

National Health and Nutrition Examination Survey (NHANES)

Kathryn S. Porter, M.D, M.S., Director
Division of Health and Nutrition Examination Surveys

2015 National Conference on Health Statistics
August 24, 2015



National Center for Health Statistics
Division of Health and Nutrition Examination Surveys



Objective

To assess the health and nutritional status of adults and children in the United States



Bloomberg Businessweek

Psoriasis Linked to Raised Heart Risk

40% of study patients with skin disorder had factors such as diabetes



MONDAY, Dec. 20 (HealthDay News) -- People with psoriasis are at increased risk for a cluster of cardiovascular risk

factors known as metabolic syndrome, a new study has found.

The feature and high study.

In the National psoriasis

The abdominal high-ce

Only 13 with 28

The Washington Post

The Checkup

Health in the News - and in Your Life

Young Americans getting fat faster

Celebrity chef and healthful eating activist [Jamie Oliver](#) has made [research suggesting](#) that today's children may be the first generation ever to have a shorter life expectancy than their parents a pillar of [Food Revolution](#).

Wait till he gets a load of the latest. A new study from the University of Michigan Health System shows that young people are becoming obese at younger ages than members of earlier generations did.

The research, to be published Monday in the International Journal of Obesity, analyzed data from the National Health and Nutrition Examination Surveys (NHANES) and found that:

Recent birth cohorts are becoming obese in greater proportions for a given age, and are experiencing a greater duration of obesity over their lifetime. For example, although the 1966-1975 and 1976-1985 birth cohorts had reached an estimated obesity prevalence of at least 20% by 20-29 years of age, this level was only reached by 30-39 years for the 1946-1955 and 1956-1965 birth cohorts, by 40-49 years for the 1936-1945 birth cohort and by 50-59 years of age for the 1926-1935 birth cohort.

The New York Times

HEALTH STATISTICS

Prescription Drug Use Soared in Past Decade

By [Nicholas Bakalar](#)
Published: October 13, 2010

If you are taking a prescription medicine and you are older than 65, you are likely to be an antidepressant.

These are just two findings from a recent report from the National Center for Health Statistics on the increasing use of prescription drugs from 1999 to 2008.



The Philadelphia Inquirer

Hearing loss rises in youths; music players at fault?

By [Carla K. Johnson](#)
Associated Press

CHICAGO - Nearly one teen in five has lost a little hearing, a problem that has increased substantially in recent years, a new national study has found.

Some experts are urging teens to turn down the volume on their digital music players, suggesting that loud music in earbuds may be to blame - although hard evidence is lacking. They warn that slight hearing losses can cause problems in school and set the stage for hearing aids in later life.

"Our hope is we can encourage people to be careful," said [Gery Curhan](#) of the Harvard-affiliated Brigham and Women's Hospital in Boston, the study's senior author.

The researchers analyzed data on 12-to-13-year-olds from a nationwide health survey. They compared hearing loss in nearly 3,000 youths tested from 1993-04 with nearly 1,800 tested in 2005-06.

The prevalence of hearing loss increased from about 4.5 percent to 16.5 percent.

Most of the hearing loss was "slight," defined as inability to hear at 15 to 24 decibels - sounds such as a whisper or rustling leaves. Teenagers with slight hearing loss might not be able to hear water dripping or their mothers whispering, "Good night."

Extrapolating to the nation's teens, that would mean about 3.5 million with at least slight hearing loss.

Those with slight loss "will hear all of the vowel sounds clearly but might miss some of the consonant sounds," Curhan said - l, k and s.

"Although speech will be detectable, it might not be fully intelligible," he said.

The researchers did not single out for blame any particular digital music players, which burst onto the scene when Apple introduced its first iPod in 2001, after the first hearing survey and before the second.

Los Angeles Times | HEALTH

Do extra pounds always equal extra risk?

Doctors say plenty of fat people are healthy, and plenty of thin people are unhealthy.

By [Jameson](#)
2009

Many people connect poor health with excess weight, but it doesn't always go together.

Most health experts say that fat fuels the onset of conditions such as hypertension, diabetes, heart disease, stroke,

The Washington Post

Study: Black Women Stand a Tad Less Tall

By [Minnema](#)
Post Staff Writer
January 6, 2009

Black American women are getting

Conclusion reached by [John Komlos](#), a researcher who studies the relationship between standards of living and human health and fitness study, which has not yet been analyzed. Data recently released by the Health and Nutrition Examination Survey, part of the U.S. Centers for Disease Prevention.

During development, since Americans are getting taller from one generation to the next, it's more or less the world to get shorter "is more or less the result of modern times, except in dire circumstances" such as war or famine, said [Professor](#) at the University of Munich.

Based on the NHANES data, black women are shorter in the United States around 1980



Black women on average are bucking Americans' generational height trend. (By [Dana Thompson](#) -- Getty Images)

Goals

Goals of NHANES

- U.S. population-based estimates of:
 - Health conditions
 - Awareness, treatment and control of selected diseases
 - Environmental exposures
 - Nutrition status and diet behaviors
- Establish and maintain a biospecimen program

History

National Health and Nutrition Examination Surveys

<i>Survey</i>	<i>Dates</i>	<i>Ages</i>
NHES I	1960-62	18-79 years
NHES II	1963-65	6-11 years
NHES III	1966-70	12-17 years
NHANES I	1971-75	1-74 years
NHANES II	1976-80	6mo.-74 years
HHANES	1982-84	6mo.-74 years
NHANES III	1988-94	2 mo. +

National Health and Nutrition Examination Surveys

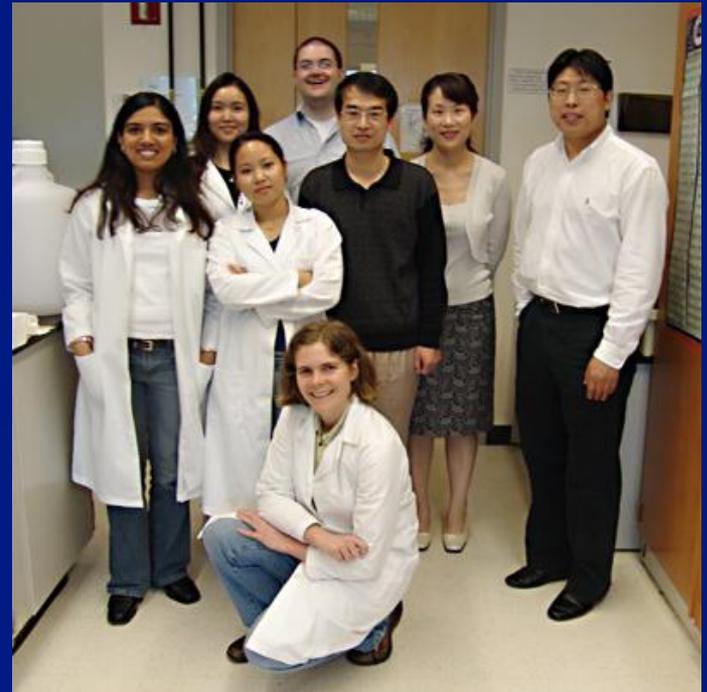
<i>Survey</i>	<i>Dates</i>	<i>Ages</i>
NHANES	1999-2000	All ages
NHANES	2001-2002	All ages
NHANES	2003-2004	All ages
NHANES	2005-2006	All ages
NHANES	2007-2008	All ages
NHANES	2009-2010	All ages
NHANES	2011-2012	All ages
NHANES	2013-2014	All ages
NHANES	2015-2016	All ages
NHANES	2017-2018	All ages

Planning NHANES

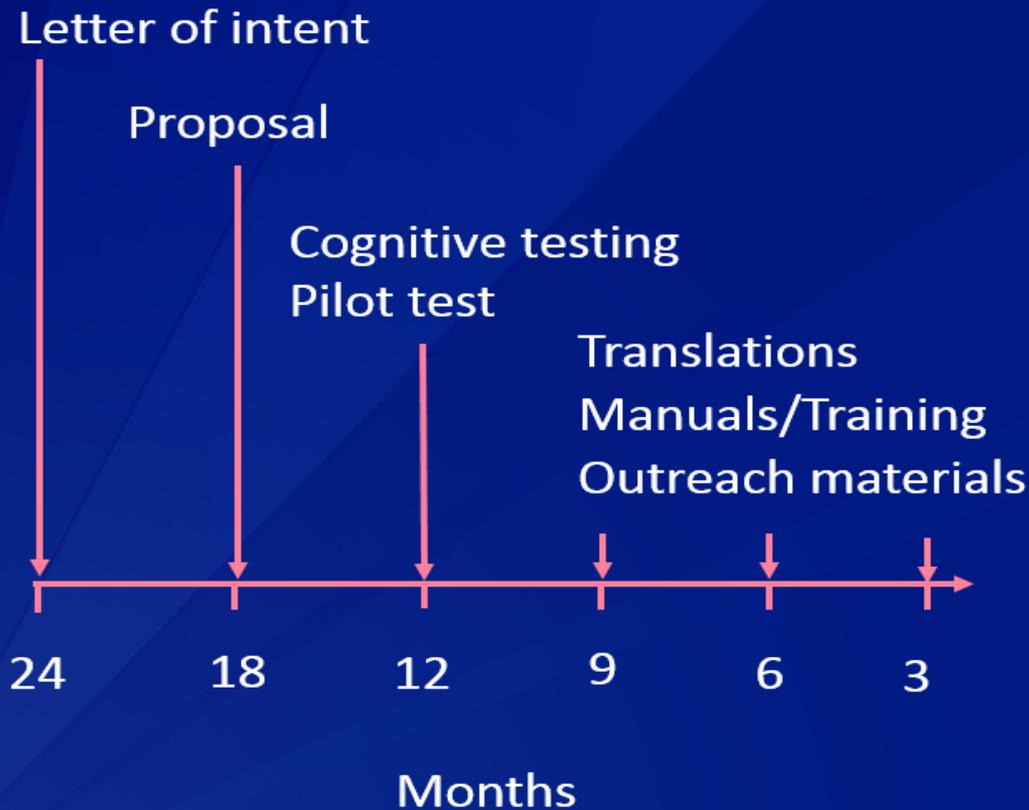
New content

Open invitation to researchers
via the internet, Listserve, and
email

- Federal government
- Universities
- Private sector
- NHANES program



Timeline



Start
January 2017

Proposal evaluation criteria

- Public health significance
- Scientific merit
- Appropriateness
- Feasibility and ethical issues
- Financial considerations

Financial considerations

← Internal funding →



← Collaborators →



Who are our collaborators?

