National SCIENCE Challenges

A BETTER START

E Tipu e Rea

A Big Data approach to A Better Start

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COMPASS Colloquium

Statistics New Zealand

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Host Institution

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AgResearch

Disclaimer

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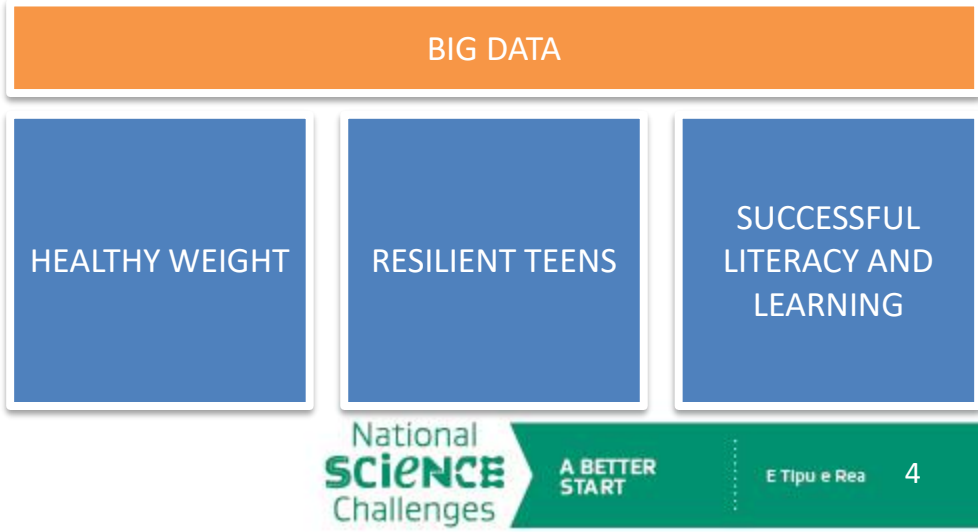
National Science Challenges

- 11 National Science Challenges
- A better start aims to improve the potential for young New Zealanders to have healthy and successful lives

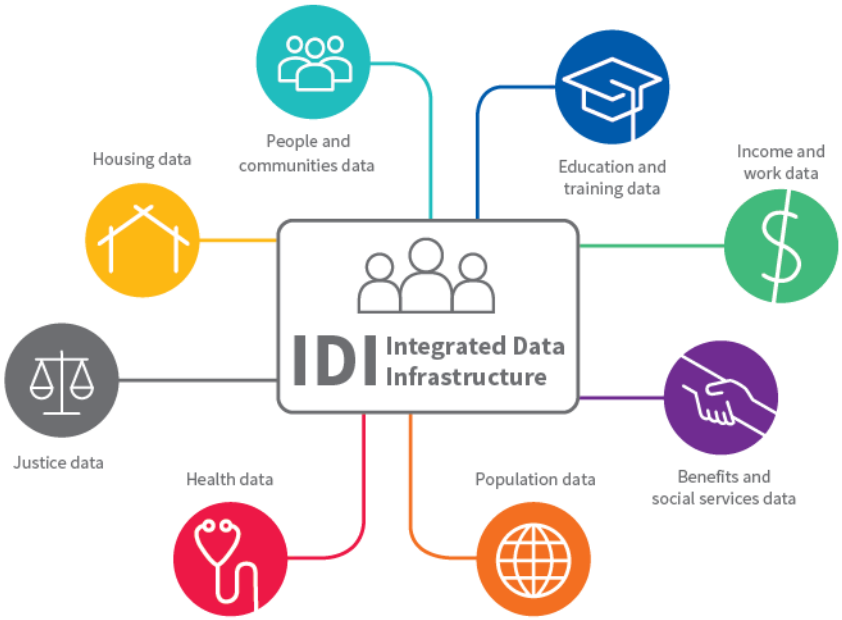
National Science Challenges

- Big Data Theme: Nichola Shackleton, Barry Milne, Stephanie D'Souza, Sheree Gibb, Rick Audas, Jess Kokaua, Nick Bowden, Justine Camp, Rose Richards, Barry Taylor
- Collaborate with other themes
- Lead our own research initiatives



Big Data Theme approach

- Monitor national trends
- Understand risk factors
- Use IDI
  - Whole population linked
  - Large numbers for subgroups
  - B4 School Check
  - Longitudinal
  - Intergenerational
  - Sibling/twin analyses



