What People Buy From Fast-food Restaurants: Caloric Content and Menu Item Selection, New York City 2007

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Fast-food restaurants provide a growing share of daily food intake, but little information is available in the public health literature about customer purchases. In order to establish baseline data on mean calorie intake, this study was completed in the Spring of 2007, before calorie labeling regulations went into effect in New York City. Receipts were collected from lunchtime customers, at randomly selected New York City fast-food chains. A supplementary survey was also administered to clarify receipt items. Calorie information was obtained through company websites and ascribed to purchases. Lunchtime purchases for 7,750 customers averaged 827 calories and were lowest for sandwich chains (734 calories); and highest for chicken chains (931 calories). Overall, one-third of purchases were over 1,000 calories, predominantly from hamburger chains (39%) and chicken chains (48%); sandwich chains were the lowest, with only 20% of purchases over 1,000 calories. "Combination meals" at hamburger chains accounted for 31% of all purchases and averaged over 1,200 calories; side orders accounted for almost one-third of these calories. Lunch meals at these fast-food chains are high in calorie content. Although calorie posting may help to raise awareness of the high calories in fast-food offerings, reducing portion sizes and changing popular combination meals to include lower calorie options could significantly reduce the average calorie content of purchases.

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INTRODUCTION

Two-thirds of adults in the United States are classified as overweight or obese, with obesity accounting for half that number (1). This represents a twofold increase in obesity prevalence since 1960 (ref. 2). At the same time, calorie intake increased steadily. From 1971 to 2000, the average calorie intake for men increased 168 calories per day, from 2,450 to 2,618 calories; for women, the increase was even greater at 335 calories per day, from 1,542 to 1,877 calories (3).

Dramatic changes in eating patterns have promoted increased calorie intake. In 1970, 26% of food dollars was spent on food prepared outside the home (4); by 1981 this increased to 40%, and in 2001, to 47%, or nearly one-half of every US food dollar, was spent on food prepared outside the home (2). Fast food, which is eaten by one in four Americans on any given day (5), accounts for a substantial share of food purchases away from home. Fast-food sales increased almost 20-fold in four decades, from six billion dollars in 1970 to 110 billion dollars in 2000 (ref. 6). At the same time, portion sizes increased substantially for several key food categories including snacks, desserts, soft drinks, hamburgers, and french fries (7). Fast food has been associated with increased calorie consumption, body weight, and fat intake in several studies (5,8–10). In one large survey, eating at a fast-food restaurant was associated with an increase of 205 calories per day for adults and 155 calories per day for children (8).

Previous research on fast-food intake has relied on dietary recall surveys and other self-reported measures; the findings, although valuable, are now more than a decade old. The purpose of this study was to examine calorie values for lunchtime purchases among fast-food customers in New York City before calorie labeling regulations went into effect, based on customers' receipts and brief surveys. This study provided baseline data for evaluating the impact of the calorie labeling regulation on fast-food purchases; follow-up data will be collected in the Spring of 2009. As far as we are aware, this is the first study to use customer receipts to estimate caloric intake for fast-food purchases.

METHODS AND PROCEDURES

Sample

A computer-generated random sample of fast-food restaurants was selected from a roster of all restaurants licensed by the New York City Department of Health and Mental Hygiene that had made nutrition information publicly available as of 1 March 2007, usually posted on

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their websites. An analysis of the frequency distribution of the eligible fast-food chains in the city found that 13 chains—with a total of 1,625 store locations—accounted for almost 90% of all eligible locations; the study sample was further limited to these chains (see Table 1 for a list of chains included in this study). From this final list, 300 chain locations were randomly selected. Sites that had closed, or that were located in nonpublic areas (malls and airports) were excluded, resulting in a total of 276 locations in the final sample. Of the 13 chains, two were coffee chains, representing 109 locations included in the study design. Results presented here focus on lunchtime calorie intake for 11 chains with 167 locations; data from the two coffee chains are not reported.

