



# Experience of nurses measuring preschool body mass index for the Health target: Raising Healthy Kids

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## ABSTRACT

**INTRODUCTION:** Childhood obesity is a major health concern in New Zealand. Primary care nurses have been charged with body mass index (BMI) screening and initiating education or referral of 4-year-old children during the Before School Check (B4SC). Asking nurses about their BMI screening experiences when reporting is mandated by the Ministry of Health reveals valuable knowledge to inform the work of health professionals in this area.

**AIM:** To explore the experience of nurses performing the B4SC since the inclusion of the Raising Healthy Kids targets into the wellchild check.

**METHODS:** Five focus group discussions across New Zealand were conducted using the Nominal Group Technique. Nurses individually recorded their answers to the research question, 'What is your perception of performing the B4SC since the inclusion of the Raising Healthy Kids target in July 2016?'. Group discussion and establishing priorities followed. Researchers collated and analysed data. Results were obtained by adding up scores across groups to provide the final overall themes of: (i) communication; (ii) BMI as a measurement; (iii) cultural norms and socioeconomic situations; (iv) parenting and family structure; and (v) education.

**RESULTS:** Communication was the common theme across groups, but other priorities were more specific to the sociodemographic and cultural profile of the areas of practice. Mandatory reporting appears to have had the positive outcome of encouraging nurses to use positive and holistic discussion on health to families rather than concentrating on BMI. Nurses reported using tools to educate parents without implying judgement of their parenting and lifestyle.

**DISCUSSION:** Nurses worked hard to maintain relationships with families as they recognised the long-term value of keeping families engaged with health professionals. Where tools were useful, such as the BMI calculator, nurses used these to assist with positive communication. The mandatory nature of the BMI referral had enhanced their skills with difficult conversations.

**KEYWORDS:** Childhood; obesity; nurses; primary healthcare

## Introduction

Childhood overweight and obesity is a global concern.<sup>1</sup> In 2017, the World Health Organization (WHO) issued an urgent call to member states to improve the health of children due to the threat posed by obesity.<sup>1</sup> In their *Ending Childhood Obesity* implementation plan (2017), the WHO

suggests monitoring children's body mass index (BMI) to track progress towards meeting national targets. In New Zealand, this was pre-empted by the *Childhood Obesity Plan* launched in 2015.<sup>2</sup> This plan introduced *Health Targets: Raising Healthy Kids*,<sup>3</sup> which stated that by December 2017, 95% of children with obesity identified at the Before School

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## WHAT GAP THIS FILLS

**What is already known:** The New Zealand Ministry of Health is actively trying to reduce childhood obesity. BMI screening of 4-year-olds at their routine health check was introduced as part of the Health targets: Raising Healthy Kids, and nurses must now report every child's BMI. The BMI measurement is controversial and rarely mandatory as part of childhood wellness checks internationally.

**What this study adds:** Communication that enhanced nurses' relationships with families was important in all focus groups. The mandatory nature of reporting targets led nurses to consider families holistically to ensure their communication was acceptable and health-enhancing. Their experience with such communication is a valuable addition to the literature given the controversy surrounding concentration on one measure in health communication.

Check (B4SC) would be offered referral to a health professional for clinical assessment and family-based nutrition, activity and lifestyle intervention. The B4SC is a nurse-led health check of children aged 4 years while their parent is present. The Ministry of Health states the aim of the check is to identify health, developmental or behavioural problems before school entry.<sup>4</sup> The national target of 95% referral for children with obesity has been met every quarter since the second quarter of 2017–18, but in the first quarter of 2018–19, six of 20 District Health Boards (DHBs) (30%) did not meet the target.<sup>5</sup> Addressing obesity of children aged 4 years is indicated as BMI at that age tracks across childhood into adolescence.<sup>6</sup> In the UK, 68% of children recognised as obese at school entry remained obese at age 11 years; therefore, early intervention to prevent intractable obesity is indicated. The Well Child/Tamariki Ora check at age 4 years is designed to provide support to families if children's BMI values are found to be in the overweight or obese categories.

