



## Variations in serving sizes of Australian snack foods and confectionery



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### ABSTRACT

This study examined the serving size and energy content per serving of Australian packaged snack foods and confectionery products. Nutrition Information Panel data for 23 sub-categories of packaged snack foods ( $n = 3481$ ) were extracted from The George Institute for Global Health's 2013 branded food composition database. Variations in serving size and energy content per serving were examined. Energy contents per serving were compared to recommendations in the Australian Dietary Guidelines. Serving sizes varied within and between snack food categories. Mean energy content per serving varied from 320 kJ to 899 kJ. More energy per serving than the recommended 600 kJ was displayed by 22% ( $n = 539$ ) of snack foods classified in the Australian Dietary Guidelines as discretionary foods. The recommendation for energy content per serving was exceeded in 60% ( $n = 635$ ) of snack foods from the Five Food Groups. Only 37% ( $n = 377$ ) of confectionery products displayed the industry-agreed serving size of 25 g. Energy content per serving of many packaged snack foods do not align with the Australian Dietary Guidelines and the industry agreed serving size has not been taken up widely within the confectionery category. Given the inconsistencies in serving sizes, featuring serving size in front-of-pack information may hinder the objective of a clear and simple nutrition message. Messaging to help consumers make healthier choices should consider the variation in serving sizes on packaged snack foods.

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### 1. Introduction

Obesity rates in Australia are rising, with 70% of men and 56% of women classified overweight or obese in 2011–2012 (Australian Bureau of Statistics, 2014). This is partly due to the increased consumption of energy-dense, nutrient-poor convenience foods (Gortmaker et al., 2011; Rangan, Schindeler, Hector, Gill, & Webb, 2009). Along with take-away foods, snack foods are a commonly consumed convenience food (Walker, Woods, Rickard, & Wong, 2008). The Australian Dietary Guidelines recommend people eat a wide variety of nutritious foods from the Five Food Groups every day – vegetables and legumes/beans; fruit; grain (cereal) foods; lean meats and poultry, fish, eggs, nuts and seeds, and/or legumes/

beans; and milk, yoghurt, cheese and/or alternatives (Australian Government, 2013). Most packaged snacks are classified as 'discretionary foods' in food selection guides as they are usually higher in energy, sugar, fat and/or sodium and low in micro-nutrients (Australian Government, 2013; de Graaf, 2006; Thornton et al., 2012). Discretionary foods do not fit into the Five Food Groups from the Australian Dietary Guidelines and are not considered essential for a healthy diet (Australian Government, 2013). Just over one-third of the total energy intake of the average Australian derives from 'discretionary' foods (Rangan et al., 2009).

Nutrition labelling on food packaging is a tool that can provide consumers with a point-of-purchase environment conducive to the selection of healthy choices (Cleanthous, Mackintosh, & Anderson, 2011; Cowburn et al., 2005; Ni Mhurchu et al., 2007). In Australia, a nutrition information panel (NIP) is required on most packaged foods and has been mandated since 2002 by Food Standards Australia New Zealand (Food Standards Australia New Zealand, 2013). However, it is the manufacturer that determines the serving size specification of packaged products (Cleanthous et al., 2011; Louie, Flood, Rangan, Hector, & Gill, 2008; Magnusson, 2010).

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In 2014 a voluntary Health Star Rating (HSR) front-of-pack labelling system was endorsed by the Australian Government (Australian Government Department of Health, 2014a). During the HSR development process, standardised serving sizes were agreed for two food categories based on current industry agreed standardised portion sizes: chocolate/sugar confectionery (25 g) and beverages (entire package if package is 600 mL or less or 250 mL for products greater than 600 mL) (Australian Government Department of Health, 2014b).

The evidence-based Australian Dietary Guidelines define the serving sizes of different food categories in grams but also indicate a kilojoule (kJ) contribution; 100–350 kJ for a vegetable serve, 350 kJ for a serve of fruit, 500 kJ for a serve of cereal, 500–600 kJ for lean meat, nuts and legumes, 500–600 kJ for dairy products or alternatives and 500–600 kJ for a discretionary food (National Health and Medical Research Council, 2013). Although serving size labelling aims to address ‘portion distortion’, an increasing trend whereby people perceive larger portion sizes as an appropriate amount to eat (Schwartz et al., 2006), the manufacturer recommended serving size is not always comparable across similar products and is not always consistent with the portion size that consumers would usually eat or drink (Faulkner, Pourshahidi, Wallace, Kerr, McCrorie, & Livingstone 2012; Roberto et al., 2014).

This study aimed to examine the range of serving sizes within categories of packaged snack foods and confectionery items from major Australian supermarkets, and to examine how the energy content per serving of these foods compared to the recommendations in the Australian Dietary Guidelines. Manufacturer adherence to the industry-agreed standard serving size of 25 g for chocolate/sugar confectionery products was also examined.

