

How big is a serve?

By IRENE MUNRO

Nutraceuticals Research Group, The University of Newcastle

Guidelines have been developed to help people work out their daily food consumption. The Australian guide to healthy eating (Department of Health & Family Services 1998), and the 12345+ Food and Nutrition Plan (CSIRO 1994), divide foods into five main groups and state how many serves of foods should be eaten from these groups each day. Although the number of serves to be consumed from each group is clear, the size of the serves of foods within these groups can be quite different. For example, in the 12345+ Food and Nutrition Plan, one serve from the food group 'bread and cereals' is a slice of bread or half a large bread roll or half a cup of cooked rice or one cup of pasta. In the Australian Guide to Healthy Eating one serve is equal to two slices of bread or one medium-size bread roll or one cup of cooked rice or pasta. If the 'experts' do not agree on serve sizes, how difficult it must be for consumers to know how big a serve is.

Difficulty in understanding what constitutes a 'serve' is highlighted in the recommendation that consumers should eat five serves of vegetables per day. A serve of vegetables can be interpreted by the consumer to mean a measured amount, for example the 75 gram or half cup [of] cooked vegetables recommended in the food guides, or it can be interpreted to mean the unspecified amount of vegetables that a person serves on to his or her plate. With the second interpretation, the consumer will believe that one 'serve' of vegetable is being consumed, when it might actually be equivalent to three measured amounts, and he/she would probably consider the consumption of five of these serves unmanageable. It has been suggested that the confusion arises because 'serve' can be both a verb (to serve) and a noun (a serve) (Murphy & Segan 1994). Using the term 'portion' instead of 'a serve' could remove the possible misunderstanding.

Are serves increasing in size?

The greatest problems relating to the size of serves arises mostly with foods outside the five main food groups, also known as indulgences. It has been suggested that the serve size of foods, particularly indulgences, has been steadily growing. A number of studies have been recently conducted in the United States (US) to find out the accuracy of such assumptions. In one study, a comparison was made of the serve sizes of food and drinks in 1989–1991 and again in 1994–1996. The greatest difference observed was in the serve size of drinks: soft drinks had increased by over 16 per cent, coffee and wine by almost 22 per cent, fruit drinks by almost 16 per cent, and beer by 35 per cent (Smiciklas-Wright, Mitchell et al. 2003). To investigate changes in serves at fast-food restaurants, a study compared serve sizes in the 1950s and in 2003. The serve size of soft drinks had increased by 450 per cent, hamburgers by almost 500 per cent, and French fries by almost 300 per cent as shown in *Table 1* (Penisten &

Table 1: Serve sizes 1950s and 2003

Foods	1950s	2003
Soft drinks	196 mL	896 mL
Hamburgers	45 g	224 g
French fries	67 g	196 g

Source: Penisten 2004.

Litchfield 2004). By including the results of a second study on fast-food serve sizes in 1977 and 1996 (*Table 2*), the progressive increases over five decades can be seen (Nielsen & Popkin 2003).

Supersized meals

A major source of increased serve sizes in the US can be found at fast-food outlets. Names such as Monster Mac, Mega Mac, BK Big Fish, Big Foot, Dominator, Jumbo Combo, Big Bacon Classic and Big Beef Taco reflect the growing size of fast foods (Howard 1993). Examples of these supersized meals are the Monster Thickburger (Figure 1), which is made from two hamburgers weighing 165 gram each, four strips of bacon, three slices of cheese and mayonnaise, and Denny's biggest burger (Figure 2), which is the size of a dinner plate. The growth in the serve size of fast-foods from the year that they were first introduced in the US and again in 2002 is shown in *Table 3*. With these foods, the size of the serve when the food was first introduced in the mid 1950s was the smallest

Figure 1: Monster Thickburger



Source: <www.msnbc.msn.com/id/6498304>, accessed 20/2/2006.

Figure 2: Denny's biggest burger



Source: <http://money.cnn.com/2005/05/03/pf/biggest_burger>, accessed 20/2/2006.

Table 2: Serve sizes 1977 and 1996

Foods	1977	1996
Soft drinks	387 mL	588 mL
Hamburgers	161.5 g	198.5 g
French fries	88 g	102 g

Source: Nielsen & Popkin 2003.

size available in 2002. With the drinks, in all but one case, the sizes available in 2002 were all larger.

The ‘supersizing’ of take-away meals was highlighted by Morgan Spurlock in 2004 in his film, ‘Supersize Me’. He was allowed to eat only from McDonald’s for an entire month and had to accept the ‘supersize’ if it was offered, which he says occurred frequently. The supersize meals contained approximately 6,000 kJ and Spurlock estimated that he was consuming 20,000 kJ each day. The public response to the film led to McDonald’s phasing out supersizes from its restaurants that year. Why do fast-food outlets promote larger and larger sizes? There is growing competition in the marketplace to win and keep customers and offering larger sizes for proportionally less cost is seen as a way to do this. For example, a ‘medium’ coke sells for \$1.29 and contains 9 cents worth of coke syrup. If consumers buy a ‘large’ coke for \$1.49 they see that as increased value for money. However, for the fast-food outlet, the cost of the ‘large’ coke is only an additional 3 cents for the cost of the syrup, so they make an extra 17 cents of pure profit (Schlosser 2001).