The health concerns surrounding children in pre-school who are overweight and obese were discussed by the Auditor General in 2013 and quantified in a review of data from the B4SC from 2009–12.<sup>7,8</sup> Overweight and obesity rates of 18.3% and 16.3% respectively, using the WHO 2006 standards, indicated that child obesity was higher in New Zealand than in similar countries.<sup>8</sup> Ethnicity and deprivation were factors in increased levels of childhood obesity, with Māori and Pacific children

and children from deprived areas over-represented in obesity figures, but also less likely to receive the check, as are children from socioeconomically deprived areas and children of younger mothers.<sup>8,9</sup>

Previous research with nurses performing B4SCs indicated that issues in 2013 were: lack of time to complete the check; language and cultural differences; lack of interaction with children; and inadequate training and peer support.<sup>10</sup> In these checks, referral was not mandated and was reported as often difficult to implement, even if nurses considered it necessary. The addition of a BMI screen into health checks increases the possible complexity of discussion associated with checks, as obesity is a challenging issue to discuss with parents.<sup>11</sup> A recent review of qualitative studies exploring the barriers and facilitators to discussing weight with families identified intra- and inter-personal factors as important, such as health professionals' knowledge and competence, which facilitated communication when present, and was a barrier if absent.<sup>11</sup> Fear of parental response to perceived criticism of their lifestyle, lack of time in consultations, cultural beliefs around healthy weight and lack of clear protocols for referral were also barriers to discussion.

The aim of this study was to explore nurses' experience of performing B4SCs since the start of the Raising Healthy Kids health target in July 2016. This research presents findings from five focus groups with nurses in Canterbury, Auckland and the North Island's east coast. As reporting BMI was mandated, the nurses' perceptions of the process may differ from research where no mandate exists for its use.

## Methods

Four agencies delivering the B4SCs were invited to participate in the research, and ethics and locality consent were obtained from all agencies. To achieve representation from across New Zealand, two providers were invited from the South Island and two from the North Island. Nurses who had performed  $\geq 10$  B4SCs since July 2016 were eligible for inclusion in the study and were invited to participate in the research by an email from the researchers via their employer. If they wished to participate, we arranged a convenient time and venue to allow

maximum participation. A NZ\$20 voucher was offered as an incentive to participate. Focus group discussions were held between December 2017 and September 2018.

The Nominal Group Technique was used to elicit priorities related to performing the B4SC.<sup>12</sup> This method was chosen as it asks individuals to prioritize the ideas of all group members, thus facilitating equal participation while preventing the domination of discussion by individual participants.<sup>13,14</sup> A four-step process was used to generate ideas in response to the question, ‘What is your perception of performing the B4SC since the inclusion of the Raising Health Kids target in July 2016?’. Participants were asked to individually record their ideas. All participants’ ideas were recorded one at a time on a whiteboard. There was a clarification phase where the meaning of each idea was explored to ensure that participants could make an informed decision when ranking their priorities. Finally, participants ranked each idea in order of importance.

The analytic technique developed by Aspinall et al.<sup>15</sup> was followed whereby ideas raised in the ‘generation of ideas’ and ‘round robin’ stages were voted on in the ‘ranking’ stage and ranked overall in order of priority for each group. Scores were allocated for each of the themes to give a total score. Scores were based on inverse ranking. If an item was top ranked, then it got the highest score, so that if there were three priorities, the highest rank scored three, the second scored two and the third scored one. Adding all scores for a theme across groups provided the final score; for example, the Communication theme scored 3 in 3 focus groups, and 2 and 1 in one group each: adding these (3 + 2 + 3 + 1 + 3 = 12) resulted in a score of 12 for this theme.

