The Journal of Nutrition
Supplement Article

Consumption Frequency and Purchase Locations of Foods Prepared Outside the Home in Australia: 2018 International Food Policy Study

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ABSTRACT

Background: Foods prepared outside the home (e.g., fast-food chains, restaurants) represent increasing proportions of diets worldwide, and have been associated with higher energy intakes and BMIs. To improve the healthiness of population diets, it is important to understand patterns of consumption of these foods, and whether related policy measures are effective.

Objectives: This study aimed to identify the frequency and sources of consumption of foods prepared outside the home in Australia, and to understand the impact of nutrition information in restaurants on related food choices.

Methods: Data were from a web-based survey (the International Food Policy Study) completed in 2018 by Australian adults aged ≥18 years (n = 4103). The number of meals prepared outside the home, their purchase locations, and the extent to which nutrition information was noticed and influenced purchasing decisions were each analyzed by sociodemographic characteristics and BMI, with linear models also adjusted for sex, age group, education, ethnicity, and BMI.

Results: An average of 2.73 (95% CI, 2.61–2.86) meals per week were prepared outside the home, with higher frequencies among men, younger ages, and more highly educated participants. A wide variety of sources for these foods was observed, with fast-food outlets being most common. Around one-quarter of all foods prepared outside the home were delivered. A small percentage (14.9%; 95% CI, 13.3%–16.7%) of participants reported noticing nutrition information, but among those who did, around half reported that it influenced their behavior.

Conclusions: Foods prepared outside the home are commonly purchased in Australia, particularly by young adults, from a variety of outlet types. While current menu energy labeling regulations may provide some population health benefit, a broader policy focus on foods prepared outside the home is needed as part of efforts to improve population diets. *J Nutr* 2022;152:76S–84S.

Keywords: fast food, menu labeling, restaurant, food sources, food environment

Introduction

Unhealthy diets are a major public health problem in Australia and globally (1, 2) with a trend over recent decades toward lower consumption of fruits and vegetables and higher consumption of energy-dense, nutrient-poor foods and beverages (3, 4). This decline in diet quality has contributed to a rise in noncommunicable diseases, such as obesity, type 2 diabetes, and cardiovascular diseases (1, 5, 6). In Australia, an average of 35% of total daily energy intake is from unhealthy foods and beverages, with 67% of Australian adults considered overweight or obese in 2017–2018 (7, 8).

Foods prepared outside the home, including by restaurants, takeaway food outlets, and fast-food chains, represent an increasing proportion of diets worldwide (9–11). These foods are often unhealthy and tend to be more energy dense and nutrient poor compared to foods prepared at home (9, 12). Frequent intake of foods purchased outside the home, and particularly fast food, has been associated with higher daily energy intakes (13) and higher BMIs (14–19). Using survey data from the American NHANES (2007–2010), it was found that, on average, adults in the United States ate 3.9 meals away from home per week, with almost half of these being fast food

Manuscript received November 7, 2021. Initial review completed December 17, 2021. Revision accepted January 17, 2022.
First published online March 11, 2022; doi: https://doi.org/10.1093/jn/nxab437.

(including takeaway burgers, pizza, and fried chicken) (17). The average BMI in the study was linearly related to the weekly frequency of meals eaten away from home (17). Fast food accounted for 11.3% of total daily energy intake according to the 2007–2010 NHANES 24-hour food recall data (20), while more recent data from NHANES (2013–2016) found that over one-third of participants reported eating fast food the previous day (21). In the UK National Diet and Nutrition Survey, 27% of adults and 19% of children reportedly ate meals out of the home once per week or more (22). Similar patterns of out-of-home food consumption have been observed in other European countries (23–25).

In Australia, recent food expenditure and dietary trends show an increase in consumption of foods prepared outside the home (11, 26–28). Australian households spent 34% of their total food expenditure on food prepared outside the home in 2015–2016, compared to 27.5% in 2003–2004 (29). There are now over 85,000 establishments preparing and selling meals in Australia, consisting mainly of fast-food chains (35%) and other restaurants (26%) (28). In 2018, 36% of Australian adults reported eating fast-food meals 1 to 3 times a week (30). Although consumption of food prepared outside the home has increased in Australia, there is limited information on the types of outlets from which these foods are purchased and on how purchases differ by sociodemographic characteristics and body weight.

Several initiatives have been proposed across the globe to promote healthier eating patterns in relation to food prepared outside the home. These include working with food outlets to improve the healthiness of the foods they offer and using planning regulations to restrict the concentrations of unhealthy fast-food outlets (31, 32). In Australia, the most prominent initiative to improve the healthiness of food prepared outside the home is energy labeling on menus. Since 2010, a number of Australian states and territories have implemented mandatory menu energy labeling schemes that apply to chains with more than 20 outlets in 1 state or more than 50 outlets nationally (33–35). As part of these schemes, outlets are required to display the kilojoule content of their food products on all menus (including drive-through menu boards and labels that display menu items) (33, 34). Some Australian jurisdictions with smaller populations (including Western Australia, Tasmania, and the Northern Territory) have not mandated menu energy labeling, although several major fast-food chains have implemented energy labeling on their menus nationally (33–35). Previous studies have shown that menu energy labeling can encourage healthier fast-food choices (36–39) and that the effects strengthen over time (36). Current evidence for the degree to which menu energy labeling is noticed and acted upon in Australia is limited.

