Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.
**Table 1. Weighted Sample Characteristics by Food Security Status Among Adults in the US, NHANES 2015-2016**

|                     | Food Secure  | Food Insecure | p-value<sup>c</sup> |
|---------------------|--------------|---------------|---------------------|
| **Unweighted sample** | 3,978        | 1,331         |                     |
| **Weighted sample**<sup>b</sup> | 186,788,670  | 41,645,622    |                     |
| **Body mass index (BMI)** |            |               | <0.001              |
| <25 kg/m<sup>2</sup>   | 29.3 (26.0-32.7) | 23.4 (18.5-28.4) |                     |
| 25 to 29.9 kg/m<sup>2</sup>   | 32.7 (31.1-34.3) | 27.0 (23.2-30.9) |                     |
| ≥30 kg/m<sup>2</sup>   | 37.9 (34.3-41.5) | 49.5 (45.2-53.9) |                     |
| **Waist circumference (WC)** |            |               | 0.006               |
| Less than High-Risk   | 44.5 (39.8-49.1) | 38.5 (34.1-42.8) |                     |
| High-Risk             | 55.5 (50.9-60.2) | 61.5 (57.2-65.9) |                     |
| **Sex**               |              |               | 0.006               |
| Female                | 51.5 (50.0-53.1) | 54.9 (52.6-57.2) |                     |
| Male                  | 48.5 (46.9-50.0) | 45.1 (42.8-47.4) |                     |
| **Race/ethnicity**    |              |               | <0.001              |
| Non-Hispanic White    | 68.3 (60.4-76.3) | 45.9 (35.5-56.3) |                     |
| Non-Hispanic African American | 9.9 (5.5-14.2) | 18.2 (11.3-25.0) |                     |
| Hispanic              | 11.9 (6.9-16.9) | 28.7 (21.0-36.5) |                     |
| Other                 | 9.9 (6.9-12.9) | 7.2 (4.8-9.5) |                     |
| **Age**               |              |               | <0.001              |
| 20-39                 | 34.0 (31.0-37.0) | 44.7 (40.2-49.1) |                     |
| 40-64                 | 43.9 (41.5-46.4) | 42.6 (39.9-45.3) |                     |
| 65 and older          | 22.0 (19.3-24.8) | 12.7 (9.0-16.5) |                     |
| **Education**         |              |               | <0.001              |
| High school or less   | 31.1 (26.2-35.9) | 53.2 (47.9-58.5) |                     |
| Some college or more  | 68.9 (64.1-73.8) | 46.8 (41.5-52.1) |                     |
| **Poverty to Income Ratio (family)** |            |               | <0.001              |
| ≤130%                 | 19.3 (15.8-22.7) | 53.9 (49.4-58.5) |                     |
| >130%                 | 80.7 (77.3-84.2) | 46.1 (41.5-50.6) |                     |
| **Marital Status**    |              |               | <0.001              |
| Married               | 57.6 (53.8-61.5) | 40.2 (34.7-45.6) |                     |
| Not married           | 42.4 (38.5-46.2) | 59.8 (54.4-65.3) |                     |

<sup>a</sup> Data are presented as percentage % (95% CI).

<sup>b</sup> Data are weighted to be nationally representative.
Chi-square tests to determine statistically significant differences between food security status groups.

Other includes race/ethnicity other than Non-Hispanic White, Non-Hispanic African American, or Hispanic, including multiracial.
eFigure 1. Crude Weighted Trends in Waist Circumference by Sex and Race/Ethnicity, NHANES 1999-2016*
Non-Hispanic White

Non-Hispanic African American

Food Insecurity Prevalence, %

Year

1999-2000
2001-2002
2003-2004
2005-2006
2007-2008
2009-2010
2011-2012
2013-2014
2015-2016

Less than High-Risk (P for trend = 0.003)
High-Risk (P for trend < 0.001)