Table 3: The growth of supersized fast-foods in the United States (Young & Nestle 2003)

Food / drink	Year introduced	Size at introduction	Sizes available in 2002
French fries: McDonald’s	1955	68g	68g (small), 150g (medium), 179g (large), 201g (super-size)
Burger King	1954	74g	74g (small), 116g (medium), 162g (large), 196g (king)
Hamburger: McDonald’s	1955	45g	45g, 91g, 113g, 227g
Soda poured into cup: McDonald’s	1955	207 mL	354 mL (child), 473 mL (medium), 621 mL (large), 1.242 litres (super-size)
7-Eleven stores	1973	355 mL, 591 mL	473 mL (gulp), 946 mL (big gulp), 1.301 litres (super big gulp), 1.893 litres (double gulp)
Coca Cola bottle/can	1916	192 mL	237 mL, 355 mL, 592 mL, 1 litre

Note: original measures converted from ounces to grams, and fluid ounces to millilitres. Source: Young & Nestle 2003.

Do larger serves increase consumption?

Although increasing serve sizes does not necessarily mean that people need to consume everything they are served, research has shown that serve size does influence consumption. The findings of one study, where individuals were served with different sizes of pre-packaged snacks to eat, showed that there was a significant increase in consumption as the package size increased for both men and women (Rolls, et al. 2004). There were similar findings in another study where people were provided with different sized packets of potato crisps to eat. In most cases individuals who ate more crisps did not significantly reduce the amount consumed at dinner to compensate for their increased energy intake from the crisps (Rolls, et al. 2004). People will also overconsume on foods they don’t like. Moviegoers were given either a 120 gram or a 240 gram container of free popcorn. One group was given fresh popcorn in their containers and the other group was given popcorn that was stale. Those with fresh popcorn and the larger container ate 45 per cent more popcorn than those with the smaller container, while people with stale popcorn in the large container ate 33 per cent more popcorn than those with stale popcorn in the smaller container, despite acknowledging that the popcorn had a bad taste (Wansink 2005).

Serve sizes in Australia

While Australia does not appear to have followed the ‘supersize’ trend from the US, product sizes in Australia have also increased. For example, the size of muffins has increased from a quarter-cup size to the new one-cup size, and chocolate chip cookies are now available in a larger 14 cm diameter as well as the original 6 cm diameter (Figure 3). Some products are available in a smaller size as well as a larger size, for example, the original Cadbury Dairy Milk was 150 gram and is now available in a larger 250 gram block (Figure 4) as well as a smaller 55 gram bar. Twisties are now available in two larger sizes. In addition to the original 50 gram size there are also 100 gram and 190 gram packs (Figure 5). While the serve size given on all three packs is 50 gram, research has shown that the larger the packet the more people eat, yet only the 190 gram pack suggests that it is ‘perfect to share’. These changes in product size appear to have highlighted problems in determining a standard serve size. A brief supermarket survey found that there were discrepancies in serve sizes with products that were identical apart from being made in a different size. The serve size on a 60 gram Mars Bar is given as 60 gram but on the two-pack Mars Bar, where the bars are 40 gram each, the serve size changes to 40 gram. The serve of a standard 50 gram Crunchie is given as 50 gram, but for the 80 gram king size Crunchie the stated serve size is 80 gram (Table 4). It would appear that the manufacturers are changing the serve to accommodate the size of the confectionery bar

Figure 3: Chocolate chip cookies



Figure 4: Cadbury Dairy Milk chocolate sizes 150 gram and 250 gram



Figure 5: Twisties packet sizes 190 gram, 100 gram and 50 gram



Table 4: different serve sizes for the same product

Product	Product size	Serve size	kJ/100g
Mars bar	60g (single bar)	60g	1910
Mars bar (2 pack)	80g (2 bars @ 40g each)	40g	1910
Bounty bar (2 pack)	50g (2 bars @ 25g each)	50g	2030
Dairy milk (slab)	250g	50g	2210
Dairy milk (bar)	55g	55g	2210
Kit Kat (slab – 4 fingers)	45g	45g	2190
Kit Kat (bar)	60g	60g	2190
Kit Kat (bar – caramel)	65g	65g	2130
Crunchie	50g	50g	2000
Crunchie (king size)	80g	80g	2000

instead of making the bar to fit standardised serves. Another discrepancy with serve sizes can be found in different brands of chocolate milk. In one 300mL carton of chocolate milk the serve size is 300mL, and in a 500mL carton the serve size is 250mL. A different brand with a 375mL carton specifies the serve size as 250mL—what do you do with the remaining half serve?. Yet another brand in the 250mL size specifies the serve size as 50mL and confirms that there are five serves in the product. A 50mL serve of a drink seems to be somewhat unrealistic and it is likely that the consumer will drink all 250mL without realising that they have consumed five serves.