Given the impact of foods prepared outside the home on health (14–19), it is important to understand relevant patterns of consumption of these foods and how the public responds to public health initiatives in this setting. Data on these topics can be used to inform policy responses to improve the healthiness of population diets. Accordingly, this study aimed to identify purchasing patterns and locations of food prepared outside the home in Australia across a range of sociodemographic and body weight strata, and to understand the impact of menu energy labeling on related food choices.

Methods

Participants and study design

Data were from the Australian arm of the 2018 wave of the International Food Policy Study (IFPS), which is conducted annually in 5 countries: Australia, Canada, Mexico, the United Kingdom, and the United States. Individuals from Australia were eligible to participate if they were 18 years of age or older. Respondents were recruited from the Nielsen Consumer Insights Global Panel and their partner panels. Nielsen drew stratified random samples from online panels in each country. Email invitations were sent to a random sample of potentially eligible respondents. After eligibility screening, all potential respondents received information about the study and were asked to provide consent prior to participation. Respondents received remuneration as per their panel's usual incentive structure, including points-based or monetary rewards and/or chances to win monthly prizes (40).

Data were collected through a self-completed online questionnaire. The questionnaire was in English and included information on demographic characteristics and food and food policy–related knowledge, attitudes, and behaviors (questionnaires available at http://foodpolicystudy.com/methods/). The study received ethics clearance from a University of Waterloo Research Ethics Committee (ORE#21460) and an exemption from the Deakin University Research Ethics Committee (DUHREC#2018-082). A detailed description of the study methods can be found elsewhere (40).

Measures

This study involved an analysis of a subset of questions from the 2018 IFPS wave related to respondents' food sources when eating meals (defined as breakfast, lunch, and dinner) prepared outside the home. As outlined in **Supplemental Table 1**, this included measures assessing the number of meals prepared outside the home over the past 7 days, where foods prepared outside the home were purchased, how these foods were procured (e.g., delivery services), and the distance from their home. For foods purchased from fast-food outlets, further information was collected on the frequency of purchases from various types of fast-food outlets. Respondents were also asked whether they noticed any nutrition information during their last visit to a restaurant (including a fast-food outlet or coffee shop) and, if so, whether it influenced their order. The impact of nutrition information was further assessed by asking "in the past 6 months, have you done any of the following because of nutrition information in restaurants?" (responses included: ordered something different, ate less of the food you ordered, changed which restaurants you visit, eaten at restaurants less often). Studies using these measures have been previously published (41–43). Where respondents reported "don't know" or "refuse to answer," data were excluded from the analysis.

Supplementary analyses using data from the 2017 IFPS wave (using the same overall methods as for 2018, but with an upper age limit

This supplement was supported by funding from a Project Grant from the Canadian Institutes of Health Research (PJT-162167). The views expressed herein are solely the responsibility of the authors and do not necessarily represent the official views of the Canadian Institutes for Health Research or other sources of funding. Funding for the International Food Policy Study was provided by a Canadian Institutes of Health Research (CIHR) Project Grant (#PJT-162167), and CIHR Population Health Intervention Research operating grant, with additional support from the Public Health Agency of Canada (PHAC).
Author disclosures: AJC, SD, and GS are researchers within the Australian National Health and Medical Research Council -funded Centre of Research Excellence in Food Retail Environments for Health (RE-FRESH; APP1152968). GS is also a recipient of an NHMRC Emerging Leadership Fellowship (APP2008535). AJC and GS are the recipients of Heart Foundation Future Leader Fellowships from the National Heart Foundation of Australia (project numbers 102611 and 102035). ER is funded by an Australian Government Research Training Program Scholarship. DH has served as a paid expert witness on behalf of public health authorities in the legal challenge to San Francisco's health warning ordinance for sugar-sweetened beverages. All other authors report no conflicts of interest.
The opinions, analysis, and conclusions in this paper are those of the authors and should not be attributed to the NHMRC.
Supplemental Tables 1–9 are available from the "Supplementary data" link in the online posting of the article and from the same link in the online table of contents at https://academic.oup.com/jn/.
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of 64 years) were also conducted. Unlike in the 2018 wave, in the 2017 wave, data on purchase locations of food prepared outside the home were collected separately for each eating occasion (i.e., breakfast, lunch, dinner, and other) per day across the past week (see **Supplemental Table 2** for question wording). An analysis of these data is reported in **Supplemental Tables 3–5**.

