

Tiffany B. Kindratt

Big Data for Epidemiology:

**Applied Data Analysis Using
National Health Surveys**

Big Data for Epidemiology: Applied Data Analysis using National Health Surveys

**Chapter 2: Overview of National Health
Surveys**

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Chapter 2 Outline

- 2.1 Introduction
- 2.2 History of National Health Surveys
- 2.3 National Health Interview Survey (NHIS)
- 2.4 Medical Expenditure Panel Survey (MEPS)
- 2.5 Health Information National Trends Survey (HINTS)
- 2.6 Behavioral Risk Factor Surveillance System (BRFSS)
- 2.7 National Health and Nutrition Examination Survey (NHANES)
- 2.8 Restricted Data
- 2.9 Linked Data
- 2.10 Summary
- 2.11 References

2.1 Introduction

- Overview of the US national health surveys covered in textbook
 - National Health Interview Survey (NHIS)
 - Medical Expenditure Panel Survey (MEPS)
 - Health Information National Trends Survey (HINTS)
 - Behavioral Risk Factor Surveillance System (BRFSS)
 - National Health and Nutrition Examination Survey (NHANES)
- Research case studies with public-use data from each national health survey used to answer research questions pertaining to how predisposing and enabling factors of individuals are associated with morbidity, mortality and health services use

2.2 History of National Health Surveys

1928-1933

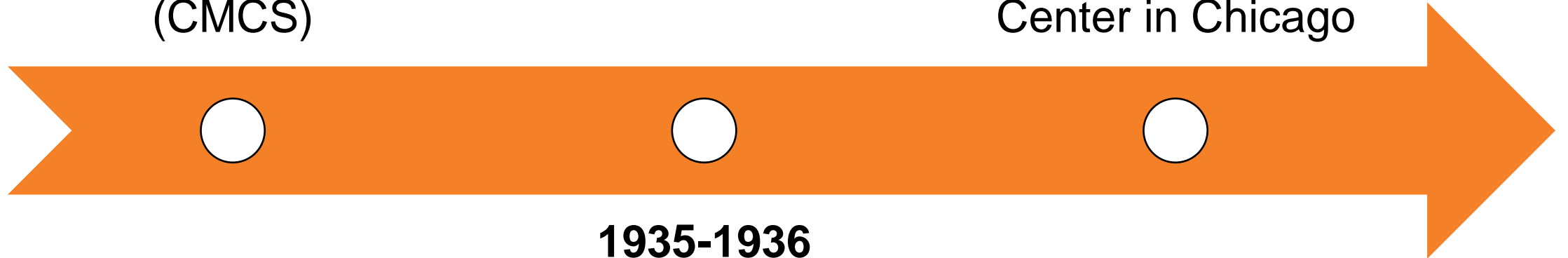
Committee on the
Cost of Medical
Care Studies
(CMCS)

1953

Health Information
Foundation in New
York and National
Opinion Research
Center in Chicago

1935-1936

National Health
Survey by Public
Health Service



2.3 National Health Interview Survey (NHIS)

- **Start Date**: 1957
- **Sponsoring Agency**: National Center for Health Statistics (NCHS)
- **Study Design**: Cross-sectional
- **Data Collection Frequency**: Annual
- **Data Collection Methods**: Computer-assisted personal interviewing (CAPI) system, in-person interviews
- **Purpose**: To monitor and explore trends in the health status and health care utilization among adults and children in the US

2.3 National Health Interview Survey (NHIS)

- **Sample Size**: ~35,000 households and 87,500 individuals
- **Response rates**: 73.8% in 2014; 64.2% in 2018
- More information on design, questionnaires, public-use data, and reports available on website (<https://www.cdc.gov/nchs/nhis/index.htm>).

2.4 Medical Expenditure Panel Survey (MEPS)

- **Start Date:** 1996
- **Sponsoring Agency:** Agency for Healthcare Research and Quality (AHRQ)
- **Study Design:** Cross-sectional, longitudinal retrospective cohort
- **Data Collection Frequency:** 5 panels over 2-year period
- **Data Collection Methods:** CAPI system, in-person interviews, self-administered questionnaires, medical providers contacted by telephone
- **Purpose:** To gather information on health services used by adults and children in the US, including cost, frequency, and payment structures.

