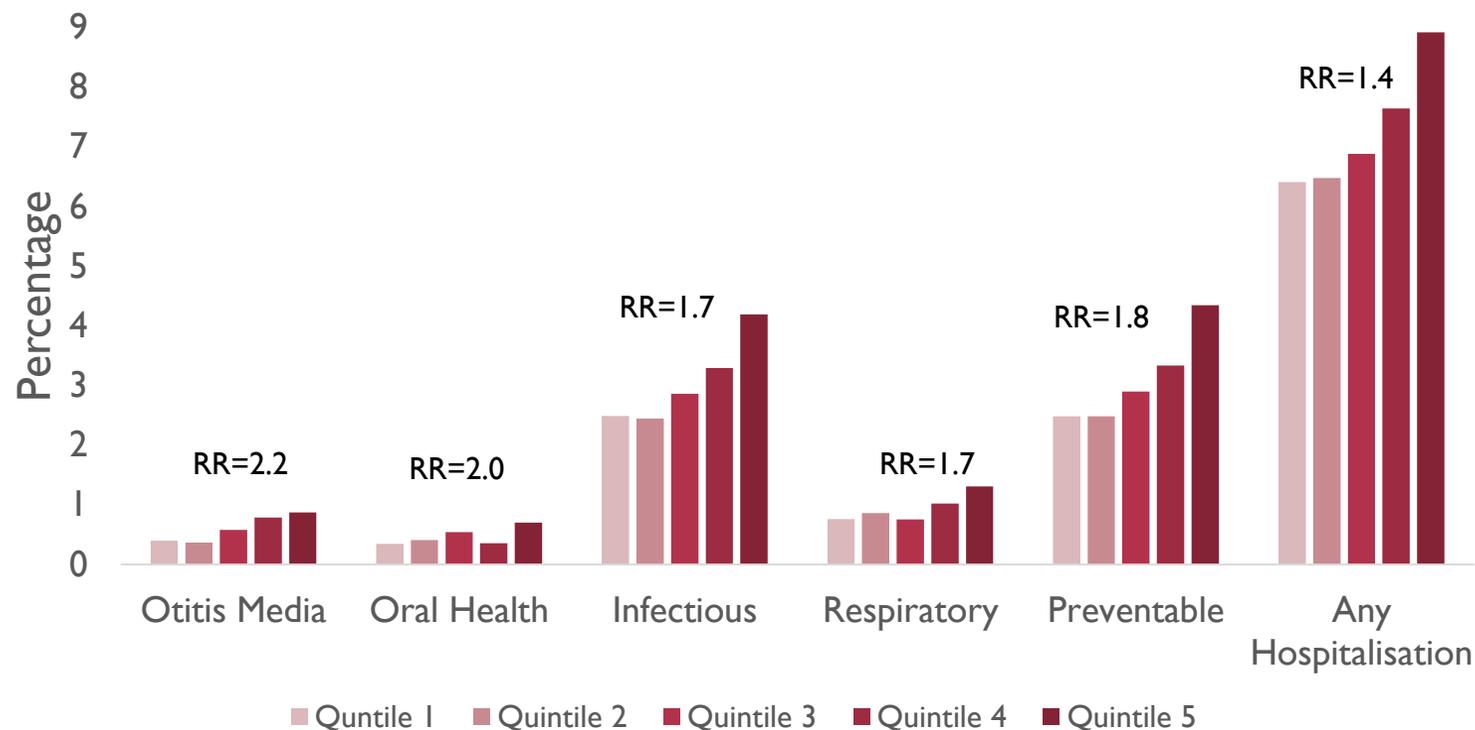
ASSOCIATION
BETWEEN
INCOME
POVERTY AFTER
HOUSING COSTS
AND HEALTH
OUTCOMES

AHC poverty = 29.5% of sample

POVERTY AND OTHER SES MEASURES IN SOFIE: NZDEP

NZDep Decile	BHC in poverty (%)
1 (least deprived)	9.4
2	12.6
3	15.6
4	15.3
5	19.1
6	20.2
7	26.0
8	25.9
9	35.6
10 (most deprived)	51.2

SoFIE: Unadjusted association between NZDep quintile and hospitalisation



Relative risks refer to rate in Quintile 5 (most deprived) compared to Quintile 1 (least deprived).

