



Table S1. Percentage of consumers' usual intakes by age and gender, adults 19+ years of age: NHANES 2001–2012

| Group | Age min. | Age max | Gender | N | < 1 Serving | | 1-2 Servings | | 2+ Servings | |
|-------|-------------|------------|--------|--------|-------------|-----|--------------|-----|-------------|-----|
| | | | | | % | SE | % | SE | % | SE |
| Water | 19 | 34 | All | 7,915 | 10.8 | 0.6 | 12.0 | 0.6 | 77.2 | 0.9 |
| Water | 19 | 34 | Male | 4,206 | 7.4 | 0.6 | 13.5 | 0.8 | 79.1 | 1.0 |
| Water | 19 | 34 | Female | 3,709 | 14.5 | 0.9 | 10.4 | 0.7 | 75.1 | 1.2 |
| Water | 35 | 50 | All | 7,232 | 10.1 | 0.5 | 12.4 | 0.6 | 77.4 | 0.8 |
| Water | 35 | 50 | Male | 3,598 | 8.9 | 0.7 | 14.5 | 0.8 | 76.6 | 1.1 |
| Water | 35 | 50 | Female | 3,634 | 11.4 | 0.7 | 10.4 | 0.7 | 78.2 | 1.0 |
| Water | 19 | 50 | All | 15,147 | 10.4 | 0.4 | 12.2 | 0.5 | 77.3 | 0.7 |
| Water | 19 | 50 | Male | 7,804 | 8.2 | 0.5 | 14.0 | 0.6 | 77.8 | 0.8 |
| Water | 19 | 50 | Female | 7,343 | 12.8 | 0.6 | 10.4 | 0.6 | 76.8 | 0.9 |
| Water | 51 | 99 | All | 10,667 | 11.9 | 0.5 | 11.9 | 0.5 | 76.2 | 0.6 |
| Water | 51 | 99 | Male | 5,285 | 14.3 | 0.8 | 12.5 | 0.9 | 73.2 | 1.0 |
| Water | 51 | 99 | Female | 5,382 | 9.8 | 0.6 | 11.4 | 0.6 | 78.7 | 0.8 |
| Water | 19 | 99 | All | 25,814 | 11.0 | 0.4 | 12.1 | 0.4 | 76.9 | 0.6 |
| Water | 19 | 99 | Male | 13,089 | 10.2 | 0.4 | 13.5 | 0.5 | 76.3 | 0.7 |
| Water | 19 | 99 | Female | 12,725 | 11.7 | 0.5 | 10.8 | 0.5 | 77.5 | 0.7 |
| LCSB | 19 | 34 | All | 7,915 | 86.8 | 0.6 | 7.3 | 0.5 | 5.9 | 0.4 |
| LCSB | 19 | 34 | Male | 4,206 | 89.7 | 0.7 | 5.7 | 0.6 | 4.6 | 0.5 |
| LCSB | 19 | 34 | Female | 3,709 | 83.5 | 1.0 | 9.2 | 0.7 | 7.4 | 0.7 |
| LCSB | 35 | 50 | All | 7,232 | 74.7 | 1.0 | 11.3 | 0.5 | 13.9 | 0.7 |
| LCSB | 35 | 50 | Male | 3,598 | 76.0 | 1.1 | 10.9 | 0.7 | 13.1 | 0.9 |
| LCSB | 35 | 50 | Female | 3,634 | 73.5 | 1.2 | 11.8 | 0.8 | 14.8 | 1.0 |
| LCSB | 19 | 50 | All | 15,147 | 80.6 | 0.7 | 9.4 | 0.4 | 10.0 | 0.5 |
| LCSB | 19 | 50 | Male | 7,804 | 82.9 | 0.8 | 8.3 | 0.5 | 8.8 | 0.6 |
| LCSB | 19 | 50 | Female | 7,343 | 78.2 | 0.9 | 10.5 | 0.5 | 11.3 | 0.7 |
| LCSB | 51 | 99 | All | 10,667 | 79.3 | 0.6 | 11.0 | 0.5 | 9.7 | 0.5 |
| LCSB | 51 | 99 | Male | 5,285 | 79.4 | 0.8 | 10.9 | 0.6 | 9.7 | 0.7 |
| LCSB | 51 | 99 | Female | 5,382 | 79.3 | 0.9 | 11.0 | 0.7 | 9.7 | 0.6 |
| LCSB | 19 | 99 | All | 25,814 | 80.2 | 0.5 | 10.0 | 0.3 | 9.9 | 0.4 |
| LCSB | 19 | 99 | Male | 13,089 | 81.7 | 0.6 | 9.1 | 0.4 | 9.1 | 0.5 |
| LCSB | 19 | 99 | Female | 12,725 | 78.6 | 0.7 | 10.7 | 0.4 | 10.6 | 0.5 |

