National SCIENCE Challenges

A BETTER START

E Tipu e Rea

E Tipu E Rea
A Better Start National Science Challenge: An update on recent findings

Barry Milne

COMPASS Colloquium

Statistics New Zealand, Wellington

6 August 2020

A Better Start is funded by the Ministry of Business, Innovation and Employment

Host Institution

The University of Auckland New Zealand | Liggins Institute

UC University of Canterbury

University of Otago

AUT University

The University of Waikato

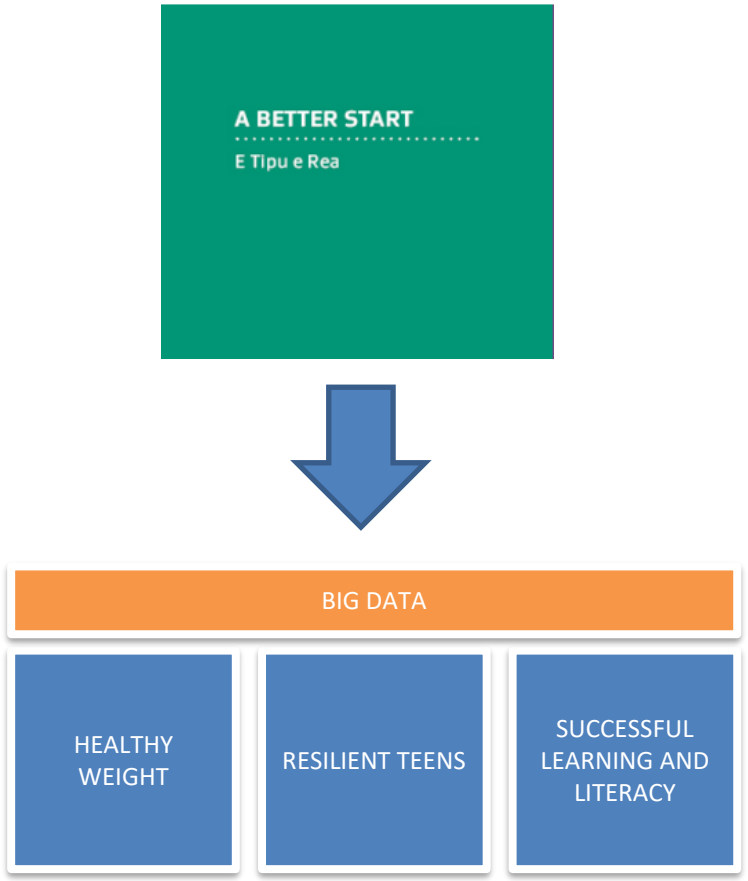
Massey University

Victoria University of Wellington

AgResearch

Big Data's role

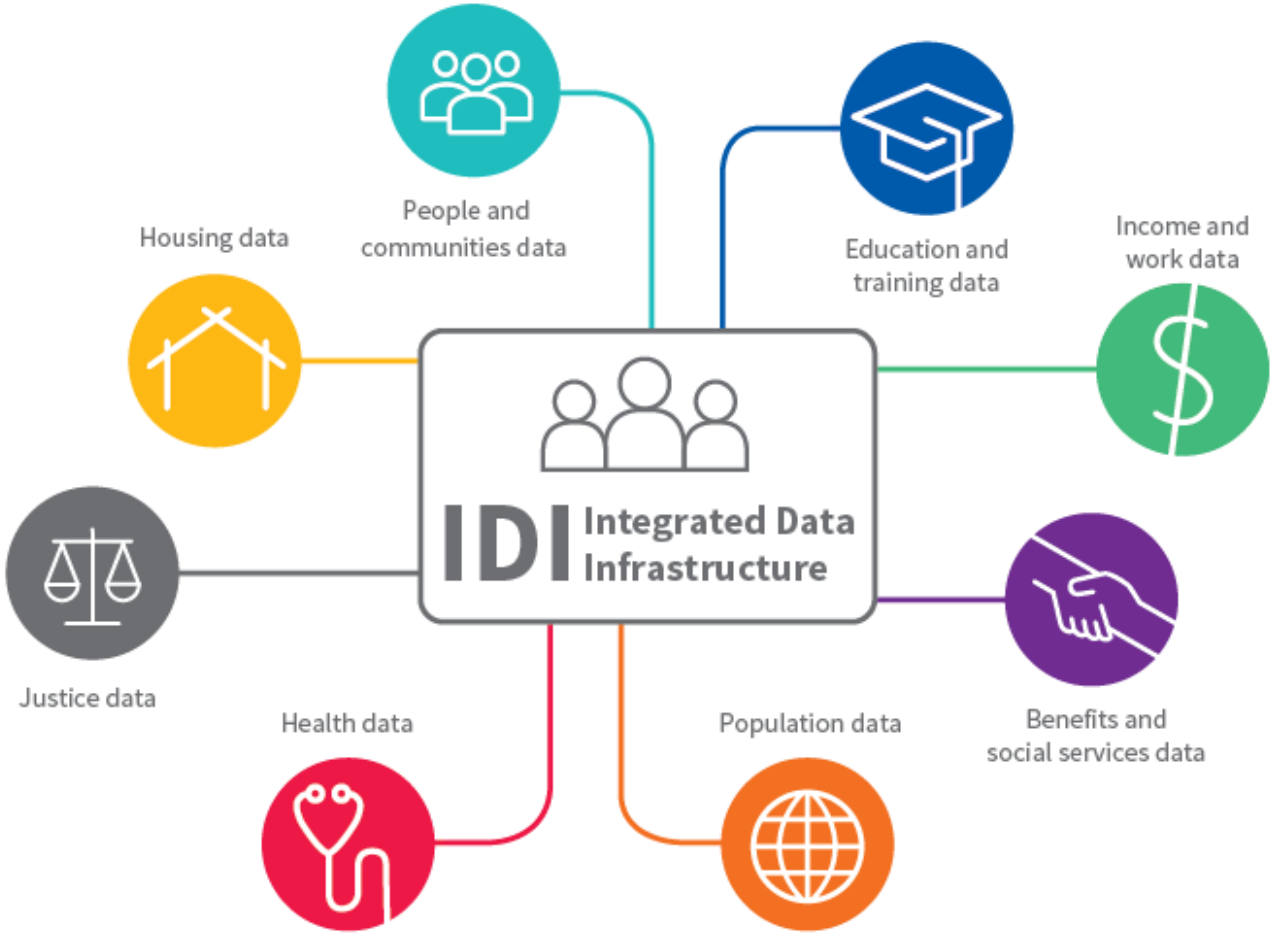
- Work with the three themes to assess time trends, spatial distribution, and answer other key questions using whole population data (IDI)
- Healthy weight
  - B4 School Check
- Resilient Teens
  - Pharmaceutical data
- Successful Learning and Literacy
  - B4 School Check, School data



Big Data Team

- Barry Milne – Principal Investigator (COMPASS)
- Barry Taylor, Lisa Daniels (DSM), Nichola Shackleton (COMPASS)
  - Healthy weight
- Jesse Kokaua (Pacific Islands Research and Student Support Unit, Otago), Stephanie D'Souza (COMPASS)
  - Successful learning and literacy
- Nick Bowden (DSM), Stephanie D'Souza (COMPASS)
  - Resilient teens
- Sheree Gibb (UOW)
  - Lead analyst
- Lisa Perry (UOA)
  - Research Management

Integrated Data Infrastructure (IDI)



DISCLAIMER

