

- 1 **Supplemental Table 1.** Detailed search strategy used for the systematic review.
- 2 The five electronic databases searched on 18 October 2018 were CINAHL, Food Science Technology Abstracts,
- 3 Mintel, PubMed and Web of Science. The detailed search terms are listed in the table below for each database.

Database	Search Terms
CINAHL: 23 records identified	<p>TI Restaurant OR TI Restaurants OR TI Fast food OR TI Fast foods OR TI Takeaway OR TI Takeout</p> <p>AND Reformulation OR Reformulations OR Change OR Portion OR Portions OR serving size OR serving portion OR Standardized serving OR Standardized portion OR Serving OR servings</p> <p>AND dietary guidelines OR dietary guideline OR diet OR ( recommendations or guidelines ) OR nutrition guidelines OR nutritional standards OR nutrition policy OR food policy OR ( monitoring and evaluation )</p> <p>AND energy OR calories OR calorie OR caloric OR kilojoule OR sodium OR salt OR sugar OR saturated fat OR trans fat OR nutrients</p>
Food Science and Technology Abstract: 36 records identified	( TI Restaurant OR TI Restaurants OR TI Fast food OR TI Fast foods OR TI Takeaway OR TI Takeout ) AND ( Reformulation OR Reformulations OR Change OR Portion OR Portions OR serving size OR serving portion OR Standardized serving OR Standardized portion OR Serving OR servings ) AND ( dietary guidelines OR dietary guideline OR diet OR ( recommendations or guidelines ) OR nutrition guidelines OR nutritional standards OR nutrition policy OR food policy OR ( monitoring and evaluation ) ) AND ( energy OR calories OR calorie OR caloric OR kilojoule OR sodium OR salt OR sugar OR saturated fat OR trans fat OR nutrients )
MINTEL: 34 records identified	Restaurant OR "fast food" OR "takeaway" OR "takeout" AND "food reformulation" OR change OR portion OR serving AND guideline OR policy OR regulation OR standard AND energy OR calories or salt OR sugar OR fat
PUBMED: 63 records identified	(((restaurant[All Fields] OR restaurant'[All Fields] OR restaurant's[All Fields] OR restaurants [All Fields] OR restaurante[All Fields] OR restaurantes[All Fields] OR restauranteur[All Fields] OR restauranteurs[All Fields] OR restaurantrelateret[All Fields] OR restaurants[All Fields] OR restaurants'[All Fields] OR restaurantswere[All Fields]) AND Title/Abstract[All Fields] OR "Fast food"[All Fields]) AND Title/Abstract[All Fields] OR "Fast foods"[Title/Abstract]) AND (((((((((((Reformulation[All Fields] OR Reformulations[All Fields]) OR (change[All Fields] OR Portion[All Fields]) OR Portions[All Fields]) OR

	<p>Serving[All Fields] OR "Serving size"[All Fields] OR "Serving sizes"[All Fields] OR "serving portion"[All Fields] OR "serving portions"[All Fields] OR (standardized[All Fields] AND serving[All Fields]) OR (standardized[All Fields] AND servings[All Fields]) OR "standardized portion"[All Fields] OR "standardized portions"[All Fields]) AND (((((((((((("dietary guideline"[All Fields] OR "dietary guidelines"[All Fields]) OR ("diet"[MeSH Terms] OR "diet"[All Fields]) OR ("diet"[MeSH Terms] OR "diet"[All Fields] OR "diets"[All Fields])) OR "dietary recommendation"[All Fields] OR "dietary recommendations"[All Fields] OR "nutrition standard"[All Fields] OR "nutrition standards"[All Fields] OR "nutrition policy"[All Fields] OR "nutrition policies"[All Fields] OR "food policy"[All Fields] OR "food policies"[All Fields] OR ("monitoring, physiologic"[MeSH Terms] OR ("monitoring"[All Fields] OR "monitor"[All Fields])) OR monitoring[All Fields])) AND (((((((((((("Energy (Oxf)"[Journal] OR "energy"[All Fields] OR calorie[All Fields] OR calories[All Fields] OR caloric[All Fields] OR (kilojoule[All Fields] OR kilojoules[All Fields] OR kilojoules'[All Fields])) OR (kilocalorie[All Fields] OR kilocalories[All Fields] OR kilocaloriesdagger[All Fields])) OR ("sodium, dietary"[MeSH Terms] OR ("sodium"[All Fields] AND "dietary"[All Fields]) OR "dietary sodium"[All Fields] OR "sodium"[All Fields] OR "sodium"[MeSH Terms]))OR ("sodium"[All Fields] AND "chloride"[All Fields]) OR "salt"[All Fields])) OR fat[All Fields] OR ("fats"[MeSH Terms] OR "fats"[All Fields]) OR "trans fat"[All Fields] OR "trans fats"[All Fields] OR "saturated fat"[All Fields] OR "saturated fats"[All Fields] OR (sugar[All Fields] OR sugar'[All Fields] OR sugar"[All Fields] OR sugar'n[All Fields] OR sugar's[All Fields] OR ("food"[MeSH Terms] OR "food"[All Fields] OR "nutrient"[All Fields])) OR ("food"[MeSH Terms] OR "food"[All Fields] OR "nutrients"[All Fields]))</p>
<p>WEB OF SCIENCE: 23 records identified</p>	<p>TI=(restaurant OR "fast food" OR restaurants OR "fast foods" OR "takeaway" OR "takeout") AND</p> <p>TS=(reformulation OR reformulations OR change)</p> <p>AND TS=(portion OR portions OR serving OR servings OR "serving size" OR "serving sizes" OR "serving portion" OR "serving portions" OR "standardized serving" OR "standardized servings" OR "standardized portion" OR "standardized portions")</p> <p>AND TS=("dietary guideline" OR "dietary guidelines" OR diet OR diets OR "dietary recommendation" OR "nutrition standard" OR "nutrition standards" OR "nutrition policy" OR "nutrition policies" OR "food</p>

	<p>policy" OR "food policies" OR "monitoring" OR "monitor")</p> <p>AND TS=(energy OR calorie OR calories OR caloric OR kilojoule OR kilocalorie OR kilocalories OR sodium OR salt OR fat OR fats OR "trans fat" OR "trans fats" OR "saturated fat" OR "saturated fats" OR "sugar" OR "nutrient" OR "nutrients")</p>
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**Supplemental Table 2.** Study quality assessed by the Joanna Briggs Institute critical appraisal checklist\* to evaluate the studies included in the systematic review.

\*Completed by two co-authors (EK) and (SRGP). The citations below [86-135] correspond to the manuscript.

Lead author, year	1. Were the inclusion criteria for the sample clearly defined?			2. Were the study subjects and the setting described in detail?			3. Was the exposure measured in a valid and reliable way?			4. Were objective, standard criteria used to measure the condition?			5. Were compounding factors identified?			6. Were strategies stated to manage confounding factors?			7. Were the outcomes measured in a valid and reliable way?			8. Was the appropriate statistical analysis used?			Overall Study Quality Score 1 weak 2 moderate 3 strong		
	1	2	1&2	1	2	1&2	1	2	1&2	1	2	1&2	1	2	1&2	1	2	1&2	1	2	1&2	1	2	1&2			
<i>Reviewers' decision</i>																											
Ahuja et al. 2015 [87]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3		
Astiasarán et al. 2017 [88]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3		
Auchincloss et al. 2014 [89]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	2		
Bauer et al. 2012 [90]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3		
Bleich et al. 2015 [91]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3		
Bleich et al. 2016 [92]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3		
Bleich et al. 2017 [93]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3		
Brindal et al. 2008 [94]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	N	N	N	2		
Bruemmer et al. 2012 [95]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	3		
Chand et al. 2012 [96]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	N	Y	Y	Y	Y	Y	3		
Cohen et al. 2017 [86]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3		
Deierlein et al. 2015 [97]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A		N/A	Y	Y	Y	Y	Y	Y	3		
Dunford et al. 2010 [98]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3		

Dunford et al. 2012 [99]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Eissa et al. 2017 [100]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Eyles et al. 2018 [101]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3
Garcia et al. 2014 [102]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	3
Garemo and Naimi, 2018 [103]	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	N	N	N	2
Hearst et al. 2013 [104]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Heredia-Blonval et al. 2014 [105]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Hobin et al. 2014 [106]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3
Jacobson et al. 2013 [107]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Jarlenski et al. 2016 [108]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3
Khan et al. 2018 [109]	Y	Y	Y	N	N	N	N	N	N	N	N	N	N/A	N/A	N/A	N/A	N/A	N/A	N	Y	Y	Y	Y	Y	2
Kirkpatrick et al. 2013 [110]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Mazariegos et al. 2016 [111]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Moran et al. 2017 [112]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3
O'Donnell et al. 2008 [113]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	Y	Y	3
Prentice et al. 2015 [114]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3
Reeves et al. 2011 [115]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	Y	Y	3
Roberts et al. [116]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3

Rudelt et al. 2014 [117]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Schoffman et al. 2016 [118]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3
Scourboutakos and L'Abbé, 2012 [119]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y	3
Scourboutakos et al. 2013 [120]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Scourboutakos et al. 2016 [121]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Scourboutakos and L'Abbé, 2013 [122]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Scourboutakos et al. 2018 [123]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Scourboutakos et al. 2014 [124]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3
Sliwa et al. 2016 [125]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Soo et al. 2018 [126]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3
Stender et al. 2006 [127]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Uechi, 2018 [128]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3
Urban et al. 2014 [129]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3
Urban et al. 2014 [130]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3
Waterlander et al. 2014 [131]	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1
Wellard et al. 2012 [132]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Wellard-Cole et al. 2018 [133]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
Wolfson et al. 2017 [134]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	3

Ziauddeen et al. 2015 [135]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y	3
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Y=yes; N=no; and N/A=not applicable

**Supplemental Table 3.** Published studies included in the systematic review of transnational restaurant chains to reformulate products and standardize portions to meet healthy dietary guidelines, 2000-2019.