Customer receipt collection and survey

Data collection was completed over the course of 11 weeks, starting 27 March through 8 June 2007. Three-person data collection teams were stationed in front of the sampled locations during weekday lunch hours—between 12:00 and 2:00 PM. Adult customers were approached as they entered the restaurant and asked to provide their register receipts when exiting and to complete a brief survey; a $2 Metrocard (a public transportation pass, good for one subway or bus ride) was offered as an incentive for participation.

In addition to collecting customers' receipts to document purchases, customers were asked several questions to supplement the receipt information and to clarify their purchase: (i) whether the purchase was for themselves only or if it included items they had purchased for others; (ii) what they had purchased and, if they purchased a beverage, whether it was diet or regular; and (iii) depending on the order, what, if anything, they added in terms of extras or condiments (e.g., dressing, cheese, mayonnaise) or any modifications to their order. The target was 55 receipts and surveys per location for the 2 h of data collection. Surveys were conducted in English only; no personally identifying information was collected. The study protocol was submitted to the Department of Health and Mental Hygiene Institutional Review Board and determined to be exempt.

Menu item and calorie data

Each item was entered as it appeared on the receipt. Additional information about the purchase obtained through the customer survey was also entered (i.e., extra items, condiments, order modifications, diet vs. caloric beverage). Calorie information posted on the websites of each restaurant chain as of 1 March 2007 was used to ascribe a calorie amount to each item. Calorie amounts for "extras" or customizations were also entered (such as added cheese on a sandwich, toppings on pizza, or type of salad dressing, no mayo, no bacon). Where the customer did not provide details about added items, for example not specifying the type of salad dressing or dipping sauce, the lowest caloric value within that category was assigned. Final calorie data were then aggregated by customer to calculate total calories per purchase. Combination meals were labeled on the store receipts; value items were identified based on a review of menu boards.

Statistical analysis

All analyses were completed using SPSS 15.0 (SPSS, Chicago, IL). SPSS complex samples module was used to adjust for the clustered sample design (customers within restaurants) when calculating mean calorie values, standard errors, estimating confidence intervals, and testing for difference in mean calories. Two-tailed t-tests with $\alpha < 0.05$ were used to test for differences in mean calories between groups.

RESULTS

A total of 7,750 customers were surveyed at 167 fast-food locations. Purchases for more than one person (N = 141), where the respondents' purchase could not be ascertained (N = 191), or where calorie information was not available (N = 100), were excluded. Multiple-diner purchases were identified either by respondent self-report or by the purchase of two or more beverages. The final sample included 7,318 valid receipts. The target of 55 receipts was reached at 78 locations; however, many locations had low customer volume, for example, 15 locations had <20 customers over the 2-h period. A mean of 44 valid receipts were collected from each location.

Burger chains account for 55% of all receipts, sandwich chains 27%, and chicken chains 9%—together these three categories accounted for over 90% of all lunch receipts collected. Single food item purchases accounted for 22.5% of receipts, beverage-only purchases were 3.5%, two or more items with a beverage were 54.1%, and without a beverage 19.9%, of all receipts.

The participation rate across all locations was ~55%; at locations with high customer volume, it was closer to 33%. Nonparticipation included both refusals and customers not approached by data collectors at high volume locations.

Lunch purchases

Customers purchased an average of 827 calories (Table 1); when single-item purchases were excluded, the mean increased to 961 calories. Across all purchases, including single-item purchases, chicken fast-food chains averaged the highest calories