Access to the data presented was managed by Statistics New Zealand under strict micro-data access protocols and in accordance with the security and confidentiality provisions of the Statistic Act 1975. Our findings are not Official Statistics. The opinions, findings, recommendations, and conclusions expressed are those of the researchers, not Statistics NZ, or the University of Auckland.

Stage II

Healthy weight

1. Prevalence of overweight and obesity in New Zealand children under 4 years of age.
   - Data: Plunket
2. Trends in healthy weight, 2011-2019
   - Data: B4SC
3. Short term follow-up of Moemoea intervention (sleep toolkit)
   - Data: Plunket
4. Cost-benefit simulation of Moemoea intervention

Stage II

Resilient teens

1. Rates of ADHD medication use by age, the age that ADHD medication is started, and duration of medication use
   - Data: NMDS, PHARMS
2. National Prescribing Rates and Polypharmacy for Children and Young People in New Zealand with and without Autism Spectrum Disorder.
   - Data: NMDS, PRIMHD, Socrates, PHARMS
3. Follow-up of digital interventions in adolescence
   - Data: Schools, NMDS
4. Cost-benefit simulation of digital interventions

Stage II

Successful Learning and Literacy

1. A comparison of literacy success between New Zealand and Ireland
   - Data: PIRLS
2. Age 2 language problems and school readiness
   - Data: Plunket, B4SC
3. Cost-benefit simulation of phonological awareness intervention (age 5)

