

# Data on Population Health to Identify “Susceptible” Populations

Amy B. Bernstein, Sc.D

CDC/National Center for Health Statistics

January 20, 2010



**National Center for  
Health Statistics**

**Bureau of  
Transportation  
Statistics**

**National Center for  
Education Statistics**

**Bureau of  
Labor  
Statistics**

**Economic  
Research Service**

**Federal  
Statistical  
System**

**Bureau of  
Justice Statistics**

**National  
Agricultural  
Statistics Service**

**Energy Information  
Administration**

**Bureau of  
the Census**

**Bureau of  
Economic Analysis**

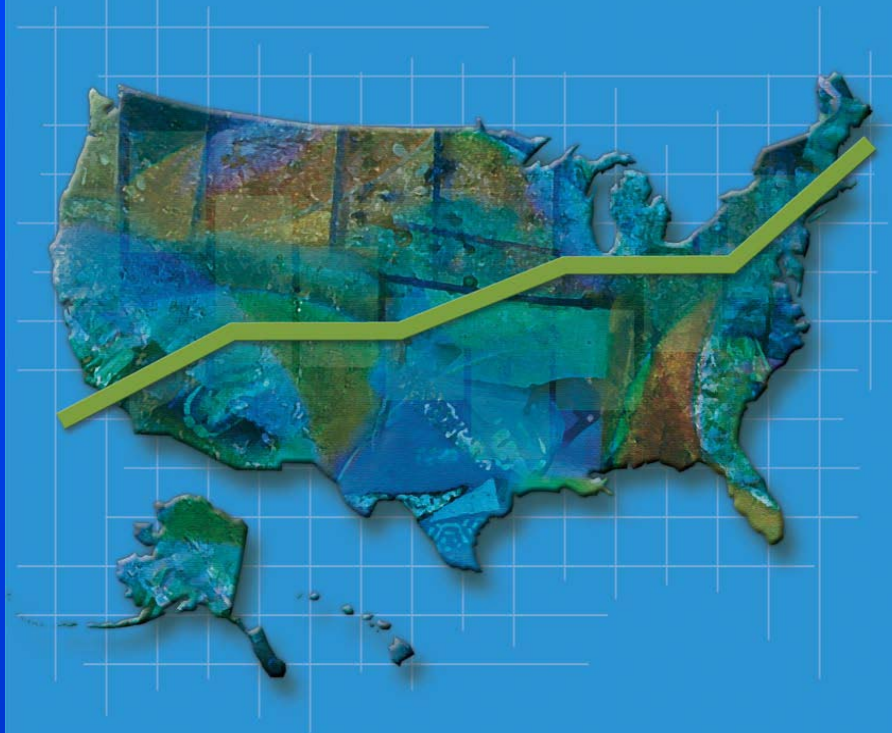
# National Center for Health Statistics

## What We Do:

- Monitor the nation's health by collecting, analyzing and disseminating health data
- Compare across time, populations, providers and geographic areas
- Identify health problems, risk factors, and disease patterns
- Inform actions and policies to improve the health of the American people

# Health, United States, 2009

With Special Feature on Medical Technology



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Centers for Disease Control and Prevention  
National Center for Health Statistics

[www.cdc.gov/NCHS/Hus.htm](http://www.cdc.gov/NCHS/Hus.htm)

# Content & Format of *Health, United States*

---

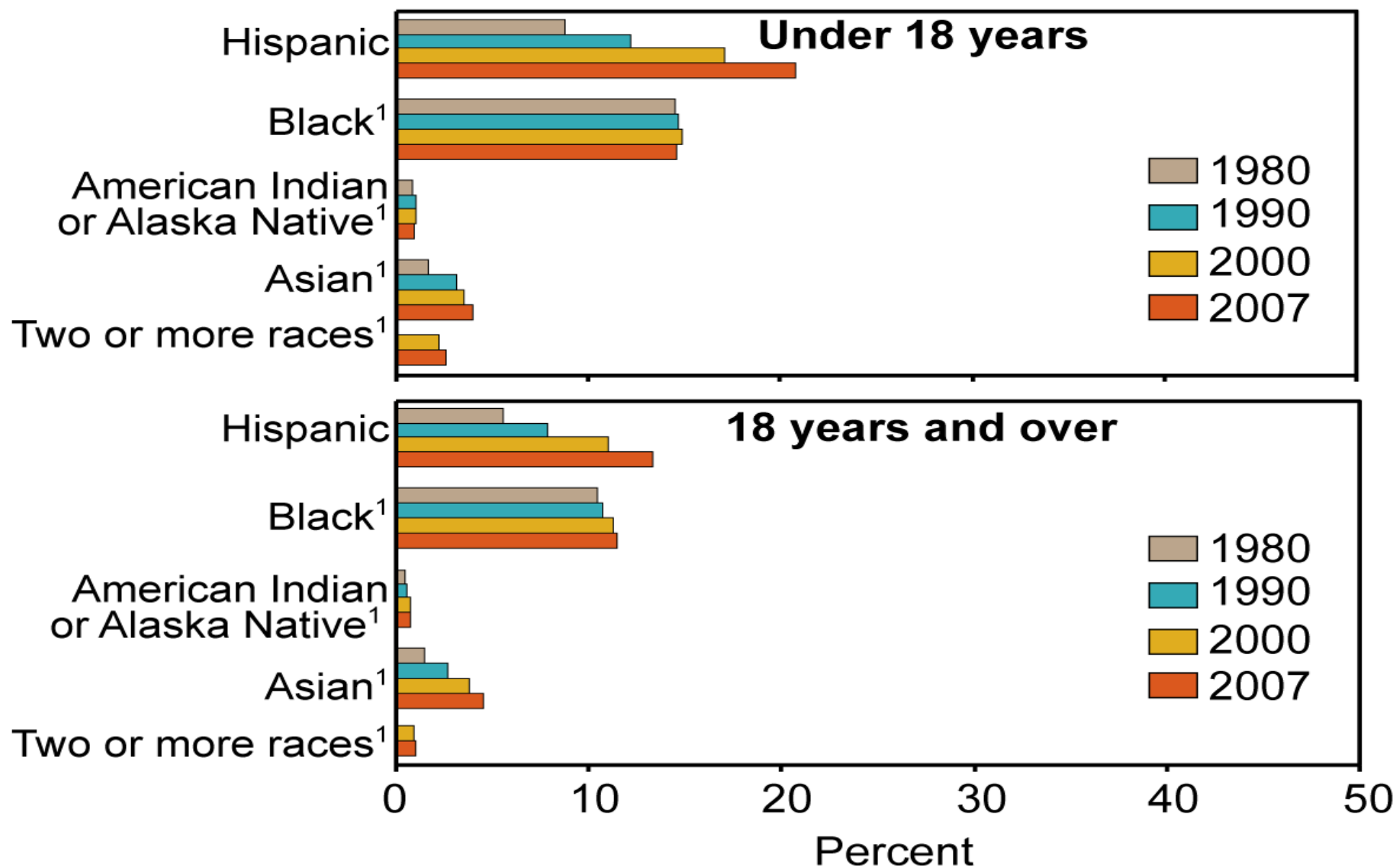
- Detailed tables on trends in four areas mandated in legislation (health status and determinants, health care utilization, health care resources, and health care expenditures)
  - 151 tables/60 data sources (trend towards more detail, and thus length, of tables)
  - Copious explanatory notes
  - Data must be nationally representative, contain 2 or more years of data that can be used to create a trend, and have ongoing/periodic reliable data collection
- Chartbook
- Appendixes:
  - I - Data sources (descriptions and URLs)
  - II - Definitions and methods
  - III - Additional data years on web
- Index to tables

