National Center for Health Statistics: Monitoring the Nation’s Health

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INFO7470 "Understanding Social and Economic Data"
March 14, 2016 - Data from Other Statistical Agencies: Health Statistics
Objective

• To understand different types of national health data and their uses for research and policy
National Center for Health Statistics

• 1960 - National Office of Vital Statistics and the National Health Survey merged to form National Center for Health Statistics

• 1987 - NCHS became part of the Centers for Disease Control and Prevention

• NCHS is an Official Federal Health Statistics Agency and part of the Federal Statistical System

• Data products
  – Public use micro-data
  – Restricted use micro-data through the Research Data Center (RDC)
  – Restricted use linked data through the RDC
  – Integrated Data Tools: reports and online tools with pre-tabulated indicators
National Vital Statistics System (NVSS)

- State based system
  - Data received from 57 vital registration jurisdictions (50 states, DC, NYC, 5 territories)
  - Comparable data across the U.S.; data collection and some coding have differed over time and across locations

- Computerized data are available over decades; published reports available for data from 1890

- About 2.4 million deaths and 4 million births each year
  - Births and information on the pregnancy and delivery.
  - Deaths and information on cause of death.
**National Vital Statistics System**

**U.S. STANDARD CERTIFICATE OF LIVE BIRTH**

<table>
<thead>
<tr>
<th>LOCAL FILE NO.</th>
<th>CHILD</th>
<th>MOTHER</th>
<th>FATHER</th>
<th>CERTIFIER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. CHILD’S NAME (First, Middle, Last, Suffix)</td>
<td>8a. MOTHER’S CURRENT LEGAL NAME (First, Middle, Last, Suffix)</td>
<td>10a. FATHER’S CURRENT LEGAL NAME (First, Middle, Last, Suffix)</td>
<td>11. CERTIFIER’S NAME:</td>
</tr>
<tr>
<td></td>
<td>2. TIME OF BIRTH (24 hr)</td>
<td>8b. DATE OF BIRTH (Mo/Day/Yr)</td>
<td>8c. MOTHER’S NAME PRIOR TO FIRST MARRIAGE (First, Middle, Last, Suffix)</td>
<td>TITLE:</td>
</tr>
<tr>
<td></td>
<td>3. SEX</td>
<td>8d. BIRTHPLACE (State, Territory, or Foreign Country)</td>
<td>9a. RESIDENCE OF MOTHER-STATE</td>
<td>□ OTHER (Specify)</td>
</tr>
<tr>
<td></td>
<td>4. DATE OF BIRTH (Mo/Day/Yr)</td>
<td>9b. COUNTY</td>
<td>9c. CITY, TOWN, OR LOCATION</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. COUNTY OF BIRTH</td>
<td>9d. STREET AND NUMBER</td>
<td>9e. APT. NO.</td>
<td>9f. ZIP CODE</td>
</tr>
<tr>
<td></td>
<td>5. FACILITY NAME (if not institution, give street and number)</td>
<td>9g. INSIDE CITY LIMITS?</td>
<td>□ Yes □ No</td>
<td></td>
</tr>
</tbody>
</table>

12. DATE CERTIFIED __/__/____
13. DATE FILED BY REGISTRAR __/__/____

INFORMATION FOR ADMINISTRATIVE USE
National Vital Statistics System

• Public-use files, Death: age, race, education, marital status, month and day of week of death, place and cause of death

• Public use files, Birth: mother’s age, education, race and ethnicity, marital status, parity, prenatal care, some medical risk factors, gestational age, birth weight

• Restricted-use files: exact dates and county of residence (some states will provide more detailed geography)

• Vital statistics data can be used to assess events during specific time windows, at specific locations, aggregated locations, and/or for specific endpoints
Infant Mortality Rates by Race
United States, 1915-2013

Year

Infant deaths per 1,000 live births

Black

White

Black : White Infant Mortality Ratio
United States: 1915-2013
Asthma deaths, all ages, 1980-2009

Rate per million

Black

White

Drug Poisoning Death Rates, 2011

Preterm birth before, during, and after the Utah Valley steel mill closure

# Vital Statistics

## Strengths
- Trends
- Subnational estimates and comparisons (restricted use)
- Less common outcomes
- Small subpopulations (e.g. Hispanic or Asian subgroups)
- Large ‘sample’ size
- International standards

## Limitations
- Limited risk factor information
- Geography limited to county (and is restricted use)
- Exact dates are restricted use
Population Health Surveys

- National Health Interview Survey
  - Household interview survey – detailed demographic, health status, health insurance, access to care, economic etc.
    - Health outcomes generally more chronic than acute
  - Approximately 35,000 – 40,000 households, 80,000 – 100,000 individuals per year
    - Data years can be combined to increase sample or study trends
  - Complex sample design (stratified, clustered, oversampling)
  - Collected since 1957
National Health Interview Survey

