

Scoping paper:

To examine whether population-level surveillance of BMI (Body Mass Index) with accompanying feedback letters to parents/guardians influences the weight status of school-children



Prepared by: Claudia Strugnell, Ryan Baldwin, Melanie Nichols, and Jaithri Ananthapavan

1. Background to topic

Approximately 27% of Australian children aged 5-17 years are either overweight or obese. (Australian Bureau of Statistics, 2016) Critical to both the prevention and treatment of the disease, measured surveillance (also known as monitoring) programs that are high participatory and routine are required to determine the prevalence of the condition, examine trends over-time, inform policy, practice and service delivery, and also to evaluate interventions. (Stubbs & Achat, 2009) Several regions/states and countries have established routine Body Mass Index [(BMI = weight (kg)/height (m²)] surveillance programs with the additional step of providing parental/guardian feedback to examine population trends in weight status. (Public Health England, 2016; D. G. Ruggieri & S. B. Bass, 2015) For example, in Singapore a nation-wide screening program exists through the school health service. (Health Promotion Board, 2017a) Doctors and nurses conduct an array of screening tests in schools (e.g. eye tests, hearing tests, spinal assessment), immunisations and asses of height and weight of students in Grade 1 (aged approx. 6-7 years) and Grade 5 (aged approx. 10-11 years) with a summary child health assessment given to parents/guardians. (Health Promotion Board, 2017a). In England, a nation-wide surveillance programme exists in government run primary schools whereby every child in Reception (aged approx. 5-6 years) and Grade 6 (aged approx. 11-12 years) has their height and weight measured in school-time. (Public Health England, 2016) Alongside the school-based monitoring, several local authorities also send BMI feedback letters to parents/guardians with information about the weight status of their child (e.g. "Your child's results is in the underweight range", "You may be surprised that your child's result is in the overweight range"). (Falconer et al., 2014) Despite these efforts, the effectiveness of BMI feedback to parents/guardians is not well established. It is hypothesised that parents/guardians who receive information on the weight status of their child will initiate positive action(s) to improve their child's health. Whilst the dose of the intervention is likely to be small, the scale of the program may have population-level benefits on weight status.

2. Intended policy impact

It is expected that educating parents/guardians on the weight status of their child through BMI feedback letters will attenuate erroneous beliefs a parent may have about their child's weight status and bring attention to the consequences related to overweight/obesity; increasing the likelihood parents/guardians will trigger action to improve their child's health. This in turn will reduce the long-term prevalence of childhood obesity.

3. Current policy status

a. Australia

There is currently no policy mandating BMI surveillance or screening with parent/guardian feedback among Australian school-children. There is however a State-specific health check among indigenous children living in remote communities aged 5-15 years occurs as part of the Health School-Aged Kids Program with parent/guardian feedback. (Davidson, Vidgen, Denney-Wilson, & Daniels, 2018) Across Australia and within its States and territories there is an absence of routine surveillance programs that collect measured height and weight among school-children and employ consistent survey methodologies across study waves. To the author's knowledge, the only current, methodologically consistent, routine and measured surveillance programs that are representative at the national or State/territory level include the Australian Health Survey (2011-12 and 2014-15) (Australian Bureau of Statistics, 2013, 2016), the National Secondary Student's Diet and Activity Survey (2009-10 and 2012-13),(Scully et al., 2017) and the New South Wales Schools Physical Activity and Nutrition Survey (1997, 2004, 2010 and 2015) (Hardy, Mhrshahi, Drayton, & Bauman, 2016). Whilst these programs do not provide parental/guardian feedback, they are vital in informing prevalence, trends, intervention effect(s) and policy and practice.

b. International

There are several international examples of routine BMI surveillance for school aged children with parent/guardian BMI feedback (see Table 1).

Table 1 *International examples of routine BMI surveillance with BMI feedback practices*