Self-reported demographic variables included age, sex at birth (male or female), highest education level, and state/territory of residence. Age was categorized as 18–29, 30–44, 45–60, and ≥60 years. Education level was categorized as low (year 12/equivalent or less), medium (trade certificate/diploma/some university), or high (bachelor's degree or above). State and territory of residence was categorized as New South Wales, Victoria, Queensland, Western Australia, South Australia, Tasmania, Australian Capital Territory, and the Northern Territory. Participants were classified as being a majority ethnicity if they self-identified as only speaking English in the home and did not identify as Aboriginal or Torres Strait Islander, and were otherwise classified as being a minority ethnicity. Body weight categories (based on BMI classifications as underweight, normal weight, overweight, or obesity) were determined using participants self-reported weight and height.

Data analysis

Data were weighted with poststratification sample weights constructed using a raking algorithm with estimates of the Australian population by age group, sex, state/territory, ethnicity, and education from the Australian Census (44). Estimates reported are weighted, with the exception being descriptive statistics (presented as both unweighted and weighted percentages). To permit comparisons between groups, 95% CIs are presented in all tables. Food sources of meals prepared outside the home are presented stratified by sex, age group, education, body weight category, and ethnicity, with the mean (95% CI) number of meals eaten per week from each food source presented. Chi-square tests were used to test for differences in proportions (e.g., of those noticing nutrition information and being influenced by nutrition information), while differences in means (e.g., mean numbers of meals) were assessed using linear regression, followed by an adjusted Wald test. Multi-variable linear models included terms for age group, education, ethnicity, and sex, with the results of these models presented in the text only (results in tables are unadjusted for these factors). Differences between groups were considered statistically significant at a P value < 0.05, with statistically significant P values reported as either $P < 0.05$, $P < 0.01$, or $P < 0.001$. For the 2017 wave, the location of each meal purchased outside the home for breakfast, lunch, dinner, and other dining over each of the previous 7 days was summarized according to age groups of 18–30, 31–49, and 50–64 years and for weekdays and weekend days. Analyses were conducted in Stata/SE 15.0.

Results

Sample characteristics of the 4103 respondents in the 2018 IFPS Australia survey are reported in **Table 1**, both unweighted and following the application of sampling weights. A small percentage (11.5%) of respondents did not provide data on height and weight for the calculation of BMI. Sample characteristics of respondents to the 2017 IFPS Australia survey are presented in Supplemental Table 1.

Source of foods prepared outside the home

The average number of meals prepared outside the home over the past week are reported in **Table 2** by food source, with the overall average across sources being 2.73 meals. The most frequent sources for foods prepared outside the home were fast-food/takeaway/café and sit-down restaurants. Differences in the number of meals by source across sociodemographic characteristics and BMI classification are also presented in Table 2. Clear differences are observed for most categories, with purchasing of foods prepared outside the home more common among men, younger age groups, those with higher education, and those of minority ethnicities (all P values < 0.001). All differences remained significant in an adjusted model including terms for sex, age group, education, and ethnicity ($P < 0.05$). No significant difference was observed among those classified as normal weight and overweight, but normal-weight participants did report eating more foods prepared outside the home than those classified as obese based on BMI ($P = 0.001$). Those classified as underweight (3% of the total) reported more frequent purchasing of fast food than those classified as normal weight, overweight, or obese ($P < 0.001$). Data from the 2017 IFPS wave showed that foods prepared outside the home were purchased more than twice as commonly on weekend days compared to weekdays (Supplemental Table 3).

Participants who reported purchasing food from a fast-food outlet, café, or other type of takeaway outlet were further asked about the type of fast-food or takeaway outlet from which they purchased food, with the average number of meals

TABLE 1 Sample characteristics, International Food Policy Study, Australia, 2018 ($n = 4103$)

	Unweighted, % (*n*)	Weighted, % (*n*)
Sex		
Male	48.5 (1988)	49.1 (2015)
Female	51.6 (2115)	50.9 (2088)
Age, y		
18–29	17.5 (719)	21.8 (896)
30–44	24.4 (1000)	26.7 (1094)
45–59	24.1 (988)	24.4 (999)
≥60	34.0 (1396)	27.2 (1114)
Education[1]		
Low	30.9 (1266)	42.0 (1724)
Medium	35.4 (1454)	32.2 (1320)
High	33.6 (1377)	25.7 (1052)
Not stated	0.2 (6)	0.2 (7)
State/territory		
New South Wales	28.7 (1177)	32.0 (1314)
Victoria	25.7 (1054)	26.1 (1069)
Queensland	22.2 (909)	19.8 (812)
Western Australia	8.9 (363)	10.3 (422)
South Australia	9.5 (391)	7.1 (289)
Tasmania	3.1 (126)	2.9 (119)
Australian Capital Territory	1.7 (70)	1.5 (63)
Northern Territory	0.3 (13)	0.4 (14)
BMI category[2]		
Underweight	2.6 (106)	3.0 (125)
Normal weight	34.6 (1418)	35.7 (1465)
Overweight	27.6 (1131)	25.9 (1063)
Obese	22.2 (911)	20.6 (847)
Missing/not stated	11.5 (470)	12.4 (511)
Ethnicity[3]		
Majority	85.8 (3521)	75.2 (3087)
Minority	13.8 (567)	24.4 (1002)
Not stated	0.4 (15)	0.4 (14)

[1] Education was defined as low (year 12/equivalent or less), medium (trade certificate/diploma/some university), or high (bachelor's degree or above).
[2] BMI was determined using participant self-reported height and weight.
[3] Ethnicity was defined as majority (self-identified as only speaking English in the home and did not identify as Aboriginal or Torres Strait Islander) or minority (all other responses).

