The variability of reported salt levels in fast foods across six countries: opportunities for salt reduction

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ABSTRACT

Background: Several fast food companies have made commitments to reduce the levels of salt in the foods they serve, but technical issues are often cited as a barrier to achieving substantial reductions. Our objective was to examine the reported salt levels for products offered by leading multinational fast food chains.

Methods: Data on salt content for products served by six fast food chains operating in Australia, Canada, France, New Zealand, the United Kingdom and the United States were collected by survey in April 2010. Mean salt contents (and their ranges) were calculated and compared within and between countries and companies.

Results: We saw substantial variation in the mean salt content for different categories of products. For example, the salads we included in our survey contained 0.5 g of salt per 100 g, whereas the chicken products we included

contained 1.6 g. We also saw variability between countries: chicken products from the UK contained 1.1 g of salt per 100 g, whereas chicken products from the US contained 1.8 g. Furthermore, the mean salt content of food categories varied between companies and between the same products in different countries (e.g., McDonald's Chicken McNuggets contain 0.6 g of salt per 100 g in the UK, but 1.6 g of salt per 100 g in the US).

Interpretation: The salt content of fast foods varies substantially, not only by type of food, but by company and country in which the food is produced. Although the reasons for this variation are not clear, the marked differences in salt content of very similar products suggest that technical reasons are not a primary explanation. In the right regulatory environment, it is likely that fast food companies could substantially reduce the salt in their products, translating to large gains for population health.

It is widely accepted that excess dietary salt causes blood pressure to increase, and that salt is a major determinant of population blood pressure levels.[1,2] Recent estimates suggest that the numbers of deaths averted by moderate reductions in population salt consumption would be at least as many as those achieved by plausible reductions in population smoking rates.[3] In western countries, more than three-quarters of dietary salt derives from processed foods.[4] Coupled with rising rates of nutrition-related diseases worldwide,[5,6] the food industry has an increasingly important role to play in public health. With consumers now purchasing larger numbers of meals outside the home, fast food increasingly contributes to population intake of dietary salt.[7,8] Fast food tends to be more energy dense, contain more saturated fat

and salt, contain fewer micronutrients and be eaten in larger portions than other foods.[9–11] Fast food items such as fried potatoes, pizzas and sugar-sweetened soft drinks typically provide between one-third and one-half of daily energy intake but less than one-quarter of most micronutrients.[7]

A number of leading multinational fast food companies have shown their ability to reformulate foods to reduce salt levels. The United Kingdom's Food Standards Agency and the New York City Health Department now have voluntary salt reduction targets in place for packaged foods,[12,13] and the National Salt Reduction Initiative in the United States has set targets for salt reduction for 25 categories of foods in restaurants.

Technical feasibility is often cited by industry

as an impediment to efforts to reduce salt content, with new processes and technologies required to deliver lower-salt products.[14] There is, however, little evidence to verify whether industry has reached the technical limits of salt reduction. A survey of the salt levels in fast foods would provide insight into this issue by quantifying the variability in the salt levels of similar products produced by different companies in different countries.

We sought to compile current data on salt content for products offered by six leading transnational fast food chains and to compare the results between companies, countries and products.

Methods

We conducted a survey of the reported salt content of menu items from six fast food chains in Australia, Canada, France, New Zealand, the UK and the US. We collected these data in April 2010.

Fast food companies

We included foods from six companies: Burger King (known as Hungry Jack's in Australia), Domino's Pizza, Kentucky Fried Chicken, McDonald's, Pizza Hut and Subway. We selected these companies because they are the largest transnational fast food chains,[15] they operate in the countries from which we (the investigators) derive, and they provide easily accessible data on their products' nutrition on the Internet.

Product categories

We included foods from seven categories in our survey: savoury breakfast items, burgers, chicken products, pizza, salads, sandwiches and french fries. The definitions used for these categories were based on those used for previous reports from the US[16] and Australia,[17] which had been derived from the categorizations commonly used by the fast food industry. Briefly, savoury breakfast items included breakfast burgers, rolls, sandwiches and hash browns. Burgers included all burger products not on the breakfast menu. Sandwiches included all sandwich items, rolls and wraps not on the breakfast menu. Chicken products included nuggets, drumsticks, and fried, grilled or roasted chicken. Salads included all salad items and salads with additional ingredients.

