



The healthcare cost burden of childhood obesity: An Australian population-based study

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Session: Established and emerging issues

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CONFLICT OF INTEREST DISCLOSURE

We have nothing to disclose





Study Objectives

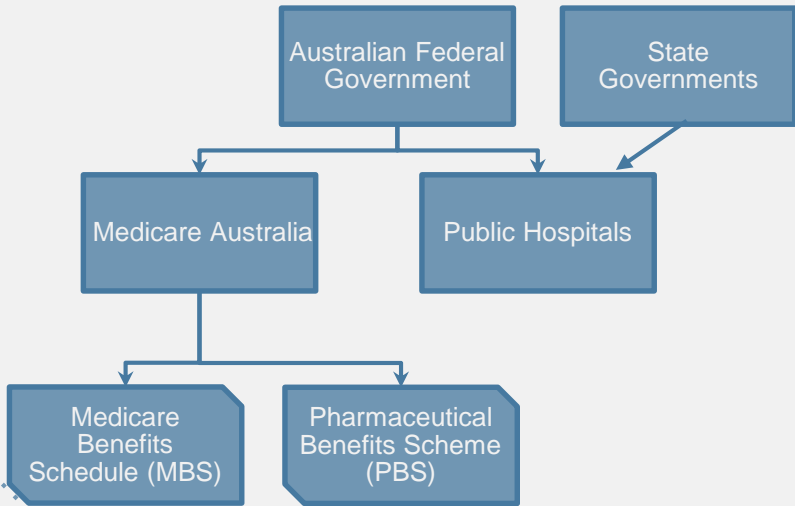
- Estimate excess Medicare cost associated with childhood obesity in Australia
- Assess whether this costs increase over age longitudinally

Background: Obesity

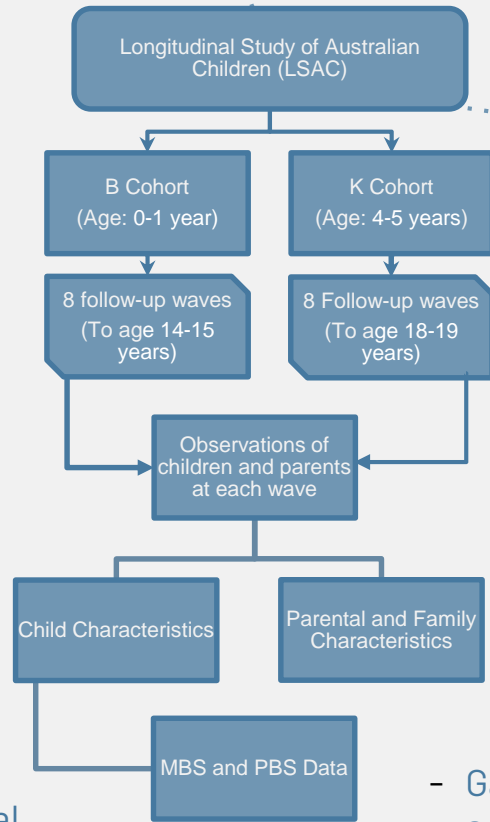
- Obesity is the second leading cause of childhood morbidity in Australia and worldwide
- Approximately 25% Australian children are affected with overweight and obesity



Background: Medicare Australia and LSAC



- The **MBS** is a **list of medical services** chargeable by medical providers upon which a **government rebate/subsidy (70 to 100%)** is provided. Service items encompass GP/specialist appts, investigations, imaging, surgery, and more
- Similarly, the **PBS** is a directory of subsidized medications and thereby sold at a government mandated price

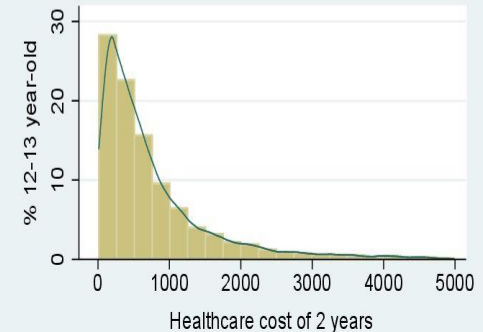
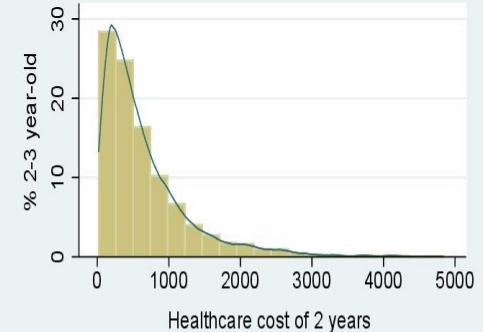


- Gathered information on **socioeconomic status, health, education, and development**
- Linked with **MBS and PBS data**

Methods

- A **total of 8,545 children** from the LSAC were included (4,099 from the B cohort and 4,446 from the K cohort)
 - Across **8 longitudinal waves**, the **total pool of observations** from which data was drawn was **50,143**
- Sample characteristics of the combined data from all waves were shown using descriptive statistics
- The connection between childhood injuries and total healthcare expenses was studied through **gamma with log link generalized linear modelling (GLM)**
- Dependent variable: Costs of obesity
- Independent Variable: Obesity Status (Categorical: Normal weight, underweight, overweight and obesity)
 - **Adjusted regression models** incorporating control variables were then established
 - **Control variables** were derived from the **Anderson healthcare utilization model**; including gender, mother's education, family structure, income quintile and area disadvantage scores.