## 2. Methods

The categories of snack foods chosen for this study included non-perishable packaged foods that would normally be consumed outside regular mealtimes, and excluded beverages. NIP data for 21 categories of packaged snack foods and seven categories of chocolate/sugar confectionery were extracted from The George Institute for Global Health’s 2013 branded food composition database (Dunford et al., 2014) in Microsoft® Office Excel 2010 format. Categories were defined in the food composition database and are those used by the Global Food Monitoring Group (Dunford et al., 2014; Elizabeth Dunford et al., 2012). The database contained information collected from photographs of NIPs on product labels in-store at the four major Australian supermarkets (Coles, Woolworths, IGA and ALDI) from August to December 2013.

These categories were grouped into either the Five Food Groups or discretionary foods, as defined by the Australian Dietary Guidelines (National Health and Medical Research Council, 2013). The discretionary food categories included in this study were corn chips, extruded snacks, potato crisps, wholegrain chips, popcorn, pretzels, plain nut bars, yoghurt/chocolate-coated bars, plain cereal-based bars, baked filled bars, puffed grain-based bars, plain sweet biscuits (without fillings, icing or topping), rich sweet biscuits (with nuts, dried fruit, choc chips, fillings, icing or topping), chocolate-coated biscuits and confectionery. Crackers were not specifically classified in the Australian Dietary Guidelines and were categorised in this study as discretionary. The food categories within the Five Food Groups included crispbread, canned fruit, dried fruit, dried fruit & nut mixes, nuts, natural yoghurt and flavoured/fruit yoghurt (Table 1). The categories of confectionery included sugar-based, block chocolate, chocolate-covered nuts & fruit, single chocolate bars, chocolate bars in packs, chocolate boxes and other chocolate-covered products. Products were excluded from analysis if they were holiday season specific snack foods (i.e.

Christmas and Easter), cooking chocolate, nuts used for cooking (i.e. nut meal and flaked or slivered nuts), chewing gum or cough lollies. All authors agreed on the grouping of the food categories, (Five Food group or discretionary food) before analysis.

Serving size information was recorded as displayed on the NIP and not determined by the package size. The data were first cleaned and any products missing serving size or energy information were removed ( $n = 175$ , 4.8%). The database was previously checked for errors as part of The George Institute for Global Health’s data integrity process (Dunford et al., 2014). As another check on the accuracy of the data in the database, each category was screened for outliers; 5% of products at the lowest and highest end of the serving size range in each category were checked with the original NIP photo and corrected if necessary ( $n = 2$ ). The data were then imported into SPSS Version 19.0 for Windows (IBM Corp., Armonk, NY, USA) and descriptive statistics, mean, standard deviation, median and range were generated. Homogeneity of variances of both serving size and energy per serve was analysed using a non-parametric Levene’s test. Regression analyses were used to investigate any correlations with the number of products in a category.

For descriptive statistics, confectionery was grouped into non-chocolate based and chocolate-based confectionery. Serving sizes for confectionery products were compared to the industry agreed standardised serving size of 25 g. The mean energy content per serving of each category of snack food was compared to the Australian Dietary Guidelines for energy contribution; 600 kJ per serving for discretionary foods, 350 kJ per serving for canned fruit and dried fruit and between 500 and 600 kJ per serving for nuts, dried fruit & nut mixes, and yoghurt (Australian Government, 2013).

## 3. Results

Nutrition information for 3656 snack food products was extracted and after exclusion of those with missing data 3481 snack food products were analysed; 2424 (70%) discretionary foods and 1057 (30%) foods from the Five Food Groups. The number of products in each category ranged from 14 for wholegrain chips to 664 for chocolate confectionery. The nuts, flavoured/fruit yoghurt, crackers, rich sweet biscuits, dried fruit and the two confectionery categories each had over 200 products, comprising over 60% of the products analysed (Table 1).

### 3.1. Variation in serving size

There was significant variation in serving sizes between categories ( $F(20, 2435) = 81.78$  ( $p = 0.000$ )) (Table 1). Relative standard deviations ranged from 11% to 59% for discretionary snacks and 31%–42% for snacks from the Five Food Groups. There was no correlation between category size and standard deviation of serving size in a category ( $R = 0.273$ ,  $p = 0.231$ ). Serving sizes ranged up to twice the mean in 15 of the 23 categories (65%) and three times the mean in six categories (26%). Some sweet biscuits had a serving size over four times the mean serving size for that category. There was also variation in serving size within particular products, for example the same potato crisps product had a serving size of 45 g in an individual pack, 19 g within a multipack, and 27 g within a large pack.

### 3.2. Energy per serve

The nuts category had the highest mean energy content per serving (899 kJ), followed by corn chips (801 kJ) and dried fruit & nut mixes (765 kJ). The categories with the lowest energy per serving were canned fruit (320 kJ), non-chocolate confectionery

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