

# NCHS Webinar: National Health and Nutrition Examination Survey 2017–March 2020 Pre-pandemic Data Release

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Wednesday, June 16, 2021



# A brief overview of NHANES



# NHANES: a compilation of components

- Assesses the health and nutritional status of adults and children in the United States
- Home Interview
- Examination
- Lab studies
- Post-exam content
  - Dietary recall interview
  - Physical activity monitoring





# NHANES Mobile Exam Center (MEC)

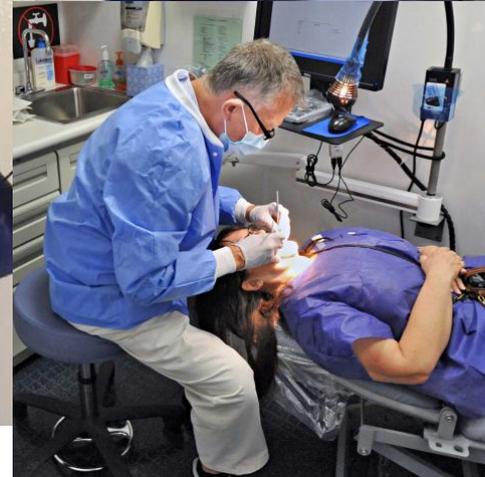
- Examinations provide unique content and operational challenges
- 15 sites per year
- Mobile laboratory
  - Specimen processing & storage
  - On-site testing for immediate results
- Equipment for medical testing



# NHANES pre-pandemic MEC activities

- Body measures
- Blood pressure
- DEXA scans
- Oral health exam
- Phlebotomy
- Urine collection
- Interviews

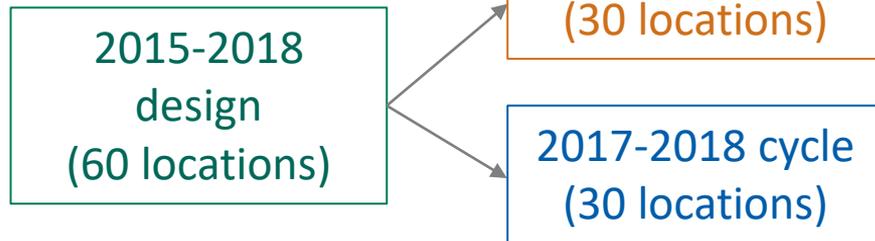
***Standardized protocols,  
equipment & exam  
environment***





# Data from continuous NHANES

- Continuous field operations began in 1999
- Data released in 2-year cycles
- Each 2-year cycle is drawn from a multi-cycle sample design



- Combining cycles is recommended for reliable estimates for subgroups



National Health and Nutrition Examination Survey

## NHANES 2017-2018

### Data, Documentation, Codebooks

- Demographics Data
- Dietary Data
- Examination Data
- Laboratory Data
- Questionnaire Data
- Limited Access Data

### Contents in Detail

- Questionnaire Instruments
- Laboratory Methods
- Procedure Manuals
- Brochures and Consent Documents

### Using the Data

- Overview
- Release Notes
- Laboratory Data Overview
- Questionnaire Data Overview
- Examination Data Overview
- Survey Methods and Analytic Guidelines
- Response Rates and Population Totals
- NHANES Web Tutorial

### Contents at a Glance

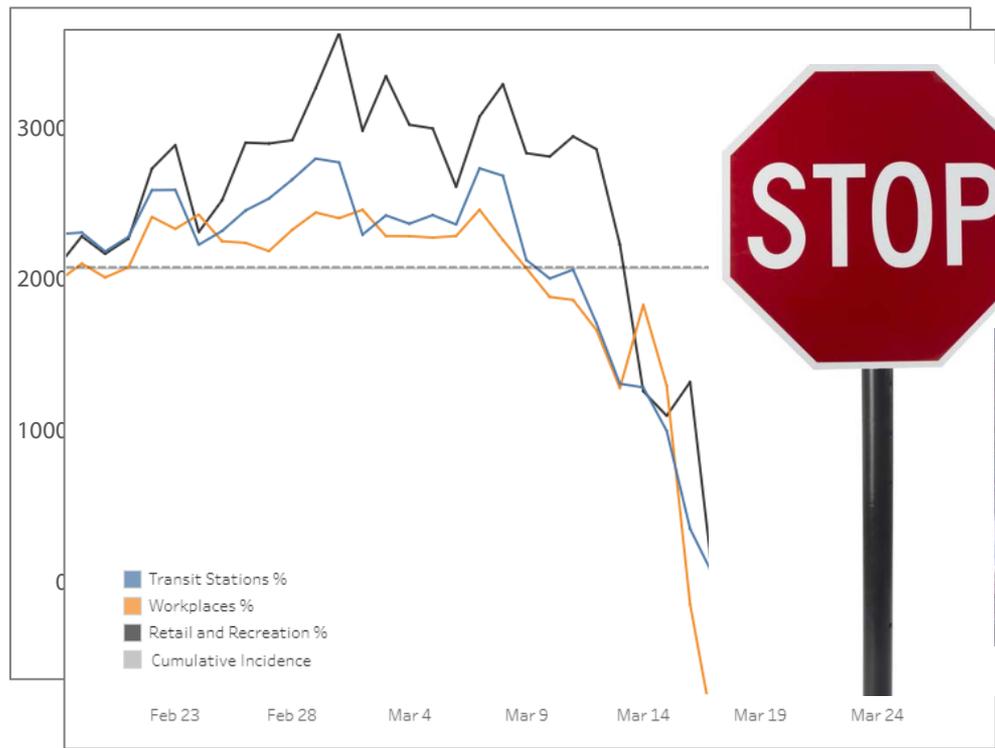
- What's New
- Survey Content Brochure [PDF - 568 KB]
- Frequently Asked Questions (FAQs)
- General Information about NHANES Documentation Files



# Impact of COVID-19 pandemic



# NHANES and the pandemic, March 2020



2019-2020 data collection cycle  
~~planned visits to 30 locations~~



## NHANES 2019–2020 cycle, interrupted

- As of March 2020, 18 of 30 planned locations were visited
- No feasible way to safely resume in-person exams in 2020
- 2019–March 2020 sample not nationally representative
- No method to create sample weights
- Data release could increase disclosure risk





# A solution: 2017–March 2020 pre-pandemic data file

- The 2017–2018 data were from a nationally representative 2-year cycle
- Statistical methods were used to combine:
  - a probability sample (2017–2018)
  - with a partial probability sample (2019–March 2020)



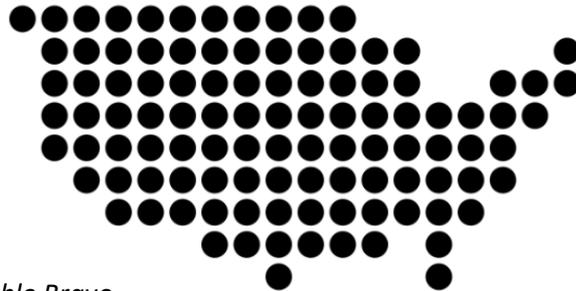


# Creation of the 2017–March 2020 pre-pandemic data set



# Data cycle combination approach

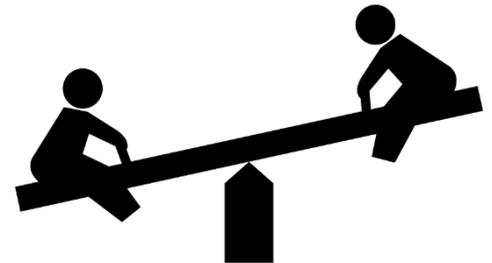
- 2015–2018 sample design: 30 of 30 locations visited in 2017–2018
- 2019–2022 sample design: only 18 of 30 selected locations visited in 2019–March 2020 cycle
- Problem: 2015–2018 and 2019–2022 sample designs were different!
- Solution: Use the 2015–2018 design
  - 2019–March 2020 sites reassigned to the 2015–2018 design