*The citations below [86-135] correspond to the manuscript.*

Lead author, year	Study objective  Study location <i>continent: city, state or country</i>	Data collection period <i>weeks, months or years</i> Study design	Main outcomes measured  Assessment/evidence sources  Dietary guidelines/criteria	Restaurant chains examined	Results
Ahuja et al. 2015 [87]	Monitor sodium content in commercially processed QSR foods.  <i>North America: USA</i>	2010–2013  Descriptive cross-sectional	Outcomes (n=2) Sodium (mg) Sodium density (mg/100 g)  Assessment/evidence Annual tracking of restaurant foods based on information from restaurants, nationwide sampling and laboratory analyses.  Guidelines/criteria Sodium compared to What We Eat in America 2007-2008; Dietary Guidelines for Americans (DGA) 2010; Food and Drug Administration (FDA)	4 QSR chains McDonald’s Burger King Domino’s Pizza Hut	A majority (88%; 29 of 33) of food samples at QSR chains exceeded the FDA’s targets for sodium.



			sodium targets (mg); and the Healthy Eating Index (HEI) 2010.		
Astiasarán et al. 2017 [88]	Examine the <i>trans</i> fatty acid (TFA) content of French fries at QSR chains.  <i>Europe: Pamplona, Navarra, Spain</i>	2017  Descriptive cross-sectional	Outcomes (n=4) Energy (kcal) Energy density (kcal/100 g) Fat (g) Trans fats (TFA) (g/100 g fat)  Assessment/evidence French fries (n=15 samples) purchased from QSR chains tested using gas chromatography Results analyzed using Stata v12 software  Guidelines/criteria TFA < 2% total energy	5 QSR chains Not specified	The TFA content for the fries ranged from 0.49% to 0.89%, which was lower than the 2% of total energy set by European countries as the maximum legal content of TFA in fats and contained < 0.5 g/serving. The TFA content of fries were below the target level at five QSR chains in Spain.
Auchincloss et al. 2014 [89]	Assess the nutritional value of meals at QSR, FCR and FSR chains.  <i>North America: Philadelphia, Pennsylvania, USA</i>	Mar and May 2011  Descriptive cross-sectional	Outcomes (n=4) Energy (kcal) Saturated fat (g) Sodium (mg) Sodium density (mg/1,000 kcal)  Assessment/evidence Data collected from restaurant websites and print menus and outcomes calculated for each menu item. Results analyzed using SAS v 9.2.	21 QSR, FCR and FSR chains Denny's Friendly's IHOP Pizza Hut Applebee's Neighborhood Grill & Bar Bertucci's Italian Restaurant California Pizza Kitchen Champs Americana Chili's Grill & Bar	Energy content for <i>à la carte</i> entrees and appetizers averaged 800 calories, which did not meet healthier criteria for calories 47% of the time. About 30% of <i>à la carte</i> entrees exceeded the % DRV for saturated fat and sodium.

			<p>Guidelines/criteria DGA 2010 and % Dietary Reference Value (DRV) for a 2000-calorie diet for adults and 1400 calories for children</p>	<p>Famous Dave's Legendary Pit Bar-B-Que Hard Rock Café Houlihan's Longhorn Steakhouse Olive Garden Red Lobster Ruby Tuesday</p>	
Bauer et al. 2012 [90]	<p>Examine changes in the energy content of lunch/dinner menu offerings at QSR chains between 1997/1998 and 2009/2010</p> <p><i>North America:</i> USA</p>	<p>2006–2010</p> <p>Descriptive longitudinal</p>	<p>Outcomes (n=3) Energy (kcal) Saturated fat (g) Sodium (mg)</p> <p>Assessment/evidence University of Minnesota Nutrition Coordinating Center's Food and Nutrient Database.</p> <p>Guidelines/criteria Not reported</p>	<p>8 QSR chains McDonald's Burger King Wendy's Taco Bell Kentucky Fried Chicken (KFC) Arby's Jack in the Box Dairy Queen</p>	<p>Median energy content for the general menu, entrée and beverage items did not differ between 2006 and 2010. Energy content of side dishes decreased, but increased for condiments and desserts from 2006-2010.</p>
Bleich et al. 2015 [91]	<p>Describe trends in calories available at U.S. chain restaurants.</p> <p><i>North America:</i> USA</p>	<p>2012–2013</p> <p>Descriptive longitudinal</p>	<p>Outcomes (n=1) Energy (kcal)</p> <p>Assessment/evidence Data collected from MenuStat Database 2012 and 2013 (n=19,417 items) that contained menu items reported by restaurants on their websites. Generalized linear models used to calculate mean change in</p>	<p>66 restaurant chains Not specified</p>	<p>Menu items offered in 2012 or 2013 did not significantly reduce calories. Newly introduced items in 2013 had lower calories (-56) than similar 2012 items. Calorie declines were among new main-course items (-10%, -67 calories), new beverages (-8%, -26 calories) and children's menus (-20%, -46 calories).</p>

			calories from 2012 to 2013, among items on the menu in both years; and difference in mean calories, comparing newly introduced items to those on the menu in 2012 only, overall and between core versus non-core items. Data analyzed in 2014.		
			Guidelines/criteria Not reported		
Bleich et al. 2016 [92]	Examine trends in calories available in QSR, FCR and FSR chains over two years.  <i>North America:</i> USA	2012–2014  Descriptive longitudinal	Outcomes (n=1) Energy (kcal)  Assessment/evidence Data collected from the MenuStat Database over three years 2012-2013 and 2014 (n=23,066) that contained menu items reported by restaurants on their websites. Statistical significance was considered at $p<0.05$ .  Guidelines/criteria Not reported	66 QSR, FCR and FSR chains Not specified	Calories in newly introduced menu items declined by 71 (15%) from 2012 to 2013 ( $p=0.001$ ) and by 69 (or 14%) from 2012 to 2014 ( $p=0.03$ ). Declines were in new main course items (85 fewer calories in 2013 and 55 fewer calories in 2014; $p=0.01$ ). Average calories in newly introduced menu items are declining but are higher than items common to the menu in all 3 years. No differences were found in mean calories among items on menus in 2012, 2013, or 2014.
Bleich et al. 2017 [93]	Describe trends in calories available at large U.S. chain restaurants over seven years.	2008 and 2012–2015  Descriptive Longitudinal	Outcomes (n=1) Energy (kcal)  Assessment/evidence MenuStat Database 2012-2015 that contained menu	44 QSR, FCR and FSR chains Not specified	Items common to the menu in all years had an overall decline on calories from 327 kcal in 2008 to 318 kcal in 2015. No observed differences in mean calories among newly introduced menu items in 2012, 2013, 2014, and 2015 relative to items only on the menu in 2008. US national

	North America: USA		<p>items reported by restaurants on their websites. Percentage of menu items available from 2012 to 2015 and in 2008 were calculated. Analysis examined mean within-item change in calories from 2008 to 2015, among items on the menu in all years; and the difference in mean per-item calories, comparing menu items newly introduced in 2012, 2013, 2014 and 2015 to those items on the menu in 2008 only.</p> <p>Guidelines/criteria Not reported</p>		<p>menu labeling mandate may have influenced restaurants to lower the average calories for menu items.</p>
Brindal et al. 2008 [94]	<p>Compare the macronutrient content of QSR meals and healthier choices from restaurant chains.</p> <p>Oceania: Australia</p>	<p>Oct 2005</p> <p>Descriptive cross-sectional</p>	<p>Outcomes (n=3)</p> <p>Energy (kJ)</p> <p>Fat (g)</p> <p>Saturated fat (g)</p> <p>Assessment/evidence</p> <p>Nutrition information for both types of meals were obtained from restaurant websites, follow-up phone calls and visits; and converted into a % Daily Allowance.</p> <p>Guidelines/criteria</p>	<p>6 QSR chains</p> <p>Domino's</p> <p>Hungry Jack's</p> <p>KFC</p> <p>McDonald's</p> <p>Red Rooster</p> <p>Subway</p>	<p>Average meal provided nearly half (47.5%) of the total energy (kJ) and dietary fat (47.1% and 93.5%), respectively, compared to the recommended daily targets.</p>

			8400 kJ/day for average adult. Fat or saturated fat guidelines or targets not reported.		
Bruemmer et al. 2012 [95]	Evaluate selected nutrient content of entrées 6- and 18-months after implementation of a US county restaurant menu labeling law  <i>North America:</i> King County of Washington State, USA	May–Jun 2009 (pre) May–Jun 2010 (post)  Intervention cross-sectional	Outcomes (n=3) <b>Energy (kcal)</b> <b>Saturated fat (g)</b> <b>Sodium (mg)</b>  Assessment/evidence Content of entrees at 18 months compared with one-third of the recommended daily nutrient intake for adults.  Guidelines/criteria DGA 2005	37 LSR and FSR chains Not specified	Energy content was lower at FSR chains (-7%, -73 calories) and LSR chains (-3%, -19 calories) from 2009 to 2010. All chains exceeded the DGA 2005 recommendations for calories (56%), saturated fat (77%), and sodium (89%).
Chand et al. 2012 [96]	Assess availability of healthier options at QSR chains.  <i>Oceania:</i> New Zealand	Dec 2010 – Jan 2011  Descriptive cross-sectional	Outcomes (n=5) Energy (kJ) Total fat (g) Saturated fat (g) Sugar (g) Sodium (mg)  Assessment/evidence Onsite visits combined with phone calls and website searches to identify products (n=1126) sold at QSR chains.	12 QSR chains  Burger Fuel Burger King Burger Wisconsin Domino's Hell Pizza KFC McDonald's Muffin Break Pizza Hut Starbucks	One-fifth (21%; n=234/1126) of products met healthier dietary guidelines, defined by QSR chain as 'healthier', 'lite' or having smaller portion size.  Meal options were high in sugar or sodium per serving. Mean sugar content of beverages was 56 g (11 teaspoons/serving); and sodium content of burgers was 1095 mg/serving, and pasta dishes were 1172 mg sodium/serving.