Two dozen partners
with various degrees
of collaboration



Data Collection

NHANES sample

- Civilian, non-institutionalized household population in the United States
- Target: 5,000 individuals examined annually

Currently oversample:

- African Americans
- Asian Americans
- Hispanics
- Older persons aged 80+
- Low income whites

Stage 1

Counties



Stage 2

Segments



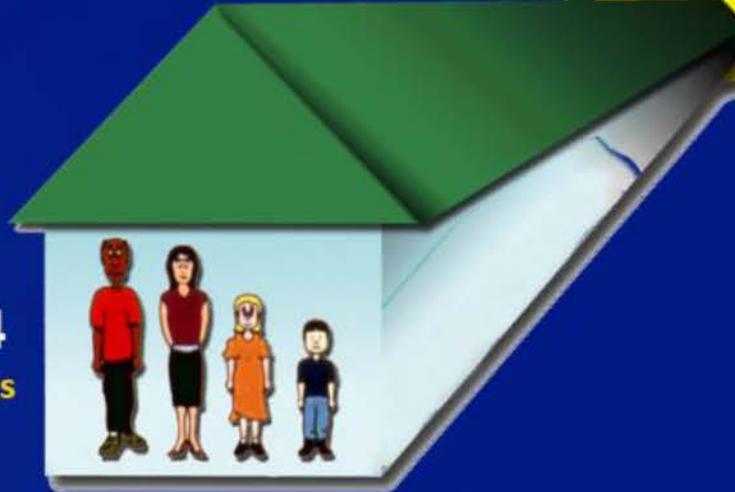
Stage 3

Households

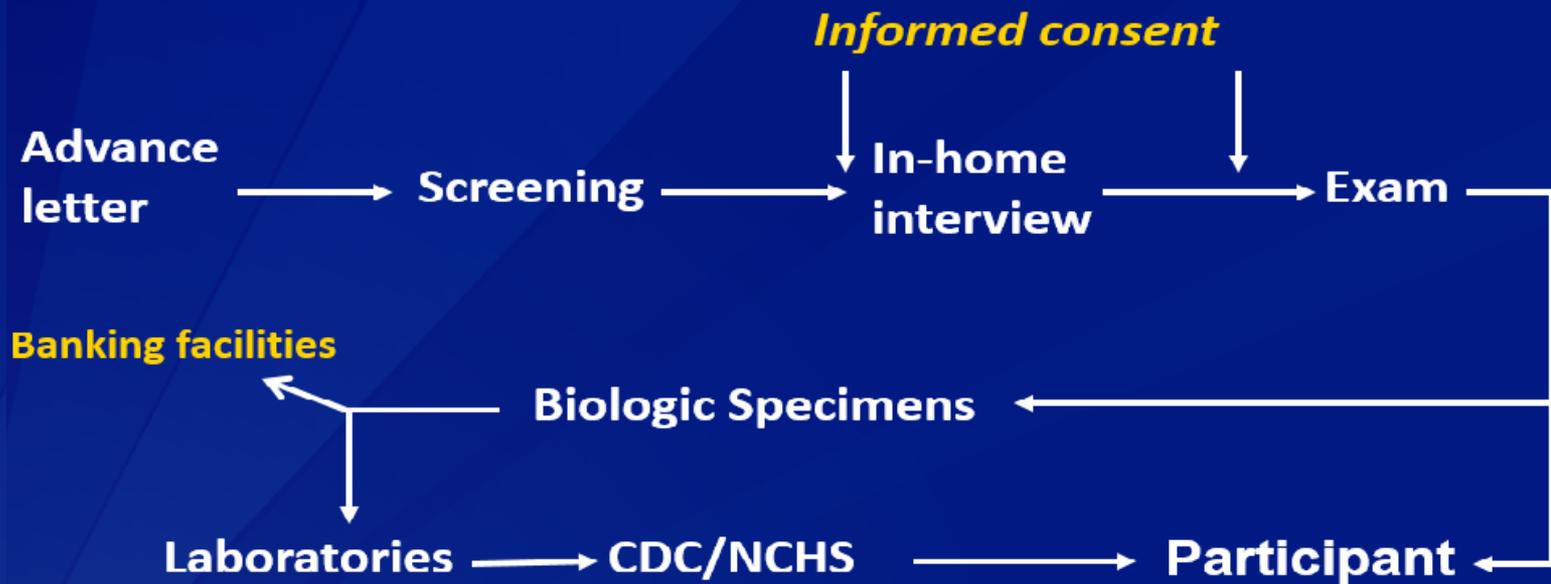


Stage 4

Participants



NHANES information flow



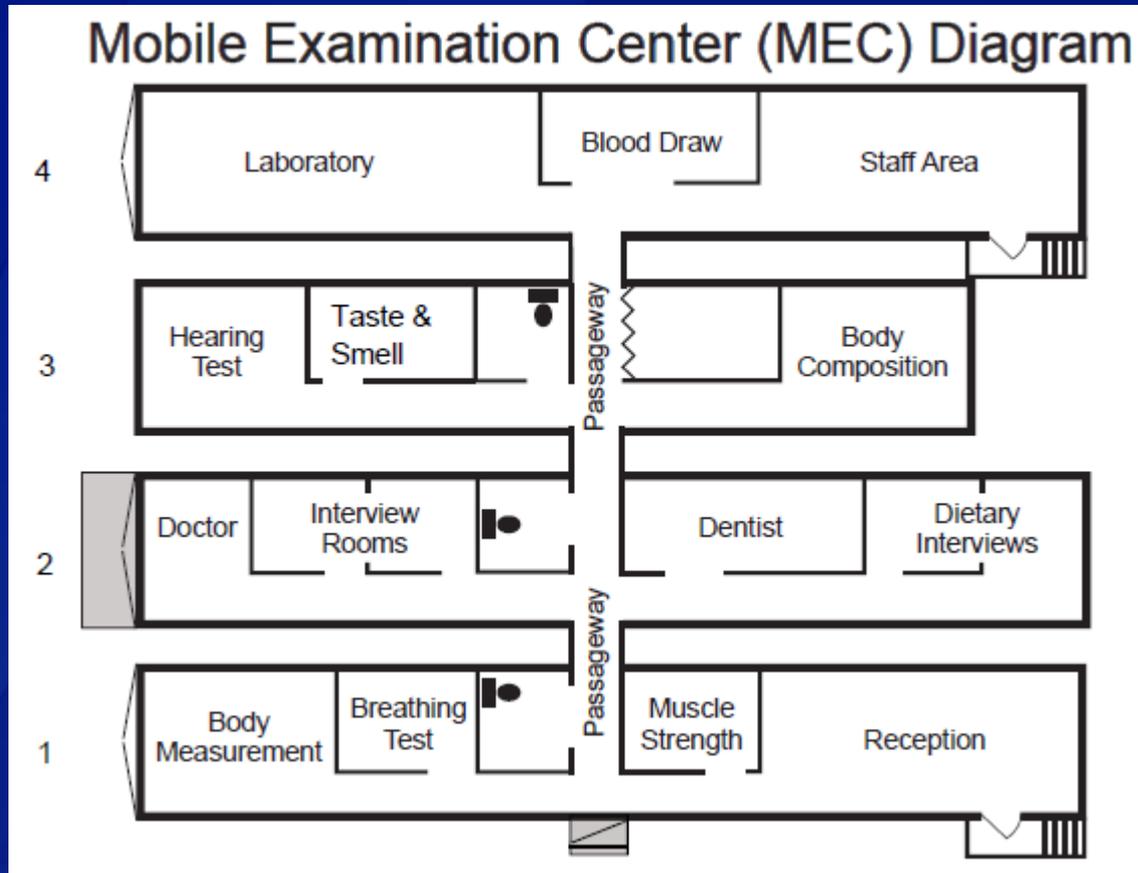
NHANES home interview



NHANES mobile exam center



NHANES mobile exam center



Configuration for NHANES 2011-12

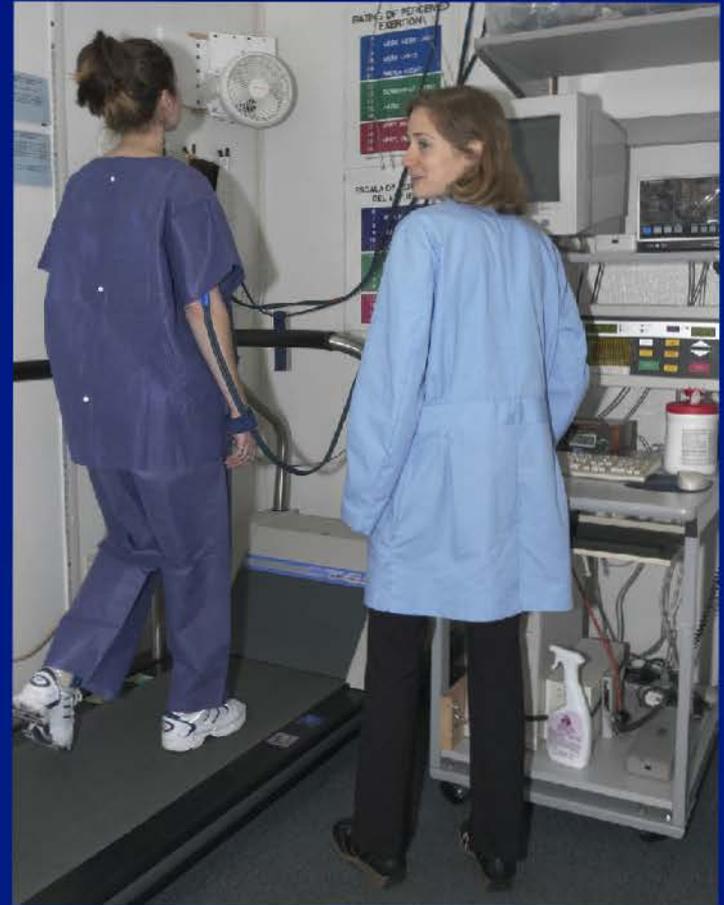
Mobile exam center entrance



Reception



Cardiovascular health



Hearing and vision



Anthropometry and body composition

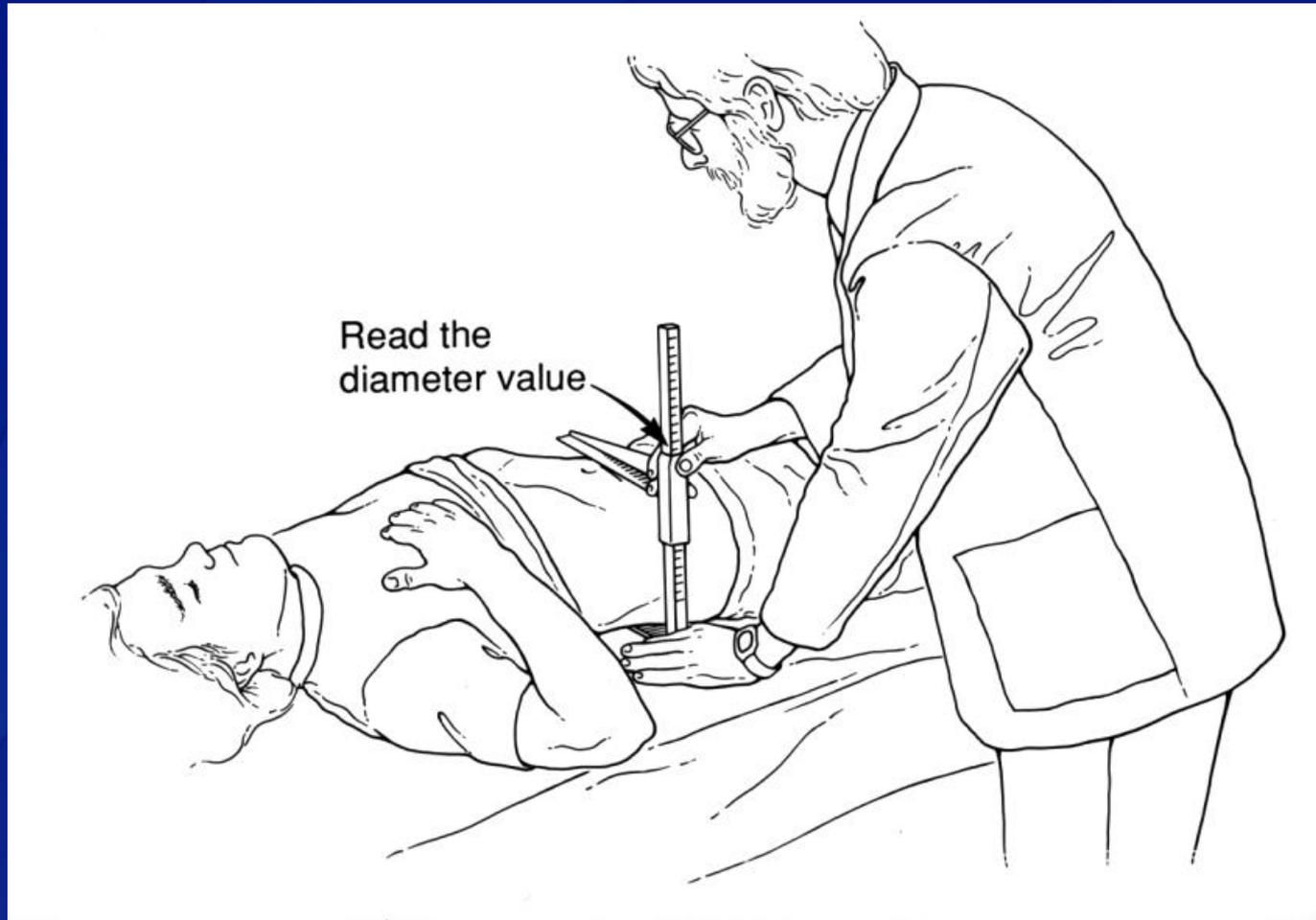


Whole body scan – percentage body fat



Sagittal abdominal diameter

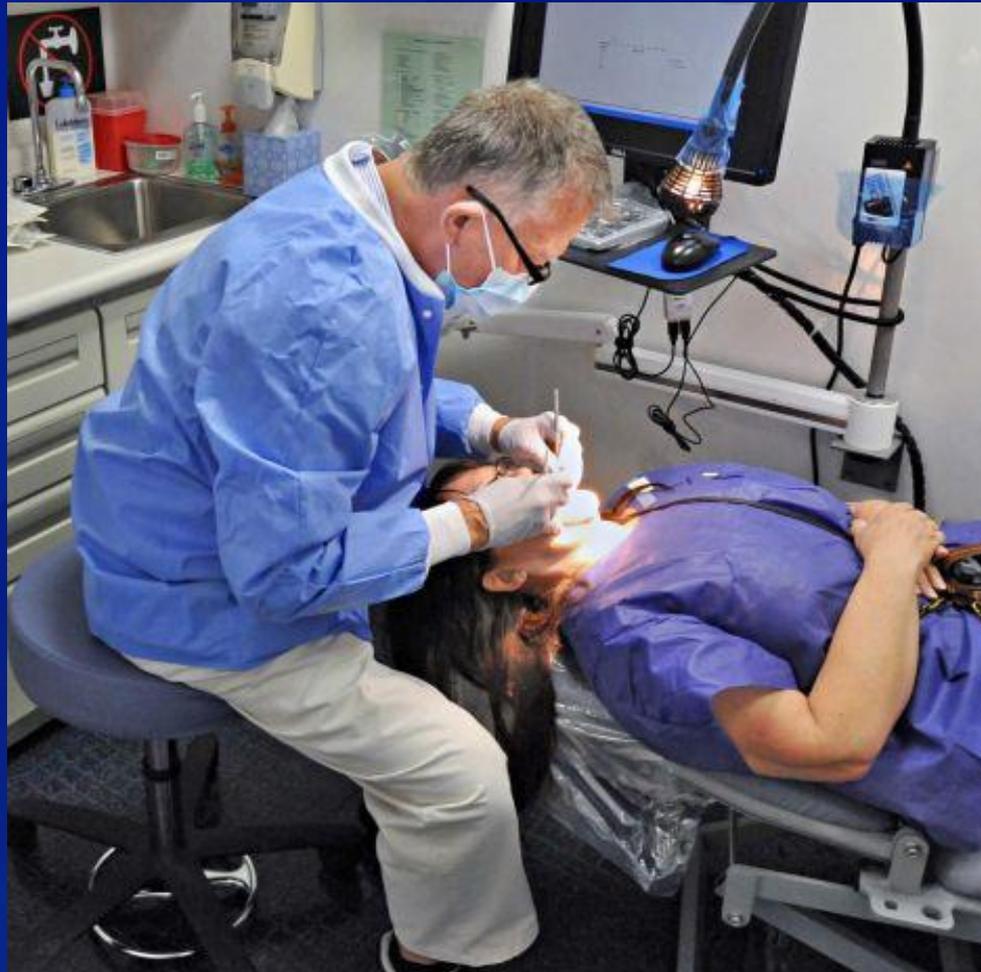
Participants 8 years and older



Private interviews



Oral health



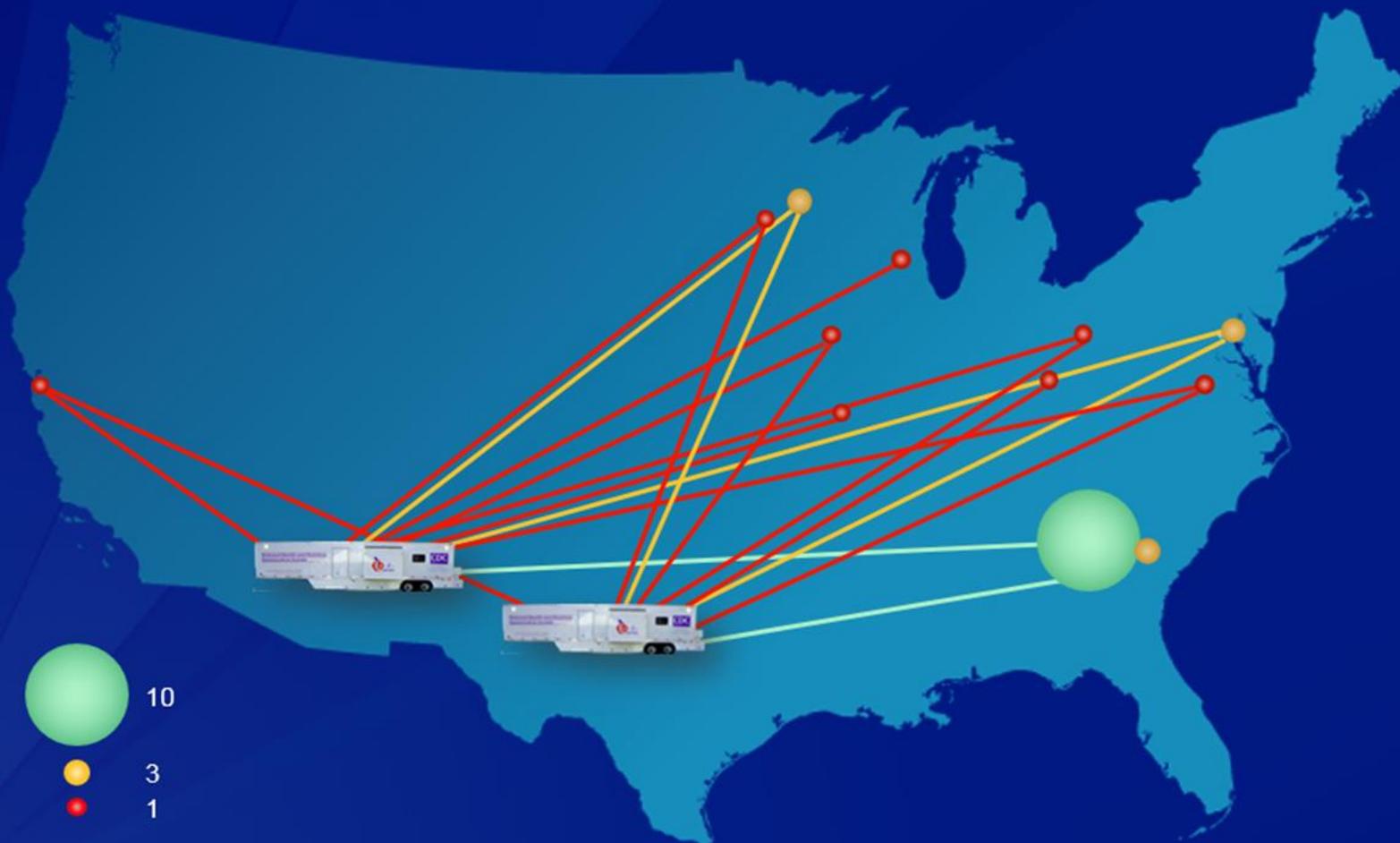
Laboratory



Mobile exam center laboratory

- Complete blood count
- Pregnancy test
- Specimen processing
 - Blood, urine, water, swabs
 - 500 assays
 - 24 laboratories

Shipping to laboratories and graders



Data transfer from laboratories and graders



Laboratory tests

- Nutritional biomarkers
- Hormone tests
- Diabetes
- Lipid profile
- Biochemistry profile
- Environmental chemicals
- Infectious diseases
 - Hepatitis viruses
 - Sexually transmitted infections
- Water fluoride levels

NHANES examination response rates



Participant remuneration

- Remuneration \$60 - \$125
- Transportation (bus, taxi, mileage) reimbursed
- Additional remuneration for other components

Examples of assessments after the exam