POVERTY AND OTHER SES MEASURES: MATERIAL DEPRIVATION – WAVES 3,5,7 ONLY

- Forced to buy cheaper food, so that they could pay for other things needed
- Unemployed for 4 or more weeks
- Put up with feeling cold, to save on heating costs
- Received help in the form of clothes or money from a community organisation
- Gone without fresh fruit and vegetables, so that they could pay for other things needed
- Continued wearing shoes with holes in them, because they could not afford to replace them
- Received an income tested benefit
- Had made use of special food grants or food banks, because they did not have enough money for food

Material deprivation	BHC in poverty (%)
0	16.6
1	16.6
2	25.9
3	32.2
4	41.7
5	43.5
6	48.0
7	56.5
8	63.0

POVERTY AND OTHER SES MEASURES: MATERIAL DEPRIVATION – WAVES 3,5,7 ONLY

Material Deprivation	Otitis Media (%)	Oral Health (%)	Infectious (%)	Respiratory (%)	Preventable (%)	All (%)
0	0.23	0.34	2.45	0.74	2.17	6.15
1	0.31	0.31	2.28	0.72	2.27	6.20
2	1.03	0.52	3.62	1.03	3.63	7.59
3	1.14	0.45	3.18	1.36	3.63	7.50
4+	0.92	0.69	3.69	1.27	3.92	8.41
Relative risk 4+ vs 0	4.0	2.0	1.5	1.7	1.8	1.4
Absolute diff 4+ vs 0	0.69	0.35	1.24	0.53	1.75	2.26

IRD VERSUS SELF REPORTED INCOME

Spearman correlation =
0.76

SoFIE
Self
report

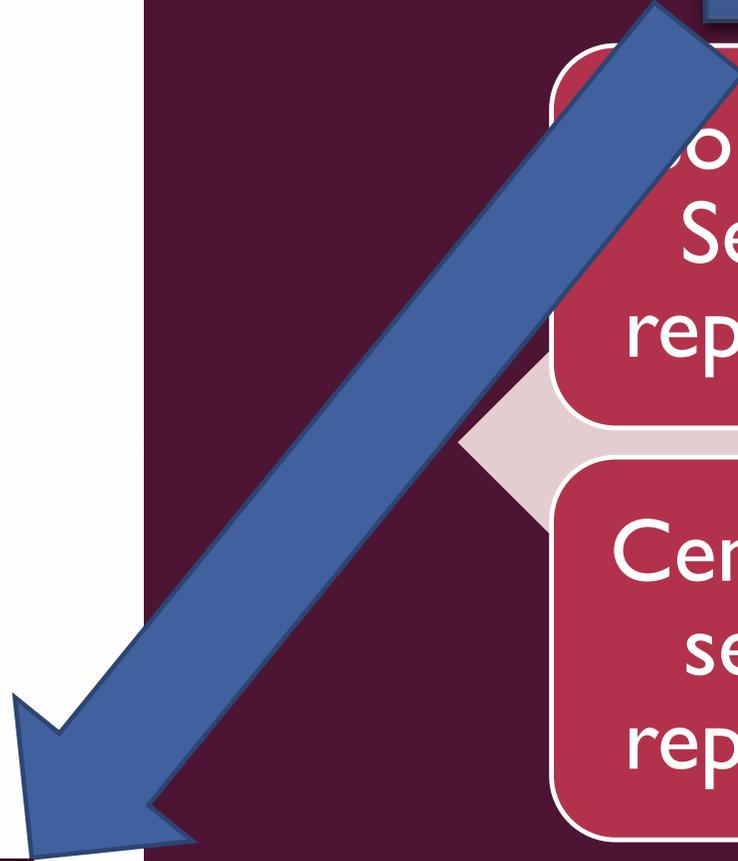
SoFIE
IRD

Census
self
report

Census
IRD

Spearman correlation =
0.79

BHC poverty based on IRD
income = 29.2% of sample



INCOME FOR SOFIE COHORT AS MEASURED BY IRD

	SR income poverty	IRD income poverty	food insecurity	parent smokes	crowding	K10
SR income poverty	1.00					
IRD income poverty	0.81	1.00				
either parent reports food insecurity	0.44	0.49	1.00			
either parent smokes	0.22	0.25	0.31	1.00		
crowding (Canadian occupancy scale)	0.35	0.30	0.28	0.18	1.00	
K10 (average of parents above 80th)	0.24	0.32	0.44	0.22	0.22	1.00
Otitis Media	0.01	-0.01	0.20	-0.03	-0.04	0.02
Oral Health	0.04	0.06	0.12	0.20	0.05	0.11
Infectious	0.04	0.02	0.13	0.04	0.04	0.03
Respiratory	0.03	0.03	0.13	-0.02	0.04	0.07
Preventable	0.02	0.02	0.14	0.03	0.04	0.06
Any admission	0.01	0.00	0.08	0.04	0.02	0.04