TABLE 2 Source of meals prepared outside the home over the past week, by sociodemographic variables and BMI category, International Food Policy Study, Australia, 2018 ($n = 3963$)

	Mean number of meals from each source (95% CI)									
	Fast-food/ takeaway/ café	Sit-down restaurant or pub with a waiter/waitress	Work or school/university /hospital canteen	Sandwich/ready-meal from a supermarket	Food truck/market food stall/"street food"	Convenience store/petrol station	Leisure center, recreation, or entertainment venue	Vending machine	Some other kind of place	Total (any food source outside the home)
Total	1.35 (1.29–1.41)	0.73 (0.67–0.78)	0.15 (0.12–0.18)	0.20 (0.17–0.24)	0.10 (0.08–0.12)	0.10 (0.08–0.13)	0.07 (0.05–0.08)	0.05 (0.04–0.07)	0.11 (0.08–0.13)	2.73 (2.61–2.86)
Sex										
Male	1.49 (1.39–1.60)	0.78 (0.70–0.86)	0.20 (0.15–0.25)	0.26 (0.19–0.33)	0.14 (0.10–0.18)	0.14 (0.1–0.17)	0.08 (0.06–0.11)	0.08 (0.05–0.11)	0.11 (0.07–0.15)	3.08 (2.87–3.29)
Female	1.21 (1.13–1.29)	0.68 (0.61–0.75)	0.10 (0.07–0.13)	0.15 (0.12–0.18)	0.07 (0.04–0.09)	0.07 (0.05–0.09)	0.05 (0.04–0.07)	0.03 (0.02–0.04)	0.11 (0.07–0.14)	2.40 (2.26–2.54)
Age, y										
18–29	2.00 (1.82–2.18)	0.95 (0.81–1.09)	0.34 (0.23–0.46)	0.43 (0.29–0.58)	0.26 (0.18–0.35)	0.22 (0.15–0.30)	0.16 (0.11–0.20)	0.16 (0.1–0.22)	0.13 (0.07–0.2)	4.29 (3.90–4.69)
30–44	1.71 (1.57–1.84)	0.76 (0.65–0.86)	0.2 (0.15–0.26)	0.3 (0.23–0.36)	0.13 (0.09–0.18)	0.16 (0.11–0.20)	0.10 (0.07–0.12)	0.07 (0.04–0.1)	0.07 (0.03–0.11)	3.28 (3.02–3.53)
45–59	1.22 (1.11–1.32)	0.55 (0.48–0.62)	0.06 (0.03–0.09)	0.09 (0.06–0.11)	0.01 (0.01–0.02)	0.04 (0.03–0.06)	0.01 (0–0.02)	0.01 (0–0.02)	0.14 (0.07–0.21)	2.20 (2.03–2.38)
≥60	0.61 (0.54–0.68)	0.67 (0.57–0.78)	0.02 (0–0.04)	0.04 (0.02–0.06)	0.02 (0.01–0.03)	0.02 (0.01–0.02)	0.03 (0.01–0.04)	0 (0–0)	0.10 (0.07–0.12)	1.47 (1.35–1.59)
Education[1]										
Low	1.16 (1.05–1.27)	0.56 (0.47–0.65)	0.10 (0.05–0.15)	0.11 (0.07–0.14)	0.06 (0.02–0.09)	0.08 (0.05–0.12)	0.04 (0.02–0.06)	0.05 (0.02–0.07)	0.11 (0.07–0.16)	2.19 (1.98–2.39)
Medium	1.32 (1.22–1.42)	0.65 (0.58–0.72)	0.15 (0.09–0.21)	0.20 (0.13–0.26)	0.08 (0.05–0.11)	0.10 (0.07–0.13)	0.07 (0.04–0.1)	0.06 (0.03–0.08)	0.11 (0.07–0.15)	2.54 (2.34–2.73)
High	1.70 (1.58–1.83)	1.09 (0.97–1.21)	0.22 (0.17–0.26)	0.37 (0.26–0.48)	0.20 (0.14–0.25)	0.15 (0.11–0.18)	0.12 (0.09–0.15)	0.07 (0.05–0.09)	0.10 (0.06–0.14)	3.88 (3.62–4.13)
BMI category[2]										
Underweight	1.98 (1.42–2.53)	1.29 (0.62–1.96)	0.39 (0.06–0.72)	0.78 (0.04–1.52)	0.20 (0.02–0.38)	0.16 (0.05–0.27)	0.2 (0.09–0.31)	0.17 (0.07–0.26)	0.24 (0.02–0.45)	5.38 (3.94–6.82)
Normal weight	1.34 (1.24–1.43)	0.76 (0.68–0.84)	0.15 (0.11–0.20)	0.20 (0.16–0.25)	0.13 (0.08–0.18)	0.13 (0.09–0.17)	0.08 (0.05–0.1)	0.05 (0.03–0.07)	0.10 (0.06–0.14)	2.74 (2.55–2.93)
Overweight	1.21 (1.1–1.32)	0.72 (0.62–0.82)	0.10 (0.07–0.14)	0.16 (0.11–0.22)	0.08 (0.05–0.11)	0.06 (0.04–0.08)	0.06 (0.03–0.09)	0.03 (0.02–0.05)	0.07 (0.03–0.11)	2.45 (2.23–2.67)
Obese	1.29 (1.14–1.44)	0.62 (0.50–0.73)	0.06 (0.02–0.10)	0.09 (0.06–0.11)	0.03 (0.01–0.06)	0.06 (0.03–0.09)	0.03 (0.01–0.06)	0.02 (0–0.04)	0.12 (0.05–0.18)	2.27 (2.05–2.49)
Ethnicity[3]										
Majority	1.25 (1.18–1.31)	0.63 (0.58–0.67)	0.11 (0.08–0.13)	0.14 (0.12–0.16)	0.07 (0.05–0.08)	0.09 (0.07–0.10)	0.05 (0.04–0.06)	0.04 (0.03–0.06)	0.12 (0.09–0.15)	2.41 (2.3–2.52)
Minority	1.65 (1.47–1.83)	1.03 (0.86–1.20)	0.27 (0.17–0.36)	0.4 (0.26–0.54)	0.19 (0.12–0.27)	0.16 (0.10–0.23)	0.12 (0.08–0.16)	0.08 (0.04–0.12)	0.08 (0.04–0.12)	3.72 (3.34–4.1)