Inductive thematic analysis was used to provide cross-group comparison. Researchers grouped similar priorities together and ascribed a theme. The researchers identified areas of thematic convergence and agreement of themes. Group four did not rank themes, considering them equally important, so each theme for this group was given a score of 1.

This study was approved by the University of Otago Human Ethics Committee (Health). [Reference:

Table 1. Demographic and employment details of nurses attending focus groups

Ethnicity	n (%)
NZ European	20 (60)
NZ Māori	5 (15)
Chinese	3 (9)
Other (including Pacific)	6 (17)
Age (years)	
21–29	2 (6)
30–39	6 (18)
40–49	6 (18)
50–59	15 (45)
60–69	4 (12)
Years as an RN	
<1–5	2 (6)
6–15	13 (39)
16–25	5 (15)
26–35	7 (21)
36–41+	6 (18)
Employer	
Primary Health Organisation	4
Non-Government Organisation	15
District Health Board (DHB) also employs Public Health Nurses	14

NZ (New Zealand); RN (Registered Nurse).

H17/108]. Consultation with the Māori Research office took place using standard University of Otago processes.

## Results

Thirty-three female nurses in total participated across the five focus groups. Participating nurses came from all four providers we approached. Numbers in groups, employers and demographic details are presented in Table 1. Participating nurses were mainly of New Zealand European ethnicity, 57% were aged >50 years and 54% had been a registered nurse (RN) for ≥16 years. Nurses were mainly employed by non-government organisations (45%) or DHBs (43%); 12% were practice nurses employed by a primary health organisation.

Table 2. Rank and score of theme by group

Group	Size and type	Rank/ score	Theme
1 South Island	n = 9 Public health	1/3	Communication
		2/2	BMI as a measurement
		3/1	Increased time to complete check
2 South Island	N = 4 Practice nurses	1/2	Communication
		2/1	BMI as measurement
3. North Island	N = 7 Non-Government Organisation	1/3	Communication
		2/2	Parenting and family structure
		3/1	Cultural norms and socio-economic status
4. North Island	N = 8 Non-Government Organisation	1	BMI as a measurement
		1	Cultural norms and socio-economic status
		1	Communication
		1	Education
5. North Island	N = 5 DHB	1/3	Communication
		2/2	Education
		3/1	Cultural norms and socio-economic status

BMI (body mass index); DHB (District Health Board).

Table 2 indicates each group locality, size, employment area and the themes emerging in each group. Rank and subsequent score for each theme are shown in column three. Results were based on adding scores across groups to give: communication = 12; BMI as a measurement = 4; cultural norms and socioeconomic situations = 3; parenting and family structure = 2; and education = 3.

Table 3 outlines the themes with a description of the meaning of each as understood by the group, accompanied by illustrative examples of discussion in the focus groups. Communication, scoring the highest of the themes, had two aspects dominant in the discussion; therefore, these were analysed as one theme.

## Discussion

The aim of this study was to explore the perceptions of nurses performing the B4SC since the inclusion of the *Raising Healthy Kids* health target. The research question elicited responses reflecting nurses' perceptions of the B4SC process and tools, and situations they observed affecting families' ability to follow healthy lifestyles. Communication, with a score of 12, was the highest priority. Other priorities included the use of BMI as a measurement, cultural issues, family issues and education. Themes evident in a study of the B4SC before the inclusion of the *Raising Healthy Kids*<sup>10</sup> health target included language and cultural issues, where 'language' referred to difficulties communicating when English was not the family's first language. In this study, discussion on language was about words used when communicating the issue of the child being overweight or obese, and avoiding appearing judgemental of the parents' lifestyle, particularly if parents were overweight. Communication was also highlighted in the recent review on barriers and facilitators to this challenging discussion.<sup>11</sup>