# Weighting approach

- The 2019–March 2020 sites didn't line up exactly with the **2015–2018 sample design**
- Some portions of the country were under-represented
- An adjustment factor was used to equalize representation over the sites visited from 2017 to March 2020
- Interview weights and exam weights were then calculated using previous methodology
- Assessments confirmed that weighted sample was representative (compared to American Community Survey)





# Analytic considerations for the 2017–March 2020 pre-pandemic data file

- 2017–March 2020 can be used to make national estimates  The 2017–March 2020 data can be used like other cycles
- 2019–March 2020 not nationally representative  2017–2018 cannot be compared to 2019–March 2020 data
- Weight adjustments designed for overall estimates  Trends for subgroups should be interpreted with caution
- 2017–March 2020 is a 3.2-year sample  Variances/standard errors are smaller than 2-year but larger than for 4-year data sets



# Combining 2017–March 2020 data with previous cycles

- Combining 2015–2016 (2-year cycle) and 2017–March 2020 (3.2-year cycle)
  - 5.2-year period
  - 2015–2016 weights multiplied by  $2/5.2$
  - 2017–March 2020 weights multiplied by  $3.2/5.2$
- Combining 2013–2014, 2015–2016 and 2017–March 2020
  - 7.2-year period
  - 2013–2014 weights multiplied by  $2/7.2$
  - 2015–2016 weights multiplied by  $2/7.2$
  - 2017–March 2020 weights multiplied by  $3.2/7.2$



# Accessing the data

# NHANES 2017–March 2020 pre-pandemic data on the NHANES website

The screenshot displays the NHANES website interface. On the left is a navigation menu with categories like 'About NHANES', 'What's New', and 'Questionnaires, Datasets, and Related Documentation'. The 'Questionnaires, Datasets, and Related Documentation' section is expanded, showing options such as 'Survey Methods and Analytic Guidelines', 'Search Variables', and 'Frequently Asked Questions'. The 'NHANES 2017-March 2020' section is highlighted, listing 'Demographics Data', 'Examination Data', 'Laboratory Data', 'Questionnaire Data', 'Questionnaire Instruments', 'Laboratory Methods', 'Procedure Manuals', 'Brochures and Consent Documents', and 'Brief Overview and Analytic Guidance'. The main content area features a blue header 'National Health and Nutrition Examination Survey' and a title 'NHANES 2017–March 2020 Pre-pandemic'. Below the title is a paragraph explaining that data collection for the 2019-2020 cycle was suspended in March 2020 due to the COVID-19 pandemic, and that data from 2019 to March 2020 were combined with data from the 2017-2018 cycle. A red circle highlights the 'Data, Documentation, Codebooks' section, which contains links for 'Demographics Data', 'Dietary Data', 'Examination Data', 'Laboratory Data', 'Questionnaire Data', and 'Limited Access Data'. To the right of this section are two columns of links: 'Using the Data' (including 'Brief Overview and Analytic Guidance', 'Estimates of Selected Health Conditions', 'Release Notes', 'Survey Methods and Analytic Guidelines', 'Response Rates and Population Totals', and 'NHANES Web Tutorial') and 'Contents at a Glance' (including 'What's New', 'Survey Content Brochure [PDF - 568 KB]', 'Frequently Asked Questions (FAQs)', and 'General Information about NHANES Documentation Files').

NHANES 2017–March 2020 Pre-pandemic

The NHANES program suspended field operations in March 2020 due to the coronavirus disease 2019 (COVID-19) pandemic. As a result, data collection for the NHANES 2019-2020 cycle was not completed and the collected data are not nationally representative. Therefore, data collected from 2019 to March 2020 were combined with data from the NHANES 2017-2018 cycle to form a nationally representative sample of NHANES 2017-March 2020 pre-pandemic data. Please see the links below for a [brief overview and analytic guidance](#) as well as a [National Health Statistics Report](#) on selected estimates for obesity, diabetes, hypertension, and oral health for additional information on the use of the data.

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<https://wwwn.cdc.gov/nchs/nhanes/continuousnhanes/default.aspx?Cycle=2017-2020>



# Data files currently available

<b>Data File Description</b>	<b>Data File Name</b>
<b>Demographic Variables and Sample Weights</b>	P_DEMO
<b>Questionnaire Data</b>	
Blood Pressure & Cholesterol	P_BPQ
Diabetes	P_DIQ
Oral Health	P_OHQ
<b>Examination Data</b>	
Body Measures	P_BMX
Blood Pressure – Oscillometric Measurement	P_BPXO
Oral Health — Dentition	P_OHXDEN
Oral Health — Recommendation of Care	P_OHXREF
<b>Laboratory Data</b>	
Fasting Questionnaire	P_FASTQX
Glycohemoglobin	P_GHB
Plasma Fasting Glucose <sup>1</sup>	P_GLU

<sup>1</sup>Requires use of fasting weights

# NHANES 2017–March 2020 pre-pandemic data on the NHANES website

Home National Health and Nutrition Examination Survey

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Questionnaires, Datasets, and Related Documentation

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National Health and Nutrition Examination Survey

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# A brief overview of the data release is available

🏠 National Health and Nutrition Examination Survey

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What's New +

Questionnaires, Datasets, and Related Documentation -

Survey Methods and Analytic Guidelines

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NHANES 2017-March 2020 -

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National Health and Nutrition Examination Survey

## NHANES Analytic Guidance and Brief Overview for the 2017–March 2020 Pre-pandemic Data Files

May 27, 2021

### Summary

The coronavirus disease 2019 pandemic required suspension of the National Health and Nutrition Examination Survey (NHANES) 2019-2020 field operations in March 2020. As a result, data collection for the NHANES 2019-2020 cycle was not completed and the collected data are not nationally representative. As of March 2020, data collection was completed in 18 of 30 locations or primary sampling units (PSUs) usually a county or a group of counties) in the 2019-2020 sample. Data collection was canceled for the remaining 12 PSUs. Because the collected data from these 18 PSUs are not nationally representative, any analyses based solely on the partial 2019-2020 data would not be generalizable to the U.S. civilian non-institutionalized population. Therefore, the partial 2019-2020 data (herein 2019-March 2020 data) were combined with the full data set from the previous cycle (2017-2018) to create nationally representative 2017-March 2020 pre-pandemic data files.