			Nutrient composition of healthier versus regular meals per serving.  Guidelines/criteria Not reported	Subway Tank Juice	
Cohen et al. 2016 [86]	Examine calories and portion sizes of children's meals.  <i>North America: USA</i>	2012-2016  Descriptive cross-sectional	Outcomes (n=2) Energy (kcal) Portion size  Assessment/evidence Examined calories and portions of items sold restaurant chains using the MenuStat Database 2014, then a Delphi Method to poll national childhood nutrition experts (n=15) to assess the ideal portion sizes for various food categories.  Guidelines/criteria $\leq 600$ calories/meal	200 restaurant chains Not specified	Only 54% (108 of 200 restaurants) in MenuStat Database publicly disclosed nutritional data for children's menu items.  Actual portion size/calorie content recorded for 200 U.S. restaurant chains exceeded the recommended amounts for children's <i>à la carte</i> items ( $\leq 300$ kcal/serving), side dishes and dessert ( $\leq 150$ calories/serving), and entrees ( $\leq 600$ kcal/serving), with the exception of fruit and vegetables, which were 46% and 69% of the recommended calorie content, respectively.  FSR chains were more likely to serve children's menu items exceeding 600 calories/serving. Chains that served highest calorie entrée was two mini Angus cheeseburgers (1170 kcal).
Deierlein et al. 2015 [97]	Determine changes in the nutritional content of children's menu items at chain restaurants over four years.	Jun-Jul 2010 and 2014  Descriptive cross-sectional	Outcomes (n=6) Calories (kcal) Energy from fat (%) Fat (g) Saturated fat (g) Energy from sat fat (%) Sodium (mg)  Assessment/evidence	29 QSR, FCR and FSR chains  Not specified	Nutrient content of main dishes for children did not change significantly between 2010 and 2014. A majority of children's menu items, especially entrees, offered high amounts of calories, fat, saturated fat, and sodium compared to the DGA 2010 targets. One-third of main dishes at QSR chains and half of main dishes at FSR chains exceeded the 2010 DGA target for sodium, fat, and saturated fat in 2014.

	North America: USA		<p>Sample consisted of chains ranked in top 50 in 2009.</p> <p>Nutritional information was accessed in 2010 and 2014 from restaurant chains' websites.</p> <p>Differences in means of nutrient content or percent of dishes with fruits or vegetables between 2010 and 2014 at QSR and FSR chains evaluated by t-tests and chi-square tests (p &lt; 0.05).</p> <p>Guidelines/criteria DGA 2010 target for sodium &lt; 2300 mg/day</p>		Improvements in nutrient content were observed for side dishes. At FSR chains, added side dishes contained over 50% less calories, fat, saturated fat, and sodium, and were more likely to contain fruits/vegetables compared to removed sides (p < 0.05 for all comparisons). Added side dishes at QSR chains contained less saturated fat (p < 0.05).
Dunford et al. 2010 [98]	<p>Examine the nutrient content of QSR menu items compared to healthy dietary guidelines.</p> <p>Oceania: Australia</p>	<p>Jun 2009</p> <p>Descriptive cross-sectional</p>	<p>Outcomes (n=5)</p> <p>Energy (kcal)</p> <p>Total fat (g)</p> <p>Saturated fat (g)</p> <p>Sugar (g)</p> <p>Sodium (mg)</p> <p>Assessment/evidence Mean nutrient levels were compared between product categories and</p>	<p>9 QSR chains</p> <p>McDonald's</p> <p>Hungry Jack's</p> <p>Oporto</p> <p>KFC</p> <p>Red Rooster</p> <p>Pizza Hut</p> <p>Domino's</p> <p>Eagle Boys</p> <p>Subway</p>	<p>Majority of products did not meet healthy criteria. Breakfast items had the highest mean sugar content (7.8 g/100 g) and saturated fat (5.5 g/100 g), and chicken items had the highest total fat (13.2 g/100 g) and sodium content (586 mg/100 g), and sides had the highest mean energy content (1087 kJ/100 g).</p> <p>Variation in the nutrient content of comparable products across the chains implicated the potential for product reformulation across all product categories that could have substantial</p>

			<p>with recommended healthy nutrient criteria.</p> <p>Data were collected by a survey and nutrient content was calculated for products/serving and per 100 g.</p> <p>Guidelines/criteria</p> <p>Nutrient criteria set by the UK's Food Standards Agency (FSA) and products were classified accordingly as 'high', 'moderate' or 'low'</p>		<p>impact on reducing poor dietary quality if all firms adhered to common nutrient targets.</p>
Dunford et al. 2012 [99]	<p>Examine and compare the sodium content of foods sold at QSR chains in six countries.</p> <p><i>Europe:</i> France and United Kingdom</p> <p><i>North America:</i> Canada and USA</p> <p><i>Oceania:</i> Australia and New Zealand</p>	<p>Apr 2010</p> <p>Descriptive cross-sectional</p>	<p>Outcomes (n=2)</p> <p>Salt (mg)</p> <p>Sodium density (mg/100 g)</p> <p>Assessment/evidence</p> <p>Data obtained from chain websites in each country for seven food categories (i.e., savory breakfast items, burgers, chicken products, pizza, salads, sandwiches and fries). Mean levels and ranges for salt for each food category and separately for each</p>	<p>6 QSR chains</p> <p>Burger King (Hungry Jack's)</p> <p>Domino's Pizza</p> <p>KFC</p> <p>McDonald's</p> <p>Pizza Hut</p> <p>Subway</p>	<p>The salt content varied substantially by food category and QSR chain in countries. Salads contained 0.5 g salt/100 g, whereas the chicken products contained 1.6 g salt/100 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 contained 0.6 g of salt per 100 g in the UK, but 1.6 g of salt per 100 g in the US).</p>



			chain were calculated across six countries.  Guidelines/criteria Not reported		
<b>Eissa et al. 2017 [100]</b>	Examine the nutrition content of children's menu items at QSRs and FSRs compared to DGA 2015-2020.  <i>North America:</i> USA	2012-2014 Descriptive Cross-sectional	Outcomes (n=5) Fat (g) Saturated fat (g) TFA (g) Sugar (g) Portion size (g)  Assessment/evidence Using the MenuStat Database 2014, 10 food items on QSR and FSR children's menus were selected. Data from each restaurant category were aggregated, and overall average of the nutritional content of each individual food item was calculated and compared between the two chain categories. Data were collected from restaurant websites.  Guidelines/criteria Daily recommended calories based on the American Academy of Pediatrics target of 1200-1600 kcal/day and DGA 2015-2020 of	42 QSR and FSR chains Not specified	Most menu items at FSR and QSR chains did not meet DGA 2015-2020 targets. Average for calories, fat, and added sugars of most items on the children's menus were lower at QSR chains compared to FSR chains. Most food items on children's menus at FSRs, and to a lesser extent at QSRs, exceeded the national recommended calories and fat content per meal. The difference between nutrient content means of FSR and QSR menu items were statistically significant at p<0.05.

			1550-1650 kcal/day		
Eyles et al. 2018 [101]	Examine nutrient content and serving/portion size changes of menu items sold annually for four years at QSR chains.  <i>Oceania:</i> New Zealand	Feb and Mar 2012-2016  Descriptive sequenced, annual cross-sectional	Outcomes (n=4) Portion size (g) Energy (kJ) Energy density (kJ per 100 g) Sodium (mg/serving)  Assessment/evidence Serving/portion size and nutrient data were collected in annual cross-sectional surveys of all products sold at 10 QSR chains over 4 years.  Guidelines/criteria Not reported	10 QSR chains Burger King Domino's Hell Pizza KFC McDonald's Corporation Muffin Break Pizza Hut St Pierre's Sushi Subway Tank Juice	Moderate to large increases in the mean serving size, energy density, energy/serving, and sodium/serving, except for sodium density, were observed across all menu items examined between 2012 and 2016.
Garcia et al. 2014 [102]	Define changes in sodium content of fast food items at six QSR chain.  <i>Oceania:</i> Australia	2009-2012  Descriptive cross-sectional	Outcomes (n=2) Sodium (mg) Sodium density (mg/100 g and mg/serving)  Assessment/evidence Nutrient content data obtained from surveys of info on company websites for menu items (n=302 to 381 annually). Surveys were conducted in March annually 2009- 2012.  Data analyzed using Stata v 12.1.	Six QSR chains  Domino's  Hungry Jack's ( <i>Burger King</i> )  KFC  McDonald's Subway  Pizza Hut	The mean sodium content of QSR products showed a modest decrease by 43 mg/100 g (95% CI, - 66 to - 20 mg/100 g) and 514 mg/100 g in 2009 to 471 mg/100 g in 2012.  Mean sodium content per serving was not significantly different at 654 mg in 2009 and 605 mg in 2012, reflecting wide variation in the serving sizes of items offered annually.  A small decline in sodium content was observed over four years across most food categories and by QSR chain, but many products still contain high levels of sodium.

			Guidelines/criteria Not reported		
Garemo and Naimi 2018 [103]	Assess the dietary quality of children's meals in restaurants by food groups and fried foods.  <i>Middle East:</i>  Abu Dhabi, United Arab Emirates	2016  Descriptive cross-sectional	Outcomes (n=3) Energy (kcal) Fat (g) Sugar (g)  Assessment/evidence Popular food outlets were identified using an online customer rating application. Menus were collected, and the meal quality was assessed for deep-frying and food group content.  Guidelines/criteria US NRA's Kids Live Well Program criteria	58 restaurants Not reported  Combination of independent non-chain and transnational QSR and FSR chains, shopping malls eateries, and hotel restaurants	Half of restaurants (50%; 29/58) offered children's menus that sold 209 meals, of which 60% were bundled and included beverages, but only 13% offered water or milk as default beverage.  More than three quarters (78.9%) of meals did not meet the US NRA's Kids' Live Well Program criteria, and nearly half of meals (46%; n=96/209) were deep-fried.
Hearst et al. 2013 [104]	Assess trends in nutritional quality of menu offerings at QSR chains.  <i>North America:</i> USA	Data examined in seven 2-year periods, of which five were relevant to our study's time frame: 2001–2002 2003–2004 2005–2006 2007–2008 2009–2010	Outcomes (n=3) Energy (kcal) Sodium (g) Saturated fat (g)  Assessment/evidence Data for menu items and food and nutrient composition were obtained in 2011 from archived versions of the University of Minnesota Nutrition Coordinating Center Food	8 QSR chains  McDonald's Burger King  Wendy's  Taco Bell  KFC  Arby's  Jack in the Box  Dairy Queen	A HEI 2005 score was assigned across all eight QSR chains that ranged from 45/100 in 1997/1998 to 48 in 2009/2010. Each individual QSR chain score ranged from 37 to 56 in 1997/1998, and 38 to 56 2009/2010.  Overall, the nutritional quality of menu offerings was poor. The most substantial improvements in nutritional quality were observed for meat/beans, and a decrease in saturated fat, and the proportion of calories from solid fats and added sugars.

