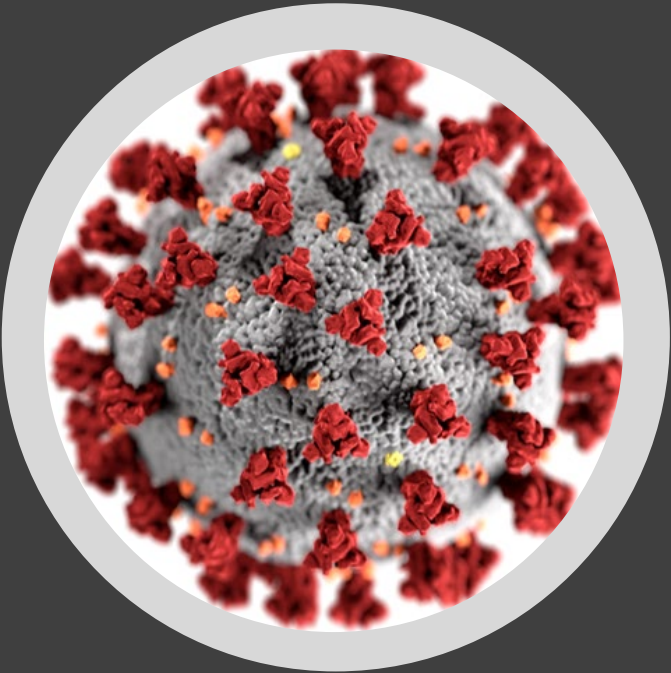# Realizing the Power of Health Data through Linkages

Lisa B. Mirel

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Centers for Disease Control and Prevention

CNSTAT May 28, 2022

National Center for Health Statistics

Implementing the Foundations for Evidence-Based Policymaking Act at the U.S. Department of Health & Human Services

PAVING THE HEALTH EQ

Health Equity is when everyone has the opportunity to be as healthy as possible

grams health egies

Measurement Data practices to support the advancement of health equity

Polic Laws rul

Infrastructure Organizational structures and functions that support health equity

U.S. Department of Health and Human Services Centers for Disease Control and Prevention

Where are we now?

Data Linkage as a Solution

- Linking data is a powerful and efficient mechanism for producing policy-relevant information

  – *Brings together information about the same person or entity to create a new, richer dataset*

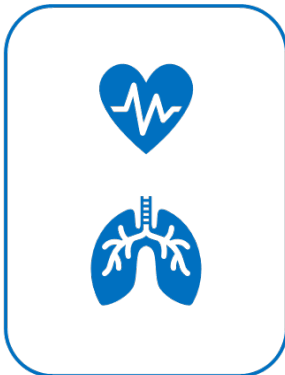 – *Allows for the construction of longitudinal events in previously cross-sectional datasets.*
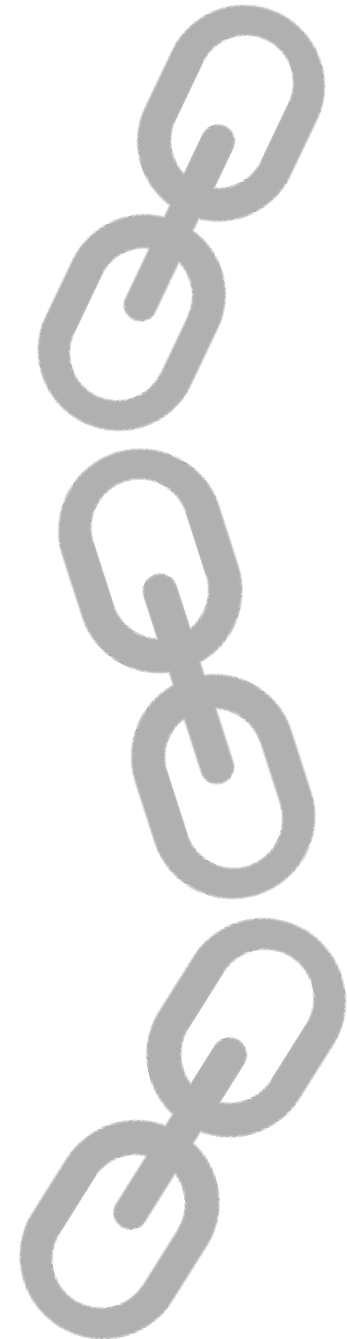
NCHS Data Linkage Program: Sources
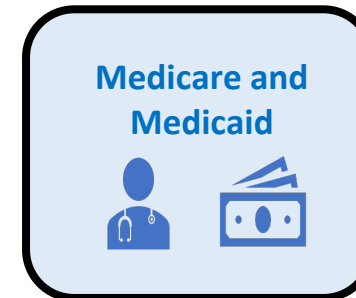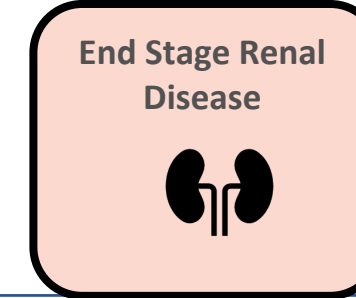
How have linked data been used for evidence-based policy-making?