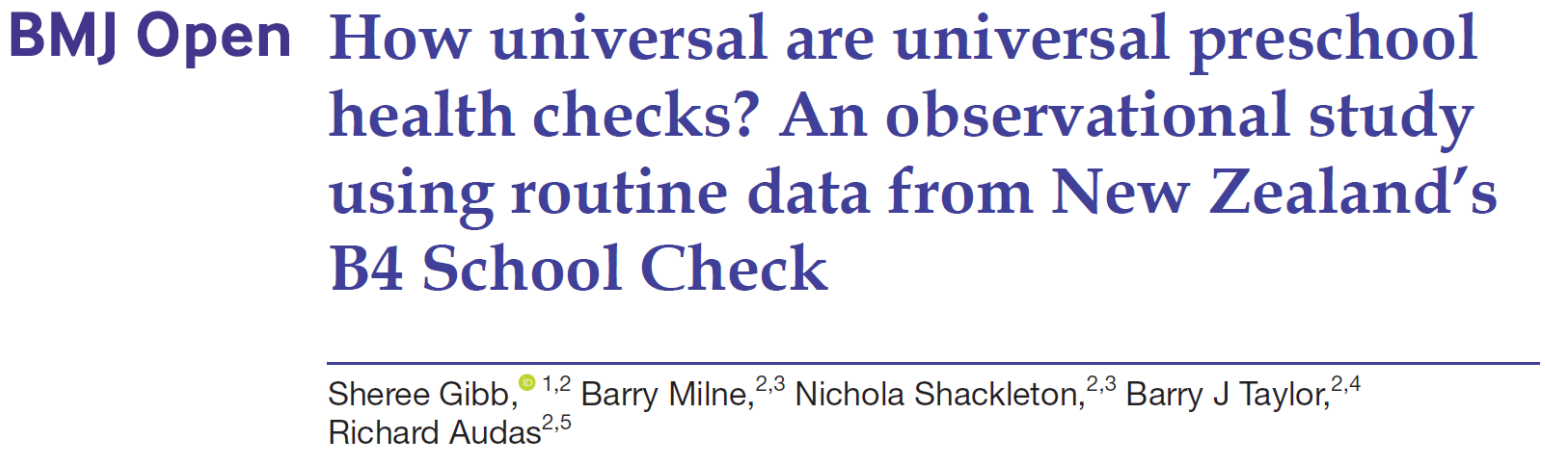
Stage II

Collaboration with Social Wellbeing Agency (SWA)

AIM: To undertake an analysis of IDI data to develop area level profiles of attendance at B4SC.

This will increase understanding of who in is not accessing B4SCs at the level of Territorial Authority (local boards in Auckland) in each of the 20 DHBs

- Work underway



National Science Challenges | A BETTER START | E Tipu e Rea

Obesity trends Ngāti Whātua – Healthy weight

JOURNAL OF THE ROYAL SOCIETY OF NEW ZEALAND
2019, VOL. 49, NO. 4, 449–458
https://doi.org/10.1080/03036758.2019.1691613

Taylor & Francis
Taylor & Francis Group

RESEARCH ARTICLE

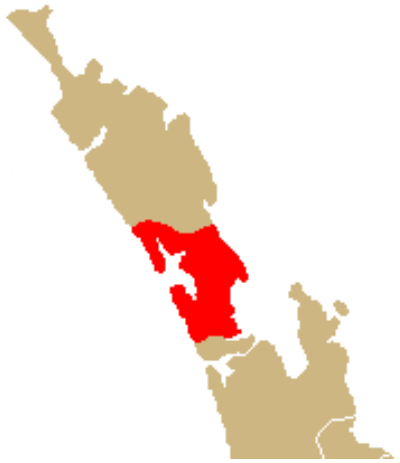
Stable prevalence of obesity among Ngāti Whātua 4-year-old children in 2010–2016

Hannah Rapata[a,b], Wayne S. Cutfield[a,b], Barry J. Milne[a,c], Nichola Shackleton [a,c], Cathrine Waetford[a], Rosalina Richards[a,d], Rachael W. Taylor[a,e], Terina Raureti[a,f], José G. B. Derraik [a,b] and Justine Camp[a,f]

Obesity trends Ngāti Whātua – Healthy weight

BACKGROUND: Pre-school obesity has reduced in Aotearoa generally 2010-16 (Shackleton et al., 2017) and there is very little evidence of regional differences in this decline (Gibb et al., 2019)

