



Question: What is the relationship between eating out and take-away meals and body weight in children and adults?

Table 1. Summary table for studies examining the relationship between meals eaten away from home and weight outcomes in children and during the transition from childhood to adulthood

Author, Year Study Design, Duration Data Source, Location Risk of Bias*	Sample Size Age % Female Race/Ethnicity Weight Status	Measure of Eating Out/Take Away Meals Weight Measures	Results
Children			
Bisset, 2007 Quebec Heart Health Demonstration Project, Canada Prospective Cohort (PC), 5y 7/24	N=1,188 4th grade 47% female NR 12.4% overweight; 7.3% obese	Weekly fast food consumption was measured with a self-administered food frequency questionnaire (FFQ) assessing intake of: 1) French fries or poutine (consists of French fries, sauce, and cheese curds) 2) Hamburgers 3) Hot dogs 4) Fried chicken Responses were coded 0, 1.5 and 3 times/week and summed to create a weekly intake index. Data collected at baseline in grade four, grade six, grade seven and grade nine Self-reported 9th grade height and weight used to calculate body mass index (BMI)	Obesity Obese students in grade nine reported a higher consumption of fast food at baseline in grade four [0.77 (0.33); P<0.05].
Fraser, 2012 Avon Longitudinal Study of Parents and Children (ALSPAC), UK PC, 2y Risk of Bias: 4/24	N=4,022 for fast food consumption 13y 51.2% female Not Reported (NR) Obese at 13y (13.1%), obese at 15 y (12.0%)	Frequency of eating in fast food restaurant assessed with FFQ question: "How often does s/he eat in a fast food restaurant?"; 5 response options then coded into binary variable: Eat fast food, yes/no. Measured height and weight at baseline to calculate; body fat percentage measured by Dual-energy X-ray absorptiometry (DEXA)	Fast-food consumption at baseline (age 13) and anthropometric outcomes at 2y follow-up (age 15): <i>BMI z-score:</i> $\beta=0.0822$ (SE=0.028); P<0.05 <i>Body fat percentage at 15y:</i> $\beta=2.063$ (SE=0.3713); P<0.05 <i>Obesity:</i> OR=1.23 (95% CI = 1.02-1.49)
Haines, 2007	N=2,516	Fast food restaurant intake was collected at baseline	Overweight total sample (included



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<p>Project Eating Among Teens (EAT) I and II, USA</p> <p>PC, 5y</p> <p>7/24</p>	<p>Younger cohort (33% of sample) mean age of 12.8±0.8y; older cohort (66% of sample) mean age of 15.8±0.8y</p> <p>55% female</p> <p>48.3% white, 18.9% African American, 5.8% Hispanic, 19.6% Asian, 3.6% Native American and 3.8% mixed race or other</p> <p>Time 1: (25.7%) girls and (26.4%) boys met the age-adjusted criteria for overweight, by Time 2: 12.0% of the girls and 9.9% of the boys became overweight.</p>	<p>and year five using a FFQ, which included a question "In the past week, how often did you eat something from a fast food restaurant?"</p> <p>Self-reported height and weight at baseline and 5y follow-up.</p>	<p>those overweight and not overweight at baseline):</p> <p><i>Girls:</i> (OR=0.88, 95% CI: 0.79, 0.98; P<0.05). <i>Boys:</i> NS</p> <p>Incidence of overweight (excluded prevalent overweight at baseline): NS in girls and boys</p>
<p>Laska, 2012</p> <p>Identifying Determinants of Eating and Activity (IDEA) and the Etiology of Childhood Obesity (ECHO) cohorts, USA</p> <p>PC, 2 y</p> <p>4/24</p>	<p>N=693</p> <p>14.6 y (SD=1.83)</p> <p>51% female</p> <p>White (87%)</p> <p>Mean BMI (22, SD=5); Mean percent body fat (21.3, SD=9.18)</p>	<p>Frequency of fast food purchases assessed with survey question: "In the past month... how many times did you buy food at a restaurant where food is ordered at a counter or at a drive-through window (there is no waiter/waitresses)?" Numerous examples of fast food facility types provided.</p> <p>Measured height and weight during clinic visit, percent body fat assessed with digital bioelectrical impedance scale</p>	<p>Fast-food intake and longitudinal anthropometric outcomes at 2-yr follow-up:</p> <p>BMI</p> <p><i>Males:</i> NS <i>Females:</i> NS</p> <p>Percent body fat</p> <p><i>Males:</i> NS <i>Females:</i> NS</p>