B4School Check

- Established September 2008
  - We use 2010/2011 to 2015/2016
- Eligible children
  - Enrolled with a PHO on their 4th birthday
  - Target is 90% of eligible children
- Coverage 72-92%
  - 55-60,000 children added each year

B4 School Check

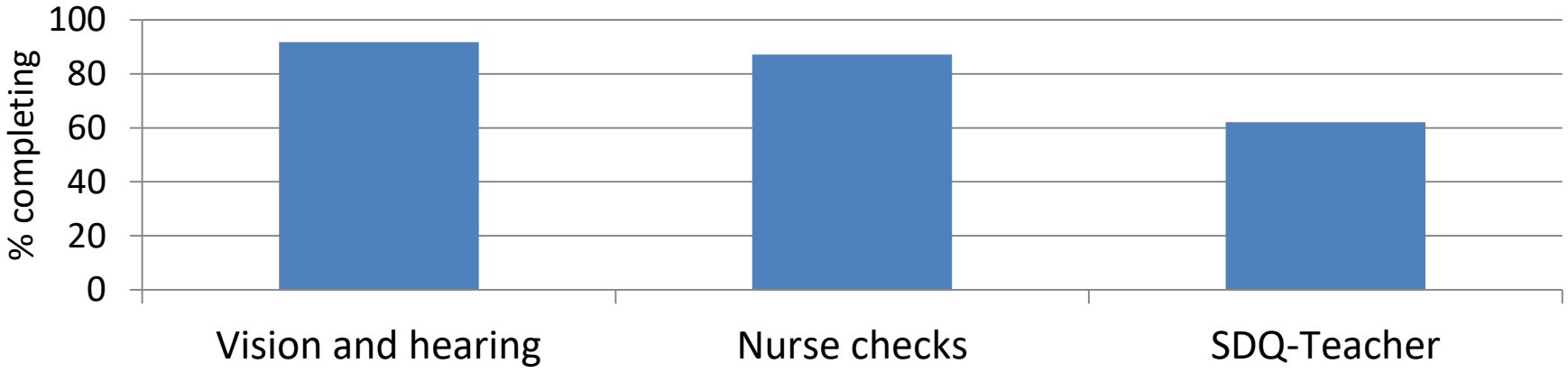
The B4 School Check is a nationwide programme offering a free health and development check for 4-year-olds.

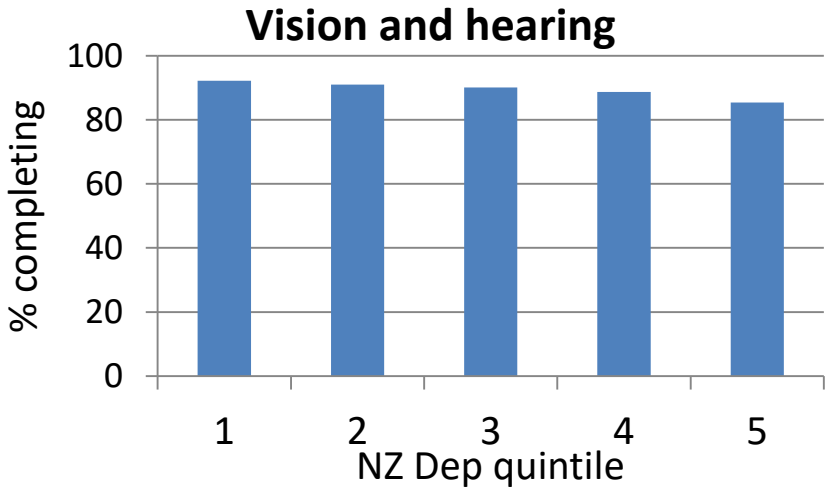
The B4 School Check aims to identify and address any health, behavioural, social, or developmental concerns which could affect a child's ability to get the most benefit from school, such as a hearing problem or communication difficulty.