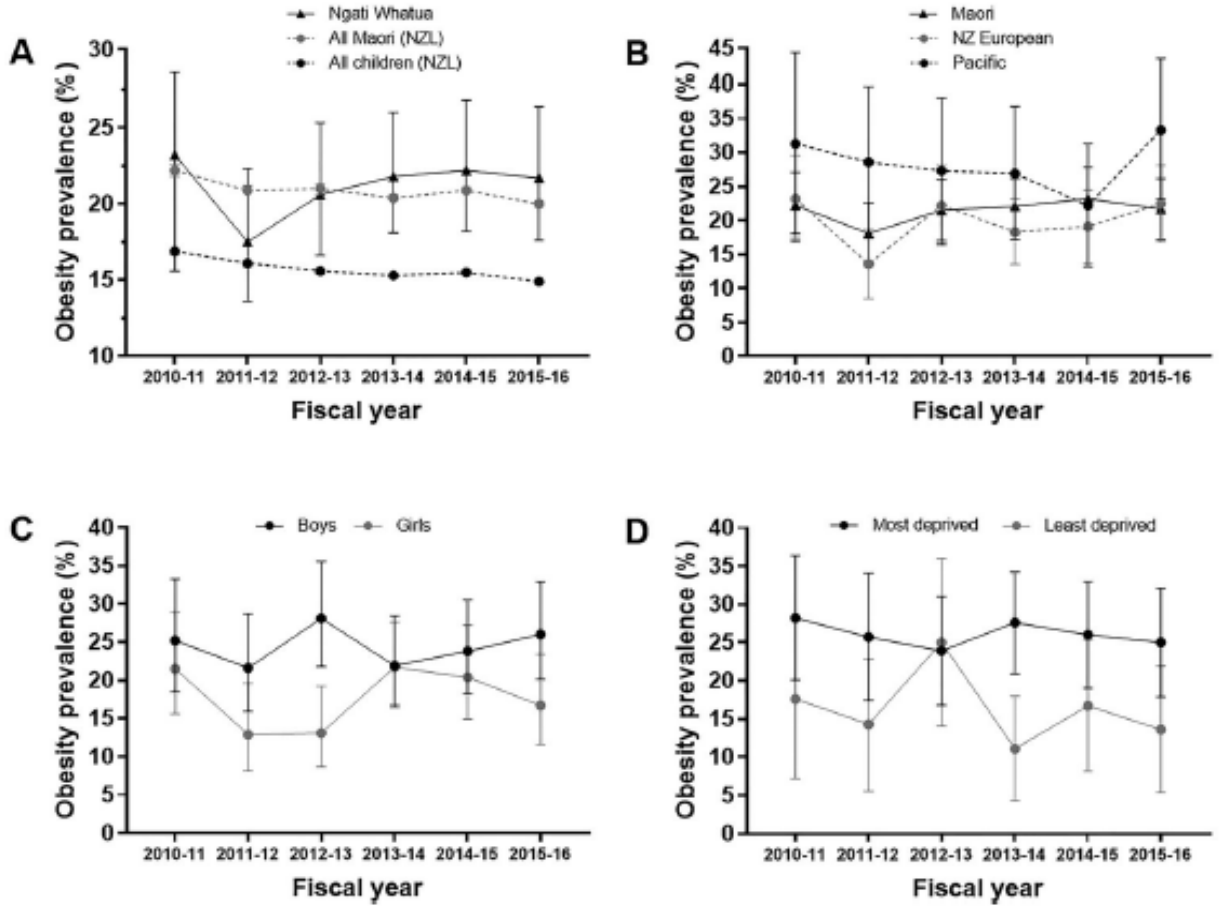
AIM: Investigate if pre-school obesity trends in Ngāti Whātua match that of the whole population, so as to provide Ngāti Whātua with data to inform their existing programmes and services to support the health and wellbeing of their children.



METHODS: Obesity trends from B4SC for children with Ngāti Whātua iwi affiliation (n~300/year: Census 2013; schools data)

Obesity trends Ngāti Whātua – Healthy weight

- Stable prevalence
  - Low numbers though…



ASD identification using IDI – Resilient teens

Original Article

Autism
1–15


Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/1362361320939329
journals.sagepub.com/home/aut
SAGE

Autism spectrum disorder/Takiwātanga: An Integrated Data Infrastructure-based approach to autism spectrum disorder research in New Zealand

Nicholas Bowden[1,2], Hiran Thabrew[1,3], Jesse Kokaua[1,2], Richard Audas[1,2], Barry Milne[1,3], Kirsten Smiler[4], Hilary Stace[4], Barry Taylor[1,2] and Sheree Gibb[1,5]

National SCIENCE Challenges | A BETTER START | E Tipu e Rea

ASD identification using IDI – Resilient teens

BACKGROUND: No national register of Autism Spectrum Disorder (ASD).
AIM: Use the IDI to identify children (aged 0-24 years) with ASD

- PRIMHD, NMDS, SoCRATES (Disability Support Services Database)

Q1: How many ASD cases are identified? What is the estimated proportion of those missed?