# U.S. Census Bureau Population Data

- Decennial Census
  - Age, sex, race, ethnicity at the block group level
- American Community Survey (formerly the “long form”)
  - Can be used to generate county-level estimates for most counties (although years of data may be combined in low population counties)
- Current Population Survey (civilian noninstitutionalized population only)
  - Poverty level, health insurance—national and state level



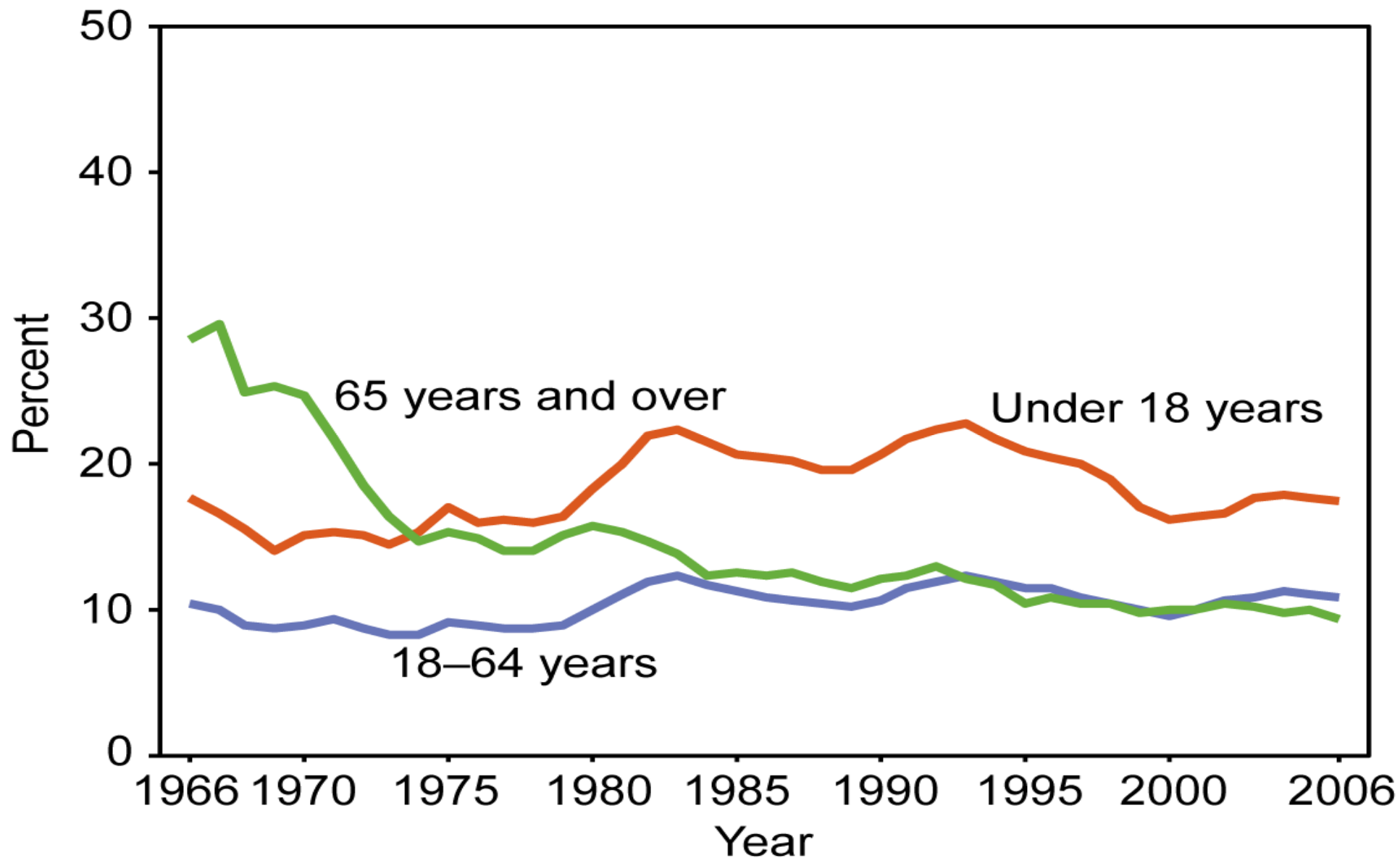
# Population by race/ethnicity



<sup>1</sup> Not Hispanic.