2.4 Medical Expenditure Panel Survey (MEPS)

- **Sample Size**: ~15,000 individuals
 - Subsample of households who participated in the previous year's NHIS
- **Response rates**: 48.5% in 2014; 42.7% in 2018
- More information on design, questionnaires, public-use data, and reports available on website (<https://www.meps.ahrq.gov/mepsweb/index.jsp>).

2.5 Health Information National Trends Survey (HINTS)

- **Start Date**: 2003
- **Sponsoring Agency**: National Cancer Institute
- **Study Design**: Cross-sectional
- **Data Collection Frequency**: 5 iterations, ~4 annual cycles
- **Data Collection Methods**: random digit dialing, mailing, online
- **Purpose**: To evaluate how patterns of health information technology and health communication are related to health-related knowledge, attitudes and behaviors among the US adult population

2.5 Health Information National Trends Survey (HINTS)

- **Sample Size**: ~3,500-6,000 individuals
- **Response rates**: ~30%
- More information on design, questionnaires, public-use data, and reports available on website (<https://hints.cancer.gov/>)

2.6 Behavioral Risk Factor Surveillance System (BRFSS)

- **Start Date:** 1984
- **Sponsoring Agency:** Centers for Disease Control and Prevention (CDC)
- **Study Design:** Cross-sectional
- **Data Collection Frequency:** Annual
- **Data Collection Methods:** computer-assisted telephone interview (CATI)
 - State-level data, expanded for national estimates 1993
 - Optional modules
- **Purpose:** To collect data on health behaviors, physical activity, diet, hypertension and preventive safety measures (e.g. seat-belt use) among US adults

2.6 Behavioral Risk Factor Surveillance System (BRFSS)

- **Sample Size**: ~400,000 individuals
- **Response rates**: Overall 49.4% in 2019
- Landline 53.3% and cell phone 43.4% in 2018
- More information on design, questionnaires, public-use data, and reports available on website (<https://www.cdc.gov/brfss/index.html>).

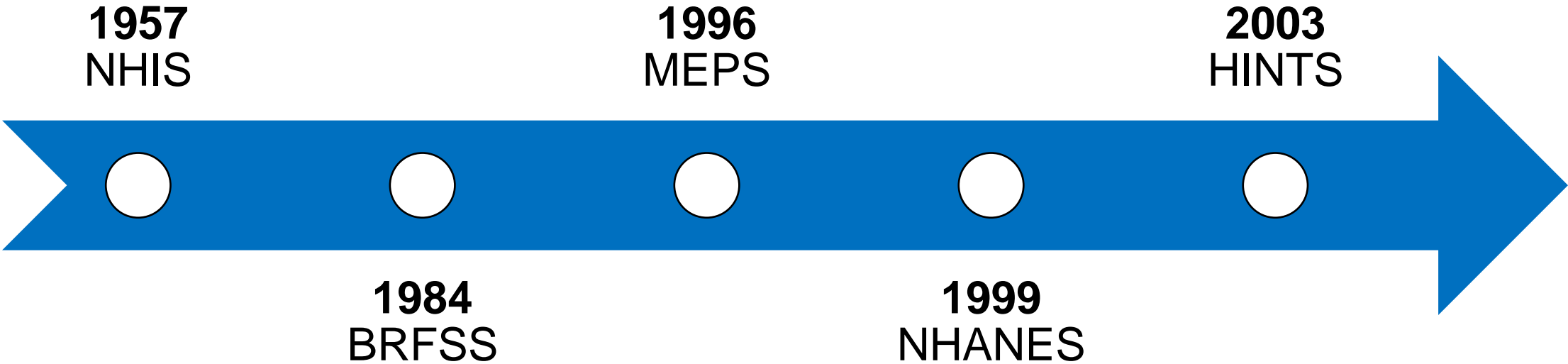
2.7 National Health and Nutrition Examination Survey (NHANES)