Q2: What are the ethnic and socioeconomic differences in ASD?

Q3: What co-occurring conditions do ASD children have, relative to non-ASD children?

ASD identification using IDI – Resilient teens

	Total	Male	Female	Ratio (Male: Female)
Overall	57.4	88.4	24.2	3.6
AGE				
0-4	22.0	33.9	9.3	3.6
5-9	89.7	141.6	34.6	4.1
10-14	85.5	135.4	33.3	4.1
15-19	58.7	88.4	27.3	3.2
20-24	33.0	47.4	16.9	2.8
ETHNICITY				
European	67.5	104.7	28.6	3.7
Māori	49.2	75.9	21.1	3.6
Pasifika	38.6	60.4	15.7	3.9
Asian	44.7	69.4	16.7	4.2
MELAA	51.1	76.6	22.2	3.5
Other	85.3	129.1	38.2	3.4
DEPRIVATION				
Quintile 1 (least deprived)	56.7	88.3	23.5	3.8
Quintile 2	60.6	92.5	26.5	3.5
Quintile 3	59.9	92.2	25.5	3.6
Quintile 4	59.2	92.5	23.4	4.0
Quintile 5 (most deprived)	52.9	81.1	22.8	3.6
RURALITY				
Urban	59.2	91.4	24.9	3.7
Rural	46.2	70.8	20.0	3.5

- ~1 in 59 8-year-olds estimated to have ASD.
- IDI identifies 1 in 102 8-year-olds to have ASD
- Estimated 40% undercount

ASD identification using IDI – Resilient teens

	ASD		Non-ASD		
Number of co-occurring conditions	Count	%	Count	%	Adjusted Ratio (ASD: non-ASD)
0	2,847	31.8	1,387,926	89.5	0.4 (0.4, 0.4)
1	2,079	23.2	80,778	5.2	4.3 (4.2, 4.5)
2	1,308	14.6	42,126	2.7	4.5 (4.2, 4.7)
3	1,194	13.3	19,512	1.3	9.1 (8.6, 9.6)
4	732	8.2	10,395	0.7	11.7 (10.9, 12.6)
5+	801	8.9	10,602	0.7	14.4 (13.4, 15.3)
N	**8,955**		**1,551,342**		

	ASD		Non-ASD		Adjusted Ratio
	Count	%	Count	%	Adjusted Ratio (ASD: non-ASD)
Intellectual disability	2,679	29.9	6,537	0.4	61.9 (59.1, 64.7)
Anxiety	1,530	17.1	27,891	1.8	10.2 (9.8, 10.6)
Depression	429	4.8	24,612	1.6	4.0 (3.7, 4.4)
Bipolar	39	1.3	1,002	0.2	8.9 (6.6, 11.2)
Substance	258	4.7	44,301	4.7	1.1 (1.0, 1.3)
ADHD	2,403	26.8	18,699	1.2	13.8 (13.2, 14.3)
Oppositional Defiant Disorder	456	5.1	2,862	0.2	17.8 (16.2, 19.5)
Sleeping	255	2.8	25,392	1.6	2.5 (2.2, 2.8)
Psychosis	276	5.1	3,756	0.4	15.9 (14.1, 17.8)
Personality	42	2.4	1,299	0.3	9.0 (6.4, 11.6)
Self-harm	159	1.8	9,954	0.6	4.1 (3.3, 4.9)

ASD identification using IDI – Resilient teens

- ¾ identified via the Socrates database. Given that individuals captured via Socrates were being assessed for government-funded disability support, cases may be skewed toward the identification of those with more severe ASD and additional comorbidities.
  - Comorbidities themselves under-identified
- Sex ratios match international estimates
- Comorbidity prevalence match low end of international estimates
- IDI not suitable for estimating prevalence of ASD (and most everything else)

Big Data summary

- Integrated work plan with substantive themes
- Have resourcing for (and are currently developing) Māori and Pacific work plan
- IDI work as well as simulations of intervention
- Collaboration with Social Wellbeing Agency
- Recent publications on
  - obesity trends in Ngāti Whātua children
  - ASD identification using administrative datasets
  - Trends in dispensing of ADHD medication (D'Souza et al., 2020)