

Letters

RESEARCH LETTER

Restaurant Meals: Almost a Full Day's Worth of Calories, Fats, and Sodium

Because of the prevalence of eating out, the connection between fast food consumption and disease risk has garnered widespread attention.¹ However, less attention has been given to the disease-promoting potential of meals from sit-down restaurants (referred to as “SDRs” and defined by the presence of table service), which account for a larger share of total away-from-home food spending and whose share is expected to rise over the next decade.²

To our knowledge, no study has systematically documented the nutrient levels in meals from SDRs. In particular, nutrients of concern include calories, fat, saturated fat, and sodium, whose excess consumption is associated with obesity, hypertension, heart disease, diabetes and, cancer.^{3,4} The objective of this study was to analyze the nutritional profile of breakfast, lunch, and dinner meals from SDRs.

Methods | Twenty-six chain sit-down restaurants that provided Canadian nutrition information online and had 10 or more locations were identified using the 2010 *Directory of Restaurant and Fast Food Chains in Canada*.⁵ Menus were retrieved from the restaurant websites in 2012. All breakfast,

lunch, and dinner meals whose constituents were present in the University of Toronto restaurant nutrition database (constructed in 2010-2011) were included. Seven restaurants were excluded because more than 60% of their meals could not be calculated using the database. The nutritional profile of every potential meal combination (entree, plus side dish[es] and sauces that are customarily served with the meal) was calculated. With a few minor exceptions, the majority of “upgrades” that cost extra (such as upgrading from regular fries to sweet potato fries) were excluded.

In total, 3507 different variations of 685 meals, as well as 156 desserts from 19 SDRs, were included. Data were weighted so that meals with many different variations were not overrepresented. Nutrient values were calculated as a percentage of the daily value (%DV).⁶ Descriptive statistics were calculated for calories, fat, saturated fat, *trans* fat, cholesterol, sodium, percentage of total calories derived from fat, and the percentage of total fat derived from saturated fats using SAS version 9.3 software (SAS Institute Inc).

Results | On average, breakfast, lunch, and dinner meals from 19 chain SDRs contained 1128 calories (56% of the average daily 2000 calorie recommendation), 151% of the amount of sodium an adult should consume in a single day (2269 mg), 89% of the daily value for fat (58 g), 83% of the daily value for saturated fat and 0.6 g of *trans* fat), and 60% of the daily value for cholesterol (179 mg) (Table).

Table. Nutrient Levels in Sit-Down Restaurant Meals

Nutrient	All Meals (n = 3507) ^a		Breakfast (n = 150) ^a	
	Mean (SE) ^b (95% CI for Mean)	%DV ^c	Mean (SE) ^b (95% CI for Mean)	%DV ^c
Calories, kcal	1128 (12) (1105-1151)	56	1126 (24) (1092-1186)	56
Fat, g	58 (1) (56-60)	89	52 (3) (46-58)	80
Saturated fat, g	16 (0.3) ^d (16-17)	83	17 (1) (15-19)	88
<i>trans</i> Fat, g	0.6 (0.02) ^d (0.5-0.6)		0.7 (0.1) (0.5-0.9)	
Cholesterol, mg	179 (4) (171-187)	60	421 (29) (364-479)	140
Sodium, mg	2269 (30) (2210-2327)	151 ^e	2027 (141) (1748-2305)	135 ^e
Fat, % total calories	45 (0.4) ^d (44-46)	NA	39 (2) (36-42)	NA
Sat fat, % total fat	28 (0.4) ^d (28-29)	NA	32 (1) (30-35)	NA
		Lunch (n = 533) ^a	Dinner (n = 2824) ^a	
Calories, kcal		1025 (26) (973-1077)	1153 (14) (1126-1180)	58
Fat, g		53 (2) (49-57)	60 (1) (58-62)	92
Saturated fat, g		14 (1) (13-16)	17 (0.4) (16-17)	87
<i>trans</i> Fat, g		0.6 (0.04) ^d (0.5-0.7)	0.5 (0.02) ^d (0.5-0.6)	
Cholesterol, mg		130 (6) (118-143)	168 (4) (160-176)	56
Sodium, mg		2206 (71) (2067-2345)	2297 (34) (2231-2364)	152 ^e
Fat, % total calories		46 (1) (44-47)	45 (1) (44-46)	NA
Sat fat, % total fat		27 (1) (25-29)	28 (0.4) ^d (28-29)	NA