Day 2 Dietary Recall



Home urine collection



Physical Activity Monitor



Do we give participants their results?

Yes



Data release process

- QC
- Editing/cleanup
- Weighting
- Data preparation
- Documentation
- Confidentiality review



National Health and Nutrition Examination Survey

National Health and Nutrition Examination Survey

About NHANES

What's New

Questionnaires, Datasets, and Related Documentation

Survey Methods and Analytic Guidelines

Search Variables

All Continuous NHANES

NHANES 2013-2014

NHANES 2011-2012

NHANES 2009-2010

NHANES 2007-2008

NHANES 2005-2006

NHANES 2003-2004

NHANES 2001-2002

NHANES 1999-2000

Prior NHANES

Other NHANES Data

Proposal Guidelines

Survey Results and Products

Listserv

[NCHS Home](#) > [Surveys and Data Collection Systems](#) > [National Health and Nutrition Examination Survey](#)

[f Recommend](#) 10
 [t Tweet](#) 6
 [+ Share](#)

Questionnaires, Datasets, and Related Documentation

- [Continuous NHANES Data, Questionnaires and Related Documentation](#)
 - [Search Continuous NHANES Variables](#)
 - [NHANES 2013-2014](#)
 - [NHANES 2011-2012](#)
 - [NHANES 2009-2010](#)
 - [NHANES 2007-2008](#)
 - [NHANES 2005-2006](#)
 - [NHANES 2003-2004](#)
 - [NHANES 2001-2002](#)
 - [NHANES 1999-2000](#)
- [Prior to 1999 Data, Questionnaires, and Related Documentation](#)
- [Other NHANES Data](#)
- [Survey Methods](#)

[f Like NCHS on Facebook](#)

[✉ Email page link](#)

[🖨 Print page](#)



Contact Us:

National Center for Health Statistics
 3311 Toledo Rd
 Room 5419
 Hyattsville, MD 20782

1 (800) 232-4636

[Contact CDC-INFO](#)

NHANES data analysis

Data analysis

A number of tools on the web

- Analytic guidelines
- Tutorials
 - Continuous NHANES
 - NHANES III
 - NHANES II
 - NHANES I
 - Dietary
 - Physical activity and cardiovascular fitness
 - Environmental chemical data