Table 1 Mean calorie purchase by brand—all receipts

Category/ brand	Receipts	Mean calories	s.e.	% Over 750 calories	% Over 1,000 calories
Total	7,318	827.4	10.7	54.1	33.5
Hamburgers	3,857	856.8	10.8	57.4	38.6
McDonald's	2,454	829.2	13.5	54.7	37.5
Burger King	969	926.2	19.5	62.0	43.8
Wendy's	434	858.0	25.8	62.0	33.2
Sandwich	1,989	733.6	16.2	44.4	20.0
Subway	1,830	749.2	13.8	46.1	21.3
Au Bon Pain	159	554.5	20.8	25.2	5.7
Chicken	649	931.3	20.7	67.8	47.5
KFC	347	916.5	16.9	66.3	43.8
Popeye's	302	948.2	38.1	69.5	51.7
Pizza	272	765.8	115.0	33.5	20.6
Domino's	44	1,309.1	167.5	81.8	52.3
Papa John's	206	622.8	78.2	21.4	12.1
Pizza Hut	22	1,017.5	127.7	50.0	36.4
Tex-Mex	96	899.7	60.1	66.7	41.7
Taco Bell	96	899.7	60.1	66.7	41.7
Other[a]	455	860.9	24.0	59.6	35.6
Pizza Hut/ KFC	49	956.0	45.3	71.4	46.9
Taco Bell/ Pizza Hut	198	788.3	15.4	51.0	22.7
KFC/Taco Bell	42	938.0	66.1	71.4	42.9
Popeye's/ Burger King	166	900.0	14.0	63.3	45.8

[a]Locations with two or more chains sharing a retail space; receipts from these locations could include items from either or both chains.

per purchase (931 calories). Taco Bell customers' mean calories per purchase were only slightly lower, at 900; this difference is not statistically significant. Hamburger chains averaged 857 calories per lunch purchase, significantly lower than chicken chains ($P < 0.01$), but there were differences between chains; Burger King customers averaged almost 100 calories more than McDonald's customers (926 vs. 829, $P < 0.001$), whereas at Wendy's the average purchase was 858 calories ($P < 0.005$). Three pizza chains were included in our sample. At Domino's and Pizza Hut, where purchases were dominated by whole pizzas, the mean calories per purchase was over 1,000 calories. At Papa John's, where pizza was sold by the slice and as whole pies, lunch purchases averaged 623 calories. The two sandwich chains had the lowest average calorie purchase—749 and 555 mean calories at Subway and Au Bon Pain, respectively—significantly lower than hamburger ($P < 0.001$), chicken ($P < 0.001$), and Tex-Mex ($P < 0.01$) chains.

Males comprised 48% of respondents, and on average, purchased 13% more calories than females; however, this also varied by chain category. At hamburger chains, males purchased 16% more calories, and 15% more at sandwich chains, but at chicken chains males purchased 5% more calories, on average, compared to females (data not shown).

More than one-third (34%) of all customers ordered ≥1,000 calories for lunch; excluding single-item purchases, 44% of customers purchased at least 1,000 calories (**Table 1**). At chicken chains, which had the highest average calorie purchase, almost half (48%) of the customers ordered >1,000 calories. Hamburger chains followed, with 39% of orders >1,000 calories ($P < 0.001$), although this varied by chain. For example, 44% of customers at Burger King ordered at least 1,000 calories compared with 33% of customers at Wendy's ($P < 0.001$). Only 20% of customers at sandwich chains had purchases over 1,000 calories, significantly lower than at other chain categories.

Considering the six million calories purchased by customers in this sample, hamburgers comprised 16%, other sandwiches 26%, french fries 14%, and drinks 12% of total calories.

Hamburger chains

To examine menu item selection in more detail, we focused on the three hamburger chains included in this study: McDonald's, Burger King, and Wendy's. Customers at the hamburger chains purchased over 3.2 million calories; 48% of these calories were sandwiches (including hamburgers), 23% french fries, and 11% drinks. Taken together, sandwich, french fries, and drinks accounted for 82% of all calories purchased at fast-food hamburger chains in our sample.

For the three hamburger chains, over 70% of all purchases were either combination meals or "dollar" meals. At both Burger King and McDonald's, 20% of all purchases were for a single item only—either a food item or a drink—and these single-item purchases averaged over 300 calories (374 calories at Burger King and 303 calories at McDonald's; **Table 2**). At Wendy's a lower proportion of purchases were for single items (13.4%), though mean calories for these were comparable to the other hamburger chains (361 calories).