		Descriptive cross-sectional study	and Nutrient Database for eight QSR chains.  Guidelines/criteria HEI 2005 scores were calculated for each menu based on the extent that menu offerings were consistent with DGA 2005		The HEI 2005 score improved modestly (45-48) at six chains (i.e., McDonald's, Taco Bell, KFC, Arby's, Jack in the Box, and Dairy Queen) and decreased at two chains (i.e., Wendy's and Burger King).
Heredia-Blonval et al. 2014 [105]	Examine the energy and salt content of products sold at QSR chains.  <i>Latin America and the Caribbean: Costa Rica</i>	Jan 2013  Descriptive cross-sectional	Outcomes (n=3) Energy (kcal) Salt (mg) Sodium density (mg/100 g and mg/serving)  Assessment/evidence Nutrient content assessed for products (n=311) across 10 food categories.  Mean salt content was compared between QSR chains and food categories.  Guidelines/criteria Not reported	7 QSR chains Domino's KFC Pizza Hut Popeye's Subway Taco Bell Teriyaki	Statistically significant differences were observed between the mean salt content across the seven QSR chains.  Subway's products had the lowest mean salt content (0.97 g/100 g; p < 0.05). Popeye's and KFC had the highest mean salt content (1.57 g/100 g; p < 0.05). Significant variations in mean salt content were observed between food categories.  Salads had a mean salt content of 0.45 g/100 g while sauces had 2.16 g/100 g (p < 0.05). There was wide variation in salt content observed within food categories. Salt content in sandwiches ranged from 0.5 to 2.1 g/100 g.
Hobin et al. 2014 [106]	Compare the energy (calories), total fat and saturated fat, and sodium levels for the children's menu items offered by four	Aug 2012  Descriptive cross-sectional	Outcomes (n=5) Energy (kcal) Fat (g) Saturated fat (g) Sodium (mg) Serving size (g)  Assessment/evidence	4 QSR chains Burger King (Hungry Jack's) KFC McDonald's Subway	Results showed variation across the QSR chains and five countries for children's menu items for energy, fat, saturated fat and sodium.  US chains had lower energy and portion sizes, and UK had lower sodium, respectively,

	<p>QSR chains across five countries.</p> <p><i>Europe:</i> United Kingdom</p> <p><i>North America:</i> Canada and USA</p> <p><i>Oceania:</i> Australia and New Zealand</p>		<p>Content analysis of menus for children's meals (n=138) based on data obtained from websites or phone calls to companies in each country.</p> <p>Guidelines/criteria Not reported</p>		<p>compared to other countries (i.e., Australia, Canada and New Zealand, US).</p> <p>Subway offered lower fat items compared to Burger King and KFC. Items offered at KFC were lower in saturated fat compared to Burger King.</p>
Jacobson et al. 2013 [107]	<p>Compare the mean levels of sodium for identical products in 2005, 2008, and 2011.</p> <p><i>North America:</i> USA</p>	<p>2005-2011</p> <p>Descriptive longitudinal</p>	<p>Outcomes (n=1) Sodium (g)</p> <p>Assessment/evidence Restaurant website data compared to the DGA 2010 and computed for each period the mean (95% CI) sodium level per 100 g of product. The number and percentage of foods that had changed sodium levels that represented increases of at least 5% or at least 30% or did not change were identified.</p> <p>Guidelines/criteria DGA 2010 and American Heart Association (AHA) guidelines for high-risk populations to consume <math>\leq 1500</math> mg sodium/day</p>	<p>16 QSR and FCR chains Arby's Au Bon Pain Blimpie Burger King Chick-fil-A Domino's Pizza Hardee's Jack in the Box KFC Little Caesars Pizza McDonald's Panera Bread Papa John's Pizza Pizza Hut Subway Wendy's</p>	<p>Between 2005 and 2011, the sodium content of 78 QSR products increased by 2.6%. Although some products showed decreases of at least 30%, a greater number of products increased at least 30%. There was no statistically significant change in sodium content over six years.</p>

<p>Jarlenski et al. 2016 [108]</p>	<p>Assessed changes in macronutrient profiles of items sold by QSR chains.</p> <p><i>North America:</i> USA</p>	<p>2012 to 2014</p> <p>Descriptive longitudinal</p>	<p>Outcomes (n=4) Energy (kcal) Fat (g) Saturated fat (g) Sugars (g)</p> <p>Assessment/evidence Data collected from MenuStat Database 2012-2014 (n=11,737 items) at 37 chains. Generalized linear models were used to examine differences in the macronutrient composition of newly introduced menu items.</p> <p>Guidelines/criteria Not reported</p>	<p>37 QSR and FCR chains</p> <p>Not specified</p>	<p>From 2012 to 2014, only a minor decline in the calorie content (22-25 calorie reduction) was observed across 11,737 menu items assessed for changes in macronutrient composition. Over the period reviewed, beverages increased by 46 calories, newly introduced main course items reduced by 59 calories, and newly introduced dessert items increased by 90 calories, of which 57 calories were from added sugars.</p>
<p>Khan et al. 2018 [109]</p>	<p>Examine calories and sodium in menu items sold by QSR chains in four countries.</p> <p><i>North America:</i> USA Australia Egypt India</p>	<p>Jul 2015</p> <p>Descriptive cross-sectional</p>	<p>Outcomes (n=2) Energy (kcal) Sodium density (g/100 g)</p> <p>Assessment/evidence All menu items and food ingredients were taken from the food labels publicly listed by QSR chains through print or electronic media.</p>	<p>3 QSR chains</p> <p>McDonald's KFC Pizza Hut</p>	<p>The energy content of KFC items (1,028 kcal) and McDonald's items (896 kcal) were highest in Egypt.</p> <p>The Big Mac at McDonald's in the US and Australia had the highest energy (530 and 493 kcal/serving), respectively, which represented ~22-24% of the daily calorie target of 2,200 kcal daily. Sodium content for the items in Arabia, US and Australia were 1,080 mg, 960 mg, and 859 mg, respectively, representing 41.7% and 37.3% of the recommended daily sodium intake for 8-50 year olds; and 47%, 64%, and 57%,</p>

			<p>Guidelines/criteria</p> <p>USDA and DGA 2015 recommendations for dietary sodium <math>\leq</math> 2,300 mg/day for adults and <math>\leq</math> 1500 mg/day for children and adults &gt; 50 years</p>		<p>respectively, for children below 8 years and adults older than 50 years based on 1,500 mg limit.</p> <p>Different brands of similar foods had different sodium content. Two thirds (66.5%) of sodium came from meats, chicken and buns.</p>
Kirkpatrick et al. 2013 [110]	<p>Evaluate children's menu items at five QSR chains compared to US dietary guidelines.</p> <p><i>North America:</i> USA</p>	<p>2008-2009 Descriptive cross-sectional</p>	<p>Outcomes (n=5) Energy (kcal) Energy from fat (%) Energy from added sugars (%) Saturated fat (g) Sodium (g)</p> <p>Assessment/evidence Data collected from the restaurant database. Recommendations vary in relation to energy requirements, scores for all components of the HEI 2005 were calculated (eg, amount per 4184 kJ/1000 kcal) rather than using absolute amounts of foods or nutrients.</p> <p>Restaurant websites menus were coded using Food and Nutrient Database for Dietary Studies and HEI 2005 score.</p>	<p>5 QSR chains</p> <p>Burger King McDonald's Subway</p> <p>Taco Bell</p> <p>Wendy's</p>	<p>Full menus at QSR chains scored lower than 50/100 points on the HEI-2005. Children's menus scored 10 points higher on average, and items marketed as healthy or nutritious scored 17 points higher compared to full menus. No menu or subset of menu items received a score higher than 72 out of 100 points. Scores for total fruit, whole grains and sodium were poor.</p>

			Guidelines/criteria DGA 2005 and HEI 2005		
Mazariegos et al. 2016 [111]	<p>Compare the nutritional quality of children's combination meals with and without health claims.</p> <p><i>Latin America and the Caribbean: Guatemala</i></p>	<p>2016</p> <p>Descriptive cross-sectional</p>	<p>Outcomes (n=6)</p> <p>Energy (kcal)</p> <p>Sodium (mg)</p> <p>Sugar (g)</p> <p>TFA (g)</p> <p>Saturated fat (%)</p> <p>Energy from fat (%)</p> <p>Assessment/evidence</p> <p>Nutrition information requested at the point of sale from the restaurant manager, checking the restaurant website, or calling customer service. Combo meals classified as "healthy" or "less healthy" using the UK Nutrient Profiling Model. REDCap was used for data entry and STATA v 13.0.</p> <p>Guidelines/criteria</p> <p>NAM/USDA's NSLP standards and UK's Nutrient Profiling Model for children</p>	<p>6 QSR chains</p> <p>McDonald's</p> <p>Burger King</p> <p>Wendy's</p> <p>Pollo Campero</p> <p>KFC</p> <p>Pizza Hut</p>	<p>Of 114 combo meals, 21 (18.4%) were marketed for children. Only five meals (24%) provided nutrition information, and all were classified as "less healthy."</p> <p>Nutrient content for selected Guatemalan children's combo meals were:</p> <p>Median Range</p> <p>energy (kcal) 514 (404-725)</p> <p>sodium (mg) 885 (495-1173)</p> <p>sugar (g) 46 (36-52)</p> <p>sat fat (%) 11 (8-13)</p> <p>energy from fat (%) (5) 39 (23-52)</p> <p>TFA (g) 0 (0-0)</p>
Moran et al. 2017 [112]	<p>Examine the trends in nutrient content of children's menus at US restaurant</p>	<p>2012-2015</p> <p>Descriptive cross-sectional</p>	<p>Outcomes (n=3)</p> <p>Energy (kcal)</p> <p>Sodium (mg)</p> <p>Saturated fat (g)</p> <p>Assessment/evidence</p>	<p>45 QSR, FCR and FSR chains</p> <p>Applebee's</p> <p>Subway</p> <p>Chipotle</p> <p>Arby's</p>	<p>From 2012 to 2014, calories in beverages offered with children's menus increased by 11 calories. From 2012 to 2015, no significant changes were observed for calories in six FCR beverages, total calories, sodium or saturated fat in children's menu offerings.</p>



