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## Flavonoid provision to 2–3-year-old children in 30 long day care centres across metropolitan Perth, Western Australia

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Early autopsy studies demonstrate that children as young as 2 years can develop vascular atherosclerotic changes.<sup>(1,2)</sup> Early vascular changes are predictive for cardiovascular disease (CVD) in adulthood.<sup>(3)</sup> Toddlerhood represents an opportunity for development of preventative lifestyle habits that can reduce risk of CVD. One such dietary intervention is consumption of a flavonoid rich diet. Flavonoid intake of Australian toddlers is largely unknown. No recommendations for flavonoid intake in children currently exist. The primary aim of this study was to quantify total flavonoid and flavonoid subclass content of food provided to 2–3-year-old children attending long day care (LDC). A secondary aim was to investigate which foods contributed the most total flavonoids and flavonoid subclasses in the LDC menus. Flavonoid subclasses and individual compounds measured in this study included flavanols, flavones, flavanones, flavan-3-ols, anthocyanins and isoflavones. Flavonoid content of ingredients for morning tea, lunch and afternoon tea were added to existing weighed food records of 30 LDC centres. Flavonoid values for individual foods were assigned using the United States Department of Agriculture (USDA) flavonoid, proanthocyanidin and isoflavone databases. Descriptive statistics were used to determine the total flavonoids and flavonoid subclass provision for each of the LDC centres. Provision was analysed for each day and each mealtime and expressed as average values per child. Comparison of daily total flavonoids and flavonoid subclass provision between each of the mealtimes was made. Spearman's Rank was used to test association between total flavonoid provision of each of the LDC centres on day 1 and day 2 as well as to test association between total flavonoids provision and average cost per meal. Average daily flavonoid provision ranged from 9 mg to 175 mg with a median provision of 59 mg (IQR 41–76). Apples contributed the most flavonoids (43%) and were offered at 69 of the 180 mealtimes. Kidney beans contributed 68 mg of total flavonoids to the single highest flavonoid meal. Afternoon teas were the greatest meal contributor to total flavonoids (50%) and lunch the lowest (20%). Proanthocyanidins had the highest level of provision (70%) and isoflavones the lowest (< 0.5%). When comparing meal cost and total flavonoids the association was low and positive ( $\rho = 0.3$ ,  $p = 0.108$ ). Flavonoid intake of toddlers is poorly represented in the literature and shows substantial inter-study variability. The intake of 2–3-year-old children in this study provides valuable insights, as well as the major food contributors in this age group in LDC. A validated tool for WFR in LDC, as well as a specific database for the flavonoid composition of Australian foods would provide more accurate assessment of provision. Increasing total flavonoids provision to the target range could be achieved conveniently and at low cost.

### References

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