Combination meals. "Combo" meal purchases, marketed at a single price for a store-defined combination meal (generally a sandwich, side, and a drink), had the highest caloric values averaging over 1,100 calories at each of the three hamburger chains (**Table 2**). Burger King had the highest-calorie combination meals (1,271 calories vs. 1,187 calories at McDonald's ($P < 0.005$) and 1,106 calories at Wendy's ($P < 0.001$)); this was due to the higher average calories for their hamburger/sandwich (676 calories) compared with 549 ($P < 0.001$) at McDonald's and 539 ($P < 0.001$) at Wendy's. Calories for french fries, other side orders, and drinks for combination meals were comparable across the three hamburger chains; on average, french fries or other side items accounted for one-third, and drinks for almost 20%, of combination meal calories. Very few (4.5%) customers purchased additional items, such as dessert.

Dollar menu meals/purchases. "Dollar menu" or "value menu" meals—purchases that included two or more items, at least one of which was a "dollar menu" or "value menu" item—were most popular at Wendy's and accounted for 54% of receipts, compared with 40% of purchases at McDonald's and 34% at Burger King (**Table 2**). These purchases averaged over 800 calories across the three hamburger chains: 890 calories at Wendy's, 967 at Burger King, and 815 at McDonald's; mean calories for dollar menu purchases were significantly lower at McDonald's compared to Burger King (815 vs. 967, $P < 0.05$) and Wendy's (815 vs. 890, $P < 0.005$). The most popular of these items at Burger King and McDonald's were hamburgers and french fries; at Wendy's, french fries were the most frequent "dollar menu" item purchase, followed by hamburgers and chicken nuggets.

Side orders. When side items were purchased individually, the most common portion size corresponded to the sizes offered in combination meals. For example, half (51%) of side orders at McDonald's were "medium" orders of french fries, the size offered in combination meals; in contrast, at Wendy's, 45% of side orders were "small" orders of french fries, the size offered in Wendy's combinations. Although the portion size descriptions differed by chain, the caloric values for these default size french fry orders were similar. At McDonald's and Burger King, the default size ("medium") for french fries were 380 and 360 calories, respectively, whereas at Wendy's, the default size ("small") was 370 calories. Excluding side orders purchased as part of a combination meal, the "value priced" small size french fry order accounted for the majority of side order purchases at both McDonald's and Burger King (54 and 57%, respectively). However, at Wendy's, where a wider choice of side orders is offered, only 32% of noncombination side orders purchased were "small" orders of french fries, because Wendy's offered more options for side orders, customers could choose side salads (20%), side potatoes (21%), or chili (12%).

Drinks. Most (58%) purchases included a beverage; of these, more than three out of four were soft drinks. At McDonald's, 71% of beverage purchases were sugar sweetened soft drinks; diet soft drinks comprised only 7%, and water only 2% of purchases. Diet

Table 2 Purchase distributions at hamburger chains: purchase type and mean calories by food item

	Total				Burger King				McDonald's				Wendy's			
	Receipts		Calories		Receipts		Calories		Receipts		Calories		Receipts		Calories	
	N	%	Mean	s.e.	*N*	%	Mean	s.e.	*N*	%	Mean	s.e.	*N*	%	Mean	s.e.
Total	3,857	100.0	856.8	10.9	969	100.0	926.2	19.6	2,454	100.0	829.2	13.5	434	100.0	858.0	25.9
Combination meal[a]	1,203	31.2	1,204.5	10.0	360	37.2	1,270.7	15.0	728	29.7	1,187.3	12.1	115	26.5	1,106.1	16.2
Sandwich/ entrée			585.5	9.2			675.8	11.2			548.2	8.6			538.7	12.8
Fries/side			393.7	2.8			390.6	5.0			396.0	3.7			388.7	6.0
Drink (all)			197.3	3.8			194.5	6.4			207.3	4.1			142.8	7.1
Additional items[b]			28.0				9.9				35.7				35.8	
Dollar meal[c]	1,530	39.7	837.4	10.4	325	33.5	866.7	16.4	972	39.6	815.0	13.4	233	53.7	890.1	22.0
With one value item	403	26.3	745.9	18.7	69	21.2	761.8	29.1	284	29.2	740.0	25.5	50	21.5	757.2	18.8
With two value items	621	40.6	743.6	12.0	136	41.8	758.2	19.4	390	40.1	730.7	17.2	95	40.8	775.7	20.3
With three value items	353	23.1	945.8	15.5	90	27.7	983.9	28.4	193	19.9	901.7	18.3	70	30.0	1,018.2	38.3
Single-item purchase	749	19.4	326.0	8.1	197	20.3	374.4	16.5	494	20.1	302.6	8.5	58	13.4	361.3	16.3
Sandwich	260	34.7	417.9	10.2	78	39.6	494.7	14.0	164	33.2	371.8	7.3	18	31.0	505.8	25.5
Fries	67	8.9	334.2	12.4	19	9.6	355.8	25.9	46	9.3	323.7	14.5	2	3.4	370.0	0.0
Other side	22	2.9	232.5	24.3	7	3.6	242.1	33.3	28	5.7	183.8	13.2	15	25.9	262.0	14.6
Salad	93	12.4	450.9	10.7	20	10.2	515.0	19.2	64	13.0	430.0	12.2	9	15.5	456.7	20.8
Nuggets	55	7.3	365.1	30.2	12	6.1	332.1	28.4	38	7.7	387.2	41.6	5	8.6	276.0	0.3
Drink	174	23.2	121.4	16.9	53	26.9	189.0	40.3	114	23.1	88.9	16.2	7	12.1	138.4	29.4
Other type of purchase	375	9.7	880.8	24.1	87	9.0	971.8	33.8	260	10.6	880.5	29.9	28	6.5	600.6	19.9