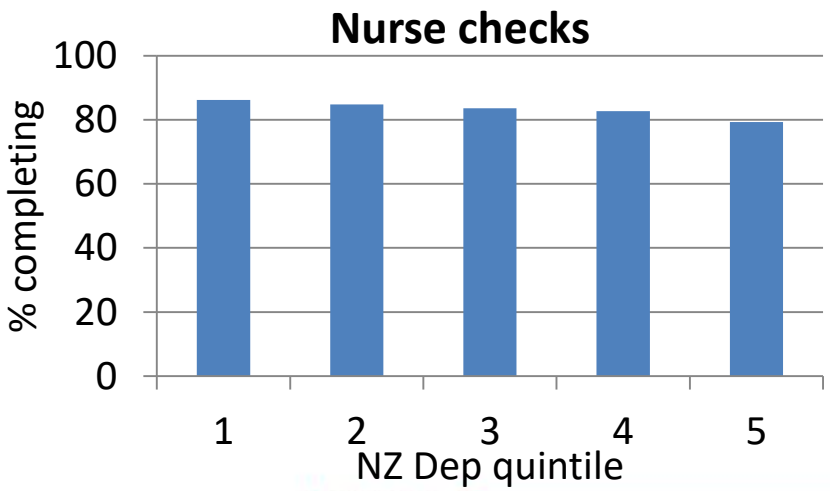
It is the 12th core contact of the Well Child Tamariki Ora Schedule of services.

B4 School Check

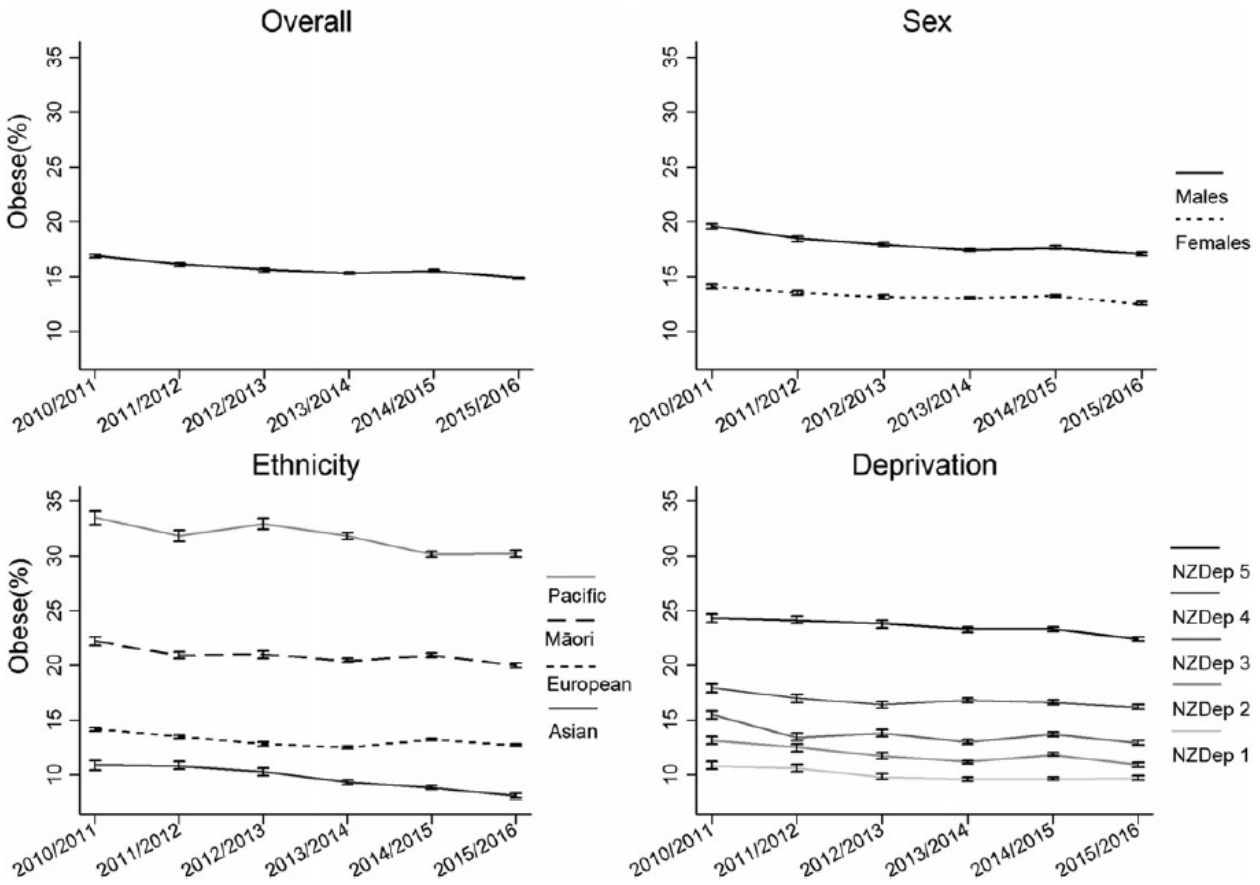
Who gets a B4 School Check?