Abbreviations: NA, not applicable; Sat fat, saturated fat; %DV, mean nutrient level expressed as a percentage of the daily value as defined by the Food and Drug Administration.⁶

^a “n” Represents the overall number of meals analyzed. However, some meals were missing data for certain nutrients, therefore the exact n for each nutrient varies slightly due to some missing data.

^b Means were weighted so that meals with many different variations were not overrepresented.

^c Daily values are as follows: calories: 2000 kcal; fat: 65 g; Sat + *trans* fat: 20 g; cholesterol, 300 mg.

^d Note: an additional decimal place was included in the SE for clarity from nonzero values.

^e Sodium was calculated as %AI, which is the mean sodium level in the category, expressed as a percentage of the daily adequate intake for adults (1500 mg/d) as defined by the Institute of Medicine.⁴

With respect to sodium, more than 80% of meals exceeded the daily adequate intake level (1500 mg), with more than 50% exceeding the daily upper tolerable intake level (2300 mg). Only 1% of meals had less than 600 mg of sodium, the “healthy level” for meals, according to the Food and Drug Administration.⁷ Almost 50% of meals exceeded the daily value for fat (65 g) and 25% exceeded the daily value for saturated fat and cholesterol.

Furthermore, a dessert, if ordered, would add an additional 549 calories, 27 g of fat (43% DV), 13 g of saturated fat, 0.6 g of *trans* fat (68% DV), and 46 g of sugar.

Meals identified by the restaurants as being “healthy” contained on average 474 calories, 13 g of fat (20% DV), 3 g of saturated fat (17% DV), and 752 mg of sodium (50% of the daily adequate intake level).

Discussion | This study presents the average nutrient levels in a variety of different breakfast, lunch, and dinner meals from the major SDR chains. On average, meals contained more than a full day’s worth of sodium and nearly a day’s worth of fat and saturated fat.

The high level of saturated fat is worrisome because according to the Institute of Medicine, intakes of saturated fat should be kept as low as possible.³ Furthermore, though recommendations suggest that approximately 20% to 35% of energy should come from fat; in this study, 45% was derived from fat.³

On a positive note, the results showed that *trans* fat levels were commendably low. Furthermore, meals advertised as being “healthy” were substantially healthier compared with average meals.

At present there is no data on the nutritional profile of meals from SDRs. Previous research on meals purchased from fast food chains reported an average of 1751 mg of sodium and 881 calories,⁸ which is lower than the levels seen in SDR meals in this study.

Limitations include the fact that the data represented meals available in restaurants and did not reflect actual meals consumed by restaurant patrons. Furthermore, beverages, appetizers, and condiments that are often added by the consumer, and would further increase intake levels, were not accounted for.

Overall, the results of this study demonstrate that calorie, fat, saturated fat, and sodium levels are alarmingly high in breakfast, lunch, and dinner meals from multiple chain SDRs. Therefore, addressing the nutritional profile of restaurant meals should be a major public health priority.

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Failure of an Internet-Based Health Care Intervention for Colonoscopy Preparation: A Caveat for Investigators

Internet-based tools for health care delivery are proliferating. We examined the effectiveness of an online instructional video aimed at improving bowel preparation prior to colonoscopy. We hypothesized that an educational tool explaining the importance of preparation, the precolonoscopy diet, and how to administer the bowel purgative would lead to improved bowel preparation. However, what we learned during this randomized clinical trial of 2000 patients was that there may still be considerable limitations to reliance on the Internet for health care interventions.

Methods | Consecutive outpatients booked for colonoscopy by open-access at Boston Medical Center were randomized for this



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