Country	Description
United States of America (USA)	Eleven of the 25 states in the USA have legislation for BMI surveillance with feedback letters to parents/guardians occurring in 11/25 states (Alabama, Arkansas, Delaware, Georgia, Illinois, Massachusetts, New York, Ohio, Oklahoma, Pennsylvania, and Tennessee).(Dominique G. Ruggieri & Sarah B. Bass, 2015) These surveillance programs cover a variety of ages and grade-levels. The first state in the USA to have state-wide surveillance was Arkansas with the Arkansas Act 2003, which requires all children in public schools to have height and weight measured and feedback sent to parents/guardians.(Raczynski, Thompson, Phillips, Ryan, & Cleveland, 2009)
England	The National Child Measurement Programme (NCMP) requires all children in government run primary schools in Reception (aged approx. 5-6 years) and Year 6 (aged approx. 11-12 years) to have their height and weight measured under an opt-out (passive consent approach).(Public Health England, 2017) The NCMP has two key purposes, 1) provide population-health surveillance data on children's weight status and, 2) provide parents/guardians with feedback on their child's weight status.(Public Health England, 2017)
Singapore	In Singapore, the Health Promotion Board (HPB) is responsible for student health and provides free dental services, immunisations and health screening (including height and weight) to all students through dedicated School Health Services (SHS) (Health Promotion Board, 2017b). Comprehensive health screening and medical examinations are conducted in Primary and Secondary (Primary 1 (aged approx. 6-7), Primary 5 (aged approx. 10-11 and Secondary 2 (aged approx. 13-14) with basic screening and health reviews occurring in every other year until the end of secondary school (Health Promotion Board, 2017a, 2017b; Ministry of Health, 2015).
Sweden	Sweden has long standing traditions of free school based health services that have evolved over the last 200 years (Berg-Kelly, 2003). The current system has two components, screening and comprehensive medical examinations. Screening is conducted annually by trained nurse practitioners for all students and involves measurements of height and weight, as well as simple psychological problems and stress evaluations (Berg-Kelly, 2003). Comprehensive medical examinations are

	compulsory and performed by doctors three times in the first nine compulsory years of schooling [Primary and lower Secondary] (aged approx. 7-16 years)] with an additional examination in the last three years of school [Upper Secondary (aged approx. 16-19 years)] (Berg-Kelly, 2003).
The Netherlands	In the Netherlands, all children aged 0 to 18 years have access to free preventative, universal and specialised (where required) health care (Hilverdink, Daamen, & Vink, 2015). At a local level, Youth Health Care branches (Bosscher, 2014) are responsible for monitoring, screening (including height and weight), vaccinations, health promotion, referrals (to specialised services) and providing information and advice to children and parents regarding health (Netherlands Youth Institute, 2007). For children aged 5 to 19 years have majority of these services conducted in school by visiting local YHC teams of physicians and nurses (Wiegersma, Hofman, & Zielhuis, 2000).

4. Evidence of efficacy/effectiveness

Overview of evidence

BMI Surveillance with parent/guardian feedback letters and weight status

Currently the evidence of effectiveness of BMI feedback on student's weight status is limited (Thompson & Madsen, 2017) To date, a limited number of studies have examined BMI feedback and the effect on population weight status (Almond, Lee, & Schwartz, 2016; Falconer et al., 2014; Gee, 2015; Johnson & Ziolkowski, 2006; Justus, Ryan, Rockenbach, Katterapalli, & Card-Higginson, 2007; Wenjun Li et al., 2015; W. Li et al., 2015; Madsen, 2011; J. W. Thompson & P. Card-Higginson, 2009). These studies are discussed below.

In Arkansas, early findings from the first 4-years of BMI screening (2003-2007) and reporting found a state-wide stabilisation in the prevalence of overweight compared to the rest of America which saw increasing BMI trends among 6-19 year olds.(J. W. Thompson & P. Card-Higginson, 2009) However, these findings are likely the result of a range of obesity prevention initiative implemented at the time of BMI reporting in Arkansas. Therefore the effectiveness of BMI screening in isolation could not be examined (Justus et al., 2007; Wenjun Li et al., 2015; Joseph W. Thompson & Paula Card-Higginson, 2009). Gee (2015) examined whether BMI screening and reporting in late adolescents (11th -12th grades aged approx. 16-18 years) influenced health outcomes when compared to a group of adolescents who were exempt from screening in 11-12th grades (all students had participated in screening and feedback in their younger years). (Gee, 2015) Utilising self-reported height and weight information from the 2005, 2007 and 2009 Youth Risk Behaviour Survey for Arkansas, the author found no significant difference in BMI, moderate-to-vigorous exercise, vegetable or fruit consumption between the screening and feedback group and exemption from screening group. (Gee, 2015) Although, exercise, vegetable consumption, BMI and obesity prevalence were heading in the desired direction in the screening and feedback group. The utilisation of self-reported weight status which is known to underestimate overweight and obesity prevalence among adolescents,(Sherry, Jefferds, & Grummer-Strawn, 2007) severely limits the accuracy of the findings.