Communication in this study had two distinct aspects: the art of communication and providing reinforced messages. The art of communication included the interpersonal skills involved in ensuring the check was a positive experience for families, particularly if referral was indicated. Bradbury et al.<sup>11</sup> noted that some health professionals reported avoiding talking to families about obesity due to previously experienced negative responses. Avoidance of the topic was rarely mentioned in this study, perhaps due to mandated reporting. Experienced nurses noted using clinical judgement in considering communication with families; for example, an experienced nurse observed that a child's teeth told her a lot about the general health of the family and therefore how receptive they would be to health education and referral and consequently she would tailor her approach. This is consistent with research indicating that increased knowledge and competence facilitated communication, while lack of confidence was a barrier.<sup>11</sup> Nurses in this study were mainly aged >50 years (57%) and 54% had ≥16 years registered nurse experience so they were an experienced group of nurses.

Table 3. Description and examples of themes emerging from focus groups

Theme	Description	Examples
Communication: two aspects	<ol style="list-style-type: none"> <li>1. The art of communication covers how health professionals felt about tackling the measurement of BMI and communicating results of assessment to parents.</li> <li>2. Providing reinforced messages focuses on the benefits of all health professionals in contact with the family delivering the same message.</li> </ol>	<ul style="list-style-type: none"> <li>• Parents react negatively to child's BMI if it is over the 91–98 percentile, especially if the child appears normal weight.</li> <li>• Has gotten easier with experience/time, also nurses are better at recognising earlier if BMI is going to be an issue.</li> <li>• BMI MOH app better than a chart. Colour on app a good indication for patients.</li> <li>• BMI paper chart and online recording mismatch increases the need to follow up.</li> <li>• Training has helped confidence.</li> <li>• Why aren't Plunket nurses doing this, they have a relationship with the family?</li> <li>• Helps if the GP has talked to the family.</li> <li>• One hour not long enough, but could be if the message was consistent from all health professionals.</li> </ul>
BMI as a measurement	Includes issues regarding the benefits and risks of discussing the results of BMI with families/child.	<ul style="list-style-type: none"> <li>• I wonder if BMI is a good tool and if what we are telling people is helpful, especially if we are less experienced.</li> <li>• Parents talk about worrying about the BMI affecting the child's self-esteem so parents don't want to discuss it.</li> </ul>
Cultural norms and socioeconomic situations	Refers to the effect that culture or socioeconomic factors have on families' perceptions of weight and management of diet.	<ul style="list-style-type: none"> <li>• Cultural norms are important; for example, some people hand-feed their 4-year-olds.</li> <li>• It can be a norm as to how big your child is. It might be that nurses have bought into this too.</li> <li>• Parents' perception of what overweight is, ethnicity makes a difference; for example, in Tongan and Māori families.</li> <li>• B4SC gone from being a screen to an intervention with no extra time. Feel pressure to explore lifestyle and give advice, but may be ESOL or have health literacy issues.</li> <li>• Socioeconomic difficulties, a lot of low decile families in this area – can't afford healthy food – a lot of noodles eaten.</li> </ul>
Parenting and family structure	Includes issues around parental ability to monitor and facilitate change.	<ul style="list-style-type: none"> <li>• Community options such as Green prescription and Triple P require huge time commitment by families.</li> <li>• Overcrowding in homes, no routine. Children help themselves to food.</li> </ul>
Education	Focuses on the delivery of education to maximise the best results.	<ul style="list-style-type: none"> <li>• Children can influence their parents in making healthy choices.</li> <li>• Health workers encourage small changes to diet.</li> </ul>

BMI (body mass index); MOH (Ministry of Health); B4SC (Before School Check); ESOL (English for Speakers of Other Languages).

One communication barrier identified by nurses was the mismatch of the paper BMI chart and the Ministry of Health's online reporting system,<sup>16</sup> so that nurses may have to contact families after the check to say that the initial assessment was wrong and referral was required. Nurses observed that this discrepancy led to decreased trust in both nurses and the process. This issue was resolved by the end of this study, but it indicates the importance of processes that are suitable for the task being essential when working with the public as a health professional, particularly in matters that are known to be difficult to approach.

