National Health and Nutrition Examination Survey (NHANES)

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2015 National Conference on Health Statistics
August 24, 2015
Objective

To assess the health and nutritional status of adults and children in the United States
Psoriasis Linked to Raised Heart Risk

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 study, published online in the journal Circulation, examined the health histories and survey data of 2,060 people known to have psoriasis, a chronic skin disease, and 4,922 people without the disorder, from the Health and Nutrition Examination Surveys (NHANES) and the Multi-ethnic Study of Atherosclerosis (MESA).

“PsoriasisLinked to Raised Heart Risk study. The study found that people with psoriasis were more likely to have three or more of the following health problems:

- High blood pressure
- High cholesterol
- High triglycerides
- Abdominal obesity

Psoriasis is a chronic inflammatory disorder that affects the skin and can also affect the joints and eyes. It is characterized by red, scaly patches that appear on the skin.

The study suggests that people with psoriasis should be monitored for these cardiovascular risk factors and that preventive measures should be taken to reduce the risk of heart disease.

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 his Food Revolution campaign.

Wait till the 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 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 research also found that the average age at which obesity was diagnosed was lower for recent birth cohorts compared to earlier cohorts.

The researchers analyzed data from 12- to 19-year-olds from a nationwide health survey. They compared obesity rates in nearly 3,000 youths tested from 1999-2000 with nearly 1,800 tested in 2005-06.

The prevalence of obesity increased from about 9 percent to 15 percent.

The paper's lead author, John Komlos, said that the findings are cause for concern.

"We are seeing the same trends in the young as we are in older adults," Komlos said. "Our findings suggest that this is not a passing phase in the obesity epidemic."

The study is important because it shows that obesity is not just a problem for adults, but also for young people.

Hearing loss rises in youths; music players at fault?

Recent research by John Komlos, who researches the relationship between living conditions and human health and his study, which has not yet been published, analyzes data recently released by the Centers for Disease Control and Prevention (CDC).

"In the past few years, we have seen a significant increase in the number of young people who are becoming obese. This is particularly concerning because young people are at increased risk for a cluster of cardiovascular risk factors such as high blood pressure, high cholesterol, and high triglycerides," Komlos said.

The study, which has not yet been published, found that young people are becoming obese at younger ages than members of earlier generations did.

"This is particularly concerning because young people are at increased risk for a cluster of cardiovascular risk factors such as high blood pressure, high cholesterol, and high triglycerides," Komlos said.

Some experts are urging young people to turn down the volume on their digital music players, suggesting that loud music in earphones may be a factor in the rise in hearing loss. They warn that the noise from digital music players can cause problems in school and set the stage for hearing loss later in life.

"Our hope is that we can encourage people to be careful," said Gary Curhan of the Harvard-affiliated Brigham and Women's Hospital in Boston, the study's senior author.

The researchers analyzed data on 12- to 19-year-olds from a nationwide health survey. They compared hearing loss in nearly 3,000 youths tested from 1999-2000 with nearly 1,800 tested in 2005-06.

The prevalence of hearing loss increased from about 6 percent to 16 percent.

Most of the hearing loss was "slight," defined as the ability to hear at 13 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 hearing loss "will hear all of the vowel sounds clearly but might miss some of the consonant sounds," Curhan said. "Good night."

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

The researchers did not single out digital music players, but did note that music players are now more prevalent and that young people are more likely to use them.

"Young people are using personal music players more than ever before, and we need to be aware of the potential harm to their hearing," Curhan said.

The researchers say that hearing loss is a major problem for young people, and that it can lead to difficulties in school and later in life.

"In the past few years, we have seen a significant increase in the number of young people who are becoming obese. This is particularly concerning because young people are at increased risk for a cluster of cardiovascular risk factors such as high blood pressure, high cholesterol, and high triglycerides," Komlos said.

The study, which has not yet been published, analyzed data recently released by the National Health and Nutrition Examination Survey (NHANES) and found that:

- Since 1988-94, the prevalence of obesity among children aged 2 to 19 years has increased from about 14% to 19%.
- The increase has been most pronounced among black children and among children living in low-income households.
- The increase in obesity is associated with an increase in the prevalence of type 2 diabetes, high blood pressure, and high cholesterol.

The researchers say that the increase in obesity is likely to be caused by a combination of factors, including changes in diet, physical activity, and sedentary lifestyles.

"We need to develop effective strategies to prevent obesity in children, including policies to promote healthy eating and physical activity," Komlos said.

The study is important because it shows that obesity is not just a problem for adults, but also for young people, and that it is associated with an increased risk of health problems such as type 2 diabetes, high blood pressure, and high cholesterol.