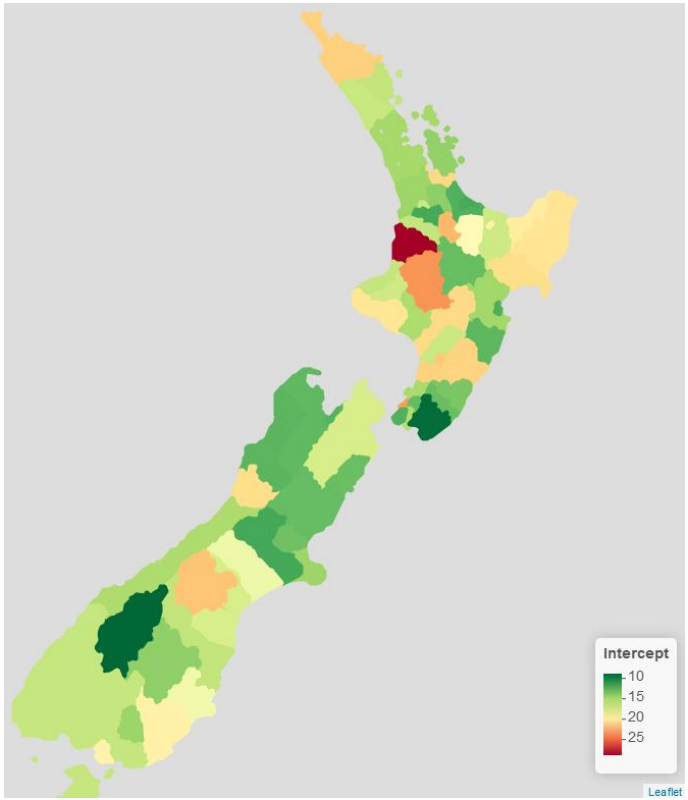
Healthy weight: trends



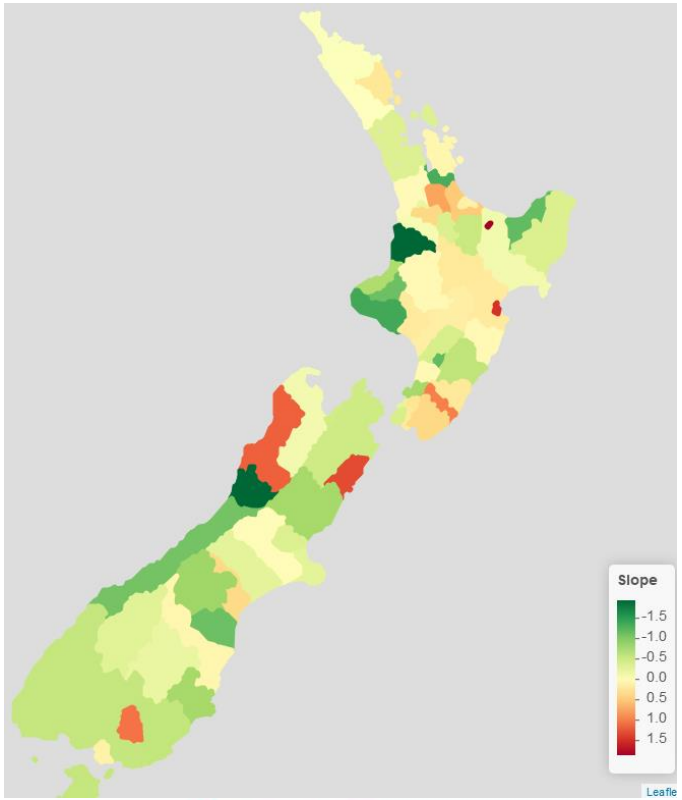
Shackleton et al. Pediatr Obes. 2017 Dec 22. doi: 10.1111/ijpo.12260.