Data collection

We obtained data from the companies' websites in each participating country and entered them in an Excel spreadsheet. We recorded the company name, product name, serving size (grams) and the base salt content (grams) for each menu item we included. When such information was available, we recorded salt content both per serving and per 100 g. When both values were not provided, we calculated one from the other using the serving size of the item. When information on sodium content was provided rather than salt content, we converted the value by multiplying by 2.5 (i.e., the atomic weight of sodium is 23, whereas the molecular weight of sodium chloride [salt] is 58.5). We checked the accuracy of our process for entering the data by selecting a random sample of 5% of the entries and comparing the information in our database against the original source. We identified three minor errors, none of which had a substantive effect on our conclusions. In addition, we subjected all data to a series of range and logic checks.

Statistical analysis

We calculated the mean levels and ranges for salt content for each food category overall and separately for each company and country. We made separate estimates per serving and per 100 g. When we saw evidence of differences between mean levels of salt per 100 g across countries, both overall and within categories of products, we tested the results using linear mixed models, allowing for the clustering of products by manufacturer. We evaluated pairwise comparisons using the Tukey–Kramer adjustment for multiple testing. We compared categories of products in the same way, both overall and by country. We used one-way analysis of variance to compare categories of products between companies, again using the Tukey–Kramer adjustment. We considered a p value of 0.05 or less as unlikely to have arisen solely by chance.

Results

We collected data on the salt content of 2124 fast food items in seven product categories from six companies operating in six countries. The number of products in a category ranged from 41 (french fries) to 1108 (pizzas). Product categories varied significantly in their mean salt content ($p < 0.001$) (Table 1), with chicken products having the highest mean level of salt (1.6 g salt per 100 g) and salads having the lowest (0.5 g salt per 100 g). This variability in salt content between product categories was apparent in every country (all $p < 0.001$), with a broadly similar pattern in each (Table 1).

Variation in salt content between countries

There was considerable variability between countries in the salt content of products in the same categories. For example, the mean salt content per 100 g for savory breakfast items was significantly lower in the UK (1.4 g), Australia (1.3 g) and New Zealand (1.1 g) than in the US (1.8 g) (all $p < 0.001$), and chicken products in the UK were significantly lower in salt (1.1 g salt per 100 g) than in the US (1.8 g) ($p < 0.001$). In addition, we found that individual items marketed as the same product had very different levels of salt in different countries (Table 2). For example, McDonald's Chicken McNuggets had two and one-half times more salt in the US than in the UK (1.6 v. 0.6 g salt per 100 g).

Variation in salt content within product categories

There was marked variation in the salt content of products within each of the seven categories studied, with a fivefold or greater difference in the salt content per 100 g between the least salty and the most salty product in each category. The average salt content of the same product category also varied considerably between companies ($p \leq 0.02$) (Table 3). For example, the mean salt level in sandwiches was 70% higher in Pizza Hut products than in Subway ($p < 0.001$).

Variation in salt content per serving

There was much greater variability when salt levels were reported per serving rather than per 100 g (Figure 1), reflecting nonstandard serving sizes between countries and between companies. For most product categories, the range of salt content per serving was more than double the range per 100 g. Variability was apparent even in very narrow product ranges, such as french fries (Figure 1), for which there were also substantial differences between countries. Large serving sizes means that some burger and chicken products have more than 6 g of salt per serving, some salads have more than 7 g, the saltiest sandwiches have 8 g, and one particular pizza has more than 10 g of salt.

Interpretation

Main findings

We saw marked variability in the reported salt content of products provided by major transnational fast food companies. This was true for comparisons made between different product categories, within product categories, and between companies and countries. Although some differences are to be expected on the basis