In California, Madsen (2011) examined the impact of measured BMI screening and feedback on weight status using data from Grade 5 (aged approx. 10-11 years) , Grade 7 (aged approx. 12-13 years)) and Grade 9 (aged approx. 14-15 years) children between 2001-2008.(Madsen, 2011) School districts were categorised into those that provided parent/guardian feedback and those that did not, with analyses adjusted for district-level factors likely to influence the results (e.g. socioeconomic status, rurality). Analyses of over 6, 967, 120 student records for the time period

(representing 72.7% of the eligible population) found no significant difference in BMI-z score between the parent/guardian notification group compared to the comparison group (BMI-z = -0.01; 95%CI: -0.03, 0.01).(Madsen, 2011) The author highlighted that the current notification method was not effective to be applied at a wider scale and its' impact likely to be small unless BMI feedback is supplemented by wider environmental changes.(Madsen, 2011) However, the author encouraged further research into enhancing the communication of children's BMI to parents/guardian, especially by understanding their mental models around paediatric obesity. (Madsen, 2011)

In Pennsylvania, a small study in one school district covering 9 schools and approximately 8,000 students examined changes in overweight and obesity among participants in the district-wide BMI screening and parent/guardian feedback program (Kindergarten to Grade 12) which began in 2000.(Johnson & Ziolkowski, 2006) There were no control group participants or statistical comparisons with national data, however, the authors propose that the stabilisation of overweight/obesity in their district over 5-years of screening compared to the prevalence nationally is demonstration of success, although environmental changes within the school also occurred at the time of the screening program.

In 2007-08 the state of New York City adopted BMI surveillance and reporting of BMI amongst public school students through their Fitnessgram testing and feedback to parents/guardians.(Almond et al., 2016) Using a quasi-experimental study design, the study analysed 3,592,026 BMI report cards to examine if being classified as overweight compared to normal weight had an impact on subsequent assessment the following year. No significant effect of BMI reporting was detected amongst those classified as overweight compared to those classified as healthy weight, in addition being classified as obese had no significant impact on BMI the following year. (Almond et al., 2016)

Since the 2008-09 school year, the state of Massachusetts has required annual screening of BMI among public school students in Grades 1, Grade 4, Grade 7 and Grade 10. (W. Li et al., 2015) The results of the screening were communicated to parents/guardians up until 2013-14 but are no longer mandated. Using the parent/guardian feedback years of 2008-09 to 2013-14, Li et al., 2015 found a significant 3% decline in overweight and obesity using a repeat cross-sectional analyses, with the largest reductions seen in students in Grade 4 (-4.8%).(W. Li et al., 2015) There were no control group comparisons or statistical comparisons with national data.

5. Implementation considerations

Implementation consideration	Details	Overall rating
Strength of evidence	<p>There is limited research literature on the effect of BMI reporting in isolation, although, incorporation of BMI feedback as part of multi-level and multi-faceted strategies to prevent childhood obesity has demonstrated effect.</p> <p>Several studies have found that BMI feedback did induce parents' intention to change, however, due to the lack of follow-up, the actual effect on behaviour and/or weight outcomes has not been demonstrated.</p>	Low
Equity	<p>Studies have found that the disparities in overweight and obesity are widening, particularly among culturally and linguistically diverse children and adolescents and those from low socioeconomic backgrounds. A mandated surveillance system with feedback would provide detailed information to those least likely to engage with health system and could be the catalyst for change and prevent the widening of inequalities in obesity.</p>	High
Acceptability	<p>Government: Internationally, several states and nations have mandated BMI surveillance and reporting into local and national legislation. These surveillance programs have aligned well with state and local governments' policy objectives related to encouraging healthy eating and physical activity throughout childhood.</p>	Medium
	<p>Parents/Guardians: Several studies have highlighted that parents/guardians are supportive of BMI screening and feedback, as long as the child's privacy and well-being is taken into consideration. There is also limited information evidence on potential negative consequences on BMI feedback on student outcomes.</p>	High
Feasibility	<p>Several BMI surveillance programs with reporting exist internationally and could be modified to the Australian context. As measurements are typically taken in-school, there is an existing health and education workforce both in-schools and within the community that could routinely collect this information. Although implementation may have substantial cost in rural and remote areas, however, the utilization of the existing workforce in schools (e.g. school nurses, Health and/or Physical Education teachers) would reduce these costs.</p>	High
Sustainability	<p>International examples highlight that once implemented and legislated, BMI surveillance programs are reporting are embedded into practice and ongoing.</p>	High
Other considerations	<p>Positive side effects:</p> <p>BMI reporting and surveillance may have "spill-over" effects through highlighting disparities in distribution of overweight/obesity among specific populations and create advocacy for further childhood obesity prevention efforts.</p> <p>BMI reporting and surveillance can be used to examine current trends, changes in prevalence and inform local health service delivery.</p>	

6. Stakeholders

a. Policy makers/regulators

- Departments of Education both state and federal
- Departments of Health both state and federal

b. Advocacy

- Obesity Policy Coalition
- Australian Heart Foundation
- Cancer Council
- Australian Medical Association
- VicHealth

7. Issues specific to this intervention

There is insufficient evidence of the effectiveness of BMI surveillance with feedback to parents/guardians to model the impact as an obesity prevention intervention.