Healthy weight: communities

Prevalence



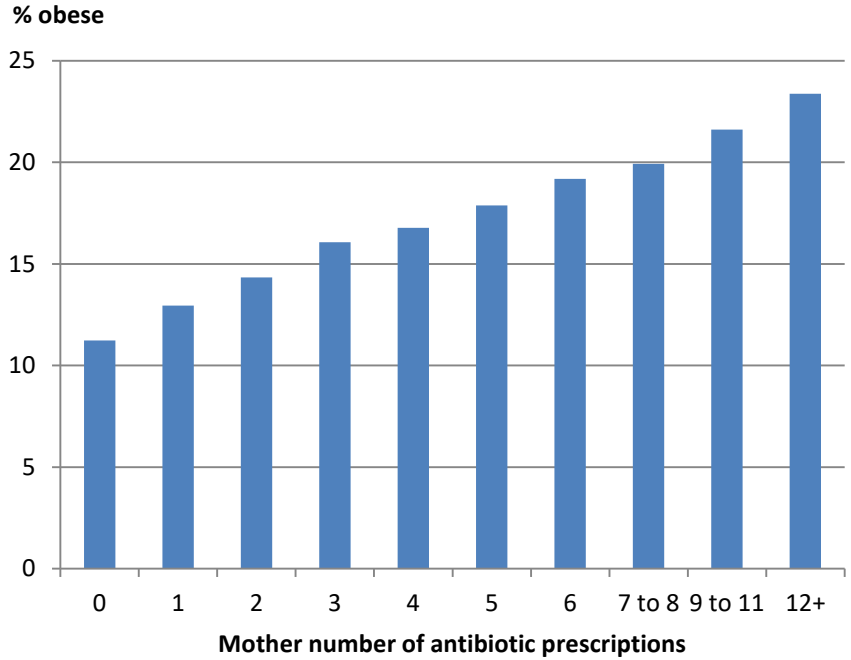
Slope



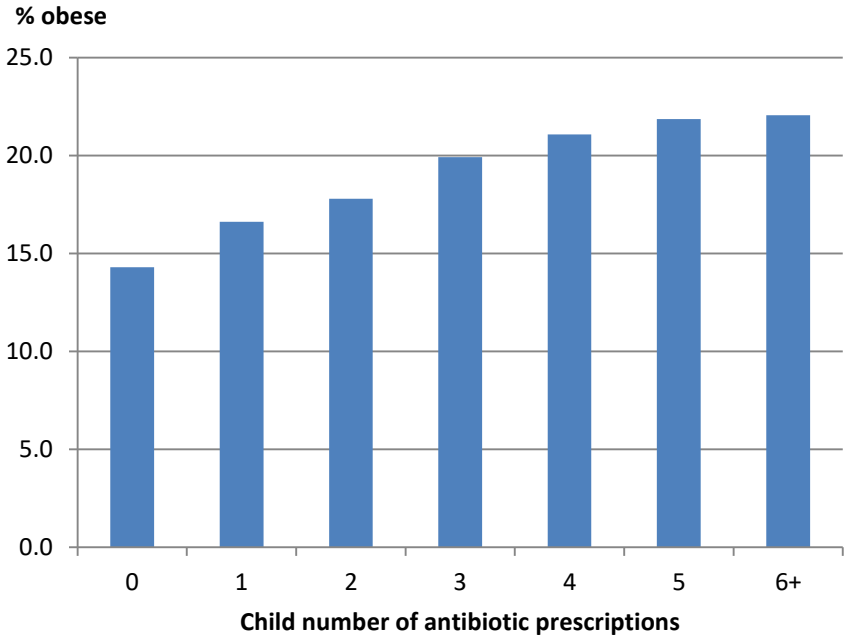
Gibb et al. (under review) ANZJ Pub Health

Healthy weight: Antibiotic use

Mother antibiotics



Child antibiotics



Leong et al. (in preparation)

Healthy weight: Antibiotic use

- Meta analysis (child use) shows modest effect (OR = 1.05)
- …But IDI twin analysis indicates NO effect
  - Twins experience potentially different AB exposure, BUT same maternal AB exposure and family exposures
- …AND IDI sibling analysis indicates NO effect
  - Sibs experience potentially different maternal AB exposure, BUT same family exposures
- Suggests no causal effect

obesity reviews doi: 10.1111/obr.12717

Pediatric Obesity/Etiology and Pathophysiology

The association between antibiotic use in infancy and childhood overweight or obesity: a systematic review and meta-analysis

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Summary

Purpose: Antibiotic use is associated with alteration of the gut microbiome and metabolic activity. As childhood obesity is a predisposing factor for adult obesity, addressing childhood risk factors to weight gain in early life is important. This review aims to investigate the association between infant antibiotic exposure (aged < 24 months) and childhood obesity or overweight.

