Various Aspects of Caffeine Intake in America: An Analysis of NHANES

Victor L. Fulgoni, III, PhD
Nutrition Impact, LLC

August 5, 2013
Agenda

- Acknowledgments/Disclosures
- Current usual intake of caffeine
  - Adults
  - Children
- Current usual intake of caffeine per consumption event
- Trends in caffeine intake over the last decade
- Food sources of caffeine intake over the last decade
Acknowledgments

- Funding Sources
  - US Army Medical Research & Materiel Command
  - American Beverage Association

- Colleagues
  - Debra R. Keast, PhD
    - Food & Nutrition Database Research Inc., Okemos, MI
Nutrition Impact, LLC provides consulting services to numerous food companies helping them create nutrition related messages about their products and services. We also conduct analyses of NHANES data for many clients.
Methods

  - Exclusions: <2 years of age, pregnant and/or lactating females
  - Data includes caffeine from all foods and beverages (does not include caffeine from dietary supplements)

- Usual Intake using two days of intake determined using the National Cancer Institute method
    - Covariates: recall day, weekend flag (Fri./Sat./Sun)

- Trend intakes determined with one–day intakes regressed over time (p<0.01 deemed significant)

- Food sources over time determined with one–day intakes (p<0.01 deemed significant)
Methods: Defining Beverages

- **Coffee** (0.4–509 mg/RACC*)
  - All hot and cold coffee beverages

- **Tea** (0–48 mg/RACC)
  - All hot and cold tea beverages

- **Soda** (0–65 mg/RACC)
  - All regular, reduced calorie, and no calorie carbonated soft drinks

- **Energy Drinks** (45–86 mg/RACC)
  - Red Bull Energy Drink
  - Red Bull Energy Drink, sugar-free
  - Full Throttle Energy Drink
  - Monster Energy Drink
  - Mountain Dew AMP Energy Drink
  - Mountain Dew AMP Energy Drink, sugar-free
  - Rockstar Energy Drink
  - Rockstar Energy Drink, sugar-free
  - Vault Energy Drink
  - Vault Zero Energy drink Energy drink

*RACC: Reference Amount Customarily Consumed
Mean Usual Intake of Caffeine by Age: Total Population

Data Source: NHANES 2007–2010; N=17,387
Mean Usual Intake of Caffeine by Age: Consumers Only

Data Source: NHANES 2007–2010; N=13,923
Percentiles of Usual Caffeine Intake (mg/day) by Age: Total Population

Data Source: NHANES 2007–2010; N=17,387
Percentiles of Usual Caffeine Intake (mg/day) by Age: Consumers Only

Data Source: NHANES 2007–2010; N=13,923
Usual Caffeine Intake by Age (Consumers only)

- Average intake is age dependent
  - Lower in children 2–11 yrs (36 mg/day) and adolescents 12–17 yrs (72 mg/day)
  - Highest in adults 50–59 yrs (257 mg/day)

- 90th percentile of intake in consumers also age dependent
  - Lower in children 2–11 yrs (89 mg/day) and adolescents 12–17 yrs (166 mg/day)
  - Highest in adults 50–59 yrs (515 mg/day)
Mean Usual Intake of Caffeine Per Consumption Event

mg, Caffeine

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Average Intake</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-11 yr</td>
<td>10 mg</td>
</tr>
<tr>
<td>12-17 yr</td>
<td>30 mg</td>
</tr>
<tr>
<td>18-29 yr</td>
<td>70 mg</td>
</tr>
<tr>
<td>30-34 yr</td>
<td>80 mg</td>
</tr>
<tr>
<td>35-39 yr</td>
<td>70 mg</td>
</tr>
<tr>
<td>40-49 yr</td>
<td>80 mg</td>
</tr>
<tr>
<td>50-59 yr</td>
<td>80 mg</td>
</tr>
<tr>
<td>60+ yr</td>
<td>60 mg</td>
</tr>
</tbody>
</table>
Percentiles of Usual Caffeine Intake (mg) Per Consumption Event by Age

Data Source: NHANES 2007–2010; N=13,923
Mean Usual Intake of Caffeine Per Consumption Event

- Average caffeine intake per consumption event varies with age
  - Total population average is 65 mg caffeine/event
    - 2–11 yrs: 15 mg/event; 2–17 yrs: 34 mg/event; and 50–59 yrs: 84 mg/event;

- 90th percentile of caffeine intake per consumption event also age dependent
  - 2–11 yrs: 27 mg/event; 2–17 yrs: 59 mg/event; and 50–59 yrs: 137 mg/event;
Trend in Caffeine Intake from NHANES 2001–2010: Consumers Only

*Significant trend for lower intake, p<0.01
Trend in Caffeine Intake from NHANES 2001–2010: Consumers Only

*Significant trend for lower intake, p<0.01
For most age groups caffeine intakes have not changed from 2001–2010

- In children 2–11 yrs and adults 35–39 yrs there is a small, but statistically significant, decrease in caffeine consumption (regression coefficients: –2.5 and –19 mg/two–year data release, respectively)
Trend in Caffeine Intake (mg/day) from Major Food Sources
All Subjects: 2–11 Years of Age

*Significant trend for lower intake, p<0.01
Trend in Caffeine Intake (mg/day) from Major Food Sources
All Subjects: 12–17 Years of Age

*Significant trend for lower intake, p<0.01
Trend in Caffeine Intake (mg/day) from Major Food Sources
All Subjects: 18–35 Years of Age

*Significant trend for lower/higher intake, p<0.01
Trend in Caffeine Intake from Major Food Sources
All Subjects: 51+ Years of Age

No differences over time

NHANES Data Release

Coffee
Tea
Sodas
Energy Drinks
Sodas are the largest source of caffeine in children 2–11 yrs and adolescents 12–17 yrs but total caffeine intakes quite low
  ◦ Contribution of soda has decreased for both age groups over time

Coffee largest source of caffeine in adults

Energy drinks small contributor to all age groups
  ◦ Can detect a small, but statistically significant, increase from energy drinks in adults 18–35 yrs (regression coefficient: 1 mg/two–year data release)
Trends in Caffeine Intake

- With trends in caffeine intake stable (or decreasing in some age groups) and new sources of caffeine entering the market this suggests that the new sources are replacing older sources
  - Studies specifically designed to assess trade-off of caffeine sources will be need to be conducted to confirm
Strengths and Limitations

- **Strengths**
  - Large national representative sample of children and adults
  - Use of sophisticated statistical techniques to estimate usual intakes

- **Limitations**
  - Intake data are self-report (first day recall assessed with in person interview with multi-pass method and second day recall assessed via telephone)
  - Small number of consumers of energy drinks for some age groups
Thank You!