	<p>chains over three years.</p> <p><i>North America:</i> USA</p>		<p>Nutrients in children's menu items (n=4,016) from 45 chains were extracted from MenuStat Database. Bootstrapped mixed linear models estimated changes in mean calories, saturated fat, and sodium in children's food and beverage menu items between 2012 and 2013, 2014, and 2015. Changes in nutrient content of these items over time were compared to restaurants participating in the US NRA's Kids Live Well Program criteria and non-participating restaurants. Data analyzed in 2016.</p> <p>Guidelines/criteria US NRA's Kids Live Well Program</p>	<p>Panera Bread Wendy's Burger King</p>	<p>Restaurants that participated in the US NRA's Kids Live Well program (n=15) had significantly reduced children's entrée calories between 2012 and 2014 (by 40 calories/meal) compared to nonparticipating restaurants, but this change did not persist for the 2012 to 2015 period.</p>
O'Donnell et al. 2008 [113]	<p>Assess the nutrient quality of children's meals at QSR chains.</p> <p><i>North America:</i> Houston, TX, USA</p>	<p>Jul 2007</p> <p>Descriptive cross-sectional</p>	<p>Outcomes (n=6) Energy (kcal) Fat (g) Energy from fat (%) Saturated fat (g) Sugars (g) Sodium (mg)</p> <p>Assessment/evidence Nutrition information was collected via phone calls to</p>	<p>10 QSR chains Arby's Burger King Chick-fil-A KFC McDonald's Sonic Subway Taco Bell Wendy's Whataburger</p>	<p>Only 3% of children's meals met all NSLP criteria. The meals that met all criteria offered a side of fruit plus milk, and most were deli-sandwich meals.</p> <p>Meals that met the criteria had about one-third fat, one-sixth added sugars, twice the iron, and three times the amount of vitamin A and calcium compared to meals that did not meet the criteria.</p>

			restaurant chains. Data analysis used SAS.  Guidelines/criteria NAM/USDA's NSLP nutrition standards		Meals that did not meet the NSLP criteria were more than 1.5 times more energy dense than those that did meet the criteria.
Prentice et al. 2015 [114]	Examine the sodium content of food items at QSR chains and independent outlets to estimate the contribution of sodium to the diet of the New Zealand population using the 2008/09 New Zealand Adult Nutrition Survey  <i>Oceania: New Zealand</i>	2008-2009  Descriptive cross-sectional	Outcomes (n=1) Sodium (mg)  Assessment/evidence Nutrient analysis was conducted for the sodium content of savory foods from QSR chains (n=471). Nutrition information obtained from company websites. Nutrient content of 12 most popular foods from independent outlets (n=52) across 8 chains was determined using laboratory analysis.  Guidelines/criteria UK FSA's 2012 sodium targets	8 QSR chains McDonald's Burger King KFC Domino's Hell's Pizza Pizza Hut Subway Wendy's	Twelve out of thirteen of the QSR food categories exceeded the UK FSA's 2012 sodium targets.  Sauces/salad dressings and fried chicken had the highest sodium content (per 100g) and from independent outlets, sausage rolls, battered hotdogs and mince and cheese pies were highest in sodium (per 100g). The mean daily sodium intake from savory fast foods was 283mg/d for the total adult population and 1229 mg/day for QSR consumers.
Reeves et al. 2011 [115]	Investigate the nutritional content and portion size children's meals at QSR and non-chain FSR.	Jul and Aug 2009  Descriptive cross-sectional	Outcomes (n=4) Energy (kcal) Portion size (g) Fat (g) Sodium (mg)  Assessment/evidence Nutrient analysis was compared to standards,	7 QSR chains and 15 non-chain FSR Not specified	Mean portion size was significantly smaller in QSR chains (220.83 ± 65 g) compared to non-chain FSR (350.40 ± 110 g). Neither the QSR nor FSR meals met the recommended nutrient standards for lunch for children aged 5-11 years.

	<p><i>Europe:</i> London, England, UK</p>		<p>and data collected by online websites and at restaurants. Chi-square tests compared the availability of nutrition information of fast food and table service restaurants.</p> <p>Guidelines/criteria Nutrient standards for children aged 5-11 years based on the UK Caroline Walker Trust guidelines</p>		
Roberts et al. 2018 [116]	<p>Measure the energy content of frequently ordered QSR and FSR chain meals in six countries.</p> <p><i>Africa:</i> Accra, Ghana</p> <p><i>Americas:</i> Boston, MA, USA and Ribeirao Preto, Brazil</p> <p><i>Asia:</i> Beijing, China and Bangalore, India</p>	<p>2014 and 2017</p> <p>Descriptive cross-sectional</p>	<p>Outcomes (n=2) Energy (kcal) Energy density (kcal/g)</p> <p>Assessment/evidence Data collected from internet searches, site visits, and lab analysis of selected items using bomb calorimetry. Differences were calculated using least squares means and 95% confidence intervals.</p> <p>Guidelines/criteria 2000 kcal/meal daily energy requirement for an adult woman</p>	<p>111 QSR and FSR chains Not reported</p>	<p>Weighted mean energy of restaurant meals was lower only in China (719 [95% CI 646 to 799] kcal versus 1088 [1002 to 1181] kcal; P &lt;0.001).</p> <p>The country, restaurant type, number of meal components, and meal weight predicted meal energy. A majority (94%) of FSR meals and 72% of QSR meals contained at least 600 kcal. QSR meals contained 33% less energy than FSR meals.</p> <p>Excluding China, consuming QSR and FSR meals daily would provide between 70% and 120% of the daily energy requirement for a sedentary woman.</p>

	<i>Europe:</i> Kuopio, Finland				
Rudelt et al. 2014 [117]	Examine trends in the sodium content of menu offerings at eight QSR chains over 14 years.  <i>North America:</i> USA	1997/1998 and 2009/2010  Descriptive cross-sectional	Outcomes (n=1) Sodium (mg)  Assessment/evidence Percentage change in mean sodium (mg)/menu item was calculated between these two time periods. Menu offerings and nutrient composition information for the menu items were obtained from archival versions of the University of Minnesota Nutrition Coordinating Center (NCC) Food and Nutrient Database. Nutrient composition information for lunch/dinner menu items sold by the QSR chains was updated in the database biannually. Menus were analyzed for changes in mean sodium content of all menu offerings except beverages, and specific categories of menu items among all restaurants and for each individual restaurant.  Guidelines/criteria	8 QSR chains  McDonald's  Burger King  Wendy's  Taco Bell  KFC  Arby's  Jack in the Box  Dairy Queen	No restaurant chain had reduced the sodium content across the lunch/dinner menu offerings over 14 years (including 2000 – 2010). The mean sodium content of menu offerings across the eight chains increased by 23.4 %. The mean sodium content of entrées increased by 17.2% and condiments increased by 26.1 %. Only side dishes showed a decrease of sodium by 6.6 %.

			Maximum intake of ≤ 2,300 mg sodium/day		
Schoffman et al. 2016 [118]	Determine and compare the energy content of entrees sold at QSR versus FCR chains.  <i>North America: USA</i>	Jan 2014  Descriptive cross-sectional	Outcomes (n=1) Energy (kcal)  Assessment/evidence Data collected from the MenuStat Database 2014. Mean energy (kcal) per entrée between QSR and FCR, and the proportion of restaurant entrées that fell into different calorie ranges were assessed based on a statistical significance of P<0.05.  Guidelines/criteria Not reported	62 QSR and FCR chains  White Castle  Panda Express  Krystal  Steak 'N Shake  Subway  Einstein Brothers  Wienerschnitzel  Bruegger's Bagels  Taco Bell  Five Guys  In-N-Out Burger  Au Bon Pain  A&W  Panera Bread  Del Taco  Noodles & Company  McDonald's  Cosi	A total of 3,193 entrées were analyzed at 34 QSR and 28 FCR chains. FCR chains provided significantly more calories per entrée (760 kcal) than QSR entrées (561 kcal). QSRs provided significantly more entrées in the lower calorie categories (< 500 calories/item) and FCRs provided more entrées in the higher-calorie categories (> 751 calories/item).

				Chick-Fil-A Qdoba Taco Bueno Schlotzsky's Arby's Potbelly's Sandwich Works Taco John's Chipotle Burger King Corner Bakery Cafe Hardee's Pollo Tropical Wendy's Culver's Charley's Grilled Subs McAlister's Deli Tropical Smoothie Cafe Jason's Deli Jack in the Box	
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				Moe's Southwest Grill	
				Dairy Queen	
				Smashburger	
				KFC	
				Dickey's Barbecue Pit	
				El Pollo Loco	
				Togo's Eatery/Sandwiches	
				Checker's Drive-In/Rally's	
				Baja Fresh	
				Sonic	
				Zaxby's	
				Church's Chicken	
				Firehouse Subs	
				Carl's Jr.	
				Captain D's	
				Fazoli's	
				Pei Wei	
				Quiznos	
				Boston Market	

				Jimmy John's Whataburger Bojangles' Popeyes Taco Cabana Long John Silver's	
Scourboutakos and L'Abbé, 2012 [119]	Analyze the calorie content of restaurant food items to determine factors that may influence the effectiveness of menu calorie labeling.  <i>North America:</i> Canada	Sept-Dec 2010  Descriptive cross-sectional	Outcomes (n=3) Energy (kcal) Energy density (% kcal/100g food) Portion or serving size (g)  Assessment/evidence Nutrition information was collected from websites of chain restaurants for n=4178 side dishes, entrees, and individual items at 85 chains.  Data analyzed in 2011 using statistical analysis (p= <0.05) considered significant for mean serving size, calories, and calorie density.  Guidelines/criteria Not reported	85 QSR and FSR chains <i>Only few names were mentioned</i>  Boston Rouge Boston Pizza Casey's Denny's Earl's Restaurant East Side Mario's Jack Astors Joey's Restaurant Kelsey's Mike's Restaurant Milestone's Montana's Mr. Greek	FSR chains had higher calories/serving for all food categories compared to QSR chains. There was substantial variation in calories both within and across food categories. Serving size was more strongly correlated with calories than caloric density. Higher-calorie items had a larger serving size compared to lower-calorie items, but did not differ significantly by calorie density.