The Ministry of Health recently adopted tool, the BMI calculator available to everyone online, is a smart phone app that nurses found useful to show parents during the check to initiate the conversation in a non-threatening manner. Using a traffic light system, it indicates where a child's BMI sits on a continuum and uses the terms 'healthy' and 'unhealthy' weight range. A paper-based BMI ruler, similar to the online version, performs the same useful function. Recently reported New Zealand-based research evaluating the use of traffic light BMI charts indicated that 82% of parents found at least one positive aspect of the chart<sup>17</sup> and nurses'

observations of parental response are consistent with this high rating. The terms 'healthy' and 'unhealthy weight' were evident in these tools, and nurses carried these terms over to their oral communication, reportedly with good effect.

Lack of consistent messages from health professionals was commonly mentioned by nurses as a barrier to communication, which is consistent with international literature.<sup>11,18</sup> The benefit of all health professionals in contact with a family delivering the same message was stressed by nurses. Nurses felt undermined when other health professionals did not mention that a child was overweight or obese. In some cases, parents did not believe a nurse because it had not been mentioned by their doctor. It may be that other health professionals prioritise preserving their relationships with families. Lack of clarity around responsibility for follow up of referrals was felt to add to reluctance to address obesity, but this appeared to improve with time and experience. South Island practice nurses reported being involved in the follow-up process and considered this effective in monitoring and educating families. They felt that nurses who have ongoing trusting relationships are well placed to communicate with families about health concerns. Nurses meeting a family for the first time found communication more challenging, but experience enhanced confidence.

Nurses across the country discussed using BMI as a measurement. Comments from nurses varied from wondering if it is a good tool, particularly if they had less experience, to noting families refusing the measurement as they perceived it lowering their child's self-esteem. BMI as a tool is used inconsistently and this is reported to be a barrier to childhood obesity prevention.<sup>11,19</sup> Although the current government intends removing target-based reporting,<sup>5</sup> consistent use for 3 years will allow assessment of this process.

Cultural norms were mentioned in all groups, but prioritised only by North Island groups. While Māori, Pacific and Indian ethnicities were all mentioned, discussion centred on Pacific families. The ethnic diversity of the regions where nurses were based may account for this. In the two North Island regions, Māori account for 11% and 45% of the population and Pacific people 14.6% and 3.5%, respectively. In the South Island groups, Māori

make up 7.7% of the population and Pacific people 2.3%. Where the percentage of Pacific families was high, the nurses commented on big babies being considered a sign of health and implying good caregiving.<sup>20</sup> Nurses observed that parents may have little influence and feel helpless to manage conflicting advice from health professionals and elders in the Pacific community.

In the region with a high Māori population, nurses commented on levels of poverty and lack of healthy food. Parents were less likely to take up activity opportunities due to time and financial pressures. In this area, income levels are lower than in New Zealand generally.<sup>21</sup> Research linking B4SC data to 2013 census data indicates that obesity affects 20% of Māori children and 11% of New Zealand European children.<sup>22</sup> These researchers calculated that obesity among Māori children could be reduced by half if family socioeconomic status and area-level deprivation were brought up to the levels New Zealand European children enjoy. The higher levels of Pacific obesity were not explained using these factors. Research around the effect of genetic variation influencing weight and height of Pacific children aged 4 years suggests that tailored intervention may be required at an earlier age, particularly for boys.<sup>23</sup>

A range of providers and regions were included in this study. The five areas of the country have diverse cultural and socioeconomic profiles. The nurses' comments reflected the range of families supported in their work. Nurses were pleased to be asked to participate in focus groups as many felt their opinions were seldom asked for. Being with families allows them insight into the experiences and lifestyles of contemporary parents. While five groups allowed cover of the country, more could be elucidated from discussion with other areas such as rural areas. Given that priorities varied according to local conditions, reaching data saturation would require more demographically diverse regions. The use of tools such as motivational interviewing did not come up in groups, but is used by some trainers and would be a useful area to examine further.<sup>17</sup> The difference of 10 months between the first and last focus group meant changes in tools used over that time may have changed the focus of discussion emerging, although themes were consistent across groups.