[a]Combo meal includes three or more combination items (as advertised by chain), including one drink. [b]Includes customizations such as "no cheese," "extra bacon," and additional menu items (apple pie, etc.). [c]Dollar meal includes two or more items, including one or more dollar menu items.

soft drinks were more popular at Wendy's, accounting for 19% of all drink purchases; water was just under 3% of purchases. Among purchases that included a drink, at McDonald's 45% of these were "medium" soft drinks, and at Wendy's 46% were "small" soft drinks, the standard combination size at each chain. This difference in default sizes was most evident in the mean caloric values of beverages in combination meals. At Burger King, combination meal drinks averaged 195 calories, and at McDonald's 207 calories. At Wendy's, where the default drink size is "small," average drink calories in combination meals were much lower at 143 calories ($P < 0.001$).

DISCUSSION

There is strong evidence of a positive correlation between fast-food consumption and increased energy intake (8,11–13). Our findings show that lunchtime customers at leading New York City fast-food chains purchased an average of 827 calories. And one in three customers purchased >1,000 calories. The high-calorie counts observed in this study suggest that these fast-food purchases may be contributing to excessive total calorie intake. How much should people eat for lunch? Using a daily intake of 2,000 calories as the benchmark for adult energy needs, it is possible to offer some guidance on calorie intake for a single meal. The restaurant industry, including several large chains, contributes to a web-based tool, "healthy dining finder," that recommends a target of 750 calories per meal when eating out (14). In sharp contrast, combination meal purchases, marketed as appropriate meal selections, averaged over 1,200 calories at hamburger chains and over 1,100 at chicken chains.

Customers can modify their fast-food selections to reduce calorie intake. The most popular combination meal at McDonald's was the Big Mac, "medium" order of french fries and "medium" size nondiet soda, totaling 1,130 calories and priced at $5.59. If customers were to substitute each item for a smaller version—double cheeseburger (100 fewer calories), "small" order of french fries (130 fewer calories), and "small" size soft drink (60 fewer calories)—this would save 290 calories and $1.90, even with no combination package discount. However, downsizing only the french fries and soft drink to "small" sizes would save 190 calories but cost only 10 cents

less than the standard combination meal with a "medium" size french fries and soft drink. This suggests a built-in economic disincentive to downsizing, a simple modification that could reduce calorie intake.

Substituting water or another noncaloric drink for a sugar sweetened soft drink, or the selection of smaller sizes of sandwiches, hamburgers, or sides can cut hundreds of calories. Selection of grilled rather than fried items also reduces calories, although grilled items typically are more expensive. A request to "hold the mayo" can cut 100–200 calories from a meal. One common misconception is that salads are always lower in calories; when, in fact, they are often filled with high-calorie ingredients. Some salads on fast-food menus are over 600 calories without dressing, and dressings can range from 40 calories for low fat up to 270 calories.