8. Intervention's potential to meet intervention selection criteria

a. Potential impact on addressing the problem of obesity

BMI surveillance with feedback in isolation is unlikely to influence population weight status. However, the inclusion of BMI surveillance with feedback as part of a multicomponent and multi-strategy interventions to prevent childhood obesity may be beneficial at both the individual and population-level.

b. Relevance to current policy decision making

There is strong evidence of support for BMI surveillance and reporting internationally and in Australia, this support is growing.

Availability of evidence of efficacy/effectiveness to support the analyses (using a broad definition of evidence)

There is insufficient evidence of efficacy/effectiveness to support further analyses

References

- Almond, D., Lee, A., & Schwartz, A. E. (2016). Impacts of classifying New York City students as overweight. *Proceedings of the National Academy of Sciences of the United States of America*, 113(13), 3488-3491. doi:10.1073/pnas.1518443113
- Australian Bureau of Statistics. (2013). *Australian Health Survey : Updated Results, 2011-12*. (4364.0.55.003). Canberra Retrieved from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4364.0.55.0032011-2012?OpenDocument>.
- Australian Bureau of Statistics. (2016). *4364.0.55.001 - National Health Survey: First Results, 2014-15*. Canberra, Australian Capital Territory: Commonwealth of Australia.
- Berg-Kelly, K. (2003). Adolescent health, school health activities, community contexts, and health surveys in Sweden. *Journal of Adolescent Health*, 33(4), 226-230. doi:doi:10.1016/S0154-139X(03)00098-3
- Bosscher, N. (2014). *The decentralisation and transformation of the Dutch youth care system*. Netherlands Youth Institute Retrieved from <https://www.nji.nl/nl/Download-NJi/Publicatie-NJi/Decentralisation-Dutch-youth-care-system-update-june-2014.pdf>.
- Davidson, K., Vidgen, H., Denney-Wilson, E., & Daniels, L. (2018). How is children's weight status assessed for early identification of overweight and obesity? - Narrative review of programs for weight status assessment. *J Child Health Care*, 1367493518759238. doi:10.1177/1367493518759238
- Falconer, C. L., Park, M. H., Croker, H., Skow, A., Black, J., Saxena, S., . . . Kinra, S. (2014). The benefits and harms of providing parents with weight feedback as part of the national child measurement programme: a prospective cohort study. *BMC public health*, 14. doi:10.1186/1471-2458-14-549
- Gee, K. A. (2015). School-Based Body Mass Index Screening and Parental Notification in Late Adolescence: Evidence From Arkansas's Act 1220. *Journal of Adolescent Health*, 57(3), 270-276. doi:10.1016/j.jadohealth.2015.05.007
- Hardy, L., Mirshahi, S., Drayton, B. A., & Bauman, A. (2016). *NSW Schools Physical Activity and Nutrition Survey (SPANS) 2015: Full Report*. Sydney: NSW Department of Health.
- Health Promotion Board. (2017a). *School Health Service - Health Check and Immunisation For Primary 5 Pupils*. Singapore Ministry of Health, Retrieved from <https://www.healthhub.sg/sites/assets/Assets/PDFs/HPB/Children/SHS%20Health%20Check%20and%20Immunisation%20for%20P5%20pupils.pdf>
- Health Promotion Board. (2017b). *School Health Service Health Check and Immunisation for Primary 1 Pupils*. Singapore Ministry of Health, Retrieved from <https://www.healthhub.sg/sites/assets/Assets/PDFs/HPB/Children/SHS%20Health%20Check%20and%20Immunisation%20for%20P1%20pupils.pdf>.
- Hilverdink, P., Daamen, W., & Vink, C. (2015). *Children and youth support and care in the Netherlands*. Netherlands Youth Institute Retrieved from <http://www.youthpolicy.nl/en/Download-NJi/Publicatie-NJi/Children-and-youth-support-and-care-in-The-Netherlands.pdf>.
- Johnson, A., & Ziolkowski, G. (2006). School-Based Body Mass Index Screening Program. *Nutrition Today November/December*, 41(6), 274-279.
- Justus, M. B., Ryan, K. W., Rockenbach, J., Katterapalli, C., & Card-Higginson, P. (2007). Lessons learned while implementing a legislated school policy: Body mass index assessments among Arkansas's public school students. *Journal of School Health*, 77(10), 706-713.