				Pizza Delight Pizza Hut Scores Rotisserie Shoeless Joe's Swiss Chalet The Keg White Spot	
Scourboutakos et al. 2013 [120]	Analyze the nutritional profile of breakfast, lunch, and dinner meals from FSR chains.  <i>North America:</i> Canada	2010-2011  Descriptive cross-sectional	Outcomes (n=5) Energy (kcal) Fat (g) Saturated fat (g) TFA (g) Sodium (mg)  Assessment/evidence Total of 3,507 different variations of 685 meals and 156 desserts.  Nutrition information collected from online websites. Nutrient values calculated as a percentage of the daily value (%DV).  Guidelines/criteria Daily Value (% DV) based on 2000 kcal/day and % Adequate Intake (AI) of sodium for adults; and	19 FSR chains Not reported	Of 19 FSR chains, breakfast, lunch, and dinner meals consisted of 1128 calories (56% of the daily 2000 calorie recommendation), 151% of the amount of sodium (2269 mg), 89% of the DV for fat (58 g), 83% of the DV for saturated fat, and 0.6 g TFA.  More than 80% of meals exceeded the daily AI for sodium (1500 mg) and more than 50% exceeded the daily UL for sodium (2300 mg). Only 1% of meals had less than recommended target of 600 mg sodium/meal. Almost 50% of meals exceeded the DV for fat (65 g) and 25% exceeded the DV for saturated fat.  Restaurants labeled meals as “healthy” if they contained an average 474 calories, 13 g fat (20% DV), 3 g saturated fat (17% DV), and 752 mg of sodium (50% AI).

			NAM=1500 mg sodium/day		
Scourboutakos et al. 2014 [121]	Analyze the added sugars content in children's meals at QSR and FSR chains.  <i>North America:</i> Toronto, Canada	2010  Descriptive cross-sectional	Outcomes (n=2) Total sugar (g) Added sugars (g)  Assessment/evidence Total sugar levels were taken from websites of 10 QSR and 7 FSR chains. Added sugar levels in children's meals (n=3,178) were calculated in 2014 by subtracting all naturally occurring sugars from the total sugar level.  Guidelines/criteria 1800 kcal/day recommended by Canadian government for a 4 to 8 year old child; and the WHO guidelines for percentage energy from added sugars (5-10%/day)	17 QSR and FSR chains Not specified	There was a wide range of added sugars in children's meals ranging from 0 g to 114 g. Half (50%) of children's meals sold at chain restaurants exceeded the WHO's daily added sugars recommendation.
Scourboutakos and L'Abbé, 2013 [122]	Evaluate the sodium levels in menu items for adults and children at QSR and FSR chains.  <i>North America:</i> Canada	Sept-Dec 2010  Systematic cross-sectional	Outcomes (n=1) Sodium (mg)  Assessment/evidence Nutrition information for 4,044 menu items was collected from FSR (n=20) and QSR (n=65) chain websites and entered into a database. Sodium	65 QSR and 20 FSR chains Not reported	Menu items at FSR chains contained 1,455 mg sodium/serving (or 97% of AI level of 1500 mg/day). At FSR chains, 40% of menu items exceeded AI for sodium and more than 22% of stir fry entrées, sandwiches/wraps, ribs, and pasta entrées with meat/seafood exceeded the daily UL for sodium.  QSR meal items contained an average of 1,011 mg sodium (68% of the daily AI), while side

			<p>content of products was compared to guidelines.</p> <p>Guidelines/criteria  AI of sodium for adults = 1500 mg sodium/day and children = 1200 mg sodium/day  Upper Level (UL) for sodium = 2300 mg sodium/day  2012 and 2014 US National Sodium Reduction Initiative (NSRI) targets</p>		<p>dishes at QSR and FSR chains contained 736 mg (49%).</p> <p>Children's meal items contained an average of 790 mg/serving (66% of the sodium AI for children of 1200 mg/day). A small number of children's items exceeded the daily UL.</p> <p>More than half (52%) of restaurants exceeded the 2012 NSRI sodium targets and 69% exceeded the 2014 sodium targets.</p>
<p>Scourboutakos et al. 2018 [123]</p> <p><i>North America: Canada</i></p>	<p>Assess whether salt substitutes and enhancers were associated with changes in sodium levels at chain restaurants.</p>	<p>2010-2016</p> <p>Longitudinal cross-sectional study</p>	<p>Outcomes (n=1)  Sodium (mg)</p> <p>Assessment/evidence  A longitudinal database (MENU-FLIP) containing nutrition information for Canadian chain restaurants with 20 or more locations nationally were created in 2010 and updated in 2013 and 2016. Changes in sodium levels (per serving) and prevalence of salt substitutes/enhancers in 222 foods from 12 of the QSR chains were compared across three time points. Data analyzed using SAS v 9.3 software.</p>	<p>12 QSR, FCR and FSR chains  A&amp;W  Arby's  Burger King  Edo Japan  KFC  McDonald's  Pizza Pizza  Subway  Taco Del Mar  Taco Time  Tim Hortons</p>	<p>Sixty-nine percent of foods contained a salt substitute/enhancer. Substitutes/enhancers were found in every restaurant chain (n = 12) for which ingredient data were available. The most common substitutes/enhancers were yeast extracts (in 30% of foods), calcium chloride (28%), monosodium glutamate (14%) and potassium chloride (12%).</p> <p>Sodium levels in foods that contained substitutes/enhancers decreased significantly more (<math>190 \pm 42</math> mg/serving) over the study period than those in foods that did not contain a substitute/enhancer (<math>40 \pm 17</math> mg/serving, <math>p &lt; 0.001</math>).</p>

			Guidelines/criteria Not reported		
Scourboutakos et al. 2014 [124]	Measure changes in sodium content of chain restaurant items over three years.  <i>North America:</i> Canada	2010-2013  Longitudinal study	Outcomes (n=4) Energy (kcal) Sodium (mg) Sodium density (mg/100 g) Serving size  Assessment/evidence Data for the serving size, calorie and sodium level of 3878 foods were collected from restaurants.  $\chi^2$ test used to compare the percentage of entrées with sodium levels (mg/serving) greater than the recommended AI level (1500 mg) and UL (2300 mg) in 2010 and 2013.  Data analyzed using SAS v 9.3.  Guidelines/criteria DRV = AI for sodium (1500 mg/day) and Tolerable UL for sodium (2300 mg/day).	61 QSR, FCR and FSR chains 241 Pizza  A&W  Arby's  Baton Rouge  Bento Nouveau  Boston Pizza  Burger King  Casey's Bar and Grill  Coffee Time  Country Style  Dagwoods Sandwiches and Salads  Dairy Queen  Denny's  Druxy's Deli  Earl's Restaurant  East Side Mario's  Edo Japan	Sodium levels (mg/serving) decreased in 30.1% of foods, increased in 16.3% of foods, and were unchanged in 53.6% of foods examined. The prevalence and magnitude of change varied depending on the restaurant and food category.  Average change in foods with a decrease in sodium was -220 (standard deviation [SD] $\pm$ 303) mg/serving (a decline of 19% [SD $\pm$ 17%]), whereas the average change in foods with an increase in sodium was 251 (SD $\pm$ 349) mg/serving (a 44% [SD $\pm$ 104%] increase).  Overall, there was a small, yet significant, decrease in sodium per serving (-25 [SD $\pm$ 268] mg, $p < 0.001$ ). However, the percentage of foods exceeding the daily sodium adequate intake (1500 mg) and tolerable upper intake level (2300 mg) remained unchanged.

				Extreme Pita	
				Flying Wedge Pizza	
				Harvey's	
				Jack Astor's	
				Joey's Restaurants	
				Jugo Juice	
				Kelsey's	
				KFC	
				Little Caesars	
				Manchu Wok	
				McDonald's	
				Mikes	
				Mmmuffins	
				Montana's	
				Mr. Greek 2	
				Mr. Sub	
				Mrs. Vanelli's Fresh Italian Foods	
				New Orleans Pizza	
				New York Fries	

				<p>           Opa! Souvlaki of Greece            Orange Julius            Panago            Pita Pit            Pizza            Pizza Delight            Pizza Hut            Pizza Nova            Pizza Pizza            Pizzaville            Robin's Donuts            Scores Rotisserie            Shoeless Joe's            Subway            Swiss Chalet            Taco Bell            Taco Del Mar            Taco Time            Teriyaki Experience            The Great Canadian Bagel         </p>	
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				<p>Tim Hortons</p> <p>Treats</p> <p>Van Houtte's Bistro</p> <p>White Spot</p> <p>Legendary Restaurant</p> <p>White Spot Triple O's</p>	
Sliwa et al. 2016 [125]	<p>Compare the nutritional content of available children's meal combinations in leading LSR chains with national recommendations.</p> <p><i>North America:</i> USA</p>	<p>May 2014</p> <p>Descriptive cross-sectional</p>	<p>Outcomes (n=5)</p> <p>Energy (kcal)</p> <p>Fat (g)</p> <p>Saturated fat (g)</p> <p>Sodium (mg)</p> <p>Portion size (g/oz)</p> <p>Assessment/evidence</p> <p>Data collected from leading 10 FSR and LSR restaurants from 2013 rankings. Menu screenshots were captured from restaurant websites for child menus.</p> <p>Children's meal combinations analyzed for calorie, fat, saturated fat, and sodium content and compared to several guidelines.</p> <p>Guidelines/criteria</p>	<p>20 chains</p> <p>10 QSR chains</p> <p>Arby's</p> <p>Burger King</p> <p>Chik-Fil-A</p> <p>Dairy Queen</p> <p>Jack-in-the-Box</p> <p>KFC</p> <p>McDonald's</p> <p>Sonic</p> <p>Subway</p> <p>Wendy's</p> <p>10 FCR or FSR chains</p> <p>Applebee's</p> <p>Buffalo Wild Wings</p> <p>Chili's</p> <p>Denny's</p> <p>IHOP</p> <p>Olive Garden</p>	<p>Majority of QSR (72%) and FSR (63%) meal combinations were 600 kcal. Only 31.9% of children's meal combinations at QSR chains and 21.7% at FSR chains met all 4 nutrient criteria (<math>\leq 600</math> kcal/meal, <math>&lt; 35\%</math> kcal from fat, <math>&lt; 105</math> kcal from saturated fat and <math>&lt; 770</math> mg of sodium).</p> <p>In QSR and FCR or FSR segments, calorie target was met more frequently and the sodium target less often.</p>

			DGA 2010 and expert recommendations = ≤ 600 kcal, < 35% kcal from fat, < 105 kcal from saturated fat and < 770 mg sodium/meal	Outback Steakhouse Red Lobster Red Robin TGI Friday's	
Soo et al. 2018 [126]	Examine the nutritional quality of menu items promoted at four QSR chains.  <i>North America:</i> USA	Jun 2010 and Jul 2013  Descriptive cross-sectional	Outcomes (n=5) Energy (kcal) Saturated fat (g) Sugar (g) Sodium (mg) Portion size (g)  Assessment/evidence Menu items pictured on signs and menu boards were recorded at 400 outlets of four QSR chains.  Nutrition scores were calculated with UK Nutrient Profiling Index for items ranging from 0 (poorest nutritional quality) to 100 (highest nutritional quality). Changes the scores and energy of promoted foods and beverages were analyzed using linear regression and significant differences btwn 2010 and 2013 were at (P< 0.05).  Guidelines/criteria	4 QSR chains  McDonald's Burger King Wendy's  Taco Bell	Promoted foods and beverages on general menu boards and signs remained below the 'healthier' cut-off at both time points. On general menu boards, pictured items were modestly healthier from 2010 to 2013 at all chains except Taco Bell, where pictured items increased in energy.  Foods and beverages pictured on the kids' section showed the greatest nutritional improvements. Although promoted foods on general menu boards and signs improved in nutritional quality, beverages remained the same or were less healthy.