Calorie-conscious modifications are hardly encouraged in quick service settings where consumers contend with a wide array of high-calorie options. Portion sizes at fast-food chains have increased over time; with these larger servings, there has been a corresponding increase in the calorie content of purchases. In 1960, McDonald's single order of french fries was 2.4 oz and 210 calories; today that size is limited to the meal combinations sold for children and the "dollar menu," whereas combination meals come with a "medium" order of french fries (380 calories). The practice of discounting combination meals, "dollar menu" and "value menu" items, serves to direct customers to specific items that often have excessive caloric content. Changing the composition of combination meals so that calorie content is consistent with healthy calorie intake would "change the default" to lower calorie purchases (15). For example, offering the default combination meals with smaller portion sizes for french fries and drinks would reduce these meals by almost 200 calories per order. Calorie intake could also be reduced by offering alternatives to french fries, which comprise a remarkable 23% of all calories purchased at hamburger chains, or routinely offering diet soft drinks, water, or low-fat milk so that customers would need to request sugared drinks. Other calorie-conscious modifications might include sandwiches prepared without mayonnaise, with packets offered separately, and use of low-fat salad dressings as the standard. Research suggests that decreasing portion size and energy density can decrease energy intake without differences in hunger and fullness ratings (16–19). Fast-food companies should change their menu offerings, and promote "healthier" options, to encourage lower calorie meal purchases.

This study has several limitations. First, these data reflect calories purchased, not calories consumed; however, research suggests that people's consumption is dependent upon the amount of food presented to them (20–22). Second, some data were reported by customers, although use of receipts overcame much of the potential bias of self-report. Relying on self-report, some receipts, which were excluded as multiple meals, may have been for a single person. When relying on these self-reported data, we made conservative assumptions. Third, customers were approached as they were entering the chains to ensure that they retained their receipts, this may have influenced their purchases. Fourth, we examined purchasing patterns of adults in New York City fast-food restaurants; we do not know to what extent these findings can be generalized to other cities or other areas of the country. Finally, study respondents may have differed from customers choosing not to participate. However, we found that the proportion of participants providing receipts at each location varied by customer traffic volume, suggesting that individual customer factors were not major determinants of participation rates.

This study will be repeated in the Spring of 2009 in order to evaluate the effect of menu board calorie posting on fast-food choices, consumer awareness, and mean calories purchased. Additional research is needed to test the effects of different pricing structures and changes in product formulations, including downsizing, on fast-food purchases. There is some evidence to suggest that some fast-food chains are responding to consumer demand for healthier choices by promoting healthier menu items or offering a separate menu for "healthy" selections. Studies are needed to track the impact of these promotions on customer purchasing patterns, nutrition awareness, and energy intake.

The popularity of fast food is likely to continue as it satisfies a need for speedy service, convenience, and low cost that is valued by time-pressed consumers. But the industry's successes may be contributing to the increased rates of obesity among both adults and children. As this study demonstrates, the calorie intake in these settings is much higher than nutrition guidelines recommend for lunchtime intake (23); information supporting this observation is readily available to companies that operate these chains and extensively research customer purchasing patterns, but it has not been well documented in public health literature. Posting calorie information on menus and menu boards, a requirement for New York City fast-food chains since April 2008, may help guide consumers to healthier choices and increase demand for lower calories items (24,25). It may also encourage companies to reduce portion sizes and increase the availability of lower calorie options, especially in the popular combination meal and value categories.

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DISCLOSURE

The authors declared no conflict of interest.

REFERENCES

1. Ogden CL, Carroll MD, McDowell MA, Flegal KM. Obesity among adults in the United States—no change since 2003–2004. *NCHS Data Brief no. 1*. National Center for Health Statistics: Hyattsville, MD, 2007.
2. US Department of Agriculture. Agriculture Factbook, 2001–2002. Chapter 2: Profiling Food Consumption in America. US Government Printing Office: Washington, DC, 2003. <http://www.usda.gov/factbook/chapter2.htm>.
3. Centers for Disease Control and Prevention (CDC). Trends in intake of energy and macronutrients—United States, 1971–2000. *Morb Mortal Wkly Rep* 2004;53:80–82.