[1] Education was defined as low (year 12/equivalent or less), medium (trade certificate/diploma/some university), or high (bachelor's degree or above).
[2] BMI was determined using participant self-reported height and weight.
[3] Ethnicity was defined as majority (self-identified as only speaking English in the home and did not identify as Aboriginal or Torres Strait Islander) or minority (all other responses).

TABLE 3 How meals prepared outside the home were procured over the past week, by sociodemographic variables and BMI category, International Food Policy Study, Australia, 2018 ($n = 3951$)

	Mean number of meals from each procurement method (95% CI)			
	Food delivery service[1]	Restaurant delivery[2]	Food outlet <5 minutes from home[3]	Food outlet >5 minutes from home[4]
Total	0.35 (0.31–0.40)	0.33 (0.29–0.38)	0.77 (0.71–0.82)	1.13 (1.06–1.19)
Sex				
Male	0.46 (0.38–0.54)	0.42 (0.35–0.49)	0.84 (0.75–0.93)	1.19 (1.08–1.30)
Female	0.25 (0.20–0.29)	0.25 (0.20–0.29)	0.69 (0.63–0.76)	1.07 (0.99–1.15)
Age, y				
18–29	0.79 (0.64–0.95)	0.65 (0.52–0.78)	1.22 (1.05–1.40)	1.36 (1.16–1.55)
30–44	0.53 (0.44–0.63)	0.48 (0.38–0.59)	0.87 (0.76–0.98)	1.26 (1.12–1.39)
45–59	0.12 (0.09–0.15)	0.16 (0.11–0.22)	0.68 (0.59–0.76)	1.08 (0.96–1.20)
≥60	0.04 (0.02–0.06)	0.09 (0.06–0.12)	0.39 (0.32–0.46)	0.86 (0.77–0.96)
Education[5]				
Low	0.24 (0.17–0.31)	0.24 (0.17–0.30)	0.68 (0.59–0.77)	0.92 (0.81–1.02)
Medium	0.30 (0.23–0.37)	0.24 (0.18–0.31)	0.77 (0.67–0.87)	1.09 (0.98–1.20)
High	0.61 (0.51–0.70)	0.60 (0.50–0.70)	0.90 (0.8–0.99)	1.51 (1.38–1.65)
BMI category[6]				
Underweight	0.84 (0.41–1.27)	0.82 (0.36–1.28)	1.41 (0.92–1.91)	1.56 (0.75–2.36)
Normal weight	0.39 (0.31–0.46)	0.35 (0.28–0.41)	0.71 (0.63–0.79)	1.12 (1.02–1.22)
Overweight	0.28 (0.20–0.35)	0.25 (0.18–0.32)	0.70 (0.60–0.80)	1.12 (1.00–1.24)
Obese	0.15 (0.09–0.21)	0.19 (0.12–0.25)	0.69 (0.59–0.8)	1.11 (0.97–1.25)
Ethnicity[7]				
Majority	0.27 (0.23–0.31)	0.24 (0.20–0.27)	0.70 (0.65–0.76)	1.02 (0.96–1.08)
Minority	0.59 (0.46–0.73)	0.61 (0.47–0.75)	0.97 (0.82–1.12)	1.44 (1.23–1.64)