Methods: Articles were retrieved from CINAHL, Cochrane CENTRAL, Embase and MEDLINE. Eligible articles investigated antibiotic use in exposed versus unexposed infants and measured childhood weight change. Data were synthesized narratively and meta-analysed where possible.

Results: After title/abstract and full-text screening, 17 articles representing 15 unique studies were included for narrative synthesis. We found a small association between antibiotic exposure in infancy (<24 months) and childhood overweight or obesity. The strongest associations were observed in boys versus girls and children exposed to multiple antibiotic courses or broad-spectrum drugs. Meta-analysis of 12 sets of results comparing the earliest age of exposure to any antibiotic with overweight or obesity at the latest age of outcome found a pooled odds ratio of 1.05 (95% confidence interval: 1.00–1.11).

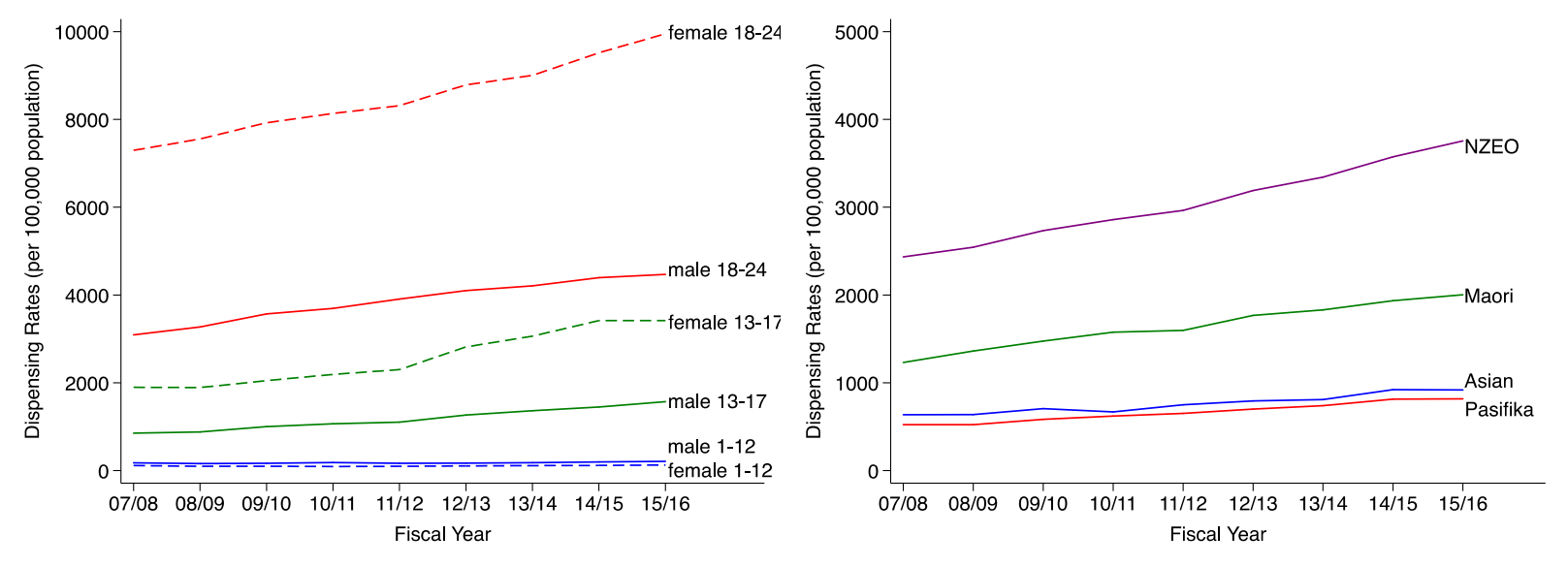
Conclusions: Antibiotic exposure in infants, aged < 24 months, was associated with a small increase in odds of childhood overweight or obesity in some subgroups of children.

Keywords: antibiotic, obesity, overweight, paediatrics.