CENSUS COHORT

n	SoFIE 39459	Census 986901
All hospitalisations	7.5	7.2
Prevetable	2.8	2.9
Respiratory	0.9	0.9
Infectious	2.8	2.9
Oral Health	0.4	0.6
Otitis Media	0.5	0.4
0 - 4 yrs	26.1	29.0
5 - 10 yrs	34.9	33.9
11 - 17 yrs	39.1	37.0
Male	50.7	51.0
Female	49.3	49.0
European	79.2	67.8
Maori	26.3	23.0
Pacific	10.0	12.2
Asian	5.6	11.6
MELAA	2.3	1.4
Other	1.4	1.4

17% missing income: n=817620 of the cohort children have self-reported household income available.

In census 23.4% classified as in BHC income poverty compared to 24.9% based on self reported household income in SoFIE.

In census 29.4% classed as in poverty compared to 29.2% in SoFIE based on IRD income (BHC).

SELF REPORT	not in poverty	in poverty	Relative risk	Absolute diff
Otitis Media (%)	0.43	0.47	1.1(1.0, 1.2)	0.04
Oral Health (%)	0.47	0.81	1.7(1.6, 1.8)	0.34
Infectious (%)	2.79	3.47	1.2(1.2, 1.3)	0.68
Respiratory (%)	0.87	1.13	1.3(1.2, 1.4)	0.26
Preventable (%)	2.76	3.54	1.3(1.3, 1.3)	0.79
All (%)	7.10	8.14	1.1(1.1, 1.2)	1.04

IRD INCOME	not in poverty	in poverty	Relative risk	Absolute diff
Otitis Media (%)	0.43	0.46	1.1(1.0, 1.1)	0.02
Oral Health (%)	0.48	0.74	1.6(1.5, 1.7)	0.27
Infectious (%)	2.81	3.27	1.2(1.1, 1.2)	0.46
Respiratory (%)	0.87	1.07	1.2(1.2, 1.3)	0.20
Preventable (%)	2.76	3.36	1.2(1.2, 1.2)	0.59
All (%)	7.14	7.84	1.1(1.1, 1.1)	0.70

CENSUS 2013: ASSOCIATION BETWEEN INCOME POVERTY (BHC) AND HEALTH OUTCOMES

Not shown, but: relationship is weaker for both Census and SoFIE if you include IRD income for those who don't self-report income

SUMMARY

- Income poverty not strongly associated with child hospitalisations (for the outcomes we chose to look at)
- AHC income poverty slightly stronger, but still not a strong association
- Self report and IRD income paint largely the same picture
- Lots of sensitivity checks suggest income, or low income, not going to show strong associations – but we haven't completed our analysis using AHC income.
- Other measures of SES or deprivation have a much stronger association with child hospitalisations – material deprivation and NZDep.

- Could there be a health service use bias? Poor health versus treatment (don't always match up). Coding for health costs/ looking at pharmaceutical
- Meeting with poverty team after this event – deciding how to proceed.

QUESTIONS/
COMMENTS/
HELP



SOME INCOME DESCRIPTIVES

Census Spearman				
		trim_eqv_hhld_income	trim_eqv_ird_hhld_inc	trim_eqv_ird_resp_hhld_inc
MEAN		59756.44	51120.48	56657.60
STD		38094.18	43138.84	440416.97
N		817623	986901	817623
CORR	trim_eqv_hhld_income	1.00	0.79	
CORR	trim_eqv_ird_hhld_inc	0.79	1.00	