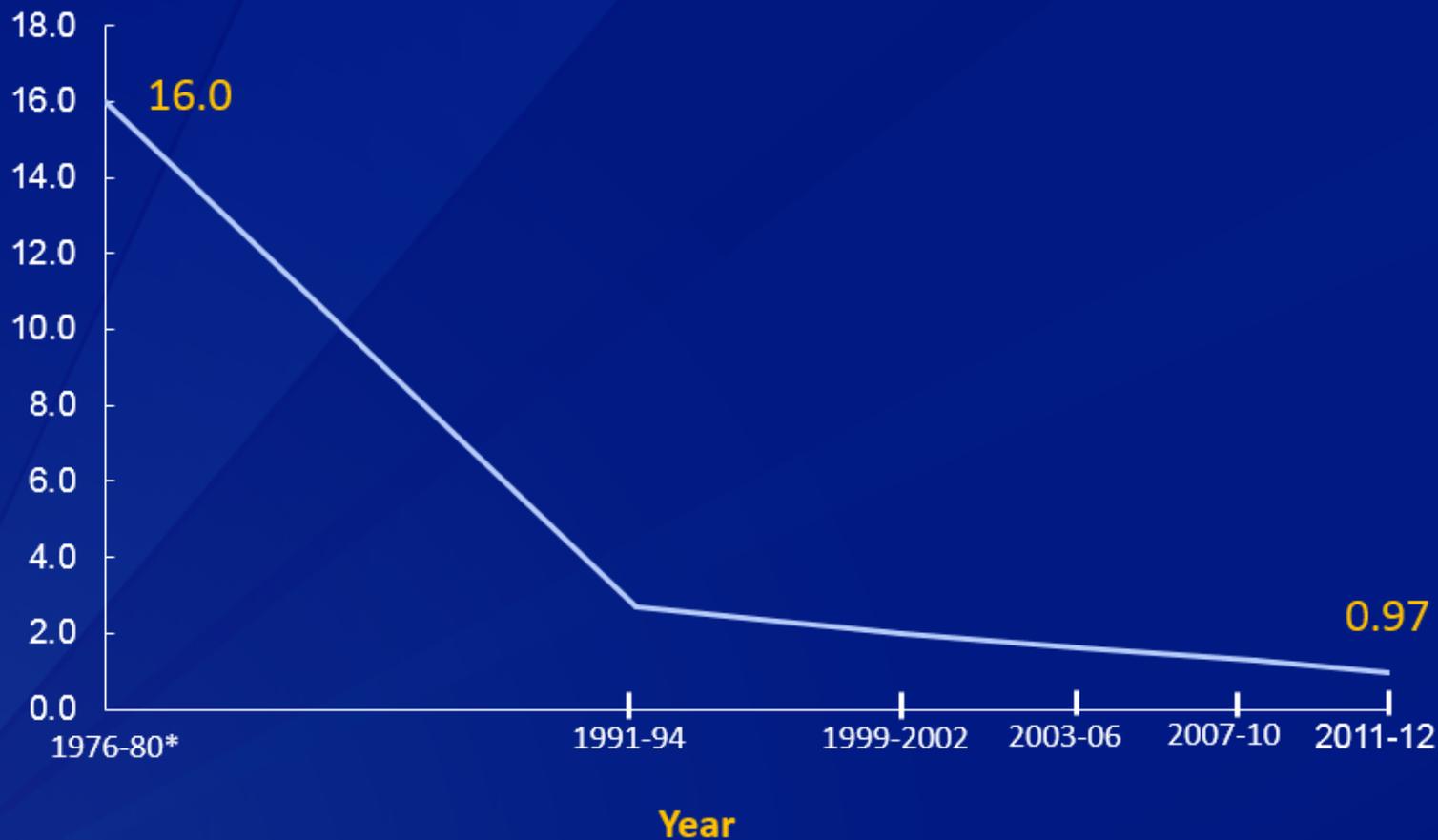
Data linked to NHANES

- National Death Index, Medicare/Medicaid enrollment and claims information, and Social Security Benefits data
- Linked data are available in NCHS Research Data Center

NHANES data findings

Environmental health

Trends in mean blood lead levels in U.S. children 1-5 years, 1976-2012



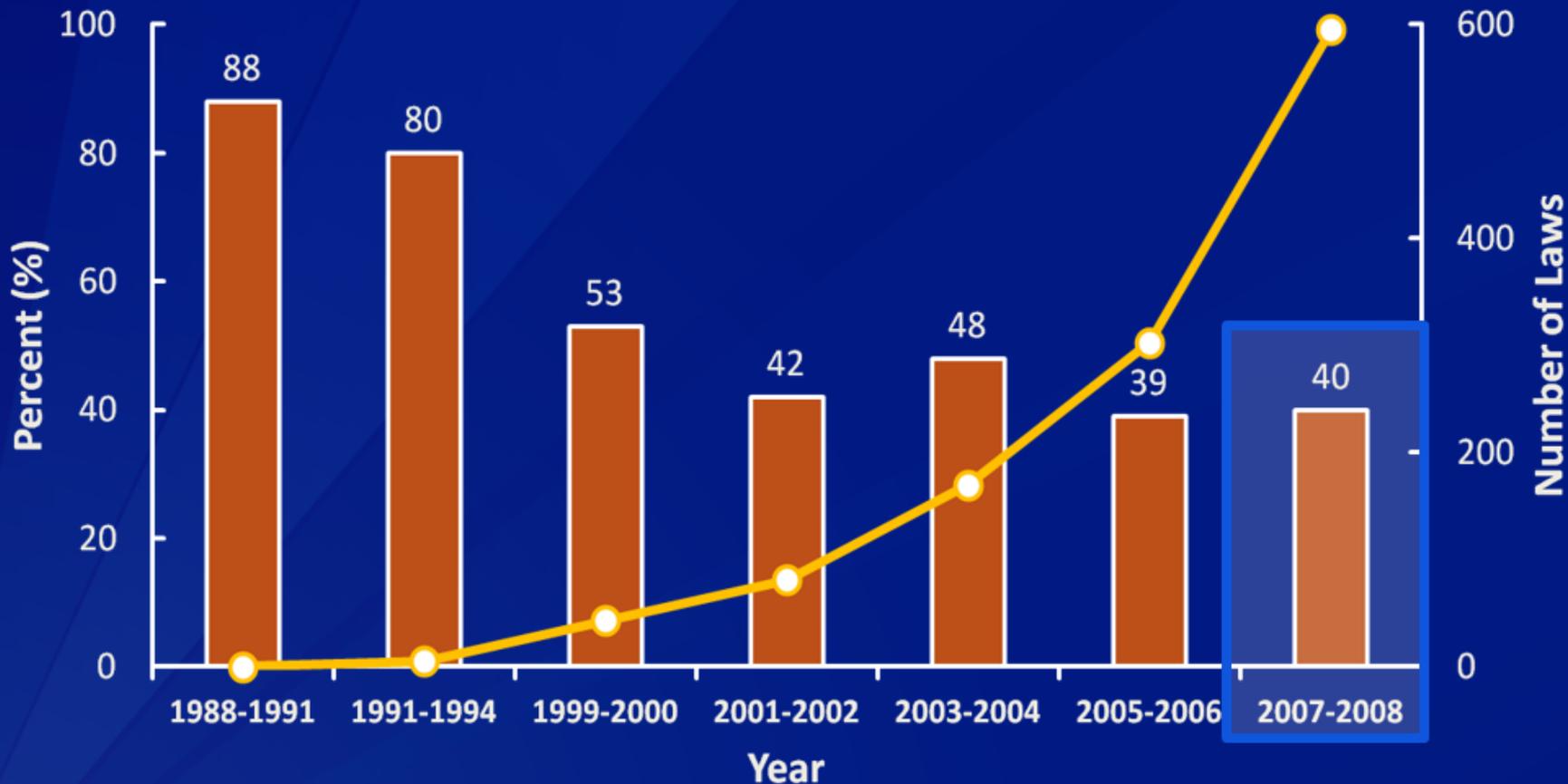
Source: CDC/NCHS National Health Examination Surveys, National Health and Nutrition Examination Surveys

* The 1976-1980 survey measured lead in children ages 6 months-5 years

Second hand smoke



Percent of non-smoking U.S. population exposed to second hand smoke



Source: Pirkle JL et al. Trends in Exposure of Nonsmokers in the U.S. Population to SHS: 1988-2002. *Env Health Persp.* 2006; 114(6): 853-8. CDC. Vital Signs: Nonsmokers' Exposure to Secondhand Smoke - United States, 1999-2008. *MMWR.* September 7, 2010. 59; 7-12

Handwashing

CDC Home



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People.™

SEARCH

A-Z Index [A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#) <#>

Handwashing: Clean Hands Save Lives

Handwashing is like a "do-it-yourself" vaccine—it involves five simple and effective steps (think Wet, Lather, Scrub, Rinse, Dry) you can take to reduce the spread of diarrheal and respiratory illness so you can stay healthy. Regular handwashing, particularly before and after certain activities, is one of the best ways to remove germs, avoid getting sick, and prevent the spread of germs to others.

Learn more about when and how to wash your hands, the importance of using soap and water, and what you can do if soap and clean, running water are not available. Whether you are at home, at work, traveling, or already sick, find out how good hand hygiene can protect you, your family, and others. [More...](#)

When & How to Wash Hands

Key times and tips

[Learn More >](#)



Print page

Get email updates

Contact Us:

Centers for Disease Control and Prevention
1600 Clifton Rd
Atlanta, GA 30333

800-CDC-INFO
(800-232-4636)
TTY: (888) 232-6348

[Contact CDC-INFO](#)



Antibacterial soap



Healthier Skin.
Healthier You.®

KILLS MORE GERMS
Than Any Other Liquid Hand Soap

OTHERS*
After washing with other ordinary or antibacterial hand soap.
*Dramatization only. Number of organisms shown does not reflect actual number of bacteria.

After washing with Dial Complete® Foaming Antibacterial Hand Wash.