A comprehensive National Center for Health Statistics' (NCHS) [Series 2](#) report describing the sample design, weighting methodology, response rate, and variance estimation procedures for these files will be released later in 2021. Estimates of

<https://wwwn.cdc.gov/nchs/nhanes/continuousnhanes/overviewbrief.aspx?cycle=2017-2020>



# Prevalence estimates for selected health outcomes



The estimates can be found in a National Health Statistics Report released this week

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# National Health Statistics Reports

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Number 158 ■ June 14, 2021

**National Health and Nutrition Examination Survey  
2017–March 2020 Prepandemic Data  
Files—Development of Files and Prevalence Estimates  
for Selected Health Outcomes**

Bryan Stierman, M.D., M.P.H.; Joseph Afful, M.S.; Margaret D. Carroll, M.S.P.H.; Te-Ching Chen, Ph.D.; Orlando Davy, M.P.H.; Steven Fink, M.A.; Cheryl D. Fryar, M.S.P.H.; Qiuping Gu, Ph.D.; Craig M. Hales, M.D., M.P.H.; Jeffery P. Hughes, M.P.H.; Yechiam Ostchega, Ph.D., R.N.; Renee J. Storandt, M.T.(A.S.C.P.), M.S.P.H.; and Lara J. Akinbami, M.D.

<https://www.cdc.gov/nchs/data/nhsr/nhsr158-508.pdf>





# Health Outcomes

- Children
  - Obesity (ages 2–19 years)
  - Dental caries (ages 2–19 years)
- Adults
  - Hypertension (ages 18 and above)
  - Obesity (ages 20 and above)
  - Severe obesity (ages 20 and above)
  - Diabetes (ages 20 and above)
- Older Adults
  - Complete tooth loss (ages 65 and above)



# Covariates

- Sex
- Age groups
- Race and Hispanic origin
- Family income



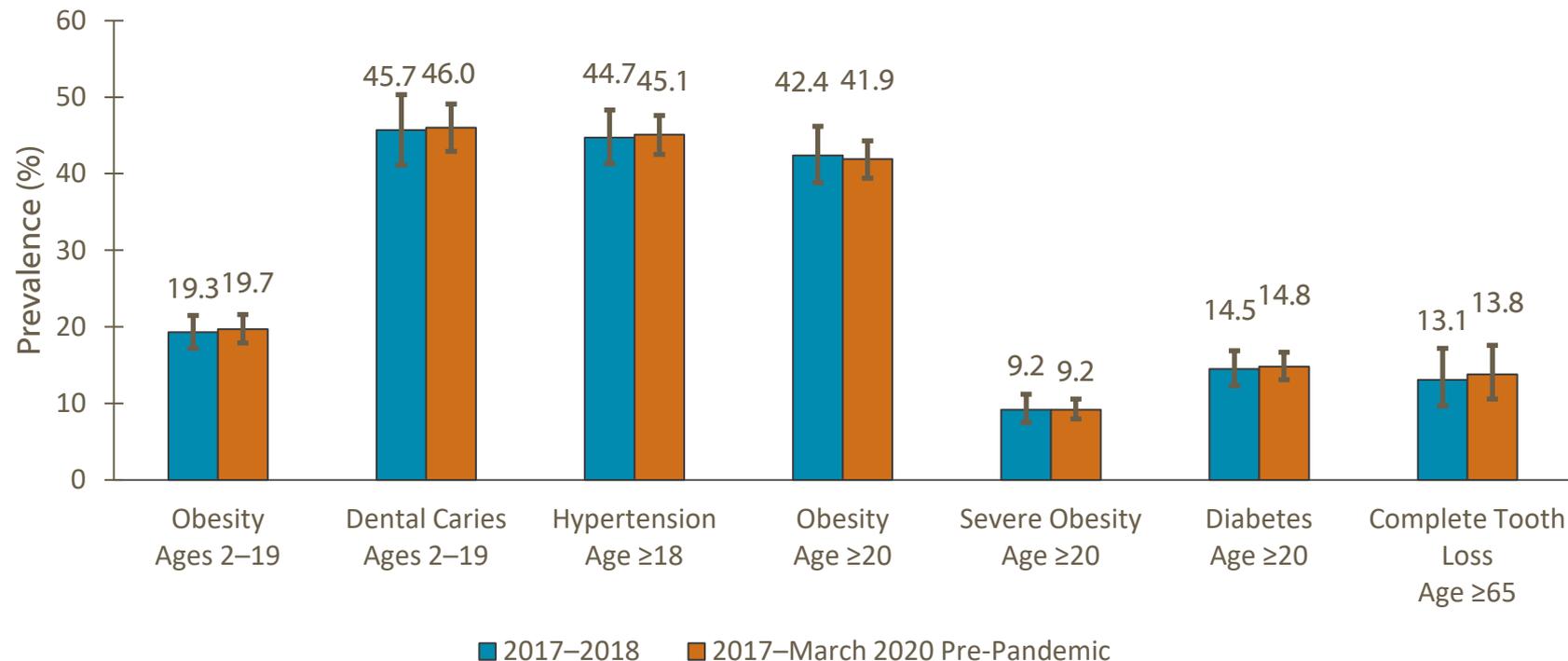


# Methods

- As is usual with NHANES analyses...
  - Accounted for complex, multistage probability design including unequal probability of selection
  - Sample weights were used
    - Fasting sample weights for diabetes estimates
    - Examination sample weights for all other estimates
- Standard errors estimated using Taylor series linearization
- Adult estimates age-adjusted to the 2000 projected U.S. Census population
  - Obesity, severe obesity, diabetes (20–39 years, 40–59 years, ≥60 years)
  - Hypertension (18–39 years, 40–59 years, ≥60 years)
  - Complete tooth loss (65–69 years, 70–74 years, ≥75 years)