Table 1: Salt content of fast foods by product type, overall and by country

Product category	Salt content, g/100 g, mean (SD; range)						
	Australia n = 325	Canada n = 466	France n = 137	New Zealand n = 340	UK n = 523	USA n = 333	Overall n = 2124
Savoury breakfast items n = 157	1.3 (0.3; 1.1–1.8)	1.5 (0.3; 1.0–2.3)	1.2 (0.4; NA*)	1.1 (0.2; 0.7–1.5)	1.4 (0.4; 1.0–1.9)	1.8 (0.5; 0.5–2.5)	1.5 (0.4; 0.5–2.5)†
Burgers n = 211	1.3 (0.3; 0.7–1.9)	1.3 (0.3; 0.6–2.0)	1.2 (0.2; 0.9–1.6)	1.4 (0.4; 0.9–2.0)	1.1 (0.3; 0.4–1.7)	1.3 (0.3; 0.8–1.8)	1.3 (0.3; 0.4–2.0)‡
Chicken products n = 168	1.6 (0.5; 0.9–3.2)	1.6 (0.6; 0.8–2.8)	1.5 (0.3; 0.9–2.2)	1.6 (0.4; 1.0–2.1)	1.1 (0.3; 0.6–1.6)	1.8 (0.4; 0.9–2.9)	1.6 (0.5; 0.6–3.2)†
French fries n = 41	0.8 (0.1; 0.7–1.0)	1.4 (0.6; 0.6–1.9)	0.5 (0.0; 0.5–0.5)	0.7 (0.4; 0.3–1.1)	0.8 (0.2; 0.5–1.0)	0.6 (0.0; 0.6–0.6)	0.9 (0.4; 0.3–1.9)§
Pizza n = 1108	1.4 (0.3; 0.6–2.2)	1.6 (0.4; 0.8–2.4)	1.5 (0.2; 1.1–2.0)	1.4 (0.4; 0.8–2.9)	1.2 (0.3; 0.5–2.0)	1.7 (0.3; 1.0–2.4)	1.4 (0.4; 0.5–2.9)†
Salads n = 151	0.5 (0.2; 0.0–1.0)	0.8 (0.4; 0.0–1.5)	0.3 (0.3; 0.0–1.2)	0.3 (0.2; 0.0–0.6)	0.5 (0.4; 0.0–1.8)	0.5 (0.3; 0.0–1.1)	0.5 (0.4; 0.0–1.8)§
Sandwiches n = 288	1.0 (0.3; 0.4–1.6)	1.4 (0.4; 0.6–2.1)	0.8 (0.4; 0.4–1.7)	1.2 (0.3; 0.7–1.8)	1.0 (0.4; 0.5–2.0)	1.2 (0.3; 0.6–1.9)	1.1 (0.4; 0.4–2.1)†
Overall n = 2124	1.3 (0.4; 0.0–3.2)	1.4 (0.5; 0.0–2.8)	1.1 (0.6; 0.0–2.2)	1.3 (0.4; 0.0–2.9)	1.2 (0.3; 0.0–2.0)	1.5 (0.5; 0.0–2.9)	1.3 (0.4; 0.0–3.2)†

Note: NA = not applicable, SD = standard deviation.
*Only two savoury breakfast products were available in France (n = 2).
†Analysis of variance, $p < 0.001$.
‡Analysis of variance, $p < 0.05$.
§Analysis of variance, $p < 0.01$.

of the different types of foods served, there is a clear opportunity for widespread reformulation of products toward the lower end of the range of salt content for most categories. Technical feasibility is unlikely to be an issue for product renovation. If reductions were made incrementally over several years, fairly large cumulative decreases in salt content could be achieved without consumers being aware of the changes in the products' formulations.[18]

Comparison with other studies

There is good evidence from the UK that agreement between government and industry on salt

Table 2: Salt content of the same fast food products sold in different countries

Company; product	Country; serving size and salt per serving (salt per 100 g), g											
	Australia		Canada		France		New Zealand		United Kingdom		United States	
Burger King*												
Double Whopper	359	2.9 (0.8)	373	2.5 (0.7)	—	—	367	2.7 (0.7)	355	2.3 (0.7)	NA	2.7 (NA)
Double Cheese	213	2.6 (1.5)	189	2.4 (1.3)	—	—	187	2.6 (1.2)	173	2.4 (1.4)	NA	2.5 (NA)
Domino's												
Hawaiian Pizza	65	1.0 (1.5)	—	—	—	—	67	1.0 (1.5)	70	0.7 (1.0)	—	—
Kentucky Fried Chicken												
Zinger Burger	197	3.0 (1.5)	—	—	207	2.6 (1.2)	186	3.1 (1.7)	NA	3.0 (NA)	—	—
McDonald's												
Big Mac	200	2.4 (1.2)	209	2.6 (1.2)	221	2.3 (1.0)	202	2.7 (1.3)	214	2.1 (1.0)	214	2.6 (1.2)
Chicken McNuggets	98	1.1 (1.1)	114	1.7 (1.5)	107	1.3 (1.2)	88	1.0 (1.1)	105	0.6 (0.6)	95	1.5 (1.6)
Pizza Hut												
Hawaiian Pizza	88	1.3 (1.5)	84	1.0 (1.1)	—	—	82	1.1 (1.3)	73	0.8 (1.1)	102	1.5 (1.5)
Subway												
Club sandwich	212	1.8 (0.9)	240	2.7 (1.1)	238	1.3 (0.5)	220	2.7 (1.2)	254	2.3 (0.9)	247	2.9 (1.2)