All P for trend < 0.001

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Less than High-Risk ($P$ for trend = 0.02)
High-Risk ($P$ for trend < 0.001)

\[ a \] Data weighted to be nationally representative. Error bars indicate 95% CIs.
| Table 2. Crude Weighted Trends in Food Insecurity by Sex and Adiposity Among the US Adult Population, NHANES 1999-2016<sup>a,b</sup> |
|---|---|---|---|---|---|---|---|---|---|---|
| | Female | | | | | | | | | P for Trend<sup>c</sup> |
| BMI | 1999-2000 | 2001-2002 | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | |
| <25 kg/m² | 7.3 (4.7 – 9.9) | 8.2 (5.8 – 10.5) | 9.2 (7.0 – 11.3) | 7.8 (5.1 – 10.4) | 8.8 (6.2 – 11.5) | 10.8 (8.2 – 13.1) | 12.3 (8.2 – 16.5) | 10.6 (7.3 – 13.8) | 14.7 (9.9-19.4) | <0.001 |
| 25 to 29.9 kg/m² | 7.0 (4.4 – 9.7) | 10.2 (6.3 – 14.1) | 11.1 (7.6 – 14.7) | 8.6 (5.8 – 11.5) | 10.8 (8.4 – 13.3) | 12.6 (9.7 – 15.5) | 13.2 (9.2 – 17.2) | 13.9 (9.6 – 18.2) | 16.1 (11.9-20.3) | <0.001 |
| ≥30 kg/m² | 11.8 (9.6 – 14.0) | 14.5 (10.9 – 18.0) | 16.0 (13.3 – 18.6) | 12.2 (8.8 – 15.6) | 15.6 (11.8 – 19.4) | 19.6 (15.5 – 23.6) | 21.3 (17.2 – 25.4) | 21.4 (17.4 – 25.4) | 24.6 (20.8-28.4) | <0.001 |
| WC | | | | | | | | | | |
| Less than High-Risk | 7.7 (4.4 – 11.0) | 9.5 (6.6 – 12.3) | 9.5 (7.4 – 11.5) | 7.4 (5.2 – 9.6) | 10.5 (7.9 – 13.1) | 11.4 (9.5 – 13.4) | 12.5 (7.9 – 17.0) | 11.1 (8.3 – 13.8) | 15.8 (11.6-20.0) | <0.001 |
| High-Risk | 9.5 (8.1 – 10.9) | 12.3 (9.0 – 15.7) | 13.7 (11.6 – 15.9) | 11.2 (8.6 – 13.8) | 12.8 (10.1 – 15.4) | 16.5 (13.9 – 19.2) | 17.8 (14.8 – 20.8) | 18.6 (15.3 – 21.9) | 20.9 (17.5-24.4) | <0.0001 |
| Male | | | | | | | | | | |
| BMI | 1999-2000 | 2001-2002 | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | P for Trend<sup>c</sup> |
| <25 kg/m² | 10.4 (6.5 – 14.4) | 14.5 (9.9 – 19.1) | 12.2 (8.1 – 16.3) | 13.1 (9.3 – 16.9) | 14.2 (11.3 – 17.2) | 14.9 (12.4 – 17.5) | 16.1 (10.6 – 21.6) | 18.8 (13.5 – 24.1) | 15.6 (11.3-20.4) | 0.008 |
| 25 to 29.9 kg/m² | 7.5 (5.2 – 9.8) | 9.3 (7.4 – 11.3) | 8.8 (6.1 – 11.5) | 9.3 (7.2 – 11.5) | 10.1 (7.6 – 12.6) | 13.7 (10.7 – 16.6) | 14.1 (9.9 – 18.2) | 11.7 (8.6 – 14.8) | 15.1 (10.8-19.5) | <0.001 |
| ≥30 kg/m² | 8.6 (5.7 – 11.5) | 7.5 (3.9 – 11.2) | 11.1 (8.9 – 13.3) | 7.2 (5.3 – 9.0) | 10.5 (7.0 – 14.0) | 11.5 (8.4 – 14.6) | 17.8 (13.6 – 22.0) | 14.7 (12.5 – 16.9) | 20.2 (16.5-24.0) | <0.001 |
| WC | | | | | | | | | | |
| Less than High-Risk | 9.5 (6.8 – 12.2) | 12.6 (10.0 – 15.2) | 11.4 (8.9 – 13.9) | 12.2 (9.6 – 14.7) | 13.0 (10.7 – 15.3) | 15.1 (13.1 – 17.0) | 16.4 (12.5 – 20.2) | 15.7 (12.0 – 19.3) | 16.2 (12.9-20.0) | <0.001 |
| High-Risk | 7.5 (5.5 – 9.4) | 6.8 (3.5 – 10.0) | 9.4 (7.2 – 11.7) | 6.5 (5.3 – 7.7) | 8.8 (6.0 – 11.6) | 10.8 (7.8 – 13.9) | 15.5 (11.5 – 19.5) | 13.2 (11.1 – 15.4) | 18.1 (14.9-21.3) | <0.001 |

<sup>a</sup>Data are presented as percentage % (95% CI) for each survey cycle.