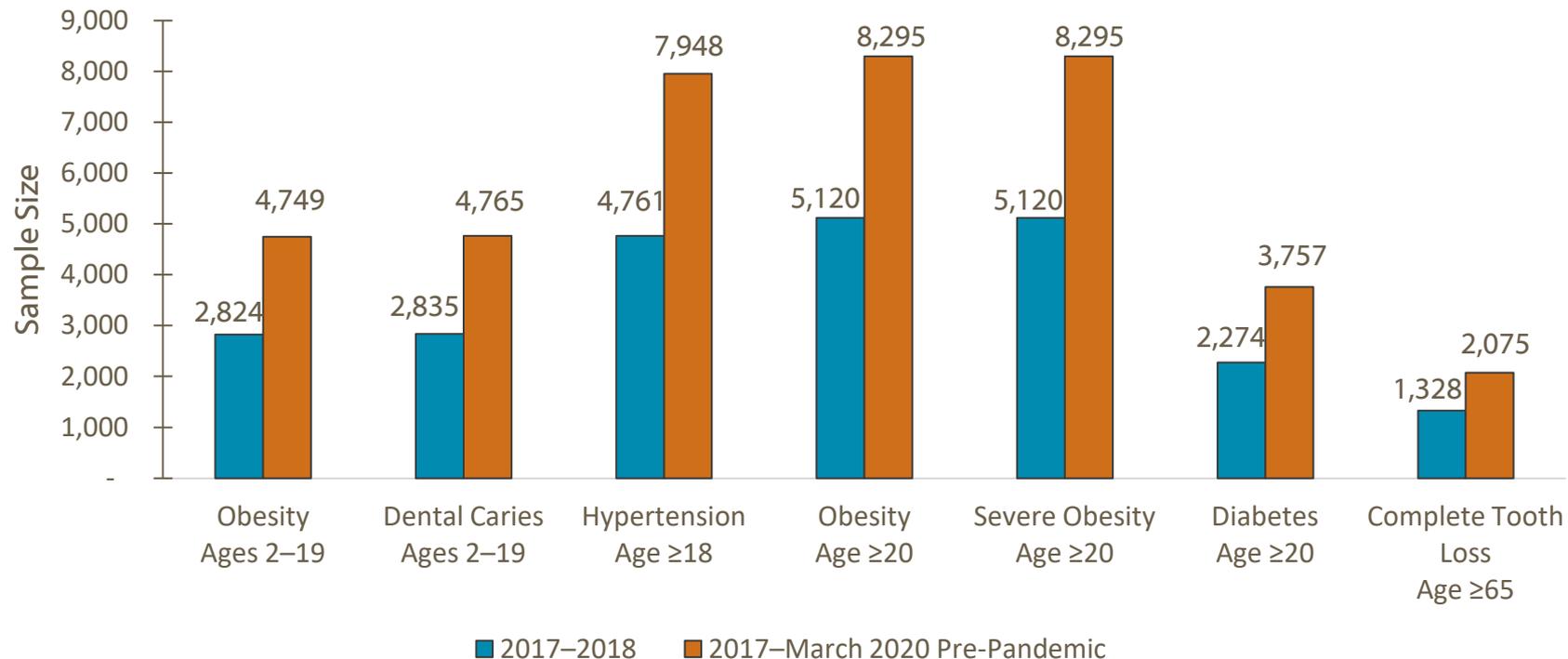


# Estimates from 2017–March 2020 are similar to 2017–2018



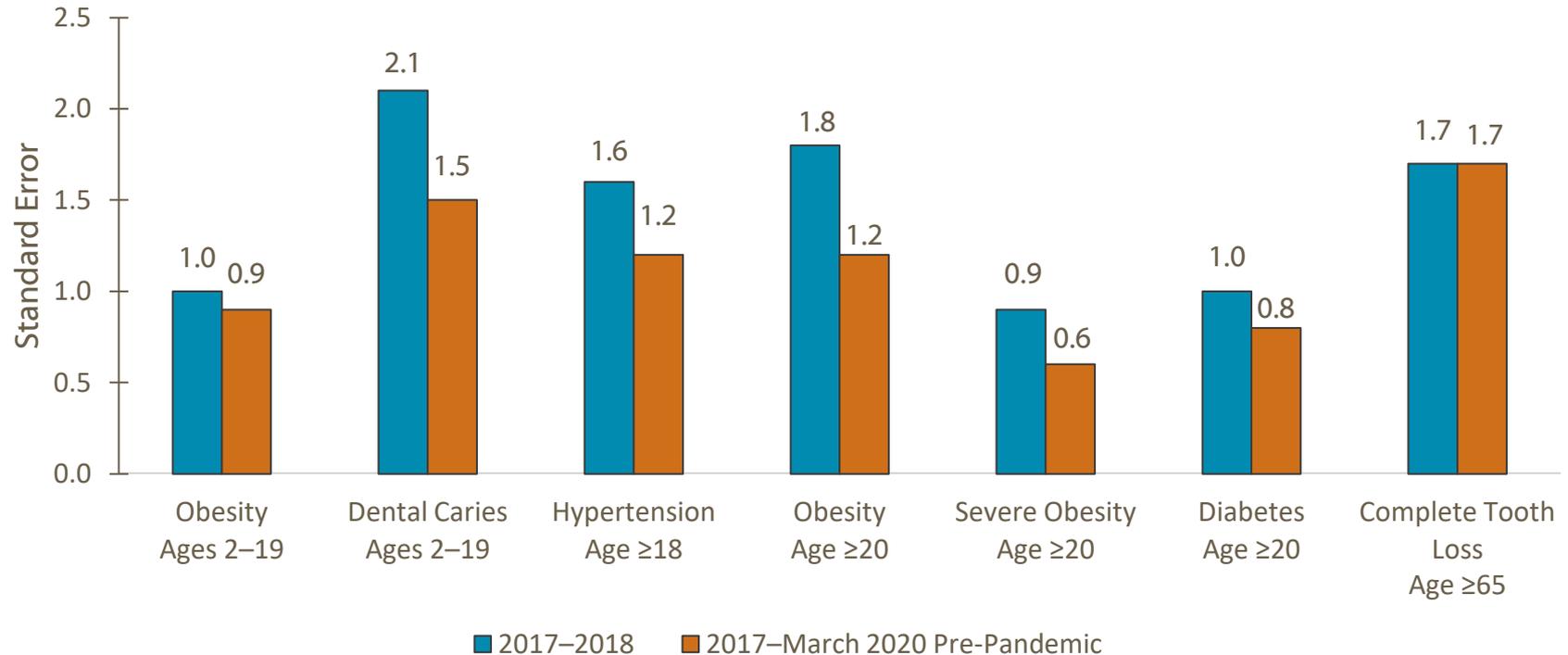


# Data from 2017–March 2020 have larger sample size than 2017–2018





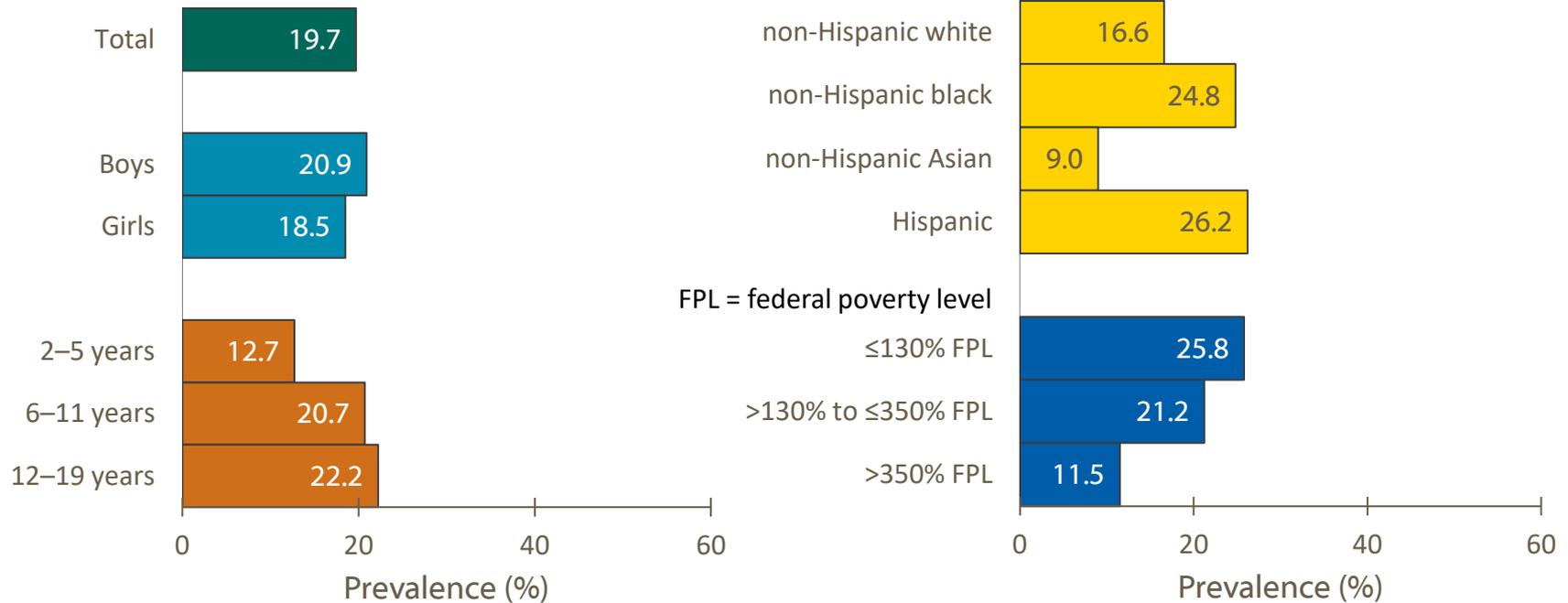
# Estimates from 2017–March 2020 have generally smaller standard error than 2017–2018