			UK Nutrient Profiling Index		
Stender et al. 2006 [127]	Analyze and compare TFA content of selected fast food items across 20 countries.  <i>Europe</i> Austria Czech Republic Denmark Hungary Finland France Germany Italy Netherlands Norway Poland Portugal Russia Spain Sweden United Kingdom (UK) [Aberdeen, Scotland; London, England]	Nov 2004 and Sept 2005  Longitudinal cross-sectional	Outcomes (n=1) TFA (g) Assessment/evidence Foods were homogenized and TFA content analyzed by capillary gas chromatography.  Results for fries and chicken nuggets were expressed as amounts/serving (i.e., 171 g of fries and 160 g of chicken).  Guidelines/criteria WHO recommendation for countries to virtually eliminate artificial TFA in the food supply	2 QSR chains McDonald's KFC	The TFA content varied from <1 g/serving in Denmark and Germany to 10 g in New York (McDonald's) and 24 g in Hungary (KFC).  Fifty percent of the 43 servings contained more than 5 g TFA/serving. Amount of daily intake was associated with a 25 percent increase in the risk of CHD.  Cooking oil used for fries at McDonald's outlets in the USA and Peru contained 23 percent and 24 percent TFA whereas oils used in many European countries contained only 10 percent TFA, some countries as low as 1 percent (Denmark) and 5 percent (Spain). At KFC, some values for TFA content were above 30 percent.
Uechi, 2018 [128]	Assess the nutritional quality of children's meals sold at chain restaurants.	Oct-Nov 2017  Descriptive cross-sectional	Outcomes (n=4) Energy (kJ) Sugar (g) Fat (g) Sodium (mg)	20 chain restaurants Not specified	More than half of restaurants had aligned with the nutrient standards of the Japanese School Lunch Program for energy. Overall, 58.9%, 40.6%, and 34.5% of the children's meals met the energy ( $\leq 2218$ kJ), fat ( $\leq 30\%$ energy) and salt ( $< 2$

	Asia: Japan		<p>Assessment/evidence Children's meals (n=438) were assessed at 42 locations. Data collected from restaurants' websites and the analysis used SAS version 9.4 and P&lt;0.05.</p> <p>Guidelines/criteria Japanese School Lunch Program standards for energy (<math>\leq 2218</math> kJ), fat (<math>\leq 30\%</math> energy), salt (g)</p> <p>6-7 years: 2218 kJ (530 kcal/meal) 12-14 years: 3431 kJ (820 kcal/meal)</p>		<p>g) content, respectively. About 15.5% of children's meals met the recommended energy, fat and salt standards.</p> <p>'Japanese-style' (restaurant-level characteristic) was associated with a decrease in the fat and an increase in the salt content.</p>
Urban et al. 2014 [129]	<p>Examine variability of popular food items at QSR chains over 18 years.</p> <p>North America: USA</p>	<p><b>1996-2013</b> <b>Period of interest:</b> <b>2000-2013</b></p> <p>Descriptive cross-sectional study</p>	<p>Outcomes (n=4) Energy (kcal) Sodium (mg) Saturated fat (g) TFA (g)</p> <p>Assessment/evidence Items selected were fries, cheeseburgers, grilled chicken sandwich, and soda.</p> <p>Data collected using an archival website. Time trends assessed using</p>	<p>3 QSR chains Not specified</p>	<p>Energy content per serving differed among chain restaurants for all menu items. Energy content of 56% of items decreased (<math>\beta</math> range, -0.1 to -5.8 kcal) and the content of 44% increased (<math>\beta</math> range, 0.6-10.6 kcal).</p> <p>Sodium content of 18% of items significantly decreased (<math>\beta</math> range, -4.1 to -24.0 mg) and 33% increased (<math>\beta</math> range, 1.9-29.6 mg).</p> <p>After 2009, saturated fat and TFA content was modest for fries. In 2013, energy content of a large-sized bundled meal (cheeseburger, fries and soda) represented 65% to 80% of a 2,000 kcal/day. Sodium content represented 63% to</p>

			<p>simple linear regression models.</p> <p>Guidelines/criteria 2000 kcal/day; 2300 mg and 1500 mg sodium/day</p>		<p>91% of the 2300 mg/day and 97% to 39% of the 1500 mg/day.</p>
Urban et al. 2014 [130]	<p>Analyze nutrient content of frequently ordered items from three QSR chains.</p> <p><i>North America: USA</i></p>	<p><b>2000 -2013</b></p> <p>Descriptive cross-sectional</p>	<p>Outcomes (n=3) Sodium density (mg/1000 kcal) Saturated fat (g/1000 kcal) TFA (g/1000 kcal)</p> <p>Assessment/evidence Products sampled: fried potatoes (large fries), cheeseburgers (2-oz and 4-oz), and a grilled chicken sandwich. They used an archival website to obtain data. The amount of each nutrient per 1,000 kcal was calculated to determine product reformulation trends. Data analyzed using SAS version 9.3.</p> <p>Guidelines/criteria Not reported</p>	<p>3 QSR chains</p> <p>Not reported</p>	<p>Sodium content per 1000 kcal differed widely among the three chains by food item, precluding generalizations across chains. During the 14-year period, sodium content per 1000 kcal for large fries remained high at all chains, although the range narrowed from 316-2,000 mg per 1000 kcal in 2000 to 700-1,420 mg per 1000 kcal in 2013.</p> <p>Cheeseburgers were the main contributor of saturated fat, and there was little change in content per 1000 kcal for this item during the 14-year period. In contrast, there was a sharp decline in saturated fat and TFA of large fries per 1000 kcal. After 2009, the major contributor of TFA/1000 kcal was cheeseburgers; and TFA content of this item remained stable during the 14-year period.</p>
Waterlander et al. 2014 [131]	<p>Determine the mean nutrient content and contribution to recommended daily intakes for energy, saturated</p>	<p>January 2014</p> <p>Descriptive cross-sectional study</p>	<p>Outcomes (n=4) Energy (kcal) Saturated fat (g) Sugar (g) Sodium (mg)</p> <p>Assessment/evidence</p>	<p>4 QSR chains</p> <p>McDonalds KFC Pizza Hut Burger King</p>	<p>The most popular burger combo meals and pizza contributed between one-third and a half of the adult's RDI for energy and nutrients.</p> <p>Combo meals provided at least 94% of the RDI for sugar when applying the new WHO guideline (5% RDI). The mean range in sodium</p>

	<p>fat, sugar, and sodium.</p> <p><i>Oceania:</i> New Zealand</p>		<p>Online survey completed for four QSR chains. The most popular QSR items were determined (n=104 NZ adults in Jan 2014) that examined reported QSR intake over past month. Nutrient content of QSR items determined using the 2013 version of Nutritrack.</p> <p>Guidelines/criteria RDI for adult men and women, respectively, for energy 13,300/9900 kJ; saturated fat 42.3g/31.5g; sugar 117.4/87.4g; and sodium 2,300 mg/day. Additionally, the WHO guideline for free or added sugars intake (5% RDI for energy).</p>		<p>content of salads available at different chains was 133 (172) mg per serving at KFC to 967 (809) mg per serving at Burger King.</p>
Wellard et al. 2012 [132]	<p>Analyze the nutritional composition of children's meals at six QSR chains.</p> <p><i>Oceania:</i> New South Wales, Australia</p>	<p>November 2010</p> <p>Descriptive cross-sectional study</p>	<p>Outcomes (n=4) Energy (kJ) Saturated fat (g) Sugar (g) Sodium (mg)</p> <p>Assessment/evidence Data of nutritional composition of children's meals were surveyed, and estimated recommended</p>	<p>6 QSR chains Chicken Treat Hungry Jack's KFC McDonald's Oporto Red Rooster</p>	<p>Of 199 children's meal combinations analyzed, each chain had a different number of meal combinations that varied from 3 to 144.</p> <p>The mean nutritional composition for all children's meals was 2229 kJ, 6.4 g saturated fat, 27.7 g sugar and 702 mg sodium per meal.</p> <p>Only 16% and 22% of meals met the industry's nutrient criteria for children aged 4-8 and 9-13 years, respectively. Seventy-two percent of QSR</p>