<sup>b</sup>Data are weighted to be nationally representative.

<sup>c</sup>The estimate β (95% CI) and P for trend were calculated using logistic regression that included the NHANES 2-year cycle as a continuous variable.

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| Table 3. Crude Weighted Trends in Food Insecurity by Race/Ethnicity and Adiposity Among the US Adult Population, NHANES 1999-2016<sup>a,b</sup> | 1999-2000 | 2001-2002 | 2003-2004 | 2005-2006 | 2007-2008 | 2009-2010 | 2011-2012 | 2013-2014 | 2015-2016 | P for Trend |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Non-Hispanic White** |  |  |  |  |  |  |  |  |  |  |
| **BMI** |  |  |  |  |  |  |  |  |  |  |
| <25 kg/m<sup>2</sup> | 6.8 (3.6 – 10.0) | 8.1 (4.5 – 11.7) | 8.5 (5.1 – 11.9) | 6.4 (4.1 – 8.8) | 8.6 (5.7 – 11.5) | 8.5 (6.2 – 10.9) | 11.6 (6.7 – 16.5) | 11.2 (7.0 – 15.4) | 11.7 (7.4-15.9) | 0.006 |
| 25 to 29.9 kg/m<sup>2</sup> | 3.9 (1.6 – 6.2) | 5.3 (3.6 – 7.0) | 5.7 (3.7 – 7.7) | 5.3 (3.5 – 7.1) | 6.9 (5.1 – 8.8) | 7.5 (5.5 – 11.8) | 8.7 (5.7 – 11.8) | 8.6 (5.5 – 11.7) | 9.6 (5.8-13.4) | <0.001 |
| ≥30 kg/m<sup>2</sup> | 7.6 (4.9 – 10.3) | 8.0 (4.8 – 11.2) | 9.2 (6.9 – 11.4) | 5.5 (3.4 – 7.7) | 8.9 (5.8 – 12.0) | 9.1 (6.6 – 11.5) | 14.3 (9.8 – 18.8) | 14.4 (11.1 – 17.7) | 17.1 (13.0-21.1) | <0.001 |
| **WC** |  |  |  |  |  |  |  |  |  |  |
| Less than High-Risk | 6.1 (4.3 – 7.5) | 7.6 (4.4 – 10.8) | 7.5 (5.0 – 9.9) | 6.1 (3.8 – 8.4) | 8.6 (6.2 – 11.0) | 8.0 (5.7 – 10.2) | 10.7 (6.9 – 14.4) | 10.2 (7.0 – 13.4) | 10.6 (7.5-13.8) | 0.003 |
| High-Risk | 5.9 (4.3 – 7.5) | 6.9 (4.6 – 9.1) | 7.9 (5.7 – 10.1) | 5.6 (4.0 – 7.1) | 7.7 (5.5 – 10.0) | 8.8 (6.5 – 11.1) | 12.2 (8.8 – 15.5) | 12.4 (10.0 – 14.8) | 14.7 (11.0-18.4) | <0.001 |
| **Non-Hispanic African American** |  |  |  |  |  |  |  |  |  |  |
| **BMI** |  |  |  |  |  |  |  |  |  |  |
| <25 kg/m<sup>2</sup> | 13.3 (6.6 – 20.1) | 18.0 (9.6 – 26.5) | 13.5 (7.6 – 19.5) | 20.8 (13.5 – 28.0) | 21.7 (13.8 – 29.7) | 31.4 (26.0 – 36.8) | 25.2 (14.7 – 35.6) | 29.6 (21.1 – 38.1) | 34.0 (24.1-43.9) | <0.001 |
| 25 to 29.9 kg/m<sup>2</sup> | 10.3 (5.0 – 15.6) | 15.8 (11.0 – 20.7) | 16.9 (8.4 – 25.5) | 15.2 (10.7 – 19.7) | 13.6 (7.6 – 19.7) | 25.5 (16.6 – 34.3) | 23.9 (19.1 – 28.7) | 22.9 (17.9 – 27.9) | 27.0 (22.6-31.5) | <0.001 |
| ≥30 kg/m<sup>2</sup> | 13.0 (9.1 – 16.9) | 16.6 (11.3 – 21.9) | 21.5 (17.0 – 25.9) | 17.5 (13.1 – 21.9) | 17.8 (14.0 – 21.6) | 28.0 (21.0 – 35.0) | 28.3 (22.4 – 34.1) | 20.6 (16.6 – 24.7) | 28.3 (22.6-34.1) | <0.001 |
| **WC** |  |  |  |  |  |  |  |  |  |  |