Note: NA = not available.
*Known as "Hungry Jack's" in Australia.

Table 3: Salt content, overall and by company, of fast foods by product type

Product category	Company; salt content, g/100 g, mean (SD; range)					
	Burger King*	Domino's	KFC	McDonald's	Pizza Hut	Subway
Savoury breakfast items	1.4 (0.3; 0.4–2.3)	—	2.5 (0.0; 2.5–2.5)	1.4 (0.4; 0.1–2.4)	—	1.3 (0.2; 0.7–1.6)
Burgers	1.2 (0.3; 0.4–1.9)	—	1.4 (0.3; 0.8–2.0)	1.2 (0.3; 0.7–2.0)	—	—
Chicken products	1.8 (0.7; 1.2–2.8)	1.8 (0.8; 1.0–3.2)	1.6 (0.5; 0.8–2.9)	1.3 (0.4; 0.6–1.9)	1.5 (0.5; 0.9–2.0)	—
French fries	1.2 (0.4; 0.0–2.4)	—	0.9 (0.5; 0.0–3.8)	0.7 (0.2; 0.0–2.5)	1.3 (0.5; 0.3–3.5)	—
Pizza	—	1.3 (0.3; 0.5–2.1)	—	—	1.5 (0.4; 0.6–2.9)	—
Salads	0.5 (0.3; 0.0–0.9)	0.8 (0.2; 0.6–0.9)	0.6 (0.3; 0.0–1.3)	0.6 (0.3; 0.0–1.5)	1.1 (0.4; 0.5–1.8)	0.3 (0.2; 0.0–1.1)
Sandwiches	1.4 (0.1; 1.3–1.6)	1.2 (0.5; 0.4–2.0)	1.4 (0.3; 0.7–2.1)	1.3 (0.4; 0.6–2.0)	1.7 (0.3; 1.3–2.1)	1.0 (0.3; 0.4–1.9)
Overall	1.3 (0.5; 0.0–2.8)†	1.3 (0.3; 0.4–3.2)†	1.4 (0.5; 0.0–3.8)†	1.1 (0.5; 0.0–2.5)†	1.5 (0.4; 0.3–3.5)†	0.9 (0.4; 0.0–1.9)†

Note: NA = not available, SD = standard deviation.
*Known as "Hungry Jack's" in Australia.
†Analysis of variance, $p < 0.001$.

targets has driven down the salt levels of processed foods.[19–21] This model would appear to have the same potential for fast foods. Indeed, in the data we present, it is apparent that mean salt levels are already lower in fast foods from the UK than from elsewhere, which may be a consequence of industry's active participation in salt reduction efforts in that country.

An approach that delivers incremental, sector-wide reductions in the salt content of all fast food products has the greatest appeal from a public health perspective, because small reductions in risk for everyone would add up to large overall benefits.[22] Because large fast food companies already have dynamic ongoing programs of product reformulation, the marginal cost of incorporating salt-reduction targets should be minimal.[23]

In addition, the much greater variation in salt content seen when comparisons were made per serving rather than per 100 g is potential evidence for reducing and standardizing serving sizes. Such an approach would have the added advantage of simultaneously reducing consumption of other adverse nutrients and is one strategy advocated for addressing the obesity epidemic.[24] There is clear evidence that the serving sizes of fast foods have increased substantially in recent decades, so such a change would simply represent a return to the norm.[11,24,25]

Limitations
Our study was based on the data provided on the companies' websites, and we relied on their veracity. Although we believe most companies report correct nutritional values, this may not always be the case. Several companies use accredited laboratories for analysis, but the limited validation data available make it difficult to know whether there are significant random or systematic errors influencing the results of those analyses.[26]