SOURCES: CDC/NCHS, *Health, United States, 2008*, Figure 2. Data from the U.S. Census Bureau.

# Poverty rates



SOURCES: CDC/NCHS, *Health, United States, 2008*, Figure 4. Data from the U.S. Census Bureau.



# NCHS Has Four Major Data Systems

- National Vital Statistics System and surveys
- National Health Interview Survey (NHIS)
- National Health and Nutrition Examination Survey (NHANES)
- National Health Care Survey

The primary focus of NCHS data collection is on producing national estimates, and when possible, sub-national estimates for as many sub-national groupings as possible.

# **NCHS Data Systems**

## **Sources of Data**

- Birth and death records (purchased from states)
- Medical records in hospitals, nursing homes, emergency rooms, doctors' offices
- Interviews with staff in hospice and home care agencies
- Physical examinations and laboratory testing in mobile exam centers (includes stored laboratory samples)
- Personal interviews in the home and via phone
- Administrative data (e.g., Medicare claims or other administrative forms linked to NCHS data)

# Potential Categorizations of "Susceptible Populations"

- **Personal/Individual Health Status:**
  - Self-reported (Exc/VG/Good/Fair/Poor)
  - Presence of specific diseases or conditions
  - Disability/functional status
  - Diet
  - Genetic factors
- **Health behaviors**
  - Exercise
  - Body mass index
  - Drug Use
  - Tobacco use/smoking

# Potential Categorizations of “Susceptible Populations” (continued)

- **Sociodemographic and socioeconomic characteristics**
  - age
  - race and ethnicity
  - gender
  - poverty status
  - family structure
  - work status, etc.
- **Environmental characteristics**
  - physical—exposures, type of water supply, etc.
  - social--crime rate, graduation rates, poverty rate in area, etc.

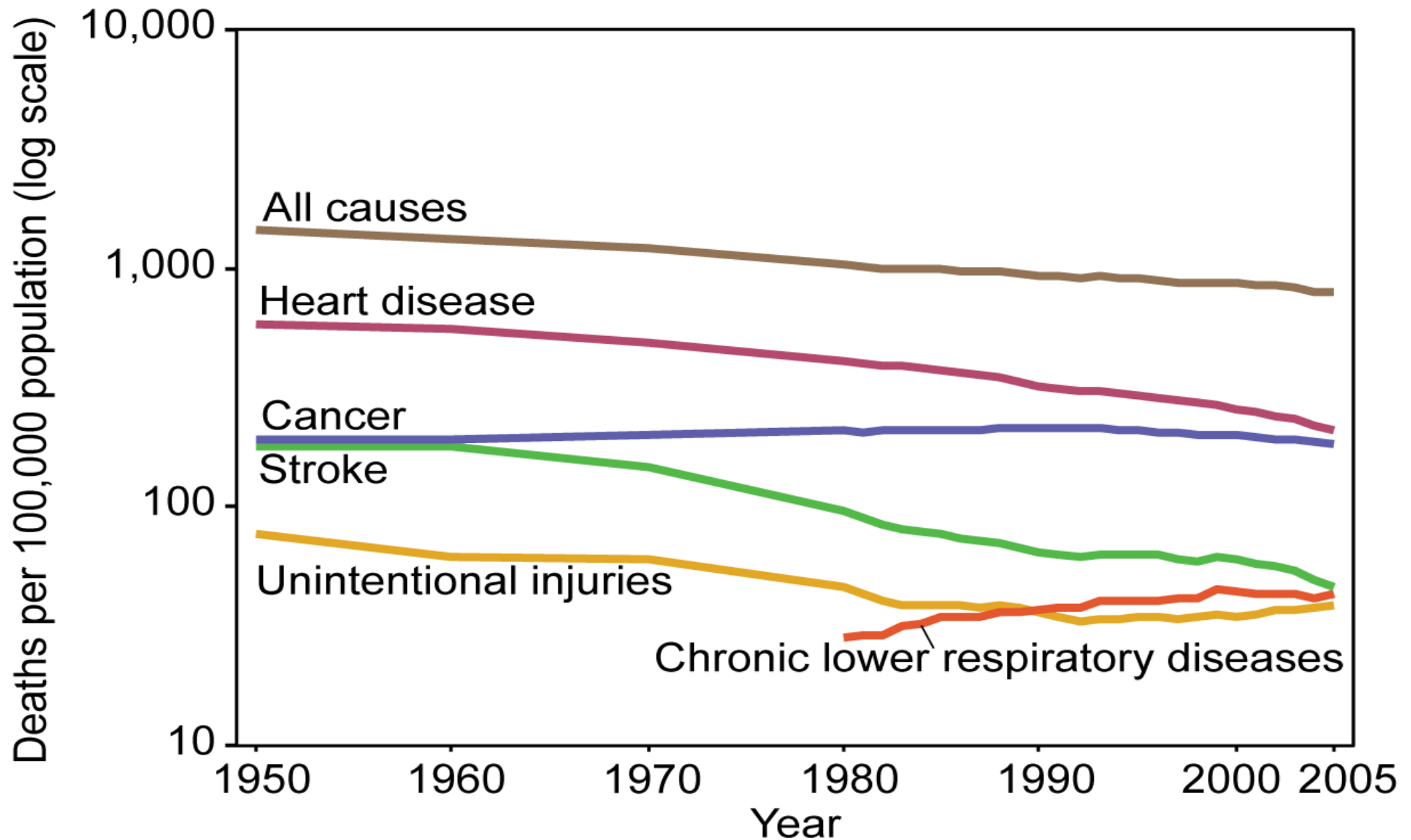
# NCHS Data—Privacy and Confidentiality Restrictions

- For all “public use” data, participants cannot be identified or re-contacted.
- For restricted data (e.g., available in the Research Data Center) identifiers for approved projects can be used to link to other data, but participants cannot be re-contacted unless they were specifically asked their permission in the original data collection initiative.
- So the data can allow you to select areas with susceptible populations, or to examine already collected data on susceptible populations, but not to conduct subsequent studies on susceptible individuals.