Drug Facts	Purpose
Active ingredient Triclosan 0.46%	Antibacterial

A high-quality, foam soap that is 99.9

Drug Facts
Active ingredient Triclosan, 0.30%.....
Uses ■ For hand washing to reduce b
Warnings

Triclosan

- Synthetic chemical with broad antimicrobial properties used extensively in consumer products
- Detected in about three quarters of urine samples from participants ages 6 and older in NHANES 2003–2004
- Between 2003-04 and 2005-06, the concentration in urine increased 45%

December 13, 2013

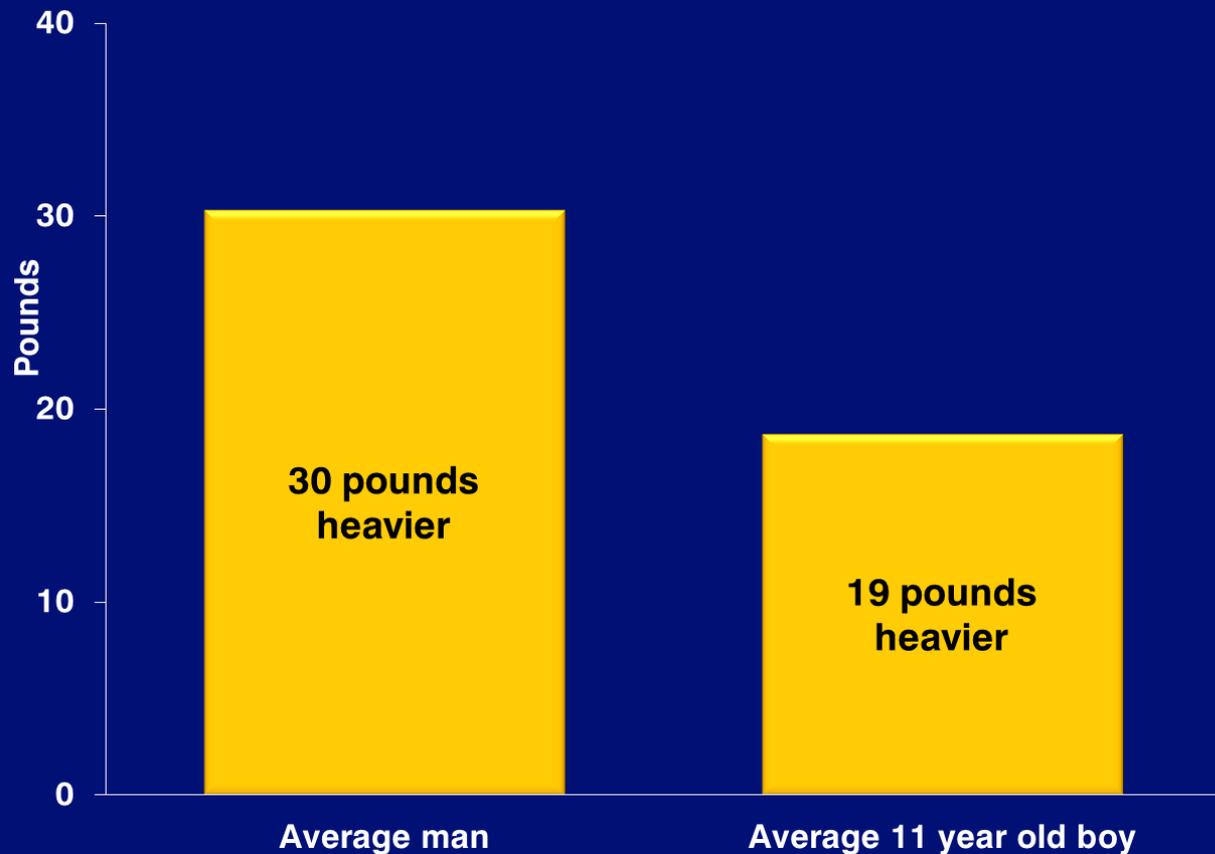
The screenshot shows the FDA website interface. At the top, it displays the U.S. Department of Health and Human Services logo and the FDA logo with the text "U.S. Food and Drug Administration Protecting and Promoting Your Health". A search bar is visible with the text "Search FDA". Below the search bar is a navigation menu with tabs for Home, Food, Drugs, Medical Devices, Radiation-Emitting Products, Vaccines, Blood & Biologics, Animal & Veterinary, Cosmetics, and Tobacco Products. The main content area is titled "For Consumers" and features a breadcrumb trail: "Home > For Consumers > Consumer Updates". A sidebar on the left lists "Consumer Updates" and "Animal & Veterinary". The main article headline is "FDA Taking Closer Look at 'Antibacterial' Soap".

- "New data suggest that the risks associated with long-term, daily use of antibacterial soaps may outweigh the benefits," ...There are indications that certain ingredients in these soaps may contribute to bacterial resistance to antibiotics, and may have unanticipated hormonal effects that are of concern to FDA.

Pediatric growth charts

Obesity

Americans heavier in 2007-10 than in the 1960s

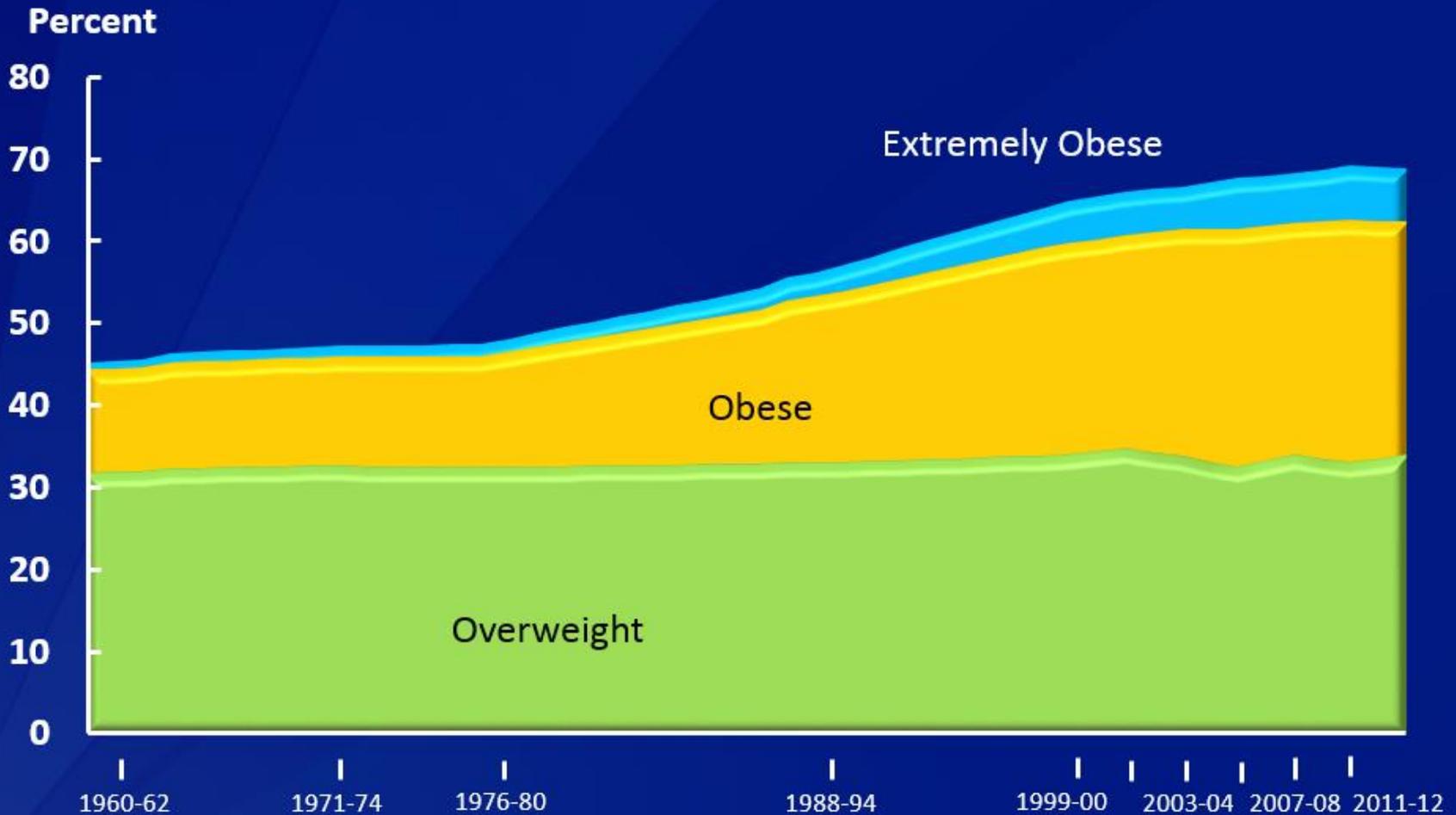


Prevalence of obesity in the U.S., 2011-12

- 17% of children & teens 2-19 y
- 35% of adults ≥ 20 y



Trends in adult obesity, U.S., 1960-2012



SOURCE: CDC/NCHS. National Health and Nutrition Examination Survey;

http://www.cdc.gov/nchs/data/hestat/obesity_adult_09_10/obesity_adult_09_10.htm

Informing safety



Click on Tools to convert PDF documents to Word or Excel.



AC 120-27E

DATE: 6/10/05

ADVISORY CIRCULAR



AIRCRAFT WEIGHT AND BALANCE CONTROL

Flight Standards Service
Washington, D.C.

Initiated By: AFS-200/AFS-300

Federal Aviation Administration

TABLE 2-1. STANDARD AVERAGE PASSENGER WEIGHTS

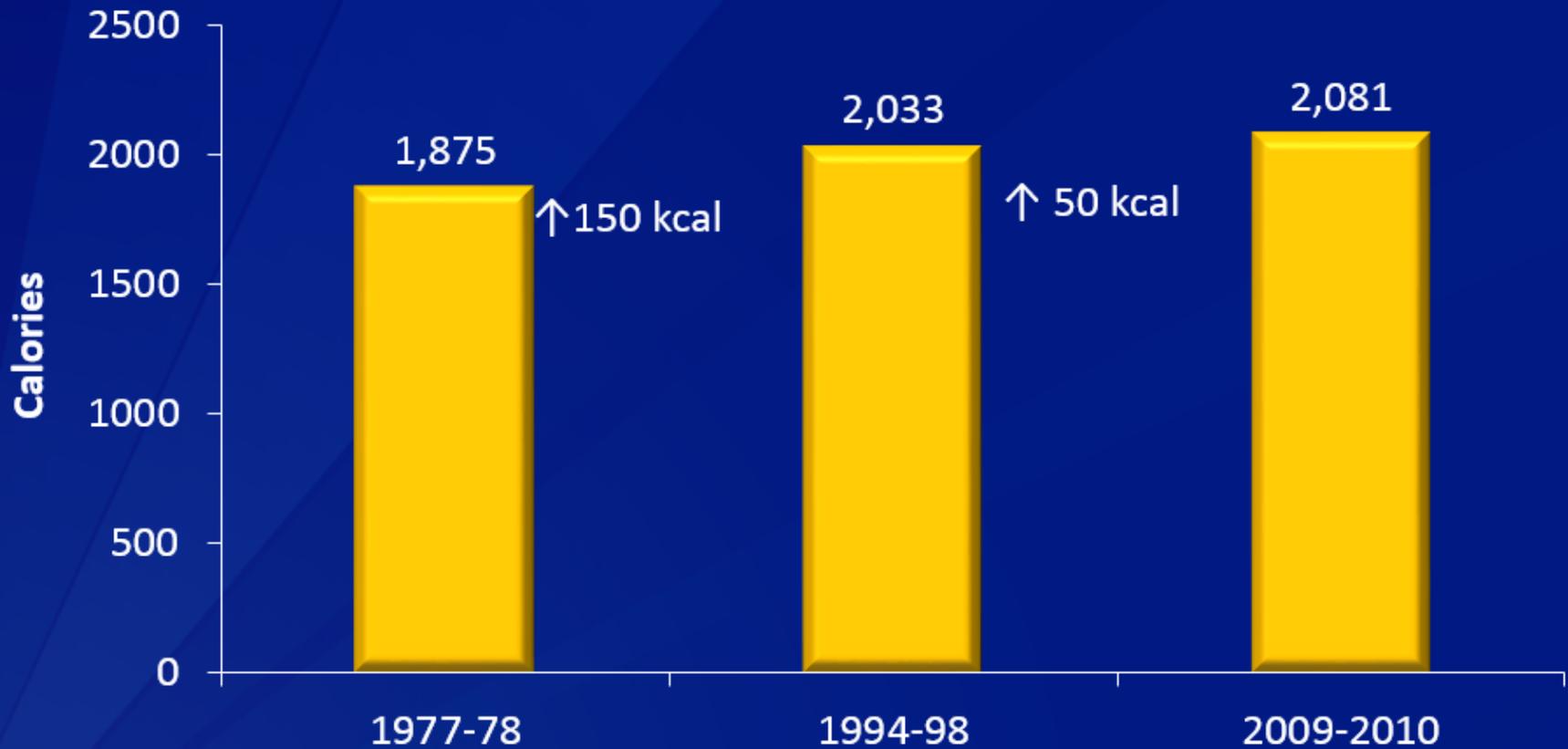
	Weight Per Passenger
<i>Summer Weights</i>	
Average adult passenger weight	190 lb
Average adult male passenger weight	200 lb
Average adult female passenger weight	179 lb
Child weight (2 years to less than 13 years of age)	82 lb
<i>Winter Weights</i>	
Average adult passenger weight	195 lb
Average adult male passenger weight	205 lb
Average adult female passenger weight	184 lb
Child weight (2 years to less than 13 years of age)	87 lb