# Estimates for childhood obesity (2–19 years)

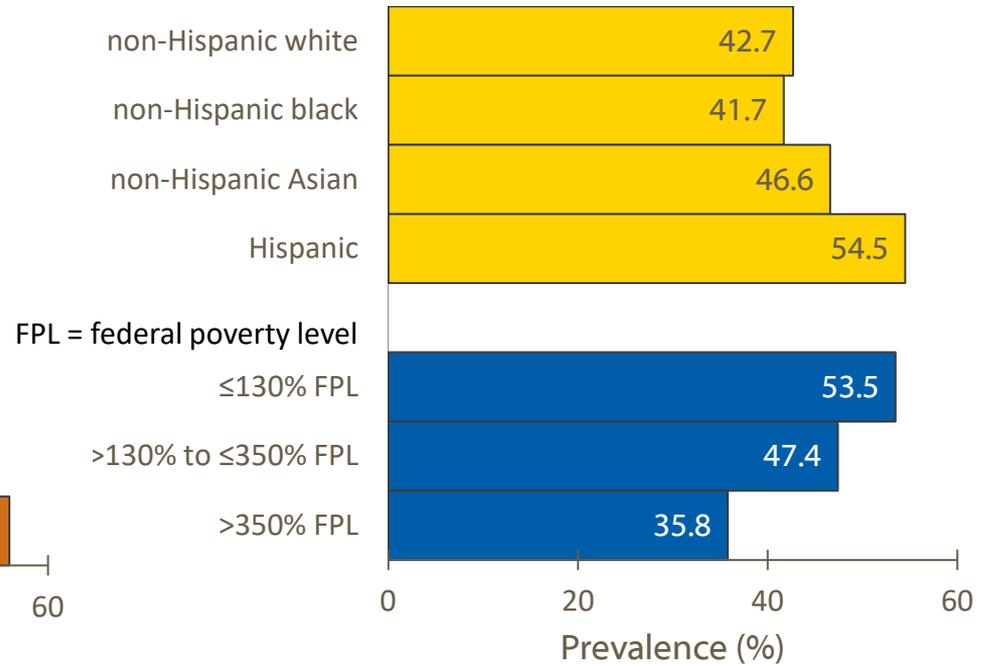
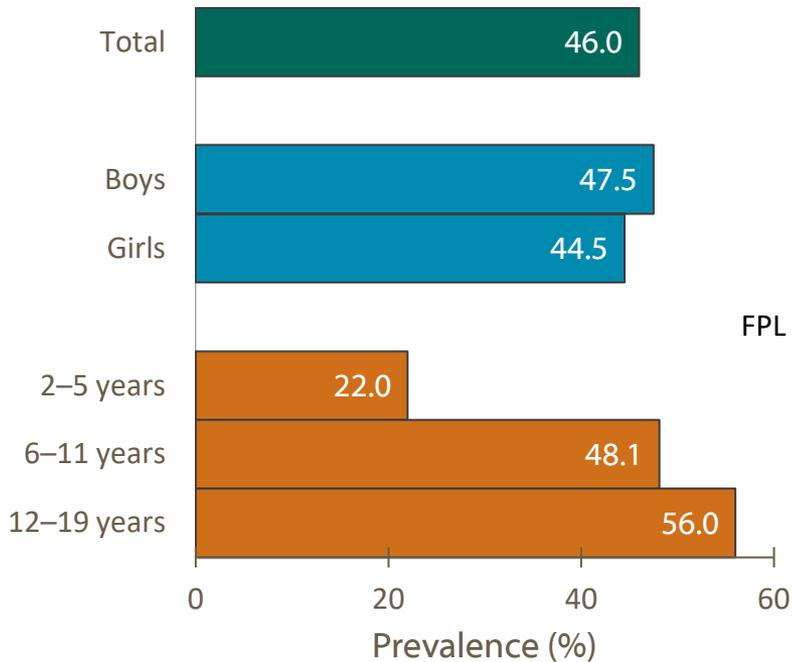
Body mass index  $\geq 95^{\text{th}}$  percentile for age and sex





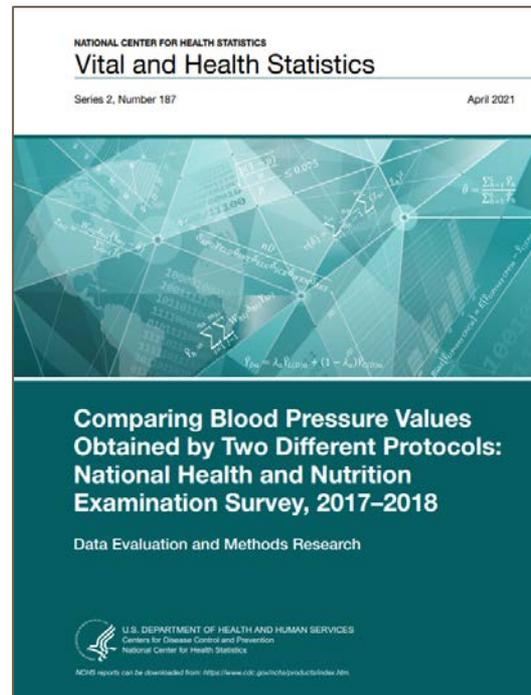
# Estimates for childhood dental caries (2–19 years)

## Untreated or restored dental caries in $\geq 1$ primary or permanent teeth



# Hypertension

- Previously NHANES estimates for hypertension used auscultatory protocol for blood pressure
- During 2017–2018, both auscultatory (manual; mercury sphygmomanometer) and oscillometric (automated) protocols were used
- During 2019–March 2020, oscillometric protocol was exclusively used
- Details available in the Series 2 report
  - Estimates for prevalence of hypertension were generally concordant between protocols