Individual usual intake was determined for each subject using the NCI method. Based on individual intake, the percentage consumers of LCSB and Water was estimated by age group, gender, and servings categories. Abbreviations: LCSB, no-and low-calorie sweetened beverages

Table S2. Associations between beverage consumption and energy and macronutrient intakes in males and females 19+ years of age: NHANES 2001–2012

| Variables | No- and Low-Calorie Sweetened beverages | | | | Water | | | | LCSB vs Water Trend |
|----------------------|---|-----------------|----------------|-----------------|----------------|-----------------|----------------|-----------------|------------------------------|
| | < 1 serving | 1-2 Servings | 2+ Servings | Linear trend | < 1 Serving | 1-2 Servings | 2+ Servings | Linear trend | Linear trend |
| Females | | | | | | | | | |
| Energy (kcal) | 1784 ± 12 | 1704 ± 25 | 1730 ± 31 | 0.081 | 1831 ± 26 | 1776 ± 30 | 1766 ± 13 | 0.103 | NS |
| Carbohydrate (g) | 231 ± 1 | 219 ± 2 | 207 ± 2 | <0.001 | 237 ± 2 | 230 ± 2 | 227 ± 1 | <0.001 | * |
| Total sugar (g) | 108 ± 1 | 91 ± 2 | 79 ± 2 | <0.001 | 119 ± 3 | 109 ± 2 | 102 ± 1 | <0.001 | * |
| Added sugar (tsp eq) | 16.2 ± 0.2 | 13.0 ± 0.5 | 11.1 ± 0.5 | <0.001 | 20.2 ± 0.6 | 17.5 ± 0.4 | 14.8 ± 0.2 | <0.001 | * |
| Dietary fiber (g) | 14.9 ± 0.2 | 15.2 ± 0.3 | 14.2 ± 0.3 | 0.065 | 13.1 ± 0.3 | 13.8 ± 0.3 | 15.3 ± 0.2 | <0.001 | * |
| Protein (g) | 67.6 ± 0.4 | 70.0 ± 0.9 | 72.2 ± 1.0 | <0.001 | 64.5 ± 0.8 | 66.2 ± 0.9 | 68.9 ± 0.4 | <0.001 | NS |
| Total fat (g) | 65.6 ± 0.3 | 69.6 ± 0.9 | 73.4 ± 0.9 | <0.001 | 64.3 ± 1.0 | 66.2 ± 0.8 | 66.7 ± 0.3 | 0.148 | * |
| Total MFA (g) | 23.9 ± 0.2 | 25.2 ± 0.4 | 26.9 ± 0.4 | <0.001 | 23.5 ± 0.4 | 24.0 ± 0.3 | 24.3 ± 0.2 | 0.072 | * |
| Total PUFA (g) | 15.0 ± 0.1 | 16.2 ± 0.3 | 16.9 ± 0.4 | <0.001 | 14.1 ± 0.3 | 15.1 ± 0.4 | 15.3 ± 0.1 | 0.044 | * |
| Total SFA (g) | 20.9 ± 0.1 | 22.1 ± 0.4 | 23.2 ± 0.4 | <0.001 | 20.8 ± 0.4 | 21.0 ± 0.3 | 21.2 ± 0.1 | 0.792 | * |
| Males | | | | | | | | | |
| Energy (kcal) | 2454 ± 16 | 2362 ± 40 | 2426 ± 45 | 0.667 | 2514 ± 42 | 2467 ± 35 | 2435 ± 18 | 0.221 | NS |
| Carbohydrate (g) | 311 ± 1 | 292 ± 3 | 279 ± 4 | <0.001 | 315 ± 3 | 314 ± 2 | 306 ± 1 | <0.001 | * |
| Total sugar (g) | 142 ± 1 | 119 ± 3 | 104 ± 4 | <0.001 | 154 ± 3 | 147 ± 2 | 134 ± 1 | <0.001 | * |
| Added sugar (tsp eq) | 22.9 ± 0.3 | 18.5 ± 0.7 | 16.0 ± 0.8 | <0.001 | 27.3 ± 0.8 | 25.1 ± 0.6 | 20.9 ± 0.3 | <0.001 | * |
| Dietary fiber (g) | 18.1 ± 0.2 | 18.4 ± 0.4 | 18.2 ± 0.5 | 0.907 | 15.5 ± 0.3 | 16.6 ± 0.3 | 18.9 ± 0.2 | <0.001 | * |
| Protein (g) | 96.4 ± 0.6 | 102 ± 1 | 103 ± 1 | <0.001 | 94.7 ± 1.2 | 94.9 ± 1.1 | 98.2 ± 0.6 | <0.001 | * |
| Total fat (g) | 90.4 ± 0.4 | 96.1 ± 1.2 | 101 ± 1 | <0.001 | 89.3 ± 1.2 | 89.9 ± 0.8 | 92.1 ± 0.5 | <0.001 | * |
| Total MFA (g) | 33.7 ± 0.3 | 35.9 ± 0.5 | 37.6 ± 0.6 | <0.001 | 33.3 ± 0.5 | 33.5 ± 0.4 | 34.3 ± 0.2 | 0.005 | * |
| Total PUFA (g) | 19.5 ± 0.2 | 21.1 ± 0.5 | 22.9 ± 0.5 | <0.001 | 18.7 ± 0.4 | 19.4 ± 0.3 | 20.1 ± 0.2 | 0.002 | * |
| Total SFA (g) | 29.2 ± 0.2 | 30.8 ± 0.6 | 31.8 ± 0.5 | <0.001 | 29.6 ± 0.5 | 29.2 ± 0.4 | 29.5 ± 0.2 | 0.126 | * |