[1]Ordered using a food delivery service (e.g., UberEats, Foodora, Deliveroo) and delivered to you.
[2]Ordered directly from a restaurant and delivered to you.
[3]Purchased at a restaurant/food outlet within 5 minutes of your home (using your usual mode of transportation: e.g., walk, drive, or public transport), excluding delivery.
[4]Purchased at a restaurant/food outlet more than 5 minutes away from your home (using your usual mode of transportation: e.g., walk, drive, or public transport), excluding delivery.
[5]Education was defined as low (year 12/equivalent or less), medium (trade certificate/diploma/some university), or high (bachelor's degree or above).
[6]BMI was determined using participant self-reported height and weight.
[7]Ethnicity was defined as majority (self-identified as only speaking English in the home and did not identify as Aboriginal or Torres Strait Islander) or minority (all other responses).

purchased from each outlet type presented in **Supplemental Table 6**, stratified by sociodemographic characteristics and BMI classification. Burger-and-fries outlets were the most common type of fast-food/takeaway outlet reported, and were reported more than twice as commonly as Asian/international, pizza, chicken, and café/bakery outlets.

Food procurement method

The average numbers of times meals were reported as having been purchased using delivery services or by visiting outlets in person are presented in Table 3. The most common procurement method was going to a food outlet, with more foods purchased from food outlets more than 5 minutes from home than from outlets within 5 minutes from home. Males were more likely to use delivery services than females ($P < 0.001$), and those younger than 45 years were the age group most likely to use delivery services ($P < 0.01$). Both differences remained statistically significant in an adjusted model that included terms for sex, age group, education, and ethnicity (both P values < 0.01).

Nutrition information

A total of 64.4% of participants reported having visited a restaurant (including a fast-food outlet or coffee shop) in the prior week. Among these respondents, a small proportion reported noticing nutrition information during their last visit (14.7%; 95% CI, 13.3%–16.1%). More of those who had visited a fast-food outlet in the prior week reported noticing nutrition information (18.9%; 95% CI, 16.1%–21.9%). The proportions noticing nutrition information are presented in Table 4 according to sex, age, education, sex, state/territory, BMI category, and ethnicity, with younger age groups, those with lower BMIs, and those of minority ethnicities more likely to notice nutrition information (all P values < 0.001). Menus and menu boards were the most common location for noticing nutrition information (61.6%; 95% CI, 56.5%–66.7%) in restaurants (**Supplemental Table 7**). No significant differences were observed by state/territory, even though only some jurisdictions (Australian Capital Territory, New South Wales, Queensland, South Australia, and Victoria) had mandatory legislation for menu energy labeling in place at the time of the survey.

Around half (52.7%) of all those who reported noticing nutrition information in restaurants during their last visit reported that it influenced what they ordered, with overall differences observed according to age and education ($P < 0.001$), state/territory ($P = 0.01$), and ethnicity ($P < 0.01$; **Supplemental Table 8**). Although no overall difference was observed for BMI category, those classified as having obesity were significantly less likely to report that the information influenced their order than those with a normal weight. Among all respondents who visited a restaurant (including fast-food outlet or coffee shop) in the prior 6 months, nutrition information influenced 15.4% of respondents to order something different and 11.5% to eat less of what they ordered (**Supplemental Table 9**).

TABLE 4 Percentage of participants reporting having noticed nutrition information in restaurants the last time they visited, by sociodemographic characteristics and BMI category, International Food Policy Study, Australia, 2018 ($n = 3759$)

	Noticed nutrition information, % (95% CI)
Total	14.7 (13.3–16.1)
Sex	
Male	15.0 (12.9–17.1)
Female	14.4 (12.6–16.2)
Age, y	
18–29	18.7 (15.2–22.1)
30–44	18.6 (15.6–21.6)
45–59	12.7 (10.2–15.2)
≥60	9.1 (7.4–10.8)
Education[1]	
Low	13.8 (11.4–16.2)
Medium	13.6 (11.4–15.7)
High	17.4 (15.0–19.8)
State/territory	
New South Wales	14.6 (12.1–17.2)
Victoria	14.3 (11.7–17)
Queensland	17.1 (14–20.2)
Western Australia	13.5 (8.9–18.1)
South Australia	11.6 (8–15.1)
Tasmania	14.1 (6.8–21.3)
Australian Capital Territory	14.9 (3.6–26.1)
Northern Territory	18.1 (7.5–43.6)
BMI category[2]	
Underweight	22.8 (11.9–33.7)
Normal weight	15.5 (13.2–17.8)
Overweight	12.6 (10.2–15.1)
Obese	11.9 (9.4–14.4)
Ethnicity[3]	
Majority	12.2 (11–13.4)
Minority	22.4 (18.3–26.4)

[1] Education was defined as low (year 12/equivalent or less), medium (trade certificate/diploma/some university), or high (bachelor's degree or above).
[2] BMI was determined using participant self-reported height and weight.
[3] Ethnicity was defined as majority (self-identified as only speaking English in the home and did not identify as Aboriginal or Torres Strait Islander) or minority (all other responses).