# National Vital Statistics System

- Birth and death records
  - National Vital Statistics System Cooperative Program—partnership with registration areas (State and Territories)
- Information at the State and local level

# Leading causes of death for all ages



NOTE: Death rates are age adjusted.

SOURCES: CDC/NCHS, *Health, United States, 2008*, Figure 16. Data from the National Vital Statistics System.

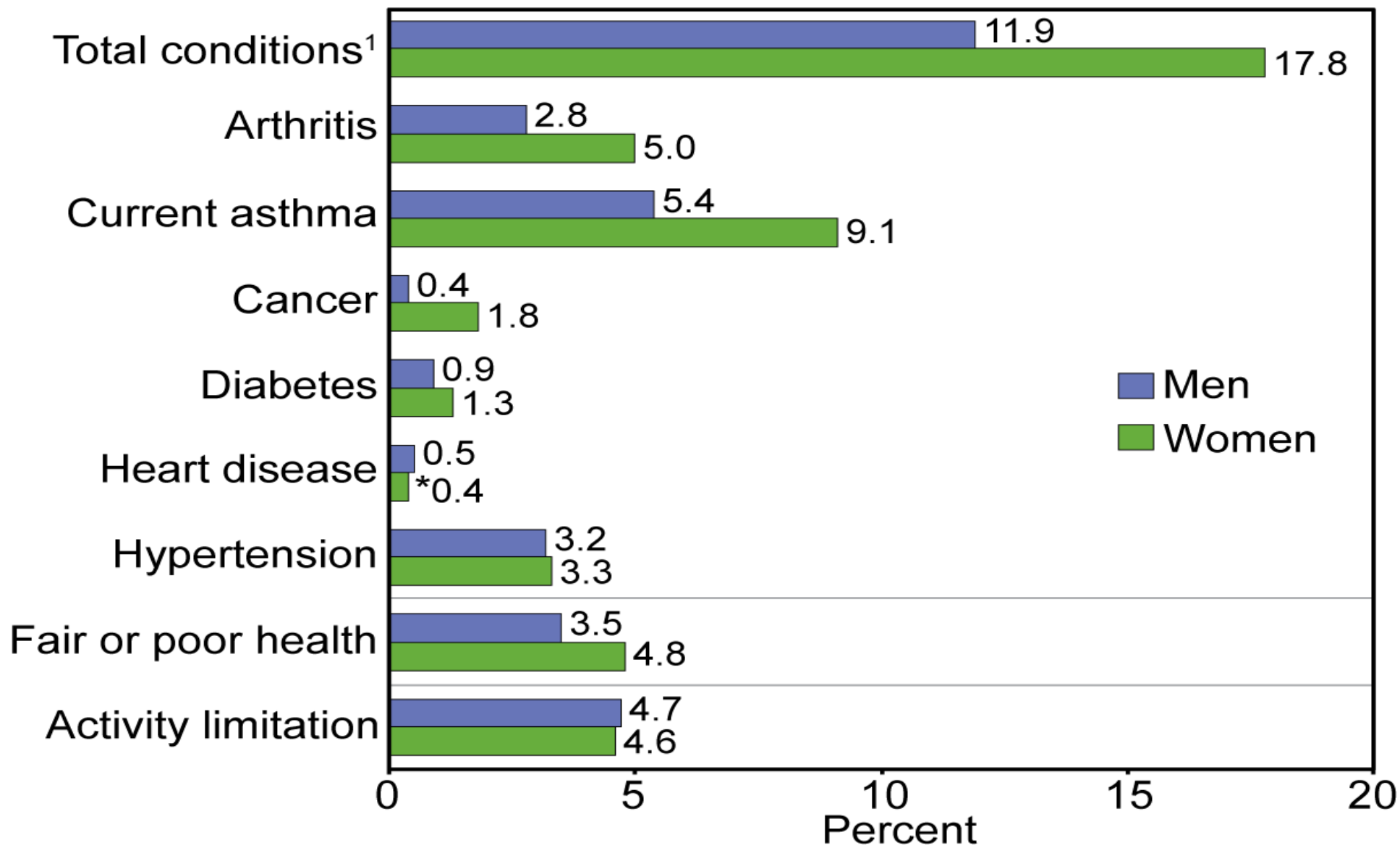


# National Health Interview Survey

- **Data source**
  - Representative in person, in home survey of 87,500\* respondents
- **Data applications**
  - Health status and disability
  - Insurance coverage
  - Access to and use of health services
  - Extent of illness and disability
  - Immunization
  - Health behaviors

\* at full survey level
- **Information primarily at the national level but state and large MSA data increasingly available**

# Young adults 18–29 years: Health status



SOURCES: CDC/NCHS, *Health, United States, 2008*, Figure 35. Data from the National Health Interview Survey.

<sup>1</sup>At least one of these physician-diagnosed conditions (arthritis, current asthma, cancer, diabetes, heart disease, or hypertension).

\* Relative standard error 20%–30%.

# Other Health Interview Surveys

- **National Immunization Survey**
- **State and Local Area Integrated Telephone Survey (SLAITS)**
  - **National Survey of Children's Health**
  - **National Asthma Survey**
  - **Influenza Vaccination Module for Children**
- **Information at the State level; sub-state level if funded with sufficient sample size**

# National Health and Nutrition Examination Survey

- **Data source**
  - Standardized physical examinations, laboratory tests, personal interviews with annual sample of about 5,000
- **Data applications**
  - Disease or condition prevalence
  - Risk factors
  - Nutrition monitoring (food frequency data)
  - Anthropometry
  - Growth and development
  - Disease monitoring
  - Use of prescription drugs
  - Genetics samples