Healthy weight: Planned investigations

- Seasonal of measurement and childhood obesity
  - Milne et al., under review, Int J Obesity
- Decomposing ethnic differences in obesity
  - Shackleton et al., under review, Int J Obesity (**UP NEXT!**)
- Childhood obesity and ADHD medication use
  - D'Souza et al., in preparation

Resilient teens: Antidepressant dispensing



Bowden et al. (under review) ANZ J Psychiatry

Resilient teens: Planned investigations

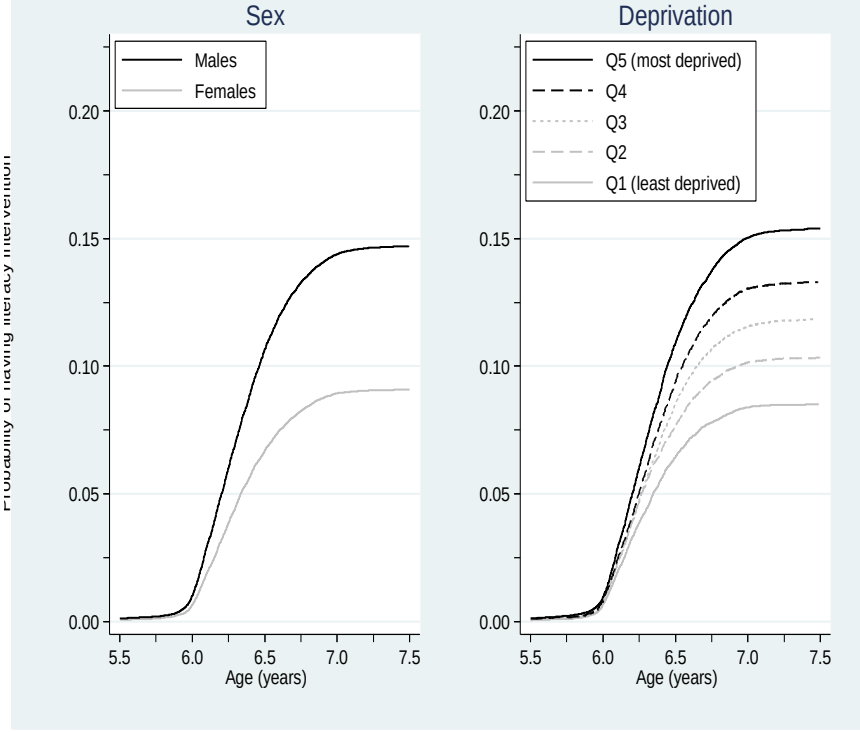
- Clustering of (treated) mental health conditions
  - Bowden et al., (planned)
- Self harm and the lunar calendar
  - Camp et al., (planned)
- Justice interactions for youth with mental health conditions
  - Bowden et al., (planned)

Successful learning: Literacy interventions

Q: Can B4SC be used to as a screen for who will likely need (receive) a literacy intervention?

A: No.

While all demographic and B4SC measures associated with later literacy intervention, overall prediction is poor (c=0.62)



Schluter et al. (in press) Child Development

Successful learning: Planned investigations

- Literacy interventions for Pacific children
  - Schluter et al. (in press) Scientific Reports
- Literacy interventions for Māori children
  - Planned

Māori and Pacific focus

- Consultation strategy with Māori & Pacific stakeholders
  - Iwi, Te Mana Raraunga
  - Pasifika Futures
- Māori- and Pacific
  - led research agendas
  - involvement with all research projects
  - workforce development in big data analytics
    - One Research Fellow, Five students

Comment

- B4SC and IDI allow a wealth of data and analytic possibilities
  - We are not running out of things to do…
- Also plans to work together with other NSC challenges (Healthier Lives; Aging Well) to undertake life-course analyses

Comment: Data issues

- B4SC coverage incomplete
- No later screen (for any theme)
- No primary health care data
- B4SC aside, data capture who has received a service
  - Impacted by service provision and access barriers
- Lack of ‘soft’ measures
  - E.g., assessment of mental health symptoms, education experiences (SDQ in B4SC has quality issues)
- Additional data being considered

Comment: Community assets/Geospatial indicators

NATURAL SPACES	OUTLETS	OTHER
Green Space	Gambling	Volunteerism
Blue Space	Fast Food	Civic Engagement
Native Space	Alcohol Outlets	Fluoridation
Sunlight	Community Alcohol and Drug (CAD) Treatment Services	Public Transport
Rainfall	Libraries	Housing Affordability
Humidity	Early Childhood Education	Rental Affordability
Air Quality	Community Centres /Community Halls	Rental Density
Water Quality	Churches	Crime rates
Walkability	Plunket	CPI Food
Cycleways	MOE Speech Language Support	School Closures
Beaches	Marae	Dependency Ratio

QUESTIONS?