Individual usual intake was determined for each subject using the NCI method. Based on individual intake, the percentage consumers of LCSB and Water was estimated by age group, gender, and servings categories. Values are least square mean ± SE from regression models with age, gender, ethnicity, current smoking (Y/N), poverty income ratio, physical activity level (sedentary, moderate, vigorous based on responses to questions), and alcohol intake. Energy intake was added as a covariate for macronutrient intakes. NS: Indicates 99th percentile confidence intervals of beta coefficients for servings for LCSB and Water overlap. * Indicates 99th percentile confidence intervals of beta coefficients for servings for LCSB and Water do not overlap. Abbreviations: LCSB, no-and low-calorie sweetened beverages; MFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acids; SFA, saturated fatty acids.

Table S3. Associations between beverage consumption and measures of glycemic control in adult males and females 19+ years of age: NHANES 2001–2012

| Variables | No- and Low-Calorie Sweetened Beverages | | | | Water | | | | LCSB vs Water trend |
|------------------|---|--------------|--------------|--------------|-------------|--------------|--------------|--------------|---------------------|
| | < 1 Serving | 1-2 Servings | > 2 Servings | Linear trend | < 1 Serving | 1-2 Servings | > 2 Servings | Linear Trend | Linear trend |
| Females | | | | | | | | | |
| Glucose (mmol/L) | 5.45 ± 0.02 | 5.39 ± 0.04 | 5.36 ± 0.04 | 0.010 | 5.43 ± 0.03 | 5.41 ± 0.03 | 5.43 ± 0.02 | 0.924 | NS |
| Insulin (pmol/L) | 70.9 ± 1.1 | 68.0 ± 2.2 | 63.1 ± 2.2 | <0.001 | 72.7 ± 2.5 | 68.9 ± 1.7 | 70.0 ± 1.2 | 0.074 | NS |
| HbA1c (%) | 5.48 ± 0.01 | 5.48 ± 0.02 | 5.45 ± 0.02 | 0.081 | 5.46 ± 0.01 | 5.47 ± 0.01 | 5.48 ± 0.01 | 0.172 | NS |
| HOMA-IR | 2.96 ± 0.06 | 2.81 ± 0.11 | 2.58 ± 0.11 | <0.001 | 3.00 ± 0.11 | 2.83 ± 0.08 | 2.93 ± 0.06 | 0.210 | NS |
| Males | | | | | | | | | |
| Glucose (mmol/L) | 5.69 ± 0.02 | 5.72 ± 0.05 | 5.66 ± 0.04 | 0.562 | 5.71 ± 0.04 | 5.71 ± 0.03 | 5.68 ± 0.02 | 0.071 | NS |
| Insulin (pmol/L) | 76.4 ± 1.7 | 72.6 ± 4.6 | 67.8 ± 3.4 | 0.013 | 77.7 ± 3.1 | 78.7 ± 2.8 | 74.7 ± 1.7 | 0.035 | NS |
| HbA1c (%) | 5.52 ± 0.01 | 5.51 ± 0.02 | 5.47 ± 0.02 | 0.041 | 5.51 ± 0.02 | 5.53 ± 0.02 | 5.51 ± 0.01 | 0.800 | NS |
| HOMA-IR | 3.34 ± 0.08 | 3.25 ± 0.23 | 2.96 ± 0.15 | 0.040 | 3.42 ± 0.15 | 3.41 ± 0.12 | 3.28 ± 0.08 | 0.107 | NS |