# NHANES Genetic Data

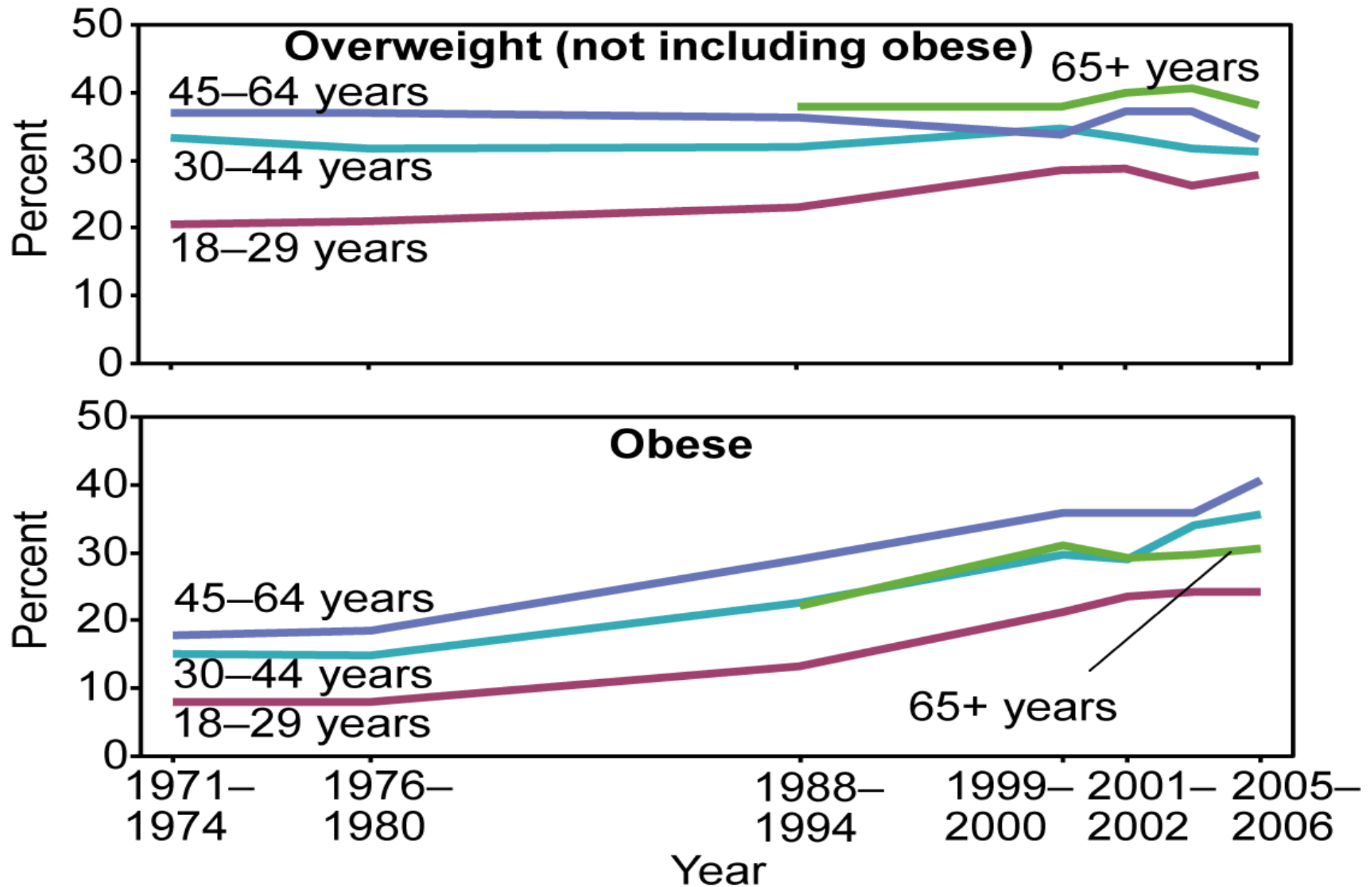
- Linkage of the NHANES III or NHANES 1999-2002 phenotype data with genetic information provides ongoing process and additional genetic variation information will become available every six months.
- The majority of the data sets will be found in the category of restricted access although there are a small number of anonymized data sets.
- All data must be used in the NCHS Research Data Center (data are restricted)

# NHANES Genetics Data

## DNA Samples

- Available for NHANES III and Continuous NHANES (1999+)
- Requires IRB approval of analysis proposal.
- Linkable to most NHANES variables for analysis in our secure Research Data Center (RDC).

# Overweight and obesity



SOURCES: CDC/NCHS, *Health, United States, 2008*, Figure 7. Data from the National Health and Nutrition Examination Survey.





## National Report on Human Exposure to Environmental Chemicals

The *Fourth National Report on Human Exposure to Environmental Chemicals* is the most comprehensive assessment to date of the exposure of the U.S. population to chemicals in our environment. CDC has measured 212 chemicals in people's blood or urine—75 of which have never before been measured in the U.S. population. The new chemicals include acrylamide, arsenic, environmental phenols, including bisphenol A and triclosan, and perchlorate.

The blood and urine samples were collected from participants in CDC's National Health and Nutrition Examination Survey (NHANES), which is an ongoing survey that samples the U.S. population every two years. Each two year sample consists of about 2,400 persons. The *Fourth Report* includes findings from national samples for 1999–2000, 2001–2002, and 2003–2004. The data are analyzed separately by age, sex and race/ethnicity groups.

[Learn More »](#)

### Download the *Fourth Report*

**Full Report**   
[PDF - 18,079 KB]

**Executive Summary**   
[PDF - 874 KB]

**Chemicals in the Fourth Report**   
[PDF - 91 KB]

This list provides the 212 chemicals and chemical metabolites included in the *Report*.