Diet

What We Eat in America

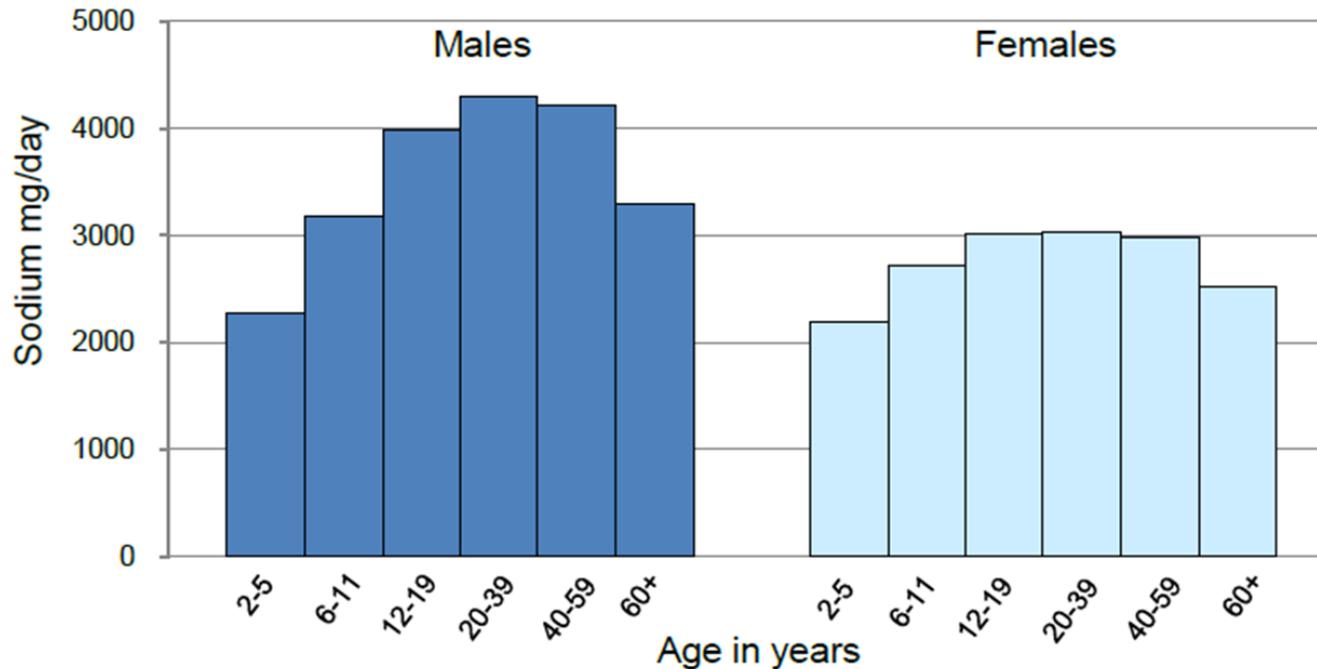


Changes in mean energy intake



Source: CDC/NCHS, National Health and Nutrition Examination Survey/What We Eat in America; 2+ years
<http://www.ars.usda.gov/Services/docs.htm?docid=18349>

Figure 1. Sodium intake by age and gender, 2007-2008



SOURCE: What We Eat in America, NHANES 2007-2008, Day 1 dietary intake data, weighted.

The *2010 Dietary Guidelines for Americans* recommend a sodium intake of less than 2300 mg per day

Measuring progress: trans-fatty acids reduction policies

JAMA The Journal of the
American Medical Association

Levels of Plasma *trans*-Fatty Acids in Non-Hispanic White Adults in the United States in 2000 and 2009

FREE

Hubert W. Vesper, PhD; Heather C. Kuiper, PhD; Lisa B. Mirel, MS; Clifford L. Johnson, MSPH; James L. Pirkle, MD, PhD

Table 2. Levels of *trans*-Fatty Acids in Fasting Non-Hispanic Whites Aged 20 Years or Older^a

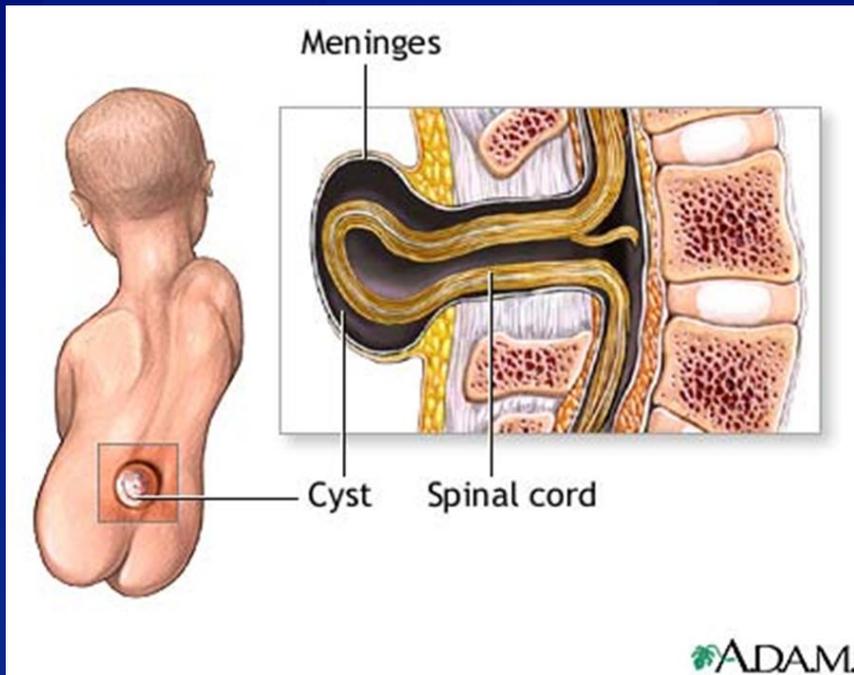
	NHANES 2000		NHANES 2009		From NHANES 2000 to 2009	
	No.	Geometric Mean (95% CI), $\mu\text{mol/L}$	No.	Geometric Mean (95% CI), $\mu\text{mol/L}$	Difference in Geometric Mean (95% CI), $\mu\text{mol/L}$	Decrease, %
Vaccenic acid	229	43.7 (39.1-48.2)	291	19.4 (16.9-21.9)	24.3 (19.6-29.0)	56
Elaidic acid	229	38.2 (33.0-43.4)	292	14.0 (11.6-16.3)	24.2 (19.1-29.3) ^b	63
Palmitelaidic acid	229	7.9 (7.3-8.5)	291	4.0 (3.6-4.5)	3.9 (3.2-4.6)	49
Linolelaic acid	227	2.6 (2.2-2.9)	290	1.3 (1.2-1.5)	1.3 (1.0-1.6)	49
Sum of <i>trans</i> -fatty acids	229	93.1 (82.5-103.6)	292	39.0 (33.7-44.3)	54.1 (43.4-64.7)	58

^aSingle-year replicate National Health and Nutrition Examination Survey (NHANES) weights were used because fasting subsample weights were not available for this analysis.

^bSlight differences due to rounding.