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<p>MacFarlane, 2009</p> <p>Health, Eating and Play Study (HEAPS),</p> <p>Australia</p> <p>PC, 3y</p> <p>4/24</p>	<p>N=293</p> <p>5-12 y (Younger children (5-6 y); Older children (10-12 y))</p> <p>50.5% female</p> <p>NR</p> <p>Baseline obesity rate (19.8%)</p>	<p>Parent report of child baseline frequency of eating takeaway or fast foods away from home</p> <p>Measured height and weight at baseline and follow up</p>	<p>Child intake of take-away/fast-food meals and anthropometric outcomes at follow up (ref: < once/week)</p> <p>BMI z-score</p> <p><i>Younger children (6y): NS</i></p> <p><i>Older children (11y): NS</i></p> <p>Prevalence overweight</p> <p><i>Younger children (6y): NS</i></p> <p><i>Older children (11y): NS</i></p>
<p>Taveras, 2005</p> <p>Growing Up Today Study, USA</p> <p>PC, 3y</p> <p>4/24</p>	<p>N=14,355</p> <p>9-14y</p> <p>54% female</p> <p>93.7% were non-Hispanic white</p> <p>Mean BMI:</p> <p><i>Girls: 9-12y: 18.4kg/m²; 13-14y: 20.2kg/m²</i></p> <p><i>Boys: 9-12y: 19.2kg/m²; 13-14y: 19.3kg/m²</i></p>	<p>Data were collected by an annual mailed self-administered questionnaire in 1996, 1997, 1998 and 1999. Intake of fried foods away from home (FFA) was determined using a question: "How often do you eat FFA (e.g., French fries, chicken nuggets)?"</p> <p>Children self-reported height and weight each year and BMI was computed</p>	<p>BMI</p> <p>BMI was found to be greater across increasing categories of FFA in boys (P<0.02), and the full sample (P<0.002), but not girls.</p> <p>Boys who decreased their consumption of FFA from "four to seven a week" to "never or less than once a week" decreased their BMI [-0.31 (-0.62 to 0.00)]; however, girls who decreased their consumption of FFA from "four to seven times a week" to "never or less than once a week" gained weight [0.27 (-0.02 to 0.56)].</p>
<p>Thompson, 2004</p>	<p>N=101 girls</p>	<p>Assessed number of occasions per week ate of</p>	<p>Change in BMI Z-score</p>



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<p>MIT longitudinal growth and development study (convenient sample), USA</p> <p>PC, 6y</p> <p>4/24</p>	<p>Median age: 9y</p> <p>100%</p> <p>74% white, 26% other</p> <p>Median: BMI 16.4kg/m²</p>	<p>food away from home in 3 categories:</p> <p>1) Quick-service food from a national quick-service food outlet or from local submarine (sandwich) shops, ice cream parlors and street vendors,</p> <p>2) Coffee-shop food from a coffee shop or doughnut shop, and</p> <p>3) Restaurant food from a pizza parlor, a self-service restaurant, or a wait-staff restaurant</p> <p>Subjects provided seven-day food records at baseline and follow-up</p> <p>Measured height and weight used to derive BMI Z-scores</p>	<p>Weekly frequency of consuming food purchased away from home/week at baseline:</p> <p>Quick-service food was positively associated with change in BMI Z-score (F=6.49, P<0.01)</p> <p><i>Coffee shops:</i> NS <i>Restaurants:</i> NS</p> <p>Participants who ate quick-service food twice a week or more at baseline had the greatest mean change in BMI Z-score at follow-up, and this change was significantly different from that seen in girls who ate quick-service food once a week or not at all (P<0.05).</p>
Transition from Adolescence to Adult			
<p>Niemeier, 2006</p> <p>National Longitudinal Study of Adolescent Health, Wave II (1996) and Wave III (2001 to 2002) (Add Health), USA</p> <p>PC, 5y</p>	<p>N=9,919</p> <p>16 years at Wave II; 21 years at Wave III</p> <p>Sex NR</p> <p>66.1% white; 15% African American; 11.9% Hispanic; 4.1% Asian; 2.1% Native American;</p>	<p>Fast food consumption measured at both waves by single item asking "In the last seven days, on how many days did you eat at a fast food type place- McDonalds, Kentucky Fried Chicken, Pizza Hut, Taco Bell, etc.?"</p> <p>Measured height and weight at both Waves used to calculate BMI and BMI Z-scores</p>	<p>BMI Z-scores: Increased fast food consumption at Wave II predicted significantly higher BMI Z-scores at Wave III ($\beta=0.02$ (SE=0.01), P<0.05).</p> <p>Change in fast food consumption between Wave II and III did not significantly predict BMI Z-score at Wave III.</p>



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6/24	0.9% other Wave II BMI=23kg/m ²		