### National Biomonitoring Program



The Program specializes in biomonitoring, which is the direct measurement of people's exposure to toxic substances in the environment by measuring the substances or their metabolites in human specimens,



### Explore the *Fourth Report*

- Overview
- Data Tables by Chemical Group
- Appendices
- Executive Summary

### Additional Resources

- [What's New in this Report?](#)
- [Peer-Reviewed Biomonitoring Articles](#)
- [Chemical Information](#)
- [Fact Sheets](#)
- [Chemical Selection](#)
- [Frequently Asked Questions](#)
- [About CDC's Environmental Health Laboratory](#)

Text size: [S](#) [M](#) [L](#) [XL](#)

[Email page](#)

[Print page](#)

[Bookmark and share](#)

[Get email updates](#)

[Get email updates](#)

To receive email updates about this page, enter your email address:

[What's this?](#)

### Contact Us:

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

800-CDC-INFO  
(800-232-4636)  
TTY: (888) 232-6348  
24 Hours/Every Day

[cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)



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](#) <#>

## National Report on Biochemical Indicators of Diet and Nutrition in the U.S. Population 1999-2002

### Nutrition Report Home

- [Executive Summary](#)
- [Frequently Asked Questions](#)
- [View the Report](#)
- [Download the Report](#)
- [Order the Report](#)

### Related Programs

- [National Biomonitoring Program](#)
- [Division of Laboratory Sciences](#)
- [National Center for Environmental Health](#)
- [National Health and Nutrition Examination Survey](#)
- [National Center for Health Statistics](#)
- [National Center for Birth Defects and Developmental Disabilities](#)
- [National Center for Chronic Disease and Public Health Promotion](#)

[CDC](#)

### About the Nutrition Report

Using advanced laboratory science and innovative techniques, the Division of Laboratory Sciences at the Centers for Disease Control and Prevention (CDC), National Center for Environmental Health (NCEH) has been in the forefront of efforts to assess the nutritional status of the U.S. population through monitoring nutritional indicators. Part of this NCEH effort has resulted in the creation of the National Report on Biochemical Indicators of Diet and Nutrition in the U.S. Population 1999-2002, the first CDC publication that offers information on a wide range of biochemical indicators in a single document.

### Related Pages

#### EQUIP

Ensuring the Quality of Iodine Procedures (EQUIP) is a standardization program that addresses laboratory quality-assurance issues related to testing for iodine deficiency.

#### Global Micronutrient Lab

Established in 2000, the Global Micronutrient Lab collaborates with CDC colleagues to reduce the worldwide burden of micronutrient deficiencies.

#### IMMPaCt

Though the International Micronutrient malnutrition Prevention and Control Program (IMMPaCt), CDC contributes its skills and resources to the global effort to eliminate micronutrient malnutrition.

#### Nutrition

CDC nutrition efforts cover a wide spectrum of related topics.

[VITAL-50A](#)Text size: [S](#) [M](#) [L](#) [XL](#)

- [Email page](#)
- [Print page](#)
- [Bookmark and share](#)
- [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  
24 Hours/Every Day
- [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)

# Air Quality Data in the NCHS RDC

- Annual air monitoring data (from EPA), linked to 1986-2005 National Health Interview Survey, geo-coded to the respondent's block group of residence.
- NHDS Pollution Exposure data files can be linked to in-house NHDS files by zip-code and admission date to obtain an analytic file with both air pollution exposures and discharge information.
- Air pollution data have been linked to the 1986-1994 Third National Health and Nutrition Examination Survey

# National Health Care Survey

- Hospital Discharge Survey
- Ambulatory Care Survey
- Hospital Ambulatory Care Survey
- Nursing Home Survey
- Home and Hospice Survey
- Residential Care Survey (in the field)

# National Health Care Survey

- **Establishment-based surveys:**
  - Rely primarily upon administrative or medical records data
  - Unit of reference is the encounter, not the person
  - Provide information on provider and establishment characteristics that can be linked to patient care
  - Measure health system capacity
  - Person-level data available only for samples of long-term care residents; otherwise all data at the encounter/visit level

# Examples of National Health Care Survey Data

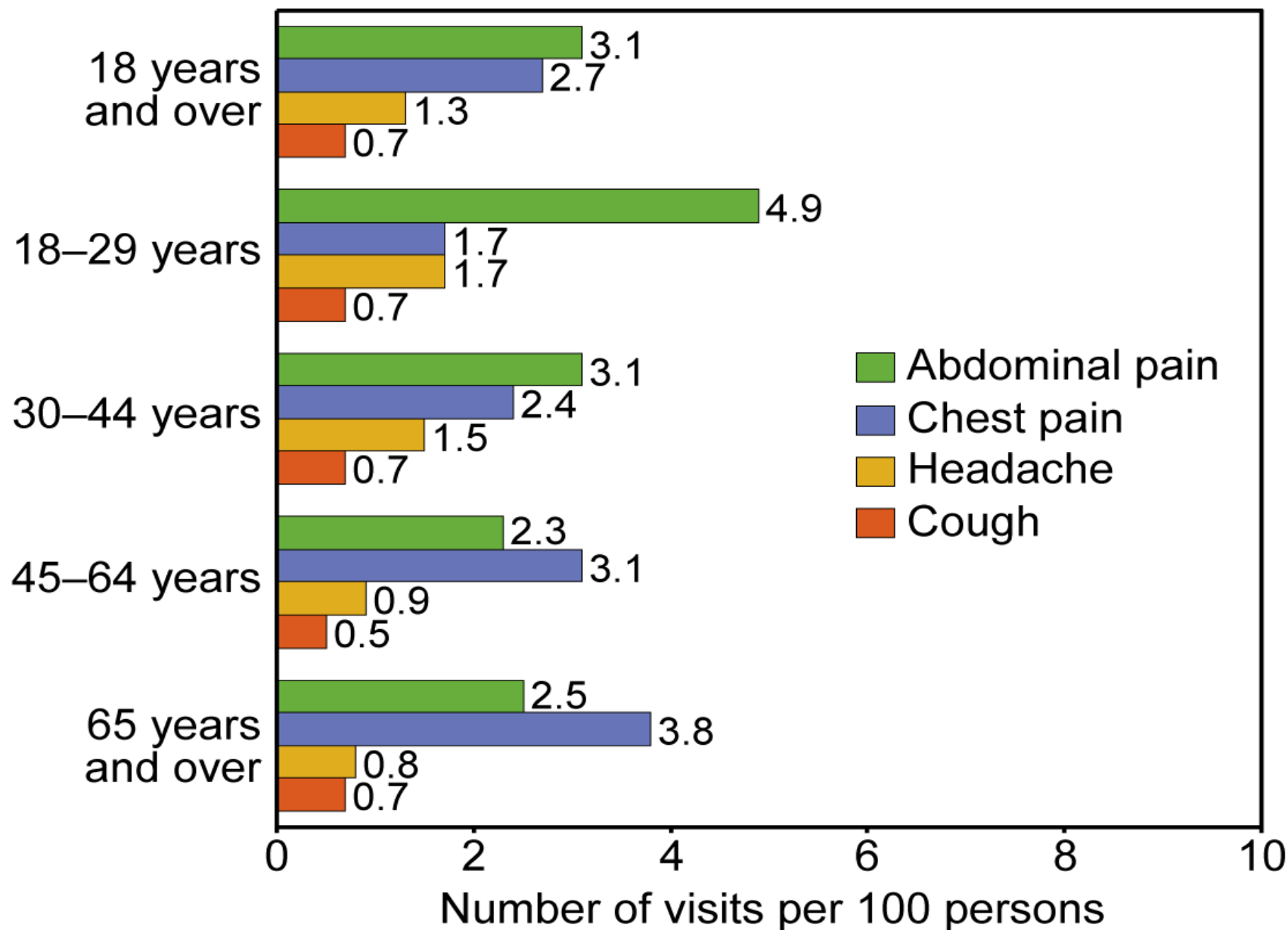
- **Diagnosis**
- **Treatment and services**
- **Characteristics of patients**
- **Characteristics of health care providers**
- **Restricted data can be merged with county-level data (e.g., poverty) by zip code of residence of patient**