- Li, W., Buszkiewicz, J. H., Leibowitz, R. B., Gapinski, M. A., Nasuti, L. J., & Land, T. G. (2015). Declining Trends and Widening Disparities in Overweight and Obesity Prevalence Among Massachusetts Public School Districts, 2009-2014. *American Journal of Public Health, 105*(10), E76-E82. doi:10.2105/ajph.2015.302807
- Li, W., Buszkiewicz, J. H., Leibowitz, R. B., Gapinski, M. A., Nasuti, L. J., & Land, T. G. (2015). Declining Trends and Widening Disparities in Overweight and Obesity Prevalence Among Massachusetts Public School Districts, 2009-2014. *AM J PUBLIC HEALTH, 105*(10), e76-82. doi:10.2105/AJPH.2015.302807
- Madsen, K. A. (2011). School-Based Body Mass Index Screening and Parent Notification A Statewide Natural Experiment. *Archives of Pediatrics & Adolescent Medicine, 165*(11), 987-992. doi:10.1001/archpediatrics.2011.127
- Ministry of Health. (2015). Health Screening for Secondary School. Retrieved from https://www.healthhub.sg/live-healthy/366/health_screening_for_secondary_school
- Netherlands Youth Institute. (2007). *Youth Policy in the Netherlands*. Netherlands Youth Institute, Retrieved from http://www.youthpolicy.org/national/Netherlands_2007_Youth_Policy_Overview.pdf.
- Public Health England. (2016). *National Child Measurement Programme - Changes in children's body mass index between 2006/7 and 2014/15*. (2016364). London: Public Health England.
- Public Health England. (2017). *National Child Measurement Programme Operational Guidance 2017*. London: Public Health England.
- Raczynski, J. M., Thompson, J. W., Phillips, M. M., Ryan, K. W., & Cleveland, H. W. (2009). Arkansas Act 1220 of 2003 to reduce childhood obesity: its implementation and impact on child and adolescent body mass index. *J Public Health Policy, 30 Suppl 1*, S124-140. doi:10.1057/jphp.2008.54
- Ruggieri, D. G., & Bass, S. B. (2015). A 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, 85*(1), 61-72. doi:10.1111/josh.12222
- Ruggieri, D. G., & Bass, S. B. (2015). A Comprehensive Review of School-Based Body Mass Index Screening Programs and Their Implications for School Health: Do the Controversies Accurately Reflect the Research? *Journal of School Health, 85*(1), 61-72. doi:10.1111/josh.12222
- Scully, M., Morley, B., Niven, P., Crawford, D., Pratt, I. S., & Wakefield, M. (2017). Factors associated with high consumption of soft drinks among Australian secondary-school students. *Public health nutrition, 20*(13), 2340-2348. doi:10.1017/S1368980017000118
- Sherry, B., Jefferds, M. E., & Grummer-Strawn, L. M. (2007). Accuracy of adolescent self-report of height and weight in assessing overweight status: a literature review. *Arch Pediatr Adolesc Med, 161*(12), 1154-1161. doi:10.1001/archpedi.161.12.1154
- Stubbs, J. M., & Achat, H. M. (2009). Individual rights over public good? The future of anthropometric monitoring of school children in the fight against obesity. *The Medical journal of Australia, 190*(3), 140-142.
- Thompson, H. R., & Madsen, K. A. (2017). The Report Card on BMI Report Cards. *Curr Obes Rep, 6*(2), 163-167. doi:10.1007/s13679-017-0259-6
- Thompson, J. W., & Card-Higginson, P. (2009). Arkansas' experience: statewide surveillance and parental information on the child obesity epidemic. *Pediatrics, 124 Suppl 1*, S73-82. doi:10.1542/peds.2008-3586J

- Thompson, J. W., & Card-Higginson, P. (2009). Arkansas' Experience: Statewide Surveillance and Parental Information on the Child Obesity Epidemic. *Pediatrics*, *124*, S73-S82. doi:10.1542/peds.2008-3586J
- Wiegersma, P. A., Hofman, A., & Zielhuis, G. A. (2000). Prevention of unhealthy behaviour by youth health care in The Netherlands. *Journal of public health medicine*, *22*(3), 386-392. doi:10.1093/pubmed/22.3.386

DRAFT