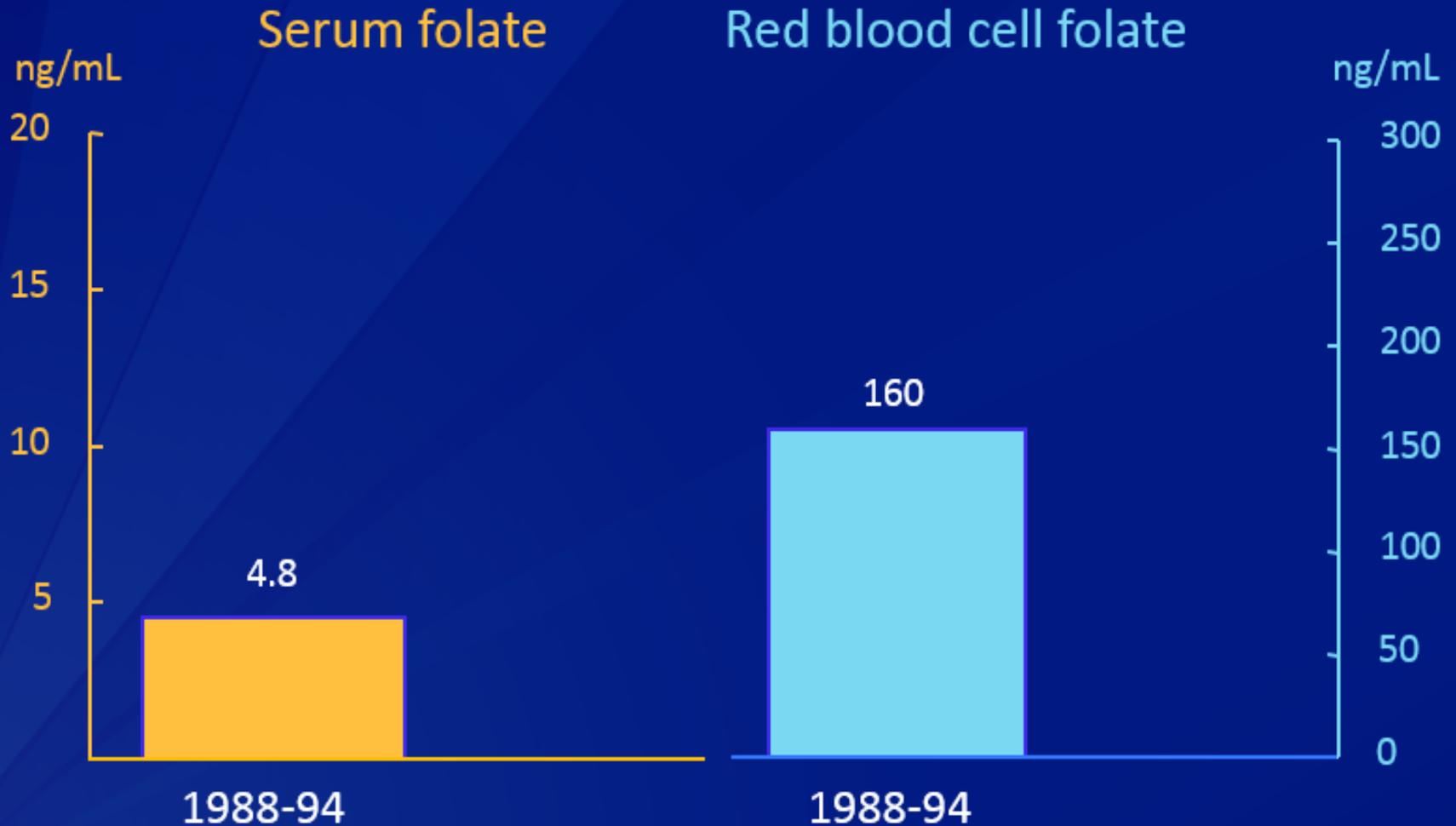
Birth defect prevention

Birth defect prevention – spina bifida



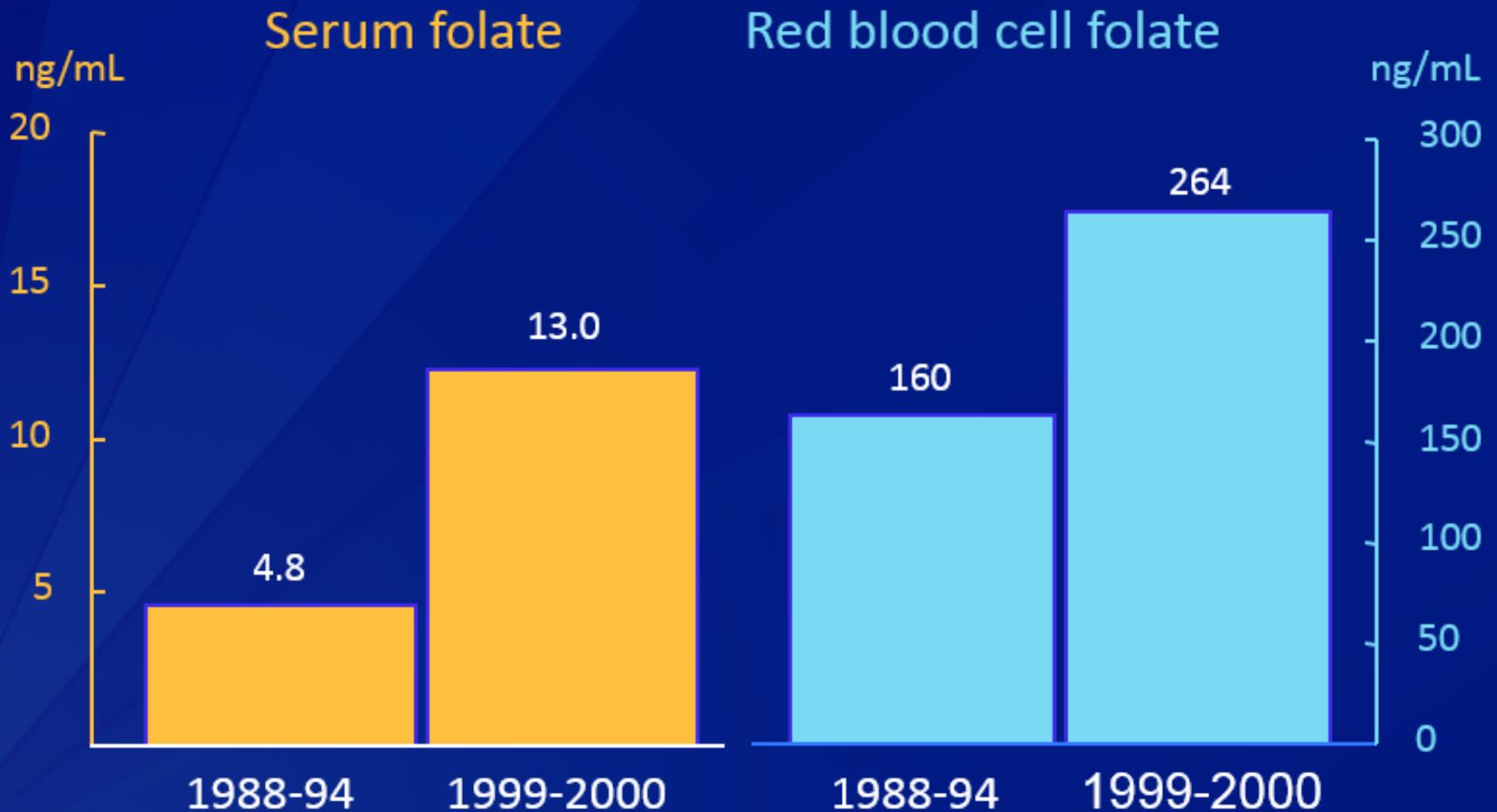
- 20-50% of cases can be prevented
- Requires adequate intake of folic acid (400 mcg daily)

Median serum and red blood cell folate concentrations: U.S. females ages 15-45



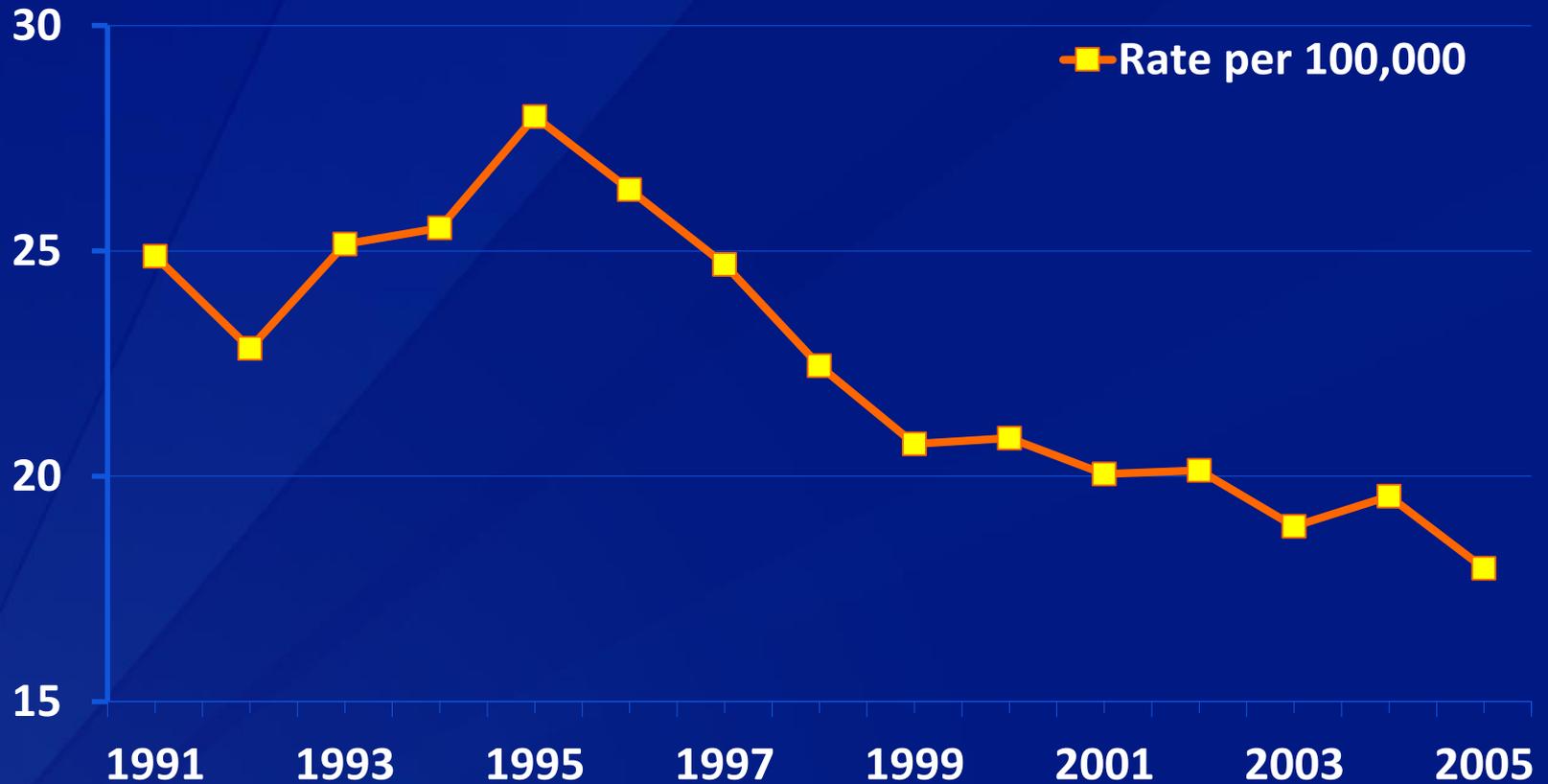
SOURCE: CDC/NCHS, National Health and Nutrition Examination Surveys, 1988-94

Median serum and red blood cell folate concentrations: U.S. females ages 15-45



SOURCE: CDC/NCHS, National Health and Nutrition Examination Surveys, 1988 94 and 1999 2000

Spina bifida rates, U.S. 1991-2005



NOTE: Excludes data for Maryland, New Mexico, and New York which did not require reporting for spina bifida for some years.

SOURCE: National Vital Statistics System, NCHS, CDC

Infectious disease

Measuring progress: HPV vaccine effectiveness

MAJOR ARTICLE

Reduction in Human Papillomavirus (HPV) Prevalence Among Young Women Following HPV Vaccine Introduction in the United States, National Health and Nutrition Examination Surveys, 2003–2010

Laori E. Markowitz,¹ Susan Hariri,¹ Carol Lin,¹ Eileen F. Dunne,¹ Martin Steinau,² Geraldine McQuillan,³ and Elizabeth R. Unger⁴

¹Division of STD Prevention, National Center for HIV, Viral Hepatitis, STD, and TB Prevention, and ²Division of High-Consequence Pathogens and Pathology, National Center for Emerging and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention (CDC), Atlanta, Georgia; and ³National Center for Health Statistics, CDC, Hyattsville, Maryland