Discussion

In this study examining patterns of consumption for almost 4000 Australian adults, on average almost 3 meals per week were prepared outside the home, with higher frequencies of consumption among men, younger age groups, ethnic minorities, and more highly educated participants. A wide variety of sources for foods prepared outside the home were observed, with fast-food outlets (and burger-and-fries outlets in particular) being most common. Around one-quarter of all foods purchased outside the home were delivered. More foods were purchased from food outlets further than 5 minutes from home than from those within 5 minutes from home.

The greater frequency of food purchases from fast-food outlets by younger people in this study mirrors findings from other studies, including a cross-sectional, multilevel Australian study using data from the Victorian Lifestyle and Neighbourhood Environments Study (45). Australian household expenditure survey data (2015–2016) also demonstrated that younger age groups (15–24 years and 25–34 years) spent a greater proportion of their total food expenditure on meals out and fast foods compared to other age groups (29), with similar results from the UK National Diet and Nutrition survey (22) and a rural US study (46). Limited time for home cooking, a desire for convenience, and the social nature of eating out may all contribute to these findings (47, 48). Young adults are also a key target group of food marketing strategies, which may further influence their purchasing decisions (49). For these reasons, there have been recommendations to include young adults in measures to protect children from exposure to unhealthy food marketing and to make them a priority group in efforts to improve population diets (49).

This study found that more food prepared outside the home was purchased from outlets more than 5 minutes from home compared to within 5 minutes from home. This finding suggests that a focus on the characteristics of "local" retail food environments (e.g., density and placement of food outlets within a short distance of the home, workplace, and/or school) as part of population health efforts may need to take into account the way that people interact with their environment (50).

Food delivery services

This study suggested online food delivery services are an important method of purchasing foods prepared outside the home, particularly for younger age groups, males, and those with higher education levels. These findings add to similar recent findings, with online food delivery increasingly important since the start of the coronavirus disease 2019 pandemic (51, 52). This is particularly important from a public health perspective given the current unhealthy profile of foods purchased using online food delivery platforms (52). Indeed, in a study of online food delivery options on UberEats in Australia and New Zealand, 85.9% of the most popular menu items were considered discretionary (unhealthy) foods according to the Australian Dietary Guidelines (52).

Energy labeling on menus

Our study found that a small proportion of respondents (14.9%) noticed nutrition information in restaurants (including fast-food outlets and coffee shops), with the percentage being higher among those who had visited a fast-food restaurant in the prior week (18.9%). While nutrition information was most commonly noticed on menus and menu boards (61.6%), no differences were observed in the extent to which nutrition information was noticed between jurisdictions in Australia, even though menu energy labeling was only mandatory in some jurisdictions at the time. This likely reflects several major fast-food chains committing to implementing menu energy labeling nationally in 2018 (53). Significant differences were observed according to age, BMI category, and ethnicity, with these findings potentially being explained by the greater number of meals purchased from fast-food outlets (the only type of outlet with mandatory legislation regarding menu energy labeling) by younger adults, those in lower BMI categories, and those from a minority ethnicity. The percentage of respondents noticing nutrition information (14.9%) was substantially lower than in previous Australian and international studies that were based on intercept surveys of customers of fast-food restaurants (39, 54, 55). This is to be expected, as the IFPS is a population survey including both those who do and those who do not frequent fast-food and other restaurants where menu energy labeling is present. A Canadian population-based study reported findings similar to those reported here (42).

We observed that among those who noticed nutrition information, around half reported this influencing their order. A 2015 systematic review of the impact of menu energy labeling on kilojoules ordered or purchased found that 9 out of 15 studies showed evidence of reductions in energy consumed or ordered (36). A meta-analysis of these studies revealed a reduction in energy consumed of 419.5 kJ (100.3 kcal) (36). Another 2015 meta-analysis on the same topic (with somewhat different inclusion criteria) found the evidence for menu energy labeling to be weaker, with a 75.9 kJ (18.1 kcal) reduction in food ordered per meal ($P = 0.021$) (56).

While increasing the awareness and use of nutrition information in restaurants has potential public health benefits, there are important equity considerations for this type of intervention. We found that younger age groups and minority ethnicities in particular were more likely to notice nutrition information. We also found that consumers with more education were more likely to report that nutrition information influenced their purchases. These findings align with previous research that has demonstrated significant differences in the sociodemographic characteristics of people who notice and use menu energy labeling. For example, women have previously been found to see and use menu energy labeling more than men (54), and consumers with higher incomes and more education have also previously been reported to be more likely to use and notice menu energy labeling (55).