- **Start Date**: 1999 (content collected since 1960)
- **Sponsoring Agency**: National Center for Health Statistics (NCHS)
- **Study Design**: Cross-sectional
- **Data Collection Frequency**: Biennial
- **Data Collection Methods**: Self-reported data using in-person household interviews, objective measurements by physical examinations and laboratory tests at mobile examination centers
- **Purpose**: Collect data on the health and diet of individuals in the US

2.7 National Health and Nutrition Examination Survey (NHANES)

- **Sample Size**: ~5,000 individuals each data collection period
- **Response rates**: Interviewed response rate 51.9% and examination response rate was 48.8% in 2017-2018
- More information on design, questionnaires, public-use data, and reports available on website (<https://www.cdc.gov/nchs/nhanes/index.htm>).

Timeline of National Health Surveys in Textbook



2.8 Restricted Data

- Data that may compromise the confidentiality of its participants
- Require special procedures and approvals
- NHANES and NHIS have restricted data accessible by the NCHS and Federal Statistical Research Data Centers
 - Dallas-Fort Worth Federal Statistical Research Data Center
- NHANES restrictions
 - Geography (Census 2010 Block ID)
 - Genetics
 - Dates of participants' interviews and examinations

2.8 Restricted Data

- NHIS restrictions on geography
 - State of birth
 - Urban or rural residence
 - Year foreign-born participants came to the US
 - Country of birth
- Arab American Example
 - Public-Use Variable: REGIONBR
 - The Middle East region includes individuals born in 25 countries.
 - Countries, such as Iran, in the Middle East but not part of Arab League of Nations
 - Create new variable with 15 countries from the Arab League of Nations and geographically located in the Middle East region

2.8 Restricted Data

- Previous studies on Arab American immigrants using restricted NHIS data
 - Chronic disease prevalence
 - Preventive cancer screenings and vaccinations among men and women
 - Smoking status

2.9 Linked Data

- NHANES and NHIS linked to National Death Index
- MEPS linked to NHIS

- Examples
 - Link NHANES III data collected from 1988-1994 with 2015 mortality data
 - Link 2001-2018 MEPS with 2000-2017 NHIS sample to examine cognitive health among Arab American/MENA individuals

2.10 Other Surveys

Survey	Websites
American Community Survey (ACS)	https://www.census.gov/programs-surveys/acs
Health and Retirement Study (HRS)	https://hrs.isr.umich.edu/welcome-health-and-retirement-study
National Death Index (NDI)	https://www.cdc.gov/nchs/ndi/index.htm
National Health and Aging Trends Survey (NHATS)	https://nhats.org/
National Longitudinal Study of Adolescent to Adult Health (Add Health)	https://addhealth.cpc.unc.edu/
National Vital Statistics System (NVSS)	https://www.cdc.gov/nchs/nvss/index.htm
National Survey of Family Growth (NSFG)	https://www.cdc.gov/nchs/nsfg/index.htm
Youth Risk Factor Surveillance System (YRFSS)	https://www.cdc.gov/healthyyouth/data/yrbfs/index.htm

2.11 Summary

- Overview of the national health surveys covered in this textbook
- Details of some expanded data analysis procedures
- Examples of other health surveys
- More specific details on each survey provided in Chapters 6-10

2.12 References

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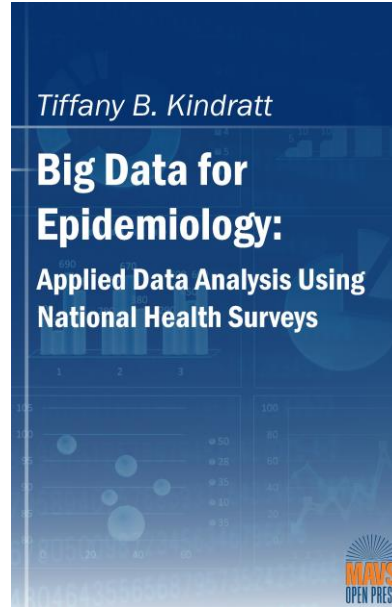
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- National Cancer Institute. Health Information National Trends Survey (HINTS): Overview of the HINTS 5 Cycle 3 Survey and Data Analysis Recommendations, January 2020.

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Thank you!

Please contact me with questions regarding this
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