Conclusion

There is concern that the larger food serves are encouraging people to eat more and that this is contributing to the current obesity epidemic. It has been suggested that, if larger serves are part of a competitive marketplace, manufacturers should invest in the development of low energy products. On a more positive side, larger serves could be a strategy to encourage people with poor appetites to eat more, such as the elderly. Also, setting out larger serves of fresh vegetable sticks for snacks could encourage children to eat more of them (Wansink 2005). However, if there is to be a serious effort

to help people manage their food intake for a healthy life, standardisation of serve sizes and unambiguous terminology are essential.

References

- Cable News Network LP 2005, '15-pound burger goes on sale', *CNN Money.com*, 4 May, <http://money.cnn.com/2005/05/03/pf/biggest_burger>, accessed 20/02/2006.
- CSIRO 1994, *The 12345+ Food & Nutrition Plan*, Commonwealth Department of Health, Adelaide.
- Department of Health and Family Services 1998, *The Australian guide to healthy eating*, Australian Government Publishing Service, Canberra.
- Howard, T. 1993, Chain reaction: bigger is better-fast food restaurant menus, *Nation's Restaurant News*, November 1.
- MSNBC.com 2004, 'Hardee's serves up 1420-calorie burger: fast-food giant skips diet craze, concocts fat-filled sandwich', MSNBC.com, 17 November, <www.msnbc.msn.com/id/6498304>, accessed 20/02/2006.
- Murphy, M. & Segan, C. 1994, *Young people and their barriers to increasing vegetable consumption*, Anti-Cancer Council of Victoria, Melbourne.
- Nielsen, S.J. & Popkin, B.M. 2003, Patterns and trends in food portion sizes 1977–1998, *Journal of the American Medical Association*, vol. 289, no. 4, pp. 450–453.
- Penisten, M.B. & Litchfield, R.E. 2004, 'Nutrition education delivered at the state fair: are your portions in proportion', *Journal of Nutrition Education Behaviour*, vol. 36, pp. 275–277.
- Rolls, B.J., Roe, L.S., Kral, T.V.E., Meengs, J.S. & Wall, D.E. 2004, 'Increasing the portion size of a packaged snack increases energy intake in men and women', *Appetite*, vol. 42, pp. 63–69.
- Schlosser, E. 2001, *Fast food nation*, Houghton Mifflin, New York.
- Smiciklas-Wright, H., Mitchell, D.C., Mickle, S.J., Goldman, J.D. & Cook, A. 2003, 'Foods commonly eaten in the United States 1989–1991 and 1994–1996: Are portion sizes changing?', *Journal of the American Dietetic Association*, vol. 103, pp. 41–47.
- Wansink, B. 2005, 'Bad popcorn in big buckets: portion size can influence intake as much as taste', *Journal of Nutrition Education Behaviour*, vol. 37, pp. 242–245.
- Young, L.R. & Nestle, M. 2003, 'Expanding portion sizes in the US marketplace: implications for nutrition counseling', *Journal of the American Dietetic Association*, vol. 103, no. 2, pp. 231–234.

Student Activities

- The article suggests that consumers might have difficulty in knowing what constitutes one serve of a particular food. Use examples from the article to provide reasons for this difficulty.
- Using the data on serving sizes from *Tables 1* and *2* draw a graph to show serving sizes of soft drinks, hamburgers and French fries from 1950s, 1977, 1996, 2003.
 - Identify when the greatest changes have occurred.
 - Calculate the percentage increase in size over the 50-year period for each food.
- Use the information from the article to discuss whether or not increasing serve size leads to an increase in overall daily consumption of food or kilojoules.
- Using the information in *Table 4*, calculate the number of kilojoules per stated serving size for each product.
 - What is the range of kilojoules per serving size?
 - According to the CSIRO 12345+ food model the recommended kilojoule value of one serve of 'indulgence food' is 600 kilojoules. How does this compare to your answers in part a?
- Outline the possible advantages of larger serving sizes described in the conclusion of the article.
 - Do the advantages of larger serving sizes outweigh the disadvantages? Discuss in the context of health outcomes for a population.

Going further

- In the article the main focus is on the kilojoule composition of foods such as soft drinks, snack foods (e.g. potato crisps and twisties), chocolate, french fries and hamburgers.
 - Use your textbook or other resources to determine aspects of food composition other than high kilojoule content of these foods.
 - Describe the health consequences other than obesity that could result from consumption of large serve sizes of these foods.
- Conduct a survey of a selection of snack foods available in your local supermarket. You will need to collect information on the serving sizes, kilojoules per 100g or kilojoules per serve.
 - Set up a table similar to *Table 4* in the article, using crisps and other snack foods instead of chocolate bars.
 - Analyse the consistency or otherwise of the information provided on the product labels.
 - In groups of two or three discuss the data and its implications, using the issues addressed in the article as a basis for your discussion.
- Is the consumer at the mercy of the food industry or can the consumer influence the foods sold by the food industry, in particular the fast food industry? In groups of three or four discuss this question using the information in the article.

Copyright of Nutridate is the property of Warringal Publications and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.