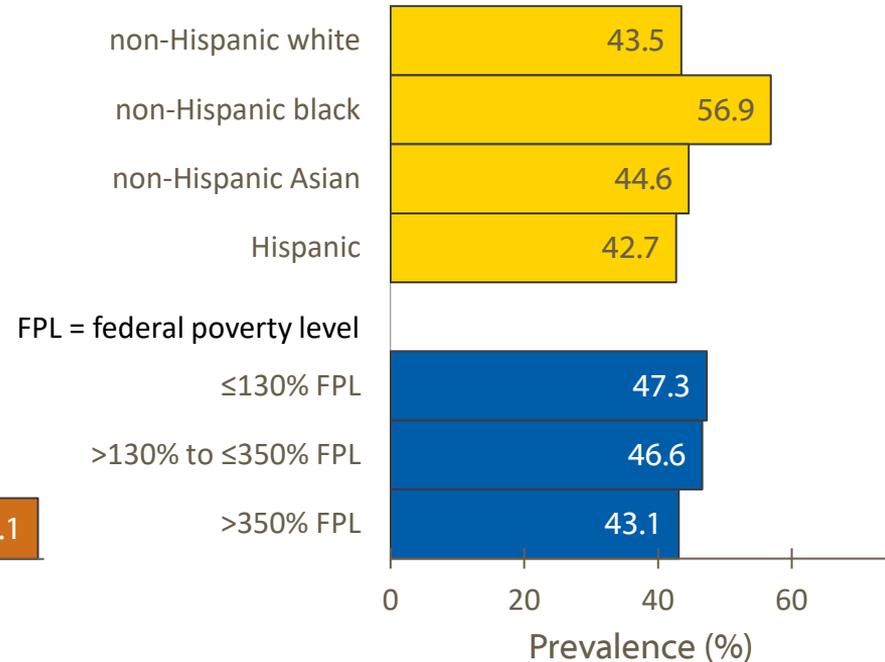
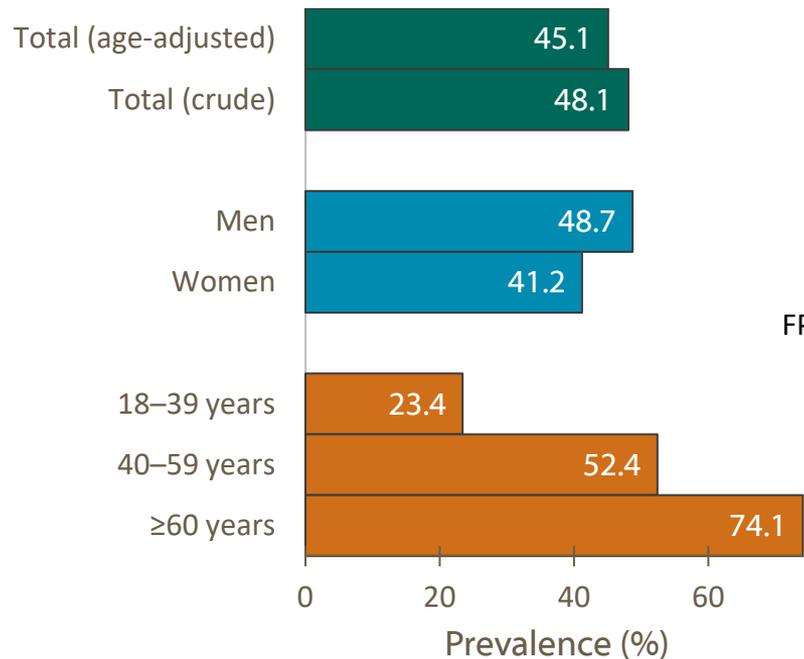


[https://www.cdc.gov/nchs/data/series/sr\\_02/sr02-187-508.pdf](https://www.cdc.gov/nchs/data/series/sr_02/sr02-187-508.pdf)



# Estimates for adult hypertension ( $\geq 18$ years)

Mean systolic blood pressure  $\geq 130$  mmHg\*, mean diastolic blood pressure  $\geq 80$  mmHg\*, or taking a medication to lower blood pressure



\* Blood pressure measured with oscillometric protocol

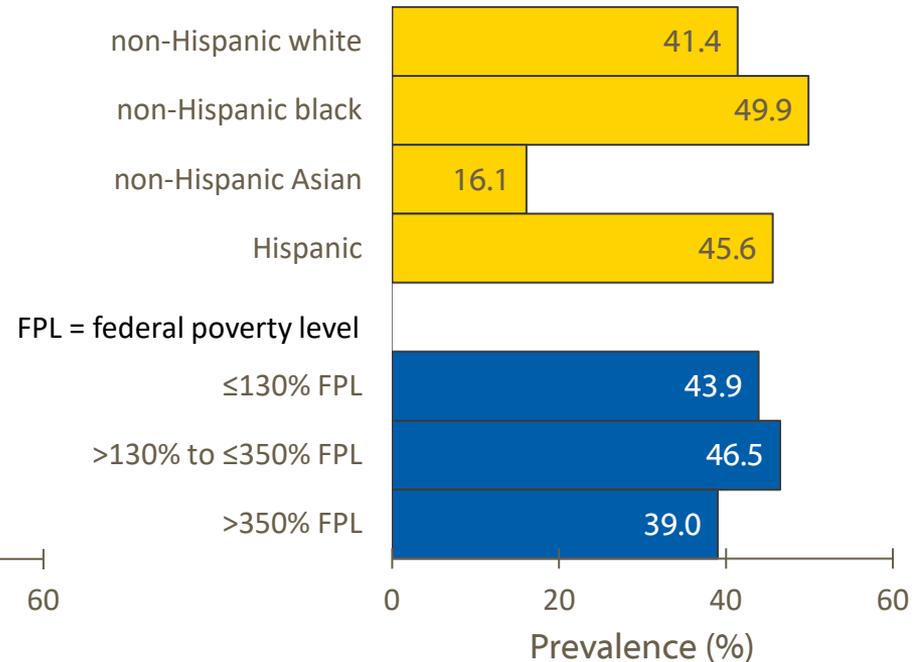
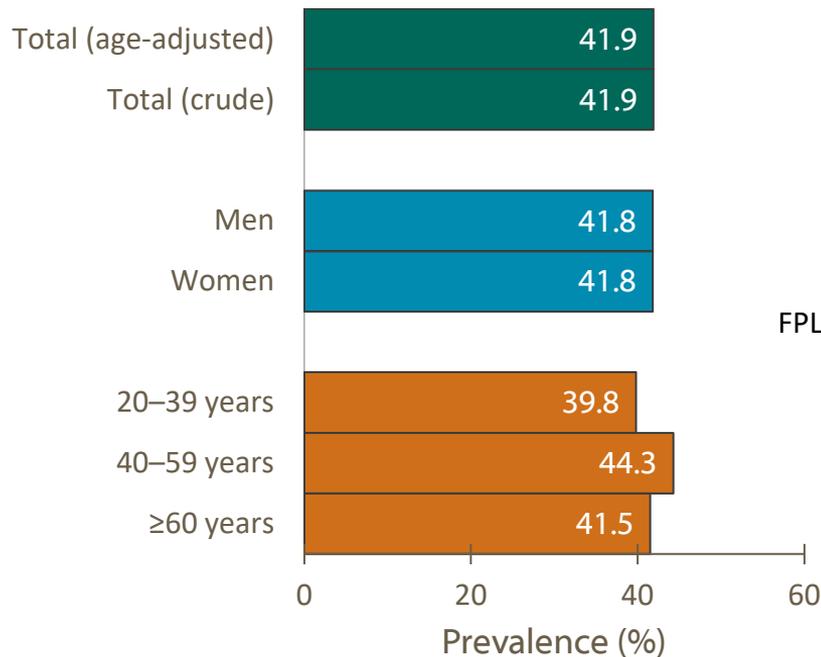
Source: NHANES 2017-March 2020 pre-pandemic data files

Note: Different x-axis range than other slides.