Given the mandatory nature of reporting for *Raising Healthy Kids* targets, this study elucidated nurses' use of positive and holistic ways to approach the topic of 'unhealthy weight' rather than focusing on BMI. Professional judgement was used around how to approach sensitive issues; experience affected confidence. Tools should also be tested and assured to be suitable for the purpose before their use for patient care.

The employment of health workers who have had training from a dietitian, to visit families to educate them about healthy eating, was seen as valuable by the well-child nurses employed by Plunket, as a means of reaching parents in their homes, if this suited the family. This requires further research and consideration of training health workers from a range of cultural backgrounds to deliver culturally appropriate health education. Where practice nurses followed up referrals with families, this worked well and is a model that could be considered in future planning. Families who do not regularly attend a general practice require more consideration and health workers may be the key here. Culturally appropriate education across age groups is needed.

Using BMI as a screening tool may place too much emphasis to one aspect of health. The efficacy of informing parents of their child's BMI is disputed in the literature. Some have found a generational shift towards parental acceptance of heavier children being the 'norm',<sup>24</sup> but knowledge of this is no guarantee of action. Longitudinal evidence suggests children of parents who were told their child was 'overweight' rather than 'the right weight' went on to gain more weight.<sup>25</sup> While the Ministry of Health has alerted health professionals to changes made to achieve consistency in BMI classification of overweight and obese in 2019,<sup>26</sup> the continued use of BMI requires consideration.

In summary, nurses worked hard to maintain relationships with families as they recognised the long-term value of keeping families engaged with health professionals. Where tools were useful, such as the BMI calculator, nurses used these to assist positive communication. The mandatory nature of the BMI referral had enhanced their skills with difficult conversations. Their observations about factors affecting the ability to buy healthy food such as socio-economic deprivation and cultural factors

leading to the normalisation of 'big' children are consistent with other research and are factors requiring further consideration by policymakers. Revision of targets<sup>5</sup> should consider that a one-size-fits all approach might not be the best approach, and groups such as Pacific families may require a targeted approach involving consultation with the community rather than a top-down approach from Government agencies.

### Competing interests

The authors declare no competing interests.

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### References

1. WHO. Report of the Commission on Ending Childhood Obesity. Implementation plan: executive summary. (WHO/NMH/PND/ECHO/17.1). Geneva: World Health Organization; 2017.
2. New Zealand Ministry of Health. Childhood Obesity Plan. Wellington: NZ Ministry of Health. [cited 2019 January 31]. Available from: <http://www.health.govt.nz/our-work/diseases-and-conditions/obesity/childhood-obesity-plan>
3. New Zealand Ministry of Health. Health Targets: Raising healthy kids. [updated August 2018; cited 2019 June 6]. Available from: <https://www.health.govt.nz/new-zealand-health-system/health-targets/about-health-targets/health-targets-raising-healthy-kids>
4. New Zealand Ministry of Health. B4 School Check. 2015. [cited 2019 July 2017]. Available from: <https://www.health.govt.nz/our-work/life-stages/child-health/b4-school-check>.
5. New Zealand Ministry of Health. Health Targets. 2018.
6. Pearce M, Webb-Phillips S, Bray I. Changes in objectively measured BMI in children aged 4–11 years: data from the National Child Measurement Programme. *J Public Health.* 2016;38(3):459–66. doi:10.1093/pubmed/fdv058
7. Office of the Auditor General. Evolving approach to combating child obesity. Wellington: Office of the Auditor General; 2013.
8. Rajput N, Tuohy P, Mishra S, et al. BMI in New Zealand preschool children. *J Paediatr Child Health.* 2015;51:334–43. doi:10.1111/jpc.12716
9. Gibb S, Shackleton N, Audas R, et al. Child obesity prevalence across communities in New Zealand: 2010–2016. *Aust N Z J Public Health.* 2019;43(2):176–81. doi:10.1111/1753-6405.12881
10. Williams SJ. An exploration of the experience of nurses performing the Before School check. [Masters thesis]. Albany, New Zealand: Massey University; 2013.
11. Bradbury D, Chisholm A, Watson PM, et al. Barriers and facilitators to health care professionals discussing child weight with parents: a meta-synthesis of qualitative studies. *Br J Health Psychol.* 2018;23(3):701–22. doi:10.1111/bjhp.12312
12. Vander Laenen F. Not just another focus group: making the case for the nominal group technique in criminology. *Crime Sci.* 2015;4(1):5. doi:10.1186/s40163-014-0016-z