Conclusion
Decreasing salt in fast foods would appear to be technically feasible and is likely to produce important gains in population health — the mean salt levels of fast foods are high, and these foods are eaten often.[16,27] Governments setting and enforcing salt targets for industry would provide a level playing field, and no company could gain a commercial advantage by using high levels of salt. Extending the research to include additional countries would help test the generalizability of our conclusions.
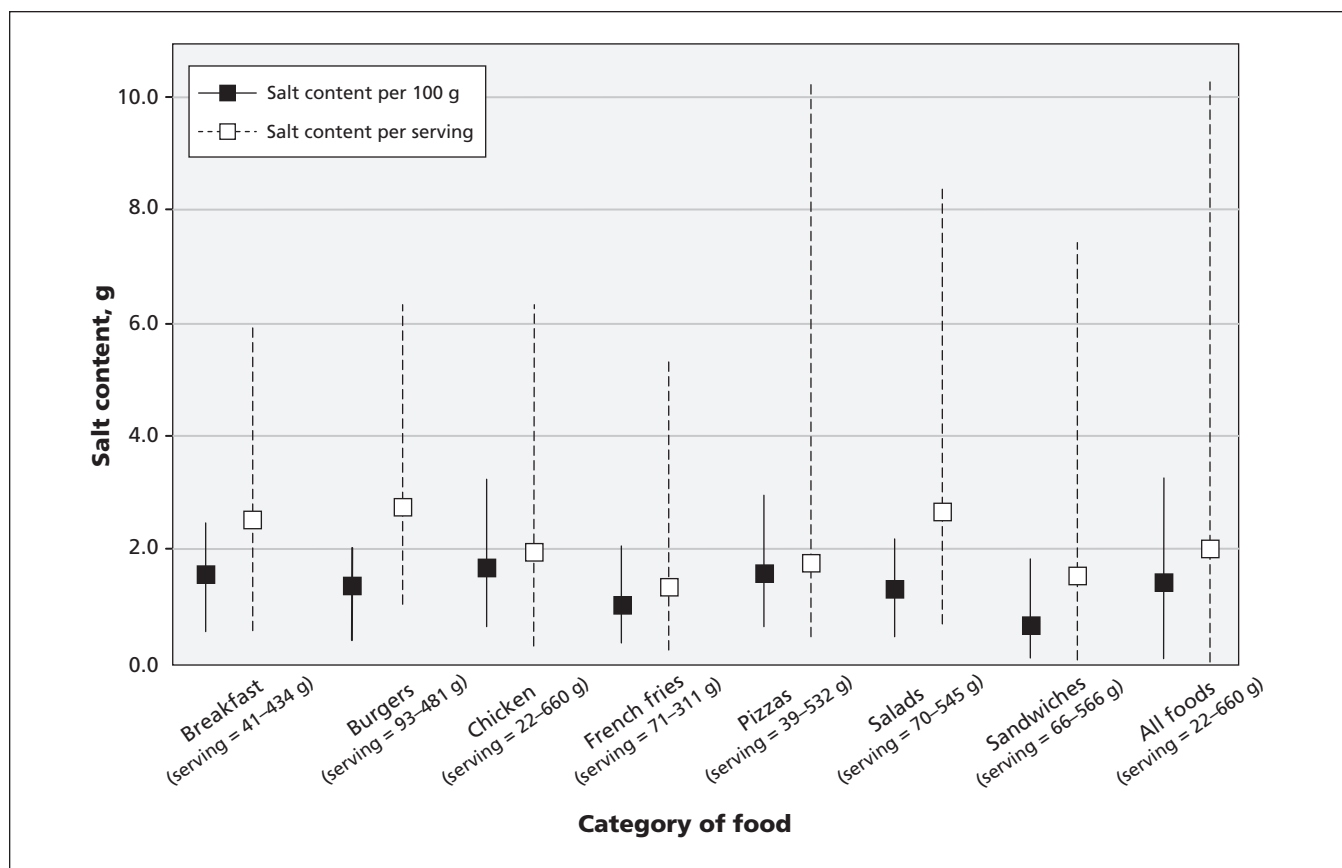

Figure 1: Mean salt content per 100 grams and per serving for fast foods by product type. Lines extending from the mean (boxes) indicate the range of values for the category. Breakfast = savoury breakfast items, chicken = all chicken products.

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