			<p>daily quantities of nutrients were calculated for a 4, 8 and 13-year-old child.</p> <p>Guidelines/criteria Nutrient Reference Values and the Dietary Guidelines for Children and Adolescents in Australia for saturated fat <math>\leq 10\%</math> total energy and sugar <math>&lt; 20\%</math> total energy.</p>		<p>meals exceeded 30% of the daily energy recommendations for 4 year old children, and 90% of meals exceeded 30% of the upper limit for sodium for children aged 4–8. Some meals also exceeded the upper limit for sodium and daily saturated fat recommendations for children aged 4–8 years.</p>
Wellard-Cole et al. 2018 [133]	<p>Examine the energy content of Australian QSR food menu items over seven years, before and after the introduction of menu board labelling, to determine the impact of the introduction of the legislation.</p> <p><i>Oceania:</i> Australia, New South Wales</p>	<p>2009-2015</p> <p>Observational cross-sectional</p>	<p>Outcomes (n=1) Energy (kJ) Energy density (kJ/100 g and kJ/serving)</p> <p>Assessment/evidence Menu items were collected from the QSR chain websites annually and analyzed for the median energy content/serving of standard menu items/100 g to assess changes over six years. Data analyzed using SAS v 9.3.</p> <p>Guidelines/criteria Not reported</p>	<p>5 QSR chains Hungry Jack's KFC McDonald's Oporto Red Rooster</p>	<p>Certain QSR chains had menu item categories with significant increases in the energy content over seven years. Overall, there were no significant or systematic decrease in energy following the introduction of menu labelling (<math>P=0.19</math> by +17 kJ/100 g, <math>P=0.83</math> by +8 kJ/serving). Limited-time only items were significantly higher in median energy content per 100 g than standard menu items (+74 kJ/100 g, <math>P=0.002</math>).</p>

<p>Wolfson et al. 2017 [134]</p>	<p>Assessed trends in sodium content of menu items at chain restaurants.</p> <p><i>North America:</i> USA</p>	<p>2012 to 2016</p> <p>Descriptive Cross-sectional</p>	<p>Outcomes (n=1) Sodium (mg)</p> <p>Assessment/evidence Data from 21,557 menu items were analyzed from the MenuStat Database in 2017.</p> <p>Generalized linear models were used to examine changes in calorie-adjusted, per-item sodium content of menu items offered in all and items offered in 2012 only compared with items newly introduced in 2013, 2014, 2015, and 2016.</p> <p>Guidelines/criteria DGA 2015-2020 target of <math>\leq 2300</math> mg sodium/day</p>	<p>66 QSR, FCR and FSR chains Restaurants not reported</p>	<p>Calorie-adjusted sodium content in newly introduced menu items declined by 104 mg from 2012 to 2016 (<math>p &lt; 0.02</math>). The magnitude and direction of changes varied by menu category and restaurant type. Sodium content for main-course items was high. Sodium declined by 83 mg in QSR chains, 19 mg in FCR chains, and 163 mg in FSR chains.</p> <p>Sodium in appetizer and side items newly introduced in 2016 increased by 266 mg compared with items on the menu in 2012 only (<math>p &lt; 0.01</math>). Sodium in main courses newly introduced in 2016 declined by 124 mg compared with items on the menu in 2012 only (<math>p = 0.01</math>), with the greatest decline, 207 mg (<math>p = 0.03</math>), among salads.</p>
<p>Ziauddeen et al. 2015 [135]</p>	<p>Compare the nutritional composition of QSR products in 10 countries.</p> <p><i>Asia:</i> China and Japan</p>	<p>Jan- Mar 2012</p> <p>Descriptive cross-sectional</p>	<p>Outcomes (n=3) Energy (kJ) Fat (g) Saturated fat (g)</p> <p>Assessment/evidence Data for 2961 food and beverage products were collected from QSR chains' websites. A survey of the reported nutrient content</p>	<p>5 QSR chains Burger King <i>(Hungry Jack's in Australia and New Zealand)</i> KFC McDonald's Pizza Hut Subway</p>	<p>There was considerable variability in energy and fat content of QSR products across the 10 countries, reflecting variability for the portfolio of products and serving sizes. Differences in total energy between countries were noted for chicken dishes (649–1197 kJ/100 g) and sandwiches (552–1050 kJ/100 g). When comparing the same product between countries, variations were</p>

	<p><i>Europe:</i> Germany, Netherlands, United Kingdom</p> <p><i>Mediterranean:</i> United Arab Emirates</p> <p><i>North America:</i> Canada and USA</p> <p><i>Oceania:</i> Australia and New Zealand</p>		<p>and content per 100 g of items was completed across 10 countries. Data checked for distribution and medians and ranges were calculated with SPSS v21.</p> <p>Guidelines/criteria Not reported</p>		<p>consistently observed in total energy and fat content (g/100 g), such as McDonald's Chicken McNuggets with 12 g total fat/100 g in Germany compared with 21.1 g/100 g in New Zealand.</p>
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**Abbreviations and Acronyms**

AI (Adequate Intake); Dietary Guidelines for Americans (DGA); Dietary Reference Value (DRV); Daily Value (DV); Food and Drug Administration (FDA); Food Standards Agency (FSA); Healthy Eating Index (HEI); grams (g); Kentucky Fried Chicken (KFC); kilocalories (kcal); kilojoules (kJ); milligrams (mg); fast-casual restaurants (FCR); full-service restaurants (FSR); limited-service restaurants (LSR); National Academy of Medicine (NAM); quick-service restaurants (QSR); National Health and Nutrition Examination Survey (NHANES); National Sodium Reduction Initiative (NSRI); Recommended Daily Intakes (RDIs); trans fatty acids (TFA); United Kingdom (UK); United States of America (USA); United States Department of Agriculture (USDA); Upper Level (UL); and What We Eat in America (WWEIA).

**Supplemental Table 4.** Published studies of transnational restaurant chains to reformulate products and standardize portions to meet healthy dietary guidelines by geographic region and country, 2000-2019.

*The citations below [86-135] correspond to the manuscript.*

Lead author, year	Africa Ghana (n=1) Egypt (n=1)	Americas <i>North America:</i> Canada (n=9) and USA (n=29)  <i>Latin America and Caribbean or South America:</i> Brazil (n=1), Costa Rica (n=1), Guatemala (n=1), and Peru (n=1)	Asia China (n=2), India (n=2) and Japan (n=2)	Europe 16 countries (ie, France, Netherlands); Spain (n=2) and UK (n=5)	Middle East United Arab Emirates (n=2)	Oceania Australia (n=9) and New Zealand (n=7)
Ahuja et al. 2015 [87]		<i>North America:</i> USA				
Astiasarán et al. 2017 [88]				<i>Europe:</i> Spain Pamplona, Navarra		
Auchincloss et al. 2014 [89]		<i>North America:</i> USA				
Bauer et al. 2012 [90]		<i>North America:</i> USA				
Bleich et al. 2015 [91]		<i>North America:</i> USA				
Bleich et al. 2016 [92]		<i>North America:</i> USA				
Bleich et al. 2017 [93]		<i>North America:</i> USA				



Brindal et al. 2008 [94]						<i>Oceania:</i> Australia
Bruemmer et al. 2012 [95]		<i>North America:</i> US				
Chand et al. 2012 [96]						<i>Oceania:</i> New Zealand
Cohen et al. 2017 [86]		<i>North America:</i> USA				
Deierlein et al. 2015 [97]		<i>North America:</i> USA				
Dunford et al. 2010 [98]						<i>Oceania:</i> Australia
Dunford et al. 2012 [99] <i>Six countries across three regions</i>		<i>North America:</i> Canada and USA		<i>Europe:</i> France and UK		<i>Oceania:</i> Australia and New Zealand
<b>Eissa et al. 2017 [100]</b>		<i>North America:</i> USA				
Eyles et al. 2018 [101]						<i>Oceania:</i> New Zealand
Garcia et al. 2014 [102]						<i>Oceania:</i> Australia
Garemo and Naimi, 2018 [103]					<i>Middle East:</i>  Abu Dhabi, United Arab Emirates	
Hearst et al. 2013 [104]		<i>North America:</i> USA				
Heredia-Blonval et al. 2014 [105]		<i>Latin America:</i> Costa Rica				
Hobin et al. 2014 [106] <i>Five countries across three regions</i>		<i>North America:</i> Canada and USA		<i>Europe:</i> UK		<i>Oceania:</i> Australia and New Zealand

Jacobson et al. 2013 [107]		North America: USA				
Jarlenski et al. 2016 [108]		North America: USA				
Khan et al. 2018 [109] <i>Four countries across four regions</i>	Africa: Egypt	North America: USA	Asia: India			Oceania: Australia
Kirkpatrick et al. 2013 [110]		North America: USA				
Mazariegos et al. 2016 [111]		Latin America: Guatemala				
Moran et al. 2017 [112]		North America: USA				
O'Donnell et al. 2008 [113]		North America: Houston, TX, USA				
Prentice et al. 2015 [114]						Oceania: New Zealand
Reeves et al. 2011 [115]				Europe: London, England, UK		
Roberts et al. 2018 [116] <i>Six countries across four regions</i>	Africa: Accra, Ghana	North America: Boston, USA  South America: Ribeiro Preto, Brazil	Asia: Beijing, China and Bangalore, India	Europe: Kuopio, Finland		
Rudelt et al. 2014 [117]		North America: USA				
Schoffman et al. 2016 [118]		North America: USA				

Scourboutakos and L'Abbé, 2012 [119]		North America: Canada				
Scourboutakos et al. 2013 [120]		North America: Canada				
Scourboutakos et al. 2014 [121]		North America: Canada				
Scourboutakos and L'Abbé, 2013 [122]		North America: Canada				
Scourboutakos et al. 2016 [123]		North America: Canada				
Scourboutakos et al. 2014 [124]		North America: Canada				
Sliwa et al. 2016 [125]		North America: USA				
Soo et al. 2018 [126]		North America: USA				
Stender et al. 2006 [127] <i>17 countries across two regions</i>		North America: USA  South America: Peru		Europe Austria Czech Republic Denmark Hungary Finland France Germany Italy Netherlands Norway Poland Portugal Russia Spain Sweden United Kingdom (UK)		

				[Aberdeen, Scotland; London, England]		
Uechi, 2018 [128]			<i>Asia:</i> Japan			
Urban et al. 2014 [129]		<i>North America:</i> USA				
Urban et al. 2014 [130]		<i>North America:</i> USA				
Waterlander et al. 2014 [131]						<i>Oceania:</i> New Zealand
Wellard et al. 2012 [132]						<i>Oceania:</i> New South Wales, Australia
Wellard-Cole et al. 2018 [133]						<i>Oceania:</i> New South Wales, Australia
Wolfson et al. 2017 [134]		<i>North America:</i> USA				
Ziauddeen et al. 2015 [135] <i>Ten countries across five regions</i>		<i>North America:</i> Canada and USA	<i>Asia:</i> China and Japan	<i>Europe:</i> Germany, Netherlands, UK	<i>Mediterranean:</i> United Arab Emirates	<i>Oceania:</i> Australia and New Zealand