| Less than High-Risk | 11.6 (6.3 – 16.9) | 17.5 (12.3 – 22.6) | 14.6 (11.7 – 17.5) | 17.8 (12.1 – 23.6) | 20.1 (12.8 – 27.5) | 28.8 (23.6 – 34.0) | 24.6 (17.5 – 31.7) | 25.2 (18.6 – 31.8) | 31.0 (24.3-37.6) | <0.001 |
| High-Risk | 13.2 (9.6 – 16.7) | 15.6 (11.1 – 20.0) | 22.0 (18.3 – 25.7) | 17.4 (13.6 – 21.2) | 15.2 (11.9 – 18.5) | 27.6 (21.0 – 34.1) | 27.4 (23.2 – 31.7) | 21.8 (17.7 – 25.9) | 27.5 (21.9-33.2) | <0.001 |
| **Hispanic** |  |  |  |  |  |  |  |  |  |  |
| **BMI** |  |  |  |  |  |  |  |  |  |  |
| <25 kg/m<sup>2</sup> | 18.4 (9.1 – 27.7) | 26.2 (18.2 – 34.2) | 30.6 (19.8 – 41.4) | 18.4 (12.1 – 24.6) | 20.2 (12.8 – 27.6) | 25.6 (21.1 – 30.4) | 23.8 (16.6 – 30.9) | 25.2 (16.7 – 33.6) | 28.1 (23.1-33.0) | 0.34 |
| 25 to 29.9 kg/m<sup>2</sup> | 20.1 (13.8 – 26.3) | 29.4 (21.3 – 37.5) | 29.2 (19.1 – 39.3) | 23.6 (18.5 – 28.7) | 23.6 (19.0 – 28.2) | 30.9 (24.7 – 37.2) | 29.4 (20.3 – 38.5) | 25.0 (19.9 – 30.1) | 34.7 (27.0-42.4) | 0.06 |
| ≥30 kg/m<sup>2</sup> | 19.1 (12.0 – 26.1) | 23.1 (14.9 – 31.2) | 27.6 (15.5 – 39.7) | 26.9 (19.9 – 33.8) | 26.8 (19.6 – 34.0) | 34.2 (28.4 – 39.9) | 30.8 (22.5 – 39.1) | 31.0 (23.4 – 38.6) | 37.6 (33.7-41.5) | <0.001 |
| **WC** |  |  |  |  |  |  |  |  |  |  |
| Less than High-Risk | 19.6 (12.8 – 26.4) | 27.5 (21.2 – 33.7) | 29.1 (21.3 – 36.9) | 21.9 (17.8 – 26.1) | 22.2 (18.9 – 25.4) | 31.5 (28.2 – 34.7) | 29.0 (21.1 – 36.9) | 25.5 (18.4 – 32.6) | 32.5 (27.3-37.7) | 0.02 |
| High-Risk | 19.3 | 24.7 | 29.0 | 24.8 | 25.6 | 30.7 | 28.7 | 30.0 | 36.7 | <0.001 |
|     | (12.7 – 25.9) | (18.1 – 31.4) | (18.4 – 39.4) | (18.7 – 30.8) | (19.8 – 31.5) | (25.3 – 36.1) | (21.1 – 36.4) | (23.4 – 36.6) | (31.7-41.7) |
|-----|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|

a Data are presented as percentage % (95% CI) for each survey cycle.
b Data are weighted to be nationally representative.
c The estimate β (95% CI) and P for trend were calculated using logistic regression that included the NHANES 2-year cycle as a continuous variable.
eFigure 2. Adjusted Odds (95% CI) of Food Insecurity Among Adults in the US, NHANES 1999-2016

A. Male
B. Female

C. Non-Hispanic White
D. Non-Hispanic African American

![Graph showing comparison between Less than High-Risk and High-Risk WC for Non-Hispanic African American.]

E. Hispanic

![Graph showing comparison between Less than High-Risk and High-Risk WC for Hispanic.]

*Data weighted to be nationally representative. Error bars indicate 95% CI.*

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