Justification of using GLM: Skewed Medicare Exp. data



Results: Two-year total Medicare costs per child by age-group and obesity status

Age (years)	No of children by age group	GLM model results for mean total Medicare expenditure over two years							P-value
		Mean (SE) by obesity status				Mean Diff. (95% CI) from Normal weight			
		Normal weight	Underweight	Overweight	Obese	Underweight (B-A)	Overweight (C-A)	Obese (D-A)	
		(A)	(B)	(C)	(D)				
2-3	4,099	700 (12.9)	773 (26.4)	747 (12.3)	824 (19.7)	73 (20 to 127)	48 (10 to 85)	124 (73 to 175)	<0.001
4-5	8,414	756 (15.9)	835 (29.6)	808 (15.9)	890 (22.1)	79 (21 to 137)	51 (11 to 92)	134 (79 to 189)	<0.001
6-7	7,527	740 (15.4)	818 (28.4)	790 (14.1)	871 (21.0)	77 (21 to 134)	50 (11 to 89)	131 (78 to 185)	<0.001
8-9	7,278	706 (13.8)	780 (26.8)	754 (11.8)	831 (19.8)	74 (20 to 128)	48 (11 to 85)	125 (74 to 177)	<0.001
10-11	6,660	716 (15.0)	791 (27.5)	765 (12.2)	843 (19.9)	75 (20 to 130)	49 (11 to 86)	127 (75 to 179)	<0.001
12-13	6,385	696 (14.0)	769 (26.6)	744 (11.2)	820 (19.7)	73 (20 to 126)	47 (11 to 84)	124 (73 to 174)	<0.001
14-15	5,441	702 (14.9)	775 (27.0)	749 (11.6)	826 (19.7)	73 (20 to 127)	48 (11 to 85)	124 (74 to 175)	<0.001
16-17	2,398	703 (14.8)	777 (27.2)	751 (11.8)	828 (19.5)	74 (20 to 127)	48 (11 to 85)	125 (74 to 176)	<0.001
18-19	1,941	757 (17.5)	836 (34.8)	808 (19.3)	891 (21.8)	79 (21 to 138)	51 (11 to 92)	134 (80 to 189)	<0.001

- From ages 2-3 to 18-19, **children with normal weight had the lowest cost** of healthcare followed by children with underweight, overweight and then with obesity.
- The **mean difference** in cost between **overweight and obesity** were statistically significant and ranged from A\$744 to A\$891 across the youngest to oldest age group.
- The cross-sectional 2-year costs incurred by underweight, overweight and obese children were 10-11%, 6-7% and 17-18% higher, respectively, compared to normal weight peers for each age group from 2-3 to 18-19 years.

Results: Estimated Medicare costs over 2 years for Australian population by age

Age (years)	Australian Population	\$ Costs in millions Estimate (95% CI) for children with:	Excess \$ costs in millions above cost of normal weight children's Estimate (95% CI) for children with:			
			Normal weight	Underweight	Overweight	Obesity
2-3	642101	321.5 (309.9 to 333.1)	2.4 (1.6 to 3.3)	5.7 (5.5 to 5.8)	3.8 (3.4 to 4.2)	
4-5	642327	348.6 (334.2 to 362.9)	3.0 (2.0 to 4.0)	5.5 (5.5 to 5.5)	4.9 (4.5 to 5.4)	
6-7	641283	352.2 (337.9 to 366.6)	2.6 (1.7 to 3.4)	4.6 (4.4 to 4.9)	5.2 (4.8 to 5.7)	
8-9	639256	316.1 (304 to 328.2)	2.5 (1.6 to 3.3)	5.4 (5 to 5.9)	5.6 (5.1 to 6.1)	
10-11	632190	302.3 (289.9 to 314.7)	3.0 (2.0 to 4.0)	6.1 (5.5 to 6.8)	5.6 (5.2 to 6.1)	
12-13	595542	273.5 (262.8 to 284.3)	2.8 (1.9 to 3.8)	5.7 (5.1 to 6.4)	5.3 (4.8 to 5.8)	
14-15	573762	261.8 (250.9 to 272.6)	2.5 (1.7 to 3.3)	5.5 (4.8 to 6.3)	6.3 (5.8 to 6.7)	
16-17	581248	256.6 (246 to 267.1)	2.7 (1.8 to 3.6)	5.7 (5 to 6.4)	7.6 (7 to 8.1)	
18-19	623919	230.3 (219.9 to 240.8)	8.5 (4.8 to 12.1)	6.6 (6.1 to 7)	11.4 (10.7 to 12.1)	

- Extrapolating from previous results, we estimated **two-year Medicare costs** for the **total Australian population** between age groups 2-3 to 18-19.
- The bi-annual total excess Medicare costs for overweight and obesity were A\$106.5 million, while for underweight the excess costs were A\$29.9 million for the population across 2- to 19-year-old children.



Discussion

- Our results revealed that children having underweight, overweight or obesity incurred **significantly higher outpatient healthcare costs** compared to normal weight children.
- Generally, normal weight children within each age group accrued the lowest cost, whereas children with obesity accrued the highest.
- The **mean excess healthcare cost remains almost similar** with the **increase of age**.
- **Translational outcomes:** Both malnutrition and over-nutrition are impacting the healthcare service systems with excessive General Practitioner consultation, out-patient presentation and medical diagnosis. These activities increase both Medicare and Pharmaceutical costs for children with underweight, overweight and obesity, compared to those of normal weight children.
- **Future actions:** Policymakers should intensify the preventive efforts to combat the pressing nutritional and health issue of obesity among Australian children. The significant financial burden on public healthcare with costs per capita higher than children with normal weight justifies the costs of health interventions on this issue.

Thank you!