- Data on:
  - Health status, health conditions, functioning and disability
  - Insurance coverage
  - Access to and use of health services
  - Immunization
  - Health-related behaviors and risk factors
- Interview dates and geocoded residential locations available on restricted use files
  - Locations can be used to examine characteristics of locations, not actual places
  - State level estimates possible for many states
Percentage of Uninsured Persons Aged <65 Years With No Health Insurance Coverage Because of Cost, by Race/Ethnicity --- NHIS: 2004 and 2014
Percentages of Adults and Children Living in Households with only Wireless Telephone Service, 2003–2013

- Children with wireless service only
- Adults with wireless service only

SOURCE: CDC/NCHS, National Health Interview Survey.
Asthma period prevalence, 1980-96, asthma attack prevalence, 1997-2009, and current asthma prevalence 2001-2009, all ages

Source: Akinbami, Moorman, and Liu, 2011, CDC/NCHS National Health Interview Survey
Population Health Surveys

- National Health and Nutrition Examination Survey
  - Standardized physical examinations, laboratory tests, personal interviews with a nationally representative annual sample of ~5,000 persons.
  - Data on:
    - Disease/condition prevalence
    - Nutrition
    - Body measures
    - Growth and development
    - Health-related behaviors
    - Risk factors
National Health and Nutrition Examination Survey

• About 15 locations each year, 30 locations in a two-year data release; data can be combined across releases

• NHANES Data Provide Basis for National Standards
  • Data are used to set national standards for height, weight, and blood pressure.
  • Dietary intake, biomarker, and body measurement data are used to set food and nutrition standards and policies.
Trends in Adult and Childhood Obesity

Prevalence of Obesity Among Adults

- Source: CDC/NCHS, National Health and Nutrition Examination Survey 2011-2014
Measured and self-reported data in population health surveys

- **Percent adults with hypertension by data source**
  - **Male**
  - **Female**

- **Percent adults with BMI >=30 by data source**
  - **Male**
  - **Female**
Population health data

- **Strengths:**
  - Reports or measures of a large variety of health outcomes, risk factors and behaviors, and detailed demographic factors
  - Many similar data elements over time

- **Limitations:**
  - Primarily cross-sectional, so difficult to determine causal relationships
  - Sample sizes can be small depending on survey, subpopulation, outcome

- Data can be combined with external data using geographic and temporal factors (restricted access)
  - Interview dates, exam dates (NHANES) and geocoded residential locations available on restricted use files
  - Locations can be used to examine characteristics of locations, not actual places
National Health Care Surveys

**Ambulatory and hospital care surveys**
- National Ambulatory Medical Care Survey (NAMCS)
  - Physician offices
  - Community Health Centers
- National Hospital Ambulatory Medical Care Survey (NHAMCS)
  - Outpatient Clinics
  - Emergency rooms
- National Hospital Care Survey (NHCS)
  - Inpatient care -- hospitals

**Long-term care surveys**
- National Study of Long-Term Care Providers (NSLTCP)
  - Administrative data: home health agencies, nursing homes, hospices
  - Questionnaire data: adult day services centers, residential care communities
NCHS Health Care Data

- Characteristics of the practice
- Characteristics of health care providers
- Characteristics of patients
- Diagnosis
- Treatment and services
- Patterns of disease
- Use of technology and drugs
Percentage of mental illness-related physician office visits by physician specialty, according to region, for persons aged 18 years and over: United States, 2012

Percentage of office-based primary care physicians accepting new Medicaid patients: 2011-2012

SOURCE: National Ambulatory Medical Care Survey (NAMCS) Electronic Health Record Survey, 2013
Median Emergency Department Wait and Treatment Times, by Triage Level: United States, 2010–2011

SOURCE: CDC/NCHS, National Hospital Ambulatory Medical Care Survey, National Electronic Health Records Survey.
NCHS Data Linkage

• Person-level: linked using respondent personal identifiers, such as social security number, date of birth, and name
  - Mortality - National Death Index
  - Medicare and Medicaid enrollment and claims
  - Social Security Administration Retirement and Disability
  - Housing and Urban Development

• Linkages are done by NCHS staff
NCHS Data Linkage

- Linkage increases risk of disclosure so linked data files are restricted
- Reference time may not be same for survey and linked data
  - Administrative data from multiple years can be linked to a single survey year
- Linkages to subnational data have been piloted, such as state-level cancer records, and are complicated by mobility
- Not all survey respondents consent to record linkage
- Sample weight adjustment or other methods to handle missing data may be needed
Restricted Data Access for Research

- Restricted-use data not released to the public because of nondisclosure or confidentiality reasons are available in the Research Data Center.
  - Detailed demographics
  - Genetics
  - Linked data
  - Other PII, detailed geography and dates

- www.cdc.gov/rdc
Tabulated data

- Publications
  - Data Briefs
  - National Health Statistics Reports
  - National Vital Statistics Reports
  - Journal articles
Data Access Tools

- **NCHS based**
  - Data Online Query System (DOQS)
  - Health Data Interactive
  - VitalStats

- **Outside NCHS**
  - CDC WONDER (NCHS birth and death data)
  - CDC WISQARS (NCHS injury mortality)
  - Health Indicators Warehouse (HHS)
  - DATA2020 (Healthy People 2020)
  - ASPE Health System Measurement Project (HHS)
Healthy People 2020 is a national agenda that communicates a vision for improving health and achieving health equity.