Individual usual intake was determined for each subject using the NCI method. Based on the individual intake, the percentage consumers of LCSB and Water was estimated by age group, gender, and servings categories. Values are least square mean ± SE from regression models with age, gender, ethnicity, current smoking (Y/N), poverty income ratio, physical activity level (sedentary, moderate, vigorous based on responses to questions), alcohol intake, body mass index. NS: Indicates 99th percentile confidence intervals of beta coefficients for servings for LCSB and Water overlap Insulin resistance calculated as insulin (mU/L) × glucose (mmol/L)/22.5. Abbreviations: LCSB, no-and low-calorie sweetened beverages; HOMA-IR, homeostasis model assessment of insulin resistance.

Table S4. Associations between beverage consumption and measures with odds ratios of risk for glycemic variables in adult males and females 19+ years of age: NHANES 2001–2012

| Variables | No- and Low-Calorie Sweetened Beverages | | | | Water | | | |
|----------------------------|---|--------------------|--------------------|--------------|-------------|-------------------|--------------------|--------------|
| | < 1 Serving | 1-2 Servings | > 2 Servings | Linear trend | < 1 Serving | 1-2 Servings | > 2 Servings | Linear Trend |
| Females | | | | | | | | |
| Glucose ≥ 5.55 mmol/L | 1.00 | 1.04 (0.78, 1.40) | 0.86 (0.64, 1.14) | 0.424 | 1.00 | 1.04 (0.74, 1.46) | 1.05 (0.82, 1.35) | 0.980 |
| Insulin ≥ 90 pmol/L | 1.00 | 0.89 (0.63, 1.25) | 0.58* (0.41, 0.84) | 0.045 | 1.00 | 0.82 (0.55, 1.21) | 0.94 (0.69, 1.26) | 0.643 |
| HbA1c ≥ 5.7 % | 1.00 | 1.03 (0.82, 1.28) | 0.87 (0.63, 1.20) | 0.232 | 1.00 | 1.18 (0.87, 1.60) | 1.24 (0.97, 1.58) | 0.620 |
| HOMA-IR ≥ 4.0 | 1.00 | 1.00 (0.70, 1.44) | 0.60* (0.41, 0.89) | 0.092 | 1.00 | 0.71 (0.47, 1.08) | 1.02 (0.74, 1.39) | 0.702 |
| Males | | | | | | | | |
| Glucose ≥ 5.55 mmol/L | 1.00 | 1.23 (0.94, 1.61) | 1.07 (0.86, 1.34) | 0.988 | 1.00 | 1.13 (0.83, 1.54) | 0.95 (0.74, 1.20) | 0.262 |
| Insulin ≥ 90 pmol/L | 1.00 | 0.61* (0.45, 0.82) | 0.65* (0.45, 0.94) | 0.005 | 1.00 | 0.76 (0.51, 1.14) | 0.67* (0.47, 0.95) | <0.001 |
| HbA1c ≥ 5.7 % | 1.00 | 0.92 (0.71, 1.18) | 0.70* (0.50, 0.98) | 0.003 | 1.00 | 1.15 (0.88, 1.50) | 0.95 (0.78, 1.15) | 0.782 |
| HOMA-IR ≥ 4.0 | 1.00 | 0.74* (0.57, 0.95) | 0.73 (0.52, 1.01) | 0.032 | 1.00 | 0.89 (0.63, 1.25) | 0.65* (0.48, 0.87) | <0.001 |

Individual usual intake was determined for each subject using the NCI method. Based on the individual intake, the percentage consumers of LCSB and Water was estimated by age group, gender, and servings categories. Values are odds ratios (95th percentile confidence limits) with < 1 serving within each beverage set as reference value with odds ratio of 1.00 from logistics regression models with age, gender, ethnicity, current smoking (Y/N), poverty income ratio, physical activity level (sedentary, moderate, vigorous based on responses to questions), alcohol intake, and body mass index. Insulin resistance calculated as insulin (mU/L) X glucose (mmol/L)/22.5. Abbreviations: LCSB, no-and low-calorie sweetened beverages; HOMA-IR, homeostasis model assessment of insulin resistance