SoFIE Spearman				
		trim_ehrginc_jensen	trim_ird_eqv_hhld_income	trim_ird_resp_eqv_hhld_income
MEAN		54905.87	42871.54	43412.14
STD		45979.77	33513.16	33406.61
N		38919	39462	38919
CORR	trim_ehrginc_jensen	1.00	0.76	
CORR	trim_ird_eqv_hhld_income	0.76	1.00	

POVERTY AND NZDEP – CENSUS AND SOFIE

NZDEP	SR pov	IRD	IRD including non responders
1	5.7	14.0	16.2
2	9.7	17.9	19.6
3	12.8	21.1	22.5
4	15.8	23.3	24.9
5	19.2	26.4	27.7
6	22.9	29.4	30.4
7	27.1	32.9	33.9
8	32.4	36.7	37.8
9	39.8	43.0	43.9
10	55.0	55.6	55.9

NZDep Decile	BHC in poverty (%)	AHC in poverty (%)
1 (least deprived)	9.4	12.1
2	12.6	17.2
3	15.6	19.7
4	15.3	20.8
5	19.1	25.5
6	20.2	25.8
7	26.0	31.6
8	25.9	32.4
9	35.6	42.1
10 (most deprived)	51.2	53.2

	Overall	Wave1	Wave2	Wave3	Wave4	Wave5	Wave6	Wave7	Wave8
n (sample)	39459	6258	5646	5127	4833	4683	4437	4278	4197
number of household	21759	3423	3090	2823	2670	2568	2472	2394	2316
Age (mean(std))	8.56 (5.03)	8.31 (5.01)	8.45 (5.03)	8.59 (5.00)	8.62 (5.01)	8.62 (5.02)	8.60 (5.02)	8.64 (5.06)	8.73 (5.11)
Age group									
0 - 4 yrs	26.1	27.6	26.8	25.5	25.4	25.4	25.8	25.7	26.2
5 - 10 yrs	34.9	35.2	35.3	35.9	35.6	34.8	34.6	33.9	32.8
11 - 17 yrs	39.0	37.2	37.8	38.7	38.9	39.8	39.6	40.4	41.1
Gender									
Male	50.7	50.6	50.9	51.0	50.5	50.7	50.4	50.7	50.8
Female	49.3	49.4	49.1	49.0	49.5	49.4	49.6	49.4	49.3
Ethnicity									
European	79.2	72.9	75.9	78.6	80.3	81.3	81.5	82.6	83.6
Maori	26.3	28.3	26.9	26.9	25.7	25.9	25.6	25.3	24.8
Pacific	10.0	12.3	11.1	9.4	9.1	9.1	9.3	9.5	9.1
Asian	5.6	6.2	6.1	5.7	5.4	5.3	5.5	4.9	4.8
MELAA	2.3	3.4	3.2	3.0	2.7	2.2	2.0	1.5	1.4
Other	1.4	1.4	1.4	1.4	1.5	1.3	1.3	1.5	1.5
Hospitalisations									
All hospitalisations	7.3	8.1	7.3	6.7	6.9	6.7	7.3	7.2	7.5
Preventable	3.1	3.9	3.3	2.9	2.9	2.9	3.0	2.7	2.8
Respiratory	1.0	1.1	0.9	0.9	0.9	0.9	1.1	0.9	0.9
Infectious	3.0	3.7	3.2	2.8	2.9	2.9	3.1	2.8	2.8
Oral Health	0.5	0.5	0.4	0.5	0.6	0.5	0.5	0.3	0.4
Otitis Media	0.6	0.7	1.0	0.6	0.5	0.6	0.5	0.5	0.5
Number of adults per household (mean (std))	2.42 (1.02)	2.36 (1.03)	2.40 (1.02)	2.45 (1.04)	2.44 (1.02)	2.45 (1.04)	2.42 (1.00)	2.43 (1.00)	2.47 (1.03)
Number of children per household (mean(std))	2.15 (1.25)	2.26 (1.32)	2.23 (1.32)	2.16 (1.26)	2.15 (1.27)	2.13 (1.26)	2.08 (1.18)	2.05 (1.17)	2.04 (1.17)

POVERTY AND OTHER SES MEASURES IN SOFIE: EDUCATION

Highest qualification	BHC in poverty (%)
no quals	55.6
school quals (level 1,2,3)	34.1
post school quals	25.0
advanced vocational	17.4
Degree or higher	11.1

SoFIE: Unadjusted association between highest qualification and hospitalisation