Implications for policy and practice

This study provides support for a specific policy focus on fast-food outlets as part of efforts to improve the healthiness of population diets, particularly because more foods prepared outside the home were purchased from fast-food outlets than any other store type. Policy action in this area could focus on expanding existing menu labeling regulations, including requiring fast-food outlets to provide more comprehensive nutrition information beyond just energy labeling (e.g., through the use of a summary measure of healthiness, such as the Health Star Rating) (57). Other potential policy measures to consider with regards to fast food are restrictions on children's exposure to marketing of unhealthy food and brands, regulations to restrict price promotions that incentive consumption of unhealthy foods (58), and a focus on improving the healthiness of foods on offer (53, 59).

Importantly, despite being the single most common source of foods prepared outside the home, fast food constituted less than half of all meals in this study, meaning that policy measures to improve the healthiness of dietary patterns related to food prepared outside the home will likely need to also include attention to other outlet types. For example, existing policies around menu energy labeling could be applied to a greater number of outlet types (e.g., a broad range of takeaway food outlets). With the increasing prevalence of online food delivery, the way in which policy interventions apply to online food delivery services also needs to be actively considered. Critically, online food delivery platforms may provide an efficient mechanism to reach a wide variety of outlet types: for example, through online interventions involving nutrition information and/or pricing incentives for healthier options.

For local governments in Australia, there are a range of opportunities to support healthy food retail environments (60, 61). Potential interventions include actions to reduce access to unhealthy food outlets (potentially via barriers/restrictions for the establishment of new fast-food outlets in key locations, such as near schools, if permissible under relevant regulations), and the provision of incentives for the operation of new healthy food outlets (62). Given the challenges in changing the mix of store types in an existing food environment, local governments can also play a role in supporting food outlets to provide and market healthier menu options, as well as in providing accessible, easy-to-understand information about the nutrition contents of their menu items (60, 61).

Strengths and limitations

This study used a large sample of Australian adults and is the first that we are aware of to report on the type, timing, and location of foods prepared outside the home. A key strength of the method was the assessment of the location and type of food source for all foods prepared outside the home over the previous 7 days. In addition, this is one of very few population-based surveys on this topic. Nevertheless, the study is subject to some limitations common to research using commercial survey panels. Although the data were weighted by age, sex, and region to represent as closely as possible the Australian population, respondents to this type of survey are not likely to be truly representative of all Australian adults. For example, BMI was somewhat lower in the survey sample than in national estimates. The analyses also do not account for multiple comparisons, meaning that it is more likely that some observed associations (particularly those where P values are close to 0.05 or where 95% CIs are close to crossing) may have arisen due to chance. The study design (descriptive analysis from repeated cross-sectional surveys), while being appropriate to explore the frequency of behaviors in a population and within subpopulations, does not permit an examination of the impact of behaviors on health outcomes over time or an assessment of associations while adjusting for potential confounding variables. The sources of food prepared away from home were only reported for those who reported a non-0 response to the question "during the past 7 days, how many meals did you get that were prepared away from home in places such as restaurants, fast food or takeaway places, food stands, or from vending machines?" Given that this question did not include the full list of locations that participants were able to nominate as food sources (which were included in subsequent questions), it is possible that some participants may have considered the first examples to be an exhaustive list. Given the high percentage of those who reported a non-zero number of meals prepared away from home (77%) and that the question made it clear that the locations provided were only examples, it is unlikely that this issue will have introduced any substantial error. More broadly, not all questions were validated measures, which should be the subject of future testing to ensure reliability. Finally, with self-reported questions relating to food consumption behaviors, there is also the potential for social desirability bias and, in particular, underreporting of fast-food purchasing.

Conclusions

People in Australia source foods prepared outside the home from a variety of outlet types, with fast-food outlets the most popular. While current menu energy labeling regulations are likely providing some population health benefit, greater policy focus on foods prepared outside the home is needed as part of efforts to improve population diets. Suggested measures as part of a comprehensive approach to improving the healthiness of foods prepared outside the home include expanding current menu energy labeling regulations to apply to a much broader set of outlet types, restricting marketing

of unhealthy foods and brands, setting strong targets and incentives for improving the healthiness of menu items in the out-of-home sector, and restricting price promotions related to unhealthy products. In addition, it is imperative to include the online food delivery sector as part of efforts to improve population diets. Suggested actions in this sector include the provision of easy-to-understand nutrition information, prompts to highlight healthier outlets and menu options, and purchase incentives for healthier options.

Acknowledgments

The authors' responsibilities were as follows – AJC, CMW, LV, DH, GS: designed the research; AJC, LHO: analyzed the data; AJC, GS, LHO, ER, SD: wrote the paper; GS: had primary responsibility for the final content; and all authors: read and approved the final manuscript.

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