The New York Times

Health

WORLD U.S. N.Y. / REGION BUSINESS TECHNOLOGY SCIENCE HEALTH SPORTS OPINION

Search Health

Inside Health

HPV Vaccine Is Credited in Fall of Teenagers' Infection Rate

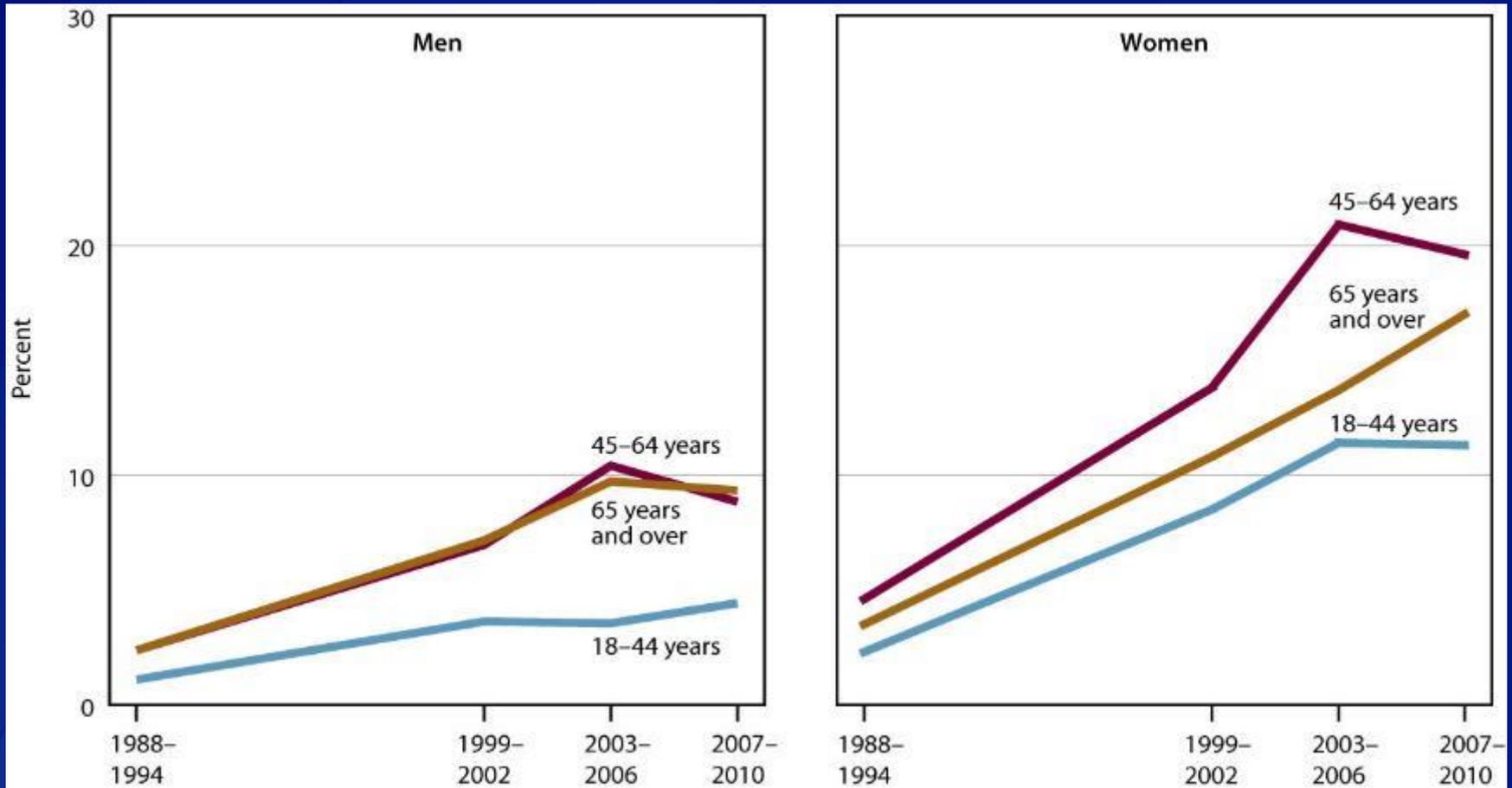


▶ **The Success of the HPV Vaccine:** The Times's Pam Dubois on how the HPV vaccine has helped drastically reduce the number of human papillomavirus cases among teenage girls.

Results. Among females aged 14–19 years, the vaccine-type HPV prevalence (HPV-6, -11, -16, or -18) decreased from **11.5%** (95% confidence interval [CI], 9.2–14.4) in 2003–2006 to **5.1%** (95% CI, 3.8–6.6) in 2007–2010, a decline of 56% (95% CI, 38–69). Among other age groups, the prevalence did not differ significantly between the 2 time periods ($P > .05$). The vaccine effectiveness of at least 1 dose was 82% (95% CI, 53–93).

Prescription medication use

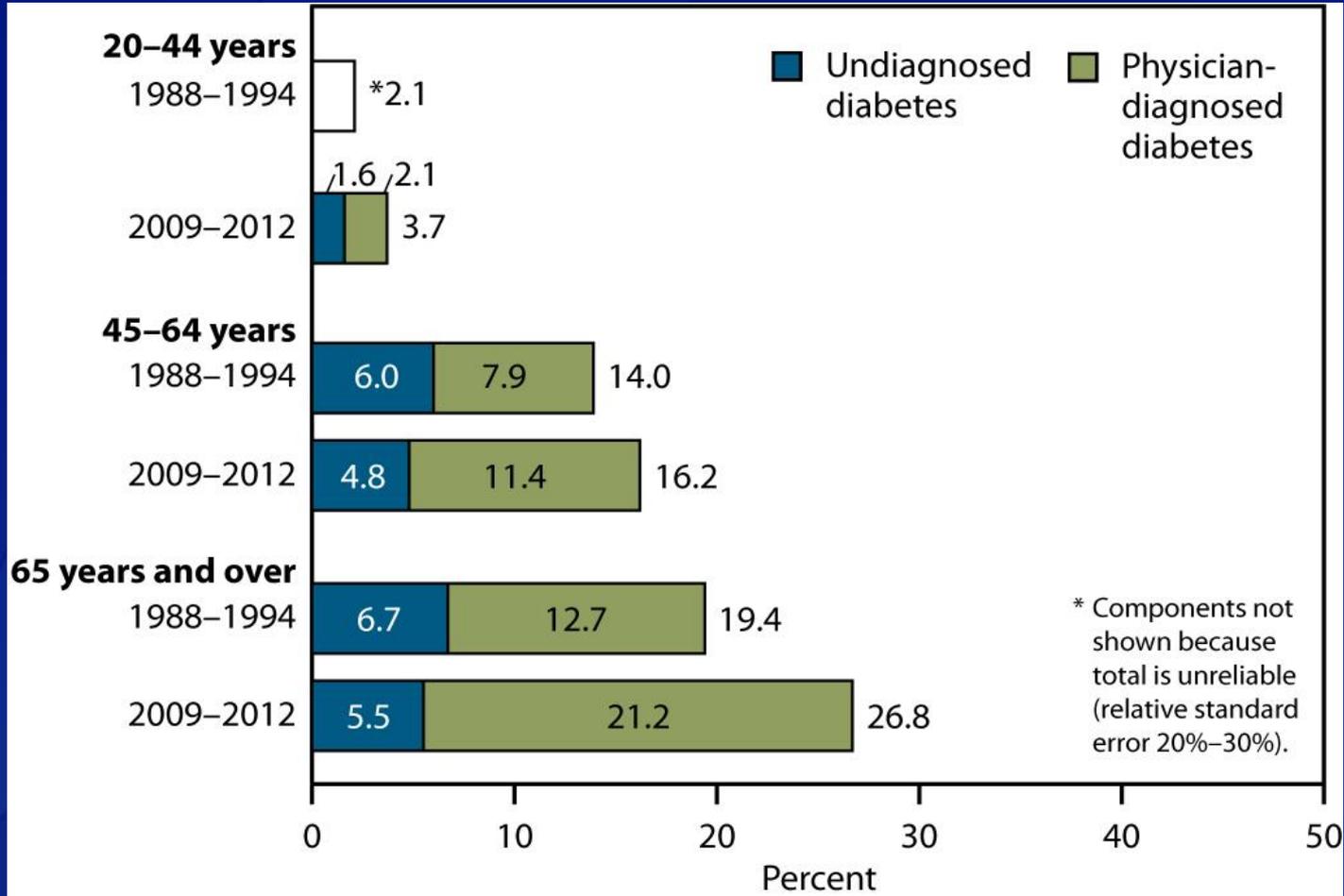
Prescription antidepressant use



NOTE: The 1988-1994 estimates for men are considered unreliable because the estimates have relative standard errors of 20%-30%.
SOURCE: CDC/NCHS, Health, United States, 2013, Figure 25. Data from the National Health and Nutrition Examination Survey.

Chronic disease

Diabetes prevalence



NOTES: The components of diabetes may not sum to the total due to rounding. Undiagnosed diabetes is fasting plasma glucose of at least 126 mg/dL or a hemoglobin A1c of at least 6.5%.

SOURCE: CDC/NCHS, *Health, United States, 2014*, Figure 6 and Table 44. Data from the National Health and Nutrition Examination Survey (NHANES).

Challenges

Translate materials

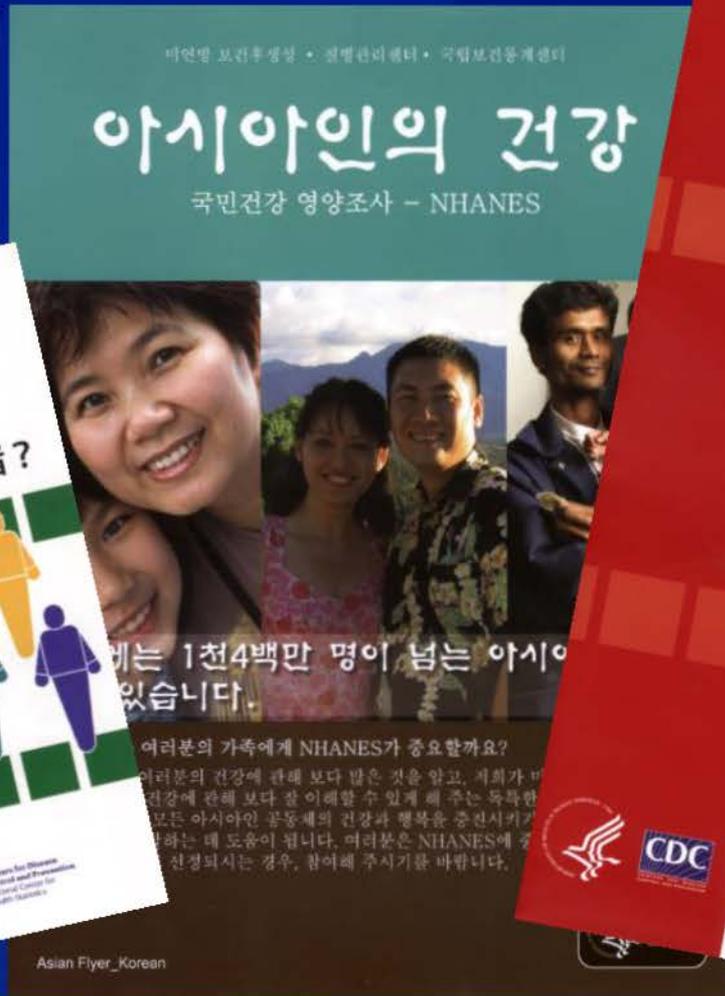


How to select NHANES participants? (Chinese Traditional)

全國健康與營養體檢調查
如何選擇 NHANES 參加者?

Sample Selection Brochure
Chinese Traditional

CDC
Centers for Disease Control and Prevention
National Center for Health Statistics



아시아인의 건강
국민건강 영양조사 - NHANES

여러분의 가족에게 NHANES가 중요할까요?
여러분의 건강에 대해 보다 많은 것을 알고, 저희가 여러분의 건강에 대해 보다 잘 이해할 수 있게 해 주는 독특한 모든 아시아인 공동체의 건강과 행복을 증진시키기 위해서는 대 도움이 됩니다. 여러분은 NHANES에 참여할 결정되는 경우, 참여해 주시기를 바랍니다.

Asian Flyer_Korean



全国健康与营养体检调查
(英语简称“NHANES”)
检查同意手册

让我们改善我们的健康状况

Adult/Parental Exam Consent Brochure_Chinese Simplified

美国卫生与公共服务部
疾病控制与预防中心
全国健康统计中心

CDC
Centers for Disease Control and Prevention
National Center for Health Statistics

anhanes

Special populations



Blackout of 2003



What's ahead

What's ahead

- NHANES 13-14 data release October 30, 2015
- NHANES DNA repository to re-open at the end of 2015
- NHANES Program is planning a feasibility study to follow-up on NHANES participants examined in the past





For more information please contact Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333
Telephone: 1 800 CDC INFO (232 4636)/TTY: 1 888 232 6348
Visit: www.cdc.gov | Contact CDC at: 1 800 CDC INFO or www.cdc.gov/info

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.