# Estimates for adult obesity ( $\geq 20$ years)

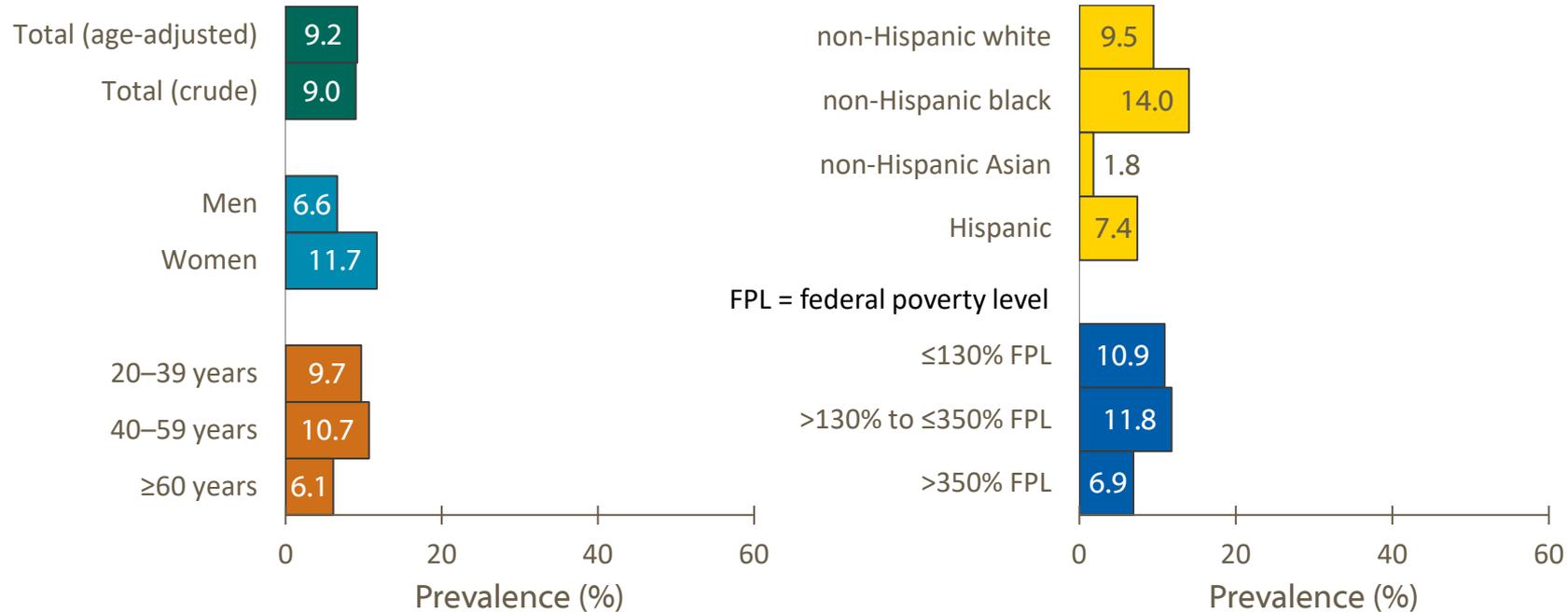
## Body mass index $\geq 30$ kg/m<sup>2</sup>





# Estimates for adult severe obesity ( $\geq 20$ years)

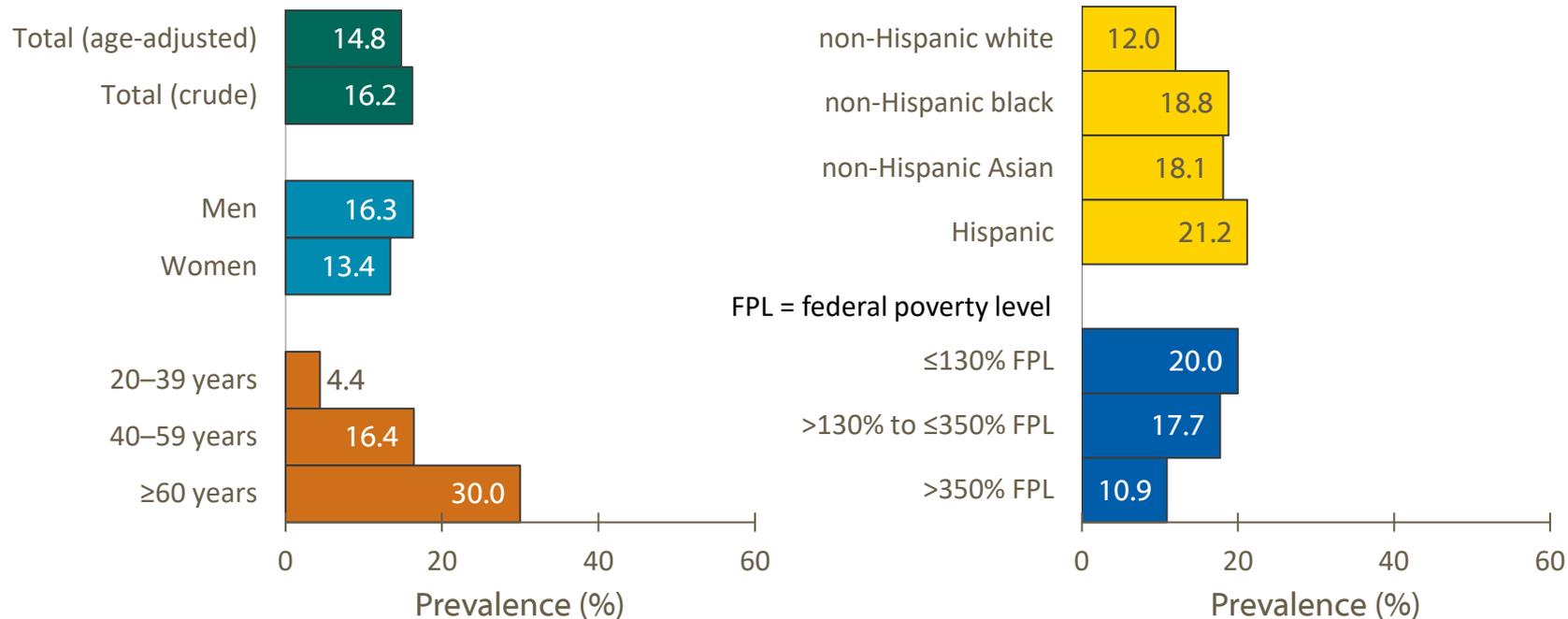
## Body mass index $\geq 40$ kg/m<sup>2</sup>