The researchers say that the increase in obesity is likely to be caused by a combination of factors, including changes in diet, physical activity, and sedentary lifestyles.
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

<table>
<thead>
<tr>
<th>Survey</th>
<th>Dates</th>
<th>Ages</th>
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<tbody>
<tr>
<td>NHES I</td>
<td>1960-62</td>
<td>18-79 years</td>
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<tr>
<td>NHES II</td>
<td>1963-65</td>
<td>6-11 years</td>
</tr>
<tr>
<td>NHES III</td>
<td>1966-70</td>
<td>12-17 years</td>
</tr>
<tr>
<td>NHANES I</td>
<td>1971-75</td>
<td>1-74 years</td>
</tr>
<tr>
<td>NHANES II</td>
<td>1976-80</td>
<td>6mo.-74 years</td>
</tr>
<tr>
<td>HHANES</td>
<td>1982-84</td>
<td>6mo.-74 years</td>
</tr>
<tr>
<td>NHANES III</td>
<td>1988-94</td>
<td>2 mo. +</td>
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</table>
### National Health and Nutrition Examination Surveys

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<tbody>
<tr>
<td>NHANES</td>
<td>1999-2000</td>
<td>All ages</td>
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<tr>
<td>NHANES</td>
<td>2001-2002</td>
<td>All ages</td>
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<tr>
<td>NHANES</td>
<td>2003-2004</td>
<td>All ages</td>
</tr>
<tr>
<td>NHANES</td>
<td>2005-2006</td>
<td>All ages</td>
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<tr>
<td>NHANES</td>
<td>2007-2008</td>
<td>All ages</td>
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<td>NHANES</td>
<td>2009-2010</td>
<td>All ages</td>
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<td>NHANES</td>
<td>2011-2012</td>
<td>All ages</td>
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<td>NHANES</td>
<td>2013-2014</td>
<td>All ages</td>
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<tr>
<td>NHANES</td>
<td>2015-2016</td>
<td>All ages</td>
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<tr>
<td>NHANES</td>
<td>2017-2018</td>
<td>All ages</td>
</tr>
</tbody>
</table>
Planning NHANES
New content

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

- Federal government
- Universities
- Private sector
- NHANES program
Timeline

- Letter of intent
- Proposal
- Cognitive testing
  - Pilot test
- Translations
- Manuals/Training
- Outreach materials

Start: January 2017

Months:
- 24 months
- 18 months
- 12 months
- 9 months
- 6 months
- 3 months
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
NHANES information flow

Advance letter → Screening → In-home interview → Exam

Informed consent

Banking facilities → Biologic Specimens

Laboratories → CDC/NCHS → Participant
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
Whole body scan – percentage body fat
Sagittal abdominal diameter

Participants 8 years and older
Private interviews
Oral health
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

- All
- NH White
- NH Black
- Mexican/Hispanic
- NH Asian

Year: 1999 to 2014

Percent: 40 to 100
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
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
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

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


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...
Antibacterial soap

Healthier Skin. Healthier You.

KILLS MORE GERMS Than Any Other Liquid Hand Soap

Drug Facts
Active ingredient
Triclosan 0.46%

Purpose
Antibacterial

Drug Facts
Active ingredient
Triclosan 0.30%

Uses
For hand washing to reduce bacteria

Warnings
For external use only

Use helps fight germs on hands when used as a hand soap
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%

"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


Informing safety

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

<table>
<thead>
<tr>
<th>Weight Per Passenger</th>
<th>Summer Weights</th>
<th>Winter Weights</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Average adult passenger weight</td>
<td>Average adult passenger weight</td>
</tr>
<tr>
<td></td>
<td>190 lb</td>
<td>195 lb</td>
</tr>
<tr>
<td></td>
<td>Average adult male passenger weight</td>
<td>Average adult male passenger weight</td>
</tr>
<tr>
<td></td>
<td>200 lb</td>
<td>205 lb</td>
</tr>
<tr>
<td></td>
<td>Average adult female passenger weight</td>
<td>Average adult female passenger weight</td>
</tr>
<tr>
<td></td>
<td>179 lb</td>
<td>184 lb</td>
</tr>
<tr>
<td>Child weight</td>
<td>82 lb</td>
<td>87 lb</td>
</tr>
</tbody>
</table>

2 years to less than 13 years of age
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
The 2010 Dietary Guidelines for Americans recommend a sodium intake of less than 2300 mg per day
Measuring progress: 
trans-fatty acids reduction policies

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

<table>
<thead>
<tr>
<th></th>
<th>NHANES 2000</th>
<th></th>
<th>NHANES 2009</th>
<th></th>
<th>Difference in Geometric Mean (95% CI), µmol/L</th>
<th>Decrease, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Geometric Mean (95% CI), µmol/L</td>
<td>No.</td>
<td>Geometric Mean (95% CI), µmol/L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaccenic acid</td>
<td>229</td>
<td>43.7 (39.1-48.2)</td>
<td>291</td>
<td>19.4 (16.9-21.9)</td>
<td>24.3 (19.6-29.0)</td>
<td>56</td>
</tr>
<tr>
<td>Elaidic acid</td>
<td>229</td>
<td>38.2 (33.0-43.4)</td>
<td>292</td>
<td>14.0 (11.6-16.3)</td>
<td>24.2 (19.1-29.3)</td>
<td>63</td>
</tr>
<tr>
<td>Palmitelaidic acid</td>
<td>229</td>
<td>7.9 (7.3-8.5)</td>
<td>291</td>
<td>4.0 (3.6-4.5)</td>
<td>3.9 (3.2-4.6)</td>
<td>49</td>
</tr>
<tr>
<td>Linoelaidic acid</td>
<td>227</td>
<td>2.6 (2.2-2.9)</td>
<td>290</td>
<td>1.3 (1.2-1.5)</td>
<td>1.3 (1.0-1.6)</td>
<td>46</td>
</tr>
<tr>
<td>Sum of trans-fatty acids</td>
<td>229</td>
<td>93.1 (82.5-103.6)</td>
<td>292</td>
<td>39.0 (33.7-44.3)</td>
<td>54.1 (43.4-64.7)</td>
<td>58</td>
</tr>
</tbody>
</table>

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

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

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


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
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
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
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.