4. Harnack L, French S. Fattening up on fast food. *J Am Diet Assoc* 2003;103:1296–1297.
5. Bowman SA, Vinyard BT. Fast food consumption of U.S. adults: impact on energy and nutrient intakes and overweight status. *J Am Coll Nutr* 2004;23:163–168.
6. Schlosser E. *Fast Food Nation: The Dark Side of the All-American Meal*. Houghton Mifflin Harcourt: New York, 2001.
7. Nielsen SJ, Popkin BM. Patterns and trends in food portion sizes, 1977–1998. *JAMA* 2003;289:450–453.
8. Paeratakul S, Ferdinand DP, Champagne CM, Ryan DH, Bray GA. Fast-food consumption among US adults and children: dietary and nutrient intake profile. *J Am Diet Assoc* 2003;103:1332–1338.
9. French SA, Harnack L, Jeffery RW. Fast food restaurant use among women in the Pound of Prevention study: dietary, behavioral and demographic correlates. *Int J Obes Relat Metab Disord* 2000;24:1353–1359.
10. Binkley JK, Eales J, Jekanowski M. The relation between dietary change and rising US obesity. *Int J Obes Relat Metab Disord* 2000;24:1032–1039.
11. Rosenheck R. Fast food consumption and increased caloric intake: a systematic review of a trajectory towards weight gain and obesity risk. *Obes Rev* 2008;9:535–547.
12. Schröder H, Fíto M, Covas MI; REGICOR investigators. Association of fast food consumption with energy intake, diet quality, body mass index and the risk of obesity in a representative Mediterranean population. *Br J Nutr* 2007;98:1274–1280.
13. Niemeier HM, Raynor HA, Lloyd-Richardson EE, Rogers ML, Wing RR. Fast food consumption and breakfast skipping: predictors of weight gain from adolescence to adulthood in a nationally representative sample. *J Adoles Health* 2006;39:842–849.
14. Healthy Dining Finder <http://www.healthydiningfinder.com>.
15. Loewenstein G, Brennan T, Volpp KG. Asymmetric paternalism to improve health behaviors. *JAMA* 2007;298:2415–2417.
16. Rolls BJ, Roe LS, Meengs JS. Reductions in portion size and energy density of foods are additive and lead to sustained decreases in energy intake. *Am J Clin Nutr* 2006;83:11–17.
17. Cohen DA, Farley TA. Eating as an automatic behavior. *Prev Chronic Dis* 2008;5 <http://www.cdc.gov/pcd/issues/2008/jan/07_0046.htm>. Accessed 20 June 2008.
18. Raynor HA, Wing RR. Package unit size and amount of food: do both influence intake? *Obesity (Silver Spring)* 2007;15:2311–2319.
19. Wansink B, Cheney MM. Super bowls: serving bowl size and food consumption. *JAMA* 2005;293:1727–1728.
20. Diliberti N, Bordi PL, Conklin MT, Roe LS, Rolls BJ. Increased portion size leads to increased energy intake in a restaurant meal. *Obes Res* 2004;12:562–568.
21. Rolls BJ, Morris EL, Roe LS. Portion size of food affects energy intake in normal-weight and overweight men and women. *Am J Clin Nutr* 2002;76:1207–1213.
22. Wansink B, Painter JE, North J. Bottomless bowls: why visual cues of portion size may influence intake. *Obes Res* 2005;13:93–100.
23. US Department of Health and Human Services and US Department of Agriculture. Dietary Guidelines for Americans, 2005, 6th edn. US Government Printing Office: Washington, DC, 2005.
24. Bassett MT, Dumanovsky T, Huang C *et al*. Purchasing behavior and calorie information at fast-food chains in New York City, 2007. *Am J Public Health* 2008;98:1457–1459.
25. Berman M, Lavizzo-Mourey R. Obesity prevention in the information age: caloric information at the point of purchase. *JAMA* 2008;300:433–435.