# Examples of National Health Care Survey Data, Continued

- Patterns of disease (e.g., infections, food allergies, poisonings)
- Use of technology and drugs (e.g., antimicrobials)
- Emergence of alternative care sites

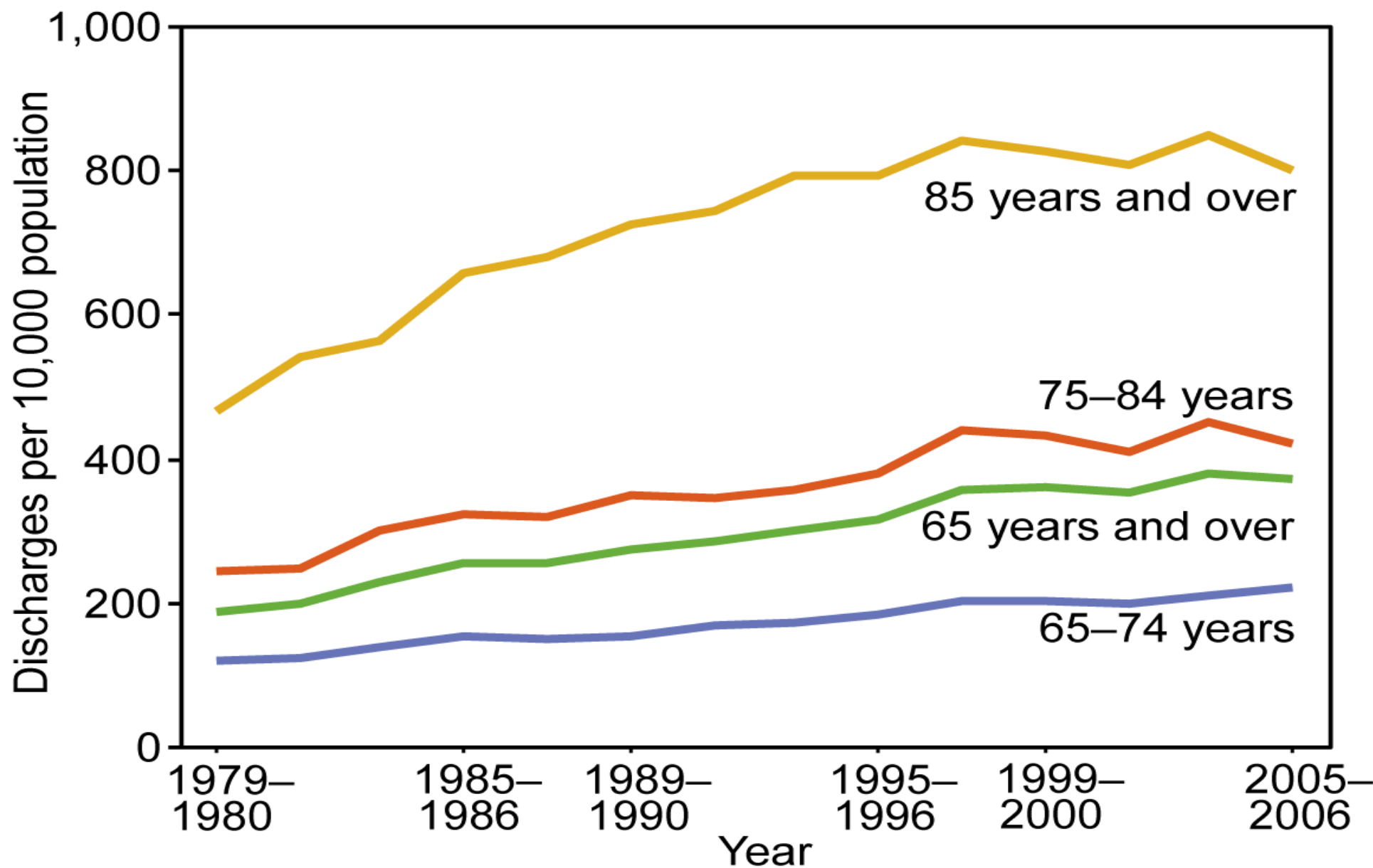


# Reasons for emergency department visits, 2006



SOURCES: CDC/NCHS, *Health, United States, 2008*, Figure 22. Data from the National Hospital Ambulatory Medical Care Survey (emergency department component).

# Pneumonia discharges, any-listed diagnosis



SOURCES: CDC/NCHS, *Health, United States, 2008*, Figure 25. Data from the National Hospital Discharge Survey.