- Overarching goals and a set of specific, measurable objectives with targets to be achieved over the decade
- These objectives are organized within 42 distinct Topic Areas

NCHS manages DATA2020, the HP data system of record
- Assess and provide guidance on national reliability and national representativeness of data sources
- Manage DATA2020, the HP data system of record
- Provide data collection expertise and statistical analyses
## Major Data Sources: Healthy People 2020

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Health Interview Survey (NHIS), CDC/NCHS</td>
<td>116</td>
<td>9.5%</td>
</tr>
<tr>
<td>National Health and Nutrition Examination Survey (NHANES), CDC/NCHS</td>
<td>96</td>
<td>7.9%</td>
</tr>
<tr>
<td>Bridged-Race Population Estimates for Census 2000 and 2010, CDC/NCHS and Census</td>
<td>61</td>
<td>5.0%</td>
</tr>
<tr>
<td>School Health Policies and Practices Study (SHPPS), CDC/NCHHSTP</td>
<td>61</td>
<td>5.0%</td>
</tr>
<tr>
<td>National Vital Statistics System - Mortality (NVSS-M), CDC/NCHS</td>
<td>44</td>
<td>3.6%</td>
</tr>
<tr>
<td>National Survey of Family Growth (NSFG), CDC/NCHS</td>
<td>43</td>
<td>3.5%</td>
</tr>
<tr>
<td>National Survey on Drug Use and Health (NSDUH), SAMHSA</td>
<td>39</td>
<td>3.2%</td>
</tr>
<tr>
<td>Population Estimates, Census</td>
<td>31</td>
<td>2.5%</td>
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<tr>
<td>State Tobacco Activities Tracking and Evaluation System (STATE), CDC/NCCDPHP</td>
<td>26</td>
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<tr>
<td>National Vital Statistics System-Natality (NVSS-N), CDC/NCHS</td>
<td>23</td>
<td>1.9%</td>
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<tr>
<td>Current Population Survey (CPS), Census and DOL/BLS</td>
<td>21</td>
<td>1.7%</td>
</tr>
<tr>
<td>United States Renal Data System (USRDS), NIH/NIDDK</td>
<td>20</td>
<td>1.6%</td>
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<tr>
<td>National Immunization Survey (NIS), CDC/NCIRD and CDC/NCHS</td>
<td>19</td>
<td>1.6%</td>
</tr>
<tr>
<td>Youth Risk Behavior Surveillance System (YRBSS), CDC/NCHHSTP</td>
<td>19</td>
<td>1.6%</td>
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<tr>
<td>National Report on Human Exposure to Environmental Chemicals, CDC/NCEH</td>
<td>18</td>
<td>1.5%</td>
</tr>
<tr>
<td>National Ambulatory Medical Care Survey (NAMCS), CDC/NCHS</td>
<td>16</td>
<td>1.3%</td>
</tr>
<tr>
<td>National Hospital Ambulatory Medical Care Survey (NHAMCS), CDC/NCHS</td>
<td>16</td>
<td>1.3%</td>
</tr>
<tr>
<td>National Notifiable Diseases Surveillance System (NNDSS), CDC/CSELS</td>
<td>16</td>
<td>1.3%</td>
</tr>
<tr>
<td>Medical Expenditure Panel Survey (MEPS), AHRQ</td>
<td>15</td>
<td>1.2%</td>
</tr>
<tr>
<td>National Profile of Local Health Departments, NACCHO</td>
<td>15</td>
<td>1.2%</td>
</tr>
<tr>
<td>National Hospital Discharge Survey (NHDS), CDC/NCHS</td>
<td>14</td>
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<tr>
<td>Monitoring the Future Study (MTF), NIH/NIDA</td>
<td>13</td>
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<tr>
<td>Comprehensive Laboratory Services Survey (CLSS), APHL</td>
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<tr>
<td>Healthy People 2020 Database (DATA2020), CDC/NCHS</td>
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<tr>
<td>National HIV Surveillance System (NHSS), CDC/NCHHSTP</td>
<td>11</td>
<td>0.9%</td>
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<tr>
<td>National Survey of Children's Health (NSCH), HRSA/MCHB and CDC/NCHS</td>
<td>11</td>
<td>0.9%</td>
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</tbody>
</table>
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