13. Carney O, McIntosh J, Worth A. The use of the nominal group technique in research with community nurses. *J Adv Nurs*. 1996;23(5):1024–9. doi:10.1046/j.1365-2648.1996.09623.x
14. Dunham RB. Nominal group technique: a users' guide. Madison: Wisconsin School of Business; 1998.
15. Aspinall F, Hughes R, Dunckley M, Addington-Hall J. What is important to measure in the last months and weeks of life?: A modified nominal group study. *Int J Nurs Stud*. 2006;43(4):393–403. doi:10.1016/j.ijnurstu.2005.06.005
16. New Zealand Ministry of Health. Healthy weight BMI calculator. Wellington: NZ Ministry of Health; 2019. [cited 2019 July 17]. Available from: <https://www.health.govt.nz/your-health/healthy-living/food-activity-and-sleep/healthy-weight/healthy-weight-bmi-calculator>.
17. Dawson AM, Brown DA, Williams SM, et al. Parental reactions to weight screening in young children: a randomized controlled trial. *Pediatr Obes*. 2018;13(11):639–46. doi:10.1111/ijpo.12195
18. Chamberlin LA, Sherman SN, Jain A, et al. The challenge of preventing and treating obesity in low-income, preschool children: perceptions of WIC health care professionals. *Arch Pediatr Adolesc Med*. 2002;156(7):662–8. doi:10.1001/archpedi.156.7.662
19. Regber S, Mårild S, Hanse J. Barriers to and facilitators of nurse-parent interaction intended to promote healthy weight gain and prevent childhood obesity at Swedish child health centers. *BMC Nurs*. 2013;12(1):27–49.
20. Ruggieri DG, Bass SB. Comprehensive review of school-based body mass index screening programs and their implications for school health: do the controversies accurately reflect the research? *J Sch Health*. 2015;85(1):61–72. doi:10.1111/josh.12222
21. Statistics New Zealand. 2013 Census QuickStats about a place. Wellington: Statistics New Zealand; 2013. Available from: <http://archive.stats.govt.nz/Census/2013-census/profile-and-summary-reports/quickstats-about-a-place.aspx>
22. Shackleton N, Derraik JG, Audas R, et al. Decomposing ethnic differences in body mass index and obesity rates among New Zealand pre-schoolers. *Int J Obes*. 2019;1.
23. Berry SD, Walker CG, Ly K, et al. Widespread prevalence of a CREBRF variant amongst Māori and Pacific children is associated with weight and height in early childhood. *Int J Obes*. 2018;42(4):603–07. doi:10.1038/ijo.2017.230
24. Hansen AR, Duncan DT, Tarasenko P, et al. Generational shift in parental perceptions of overweight among school-aged children. *Pediatrics*. 2014;134(3):481–8. doi:10.1542/peds.2014-0012
25. Robinson E, Sutin A. Parental perception of weight status and weight gain across childhood. *Pediatrics*. 2016;137(5). doi:10.1542/peds.2015-3957
26. Tuohy P, Clendon J. Letter titled: Ministry of Health Growth Chart recommendations for children and young people and new online BMI calculator. Wellington: NZ Ministry of Health; 2018.