# NCHS Record Linkage Activities

- **Mortality**
  - National Death Index
- **Retirement and Disability**
  - Social Security data from the Retirement, Survivors, Disability Insurance (RSDI) and Supplemental Security Income (SSI) programs
- **Medicare enrollment and payments**
  - Enrollment and claims data

# Summary Linked Mortality Data Files

	Current Linkage (death data through 2000/2002)		Next Linkage (death data through 2006)	
	Restricted- use	Public-use	Restricted-use	Public-use
NHIS 1986-2000	X	X	X	X
NHIS 2001-2004			X	X
LSOA II (1994-2000)	X	X	X	X
NHEFS (1971-1992)	X		X	X
NHANES II (1976-1980)	X		X	X
NHANES III (1988-1994)	X	X	X	X
NHANES 1999-2004			X	X
NNHS 1985	X		X	
NNHS 1995, 1997, 2004			X	

# Linked Medicare Files

Medicare enrollment and claims data for the years 1991-2000

- Denominator file
- MEDPAR Inpatient hospitalization
- MEDPAR Skilled nursing facility (SNF)
- Hospital outpatient
- Home Health Agency (HHA)
- Hospice
- Carrier (physician/supplier Part B file)
- Durable Medical Equipment (DMERC)



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](#) <#>

## Data Access

### Data Access

[Data Access Tools](#)

#### Data Linkage

[Air Quality](#)[Mortality Data](#)[Medicare Enrollment and Claims Data](#)[Social Security Benefit History Data](#)[National Death Index](#)[Public-Use Data Files](#)[Research Data Center](#)[NCHS Home](#) > [Data Access](#)

## NCHS Data Linkage Activities

NCHS has developed a record linkage program designed to maximize the scientific value of the Center's population-based surveys. Linked data files enable researchers to examine the factors that influence disability, chronic disease, health care utilization, morbidity, and mortality. NCHS is currently linking various NCHS surveys with air monitoring data from the [Environmental Protection Agency \(EPA\)](#), death certificate records from the [National Death Index \(NDI\)](#), Medicare enrollment and claims data from the [Centers for Medicare and Medicaid Services \(CMS\)](#), and Retirement, Survivor, and Disability Insurance (RSDI) and Supplemental Security Income (SSI) benefit data from the [Social Security Administration \(SSA\)](#).


### Linked Data Resources by Topic Area:


- [Air Quality](#)
- [Mortality data](#)
- [Medicare Enrollment and Claims data \(CMS\)](#)
- [Social Security Benefit History data \(SSA\)](#)


National Center for Health Statistics

Text size: [S](#) [M](#) [L](#) [XL](#)[Email page](#)[Print page](#)[Bookmark and share](#)

### Contact Us:

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

 1 (800) 232-4636

 [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)

### Important Information

[Data Release Policy](#)[Data User Agreement](#)[Email](#)[Print](#)[Share](#)[PDF Reader](#)[PPT Reader](#)

Page last updated: March 11, 2009

Page last reviewed: February 24, 2009

Content source: [CDC/National Center for Health Statistics](#)

Page maintained by: Office of Information Services

[Home](#)[A-Z Index](#)[Site Map](#)[Policies](#)[About CDC.gov](#)[Link to Us](#)[All Languages](#)[CDC Mobile](#)[Contact CDC](#)

# Data Linkage URLs

- [http://www.cdc.gov/nchs/data\\_access/data\\_linkage\\_activities.htm](http://www.cdc.gov/nchs/data_access/data_linkage_activities.htm)
- <http://www.cdc.gov/exposurereport/>
- <http://www.cdc.gov/nutritionreport/>



# **Selected Additional Potentially Useful Nationally Representative Population Data**

- **National Children's Study (NIH/CDC/EPA and others)**
  - A multi-year research study that will examine the effects of environmental influences on the health and development of more than 100,000 children across the United States, following them from before birth until age 21.
- **National Survey of Family Growth (NCHS)**
- **Survey of Drug Use and Health (SAMHSA)**
- **Monitoring the Future (NIH)**
- **Youth Risk Behavior Surveillance System (CDC)**
- **Survey of Occupational Injuries and Illnesses (NIOSH)**

# National Environmental Health Tracking Network

A system of integrated health, exposure, and hazard information and data from a variety of national, state, and city sources. The site can be used to graph, chart and map (for selected states and counties):

- **Health effect data** on health conditions and diseases, such as asthma and birth defects.
- **Environmental hazard data** on chemicals or other substances such as carbon monoxide and air pollution in the environment.
- **Exposure data** on the amount of a chemical in a person's body, such as lead in blood.
- Other data that helps us learn about relationships between exposures and health effects. For example, information about age, sex, race, and behavior or lifestyle choices that may help us understand why a person has a particular health problem.

<http://ephtracking.cdc.gov/showHome.action>

# Pregnancy Risk Assessment Monitoring System (PRAMS)

- Collects state-specific, population-based data on maternal attitudes and experiences before, during, and shortly after pregnancy.
- Thirty–seven states, New York City, and South Dakota (Yankton Sioux Tribe) currently participate in PRAMS. Six other states previously participated.
- Survey conducted by mailed questionnaire with multiple follow-up attempts, and a survey by telephone.
- Sample of women who have had a recent live birth is drawn from the state's birth certificate file. Each participating state samples between 1,300 and 3,400 women per year (with oversampling of low birthweight babies and race/ethnicity in some states).
- Topics include: barriers to and content of prenatal care, obstetric history, maternal use of alcohol and cigarettes, physical abuse, contraception, economic status, maternal stress, and early infant development and health status.

<http://www.cdc.gov/prams/>

# Possibly Useful URLs

- NCHS website:  
[www.cdc.gov/nchs](http://www.cdc.gov/nchs)
- Health, United States, website:  
[www.cdc.gov/nchs/hus.htm](http://www.cdc.gov/nchs/hus.htm)
- CMS Research Assistance Data Center website:  
<http://www.resdac.umn.edu/>

**Future Plans?**