# Estimates for adult diabetes ( $\geq 20$ years)

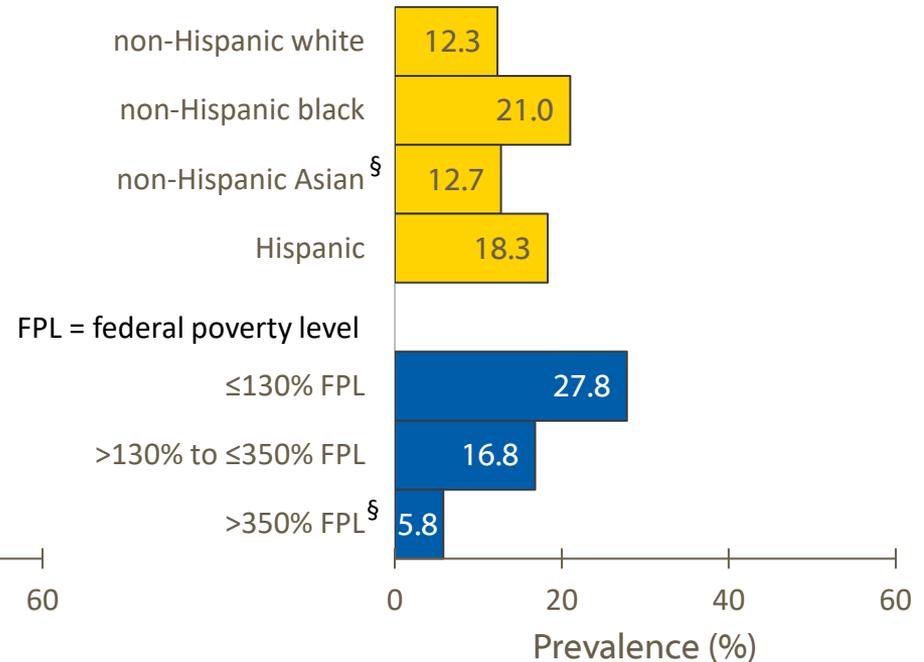
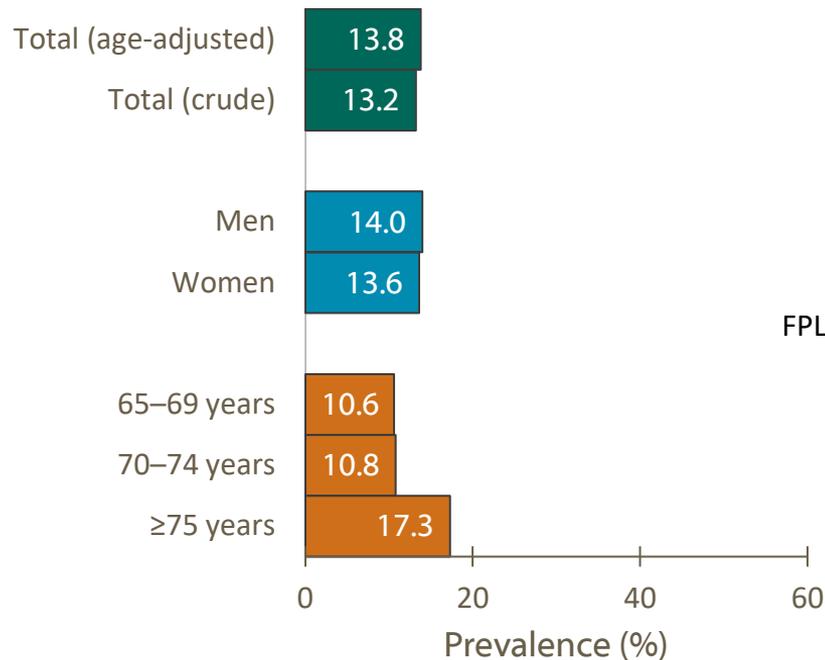
Previously told they have diabetes, fasting plasma glucose  $\geq 126$  mg/dL, or hemoglobin A1c  $\geq 6.5\%$





# Estimates for complete tooth loss among adults $\geq 65$ y

No natural tooth, no dental root fragment, and no implanted tooth\*



\*Based on 28 teeth, excluding 3rd molars

<sup>§</sup> Estimate does not meet NCHS standards of reliability

Source: NHANES 2017-March 2020 pre-pandemic data files



**What's next?**



# More data releases are anticipated in the future

Data Type	Location	Weights
Other combined 2017–March 2020 pre-pandemic data	On NHANES website <a href="https://www.cdc.gov/nchs/nhanes/index.htm">https://www.cdc.gov/nchs/nhanes/index.htm</a>	Use sample weights

# Data Files on NHANES Website

↑ National Health and Nutrition Examination Survey

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NHANES 2017-March 2020 -

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Confidential combined 2017–March 2020 pre-pandemic data	NCHS Research Data Center <a href="https://www.cdc.gov/rdc/index.htm">https://www.cdc.gov/rdc/index.htm</a>	Use sample weights

# 2017–March 2020 Limited Access Data Files

🏠 National Health and Nutrition Examination Survey

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👤 Demographics Data

🍴 Dietary Data

🏥 Examination Data

🔬 Laboratory Data

💬 Questionnaire Data

⚠️ Limited Access Data

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📄 Brief Overview and Analytic Guidance

📄 Estimates of Selected Health Conditions

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Confidential combined 2017–March 2020 pre-pandemic data	NCHS Research Data Center <a href="https://www.cdc.gov/rdc/index.htm">https://www.cdc.gov/rdc/index.htm</a>	Use sample weights
Data collected only during 2019–March 2020	NCHS Research Data Center <a href="https://www.cdc.gov/rdc/index.htm">https://www.cdc.gov/rdc/index.htm</a>	No weights available

# 2019–March 2020 Limited Access Data Files

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NHANES 2017-March 2020 +

**NHANES 2019-2020** -

Questionnaire Instruments

Laboratory Methods

Procedure Manuals



## National Health and Nutrition Examination Survey

### NHANES 2019–2020

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#### Data, Documentation, Codebooks

-  [Limited Access Data - 2019-March 2020 Convenience Sample](#)

#### Using the Data

-  [Overview](#)
-  [Release Notes](#)
-  [Laboratory Data Overview](#)
-  [Questionnaire Data Overview](#)

#### Contents in Detail

-  [Questionnaire Instruments](#)

<https://wwwn.cdc.gov/nchs/nhanes/continuousnhanes/default.aspx?BeginYear=2019>



# Research Data Center

- [RDC](#)
- [Restricted Data](#) +
- [Location of Access](#) +
- [Proposal Process](#) +
- [Confidentiality](#)
- [Accessing Restricted Data](#)
- [Preparing for proposal Submission](#)
- [Providing the Public Use Data](#)
- [Output](#)
- [Fees and Invoicing](#)
- [Publishing Guidelines](#) +
- [Reference Materials](#)
- [Directions](#)
- [FAQs](#)

**Attention:**

 All National Center for Health Statistics RDCs are closed.

NCHS researchers may not enter any NCHS or FSRDC facility until they are informed that the facility has reopened. We will continue to accept and review new proposals and amendments. Please direct all RDC related questions to [rdca@cdc.gov](mailto:rdca@cdc.gov).

## Research Data Center (RDC)

The National Center for Health Statistics (NCHS) operates the Research Data Center (RDC) to allow researchers access to restricted-use data. The RDC is responsible for protecting the confidentiality of survey respondents, study subjects, or institutions while providing access to the restricted-use data for statistical purposes. For access to the restricted-use data, researchers must submit a research proposal outlining the need for restricted-use data. The proposal provides a framework for NCHS to identify potential disclosure risks and how the data will be used.



[Preparing for Proposal Submission](#)

- [1. Restricted Data](#)
- [2. Location of access](#)
- [3. The Proposal Process](#)

[Accessing Restricted Data](#)

- [1. Confidentiality](#)
- [2. Output](#)
- [3. Publishing Guidelines](#)

<https://www.cdc.gov/rdc/index.htm>



# Questions?

- Please submit your questions via the Q&A feature in the Zoom application
- The facilitator will address questions as time allows. Questions not answered may be forwarded to [paoquery@cdc.gov](mailto:paoquery@cdc.gov)

<https://www.cdc.gov/nchs>

<https://www.cdc.gov/nchs/nhanes>

For more information, contact CDC  
1-800-CDC-INFO (232-4636)  
TTY: 1-888-232-6348 [www.cdc.gov](http://www.cdc.gov)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