Health care finance & coverage

- Assess health insurance coverage and access to care for Social Security Disability Insurance beneficiaries during the waiting period before Medicare entitlement

- Health conditions and medical costs of Chronic Kidney Disease in the Medicare population

Evaluation of policy

- HUD policy to reduce lead exposure for children

- Effectiveness of smoking cessation medication for individuals enrolled in Medicaid

Evidence generation for public health & health care

- Assess adverse health effects associated with the mandatory folic acid fortification policy

- Assess the role of eliminating obesity and smoking (through simulation study) to reduce disparities in life expectancy

Linked Data Support Evidence-Based Policymaking

NHANES-HUD Linked Data:

- Blood lead levels among federal housing assistance recipients

  - Results: Children living in federal assisted housing had lower blood lead levels compared to comparable children not living in federal assisted housing.

  - HUD 2018-2022 Strategic Plan cited findings from the NCHS-HUD linked files to support the continued removal of lead-based paint hazards in HUD homes.

  - HUD also cited this evidence in a proposed rule to lower the threshold for elevated blood lead level determination to align with CDC standards.

NCHS Linked Data Used in >1,000 Public Health Research Studies

Linked Mortality Data	Linked NCHS-CMS Data	Linked NCHS-HUD Data
• Deaths Associated with Underweight, Overweight, and Obesity • Air Pollution Exposure and Heart Disease Mortality • Educational Differentials in US Adult Mortality	• Characteristics of those who chose Medicare Advantage upon Medicare enrollment • Health service use among the previously uninsured • Concordance between survey reported childhood asthma and linked Medicaid	• Housing assistance and blood lead levels • Cigarette smoking and adverse health outcomes among adults receiving federal housing assistance • Housing assistance associated with insurance rates and unmet medical need

Emerging Data Needs: Linked Health Data

COVID-19

- Prevalence of risk factors for key population subgroups and subsequent COVID-19 mortality

- Assess population disparities in vaccination trends, acute care utilization, and hospitalization

Opioids

- Assess risk factors to reduce re-admissions and deaths due to opioids

- Following hospitalization for opioid overdose, assess treatment protocols on subsequent readmission or mortality

Social determinants of health/health equity

- Assess how federal support programs (such as those providing housing or food assistance support) mitigate health related outcomes

- Assess disparities that increase potential exposure to infectious disease (such as large households and occupational exposures)

# Emerging Data Needs: Enhancing Patient Data with Health outcomes

■ Linked Inpatient and Emergency Department records with death certificate data to assess 30, 60, 90-day post-hospitalization mortality

■ Linked electronic health records and claims with Medicare and Medicaid data to provide new resources for patient outcomes research, including evaluating treatment effectiveness and post-acute care utilization

https://www.cdc.gov/nchs/data-linkage/nhcs_linkage.htm
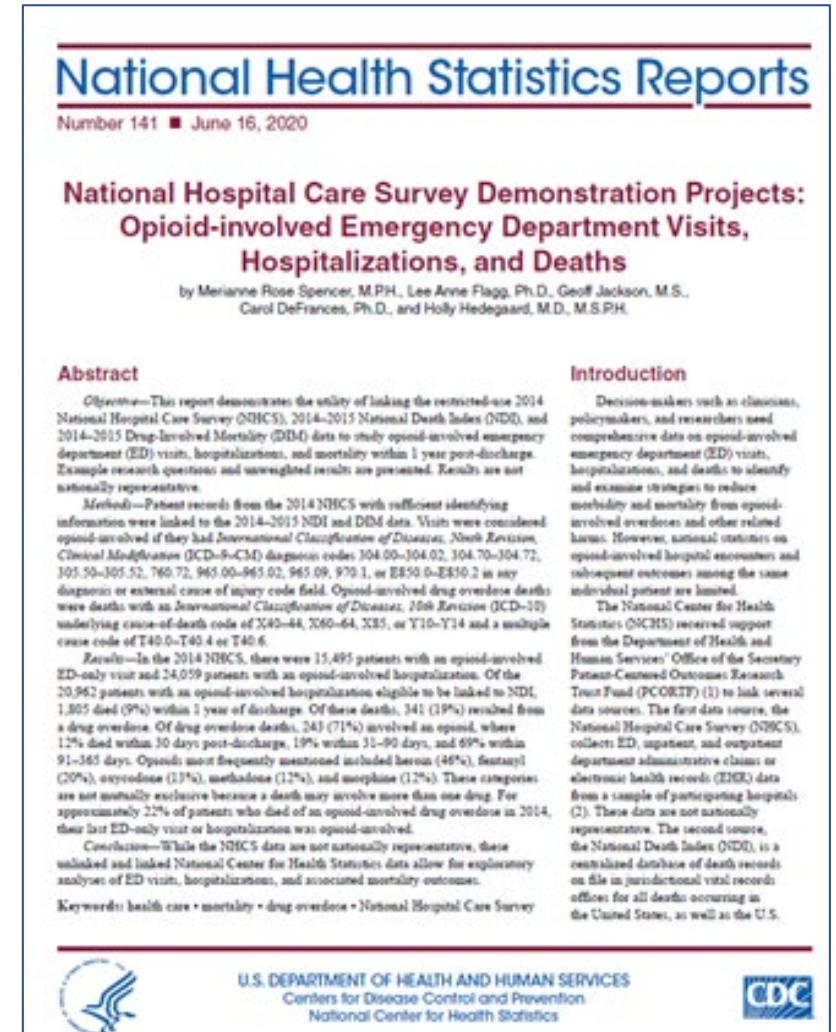
Linked Data Quality Transparency is Essential For Proper Inference
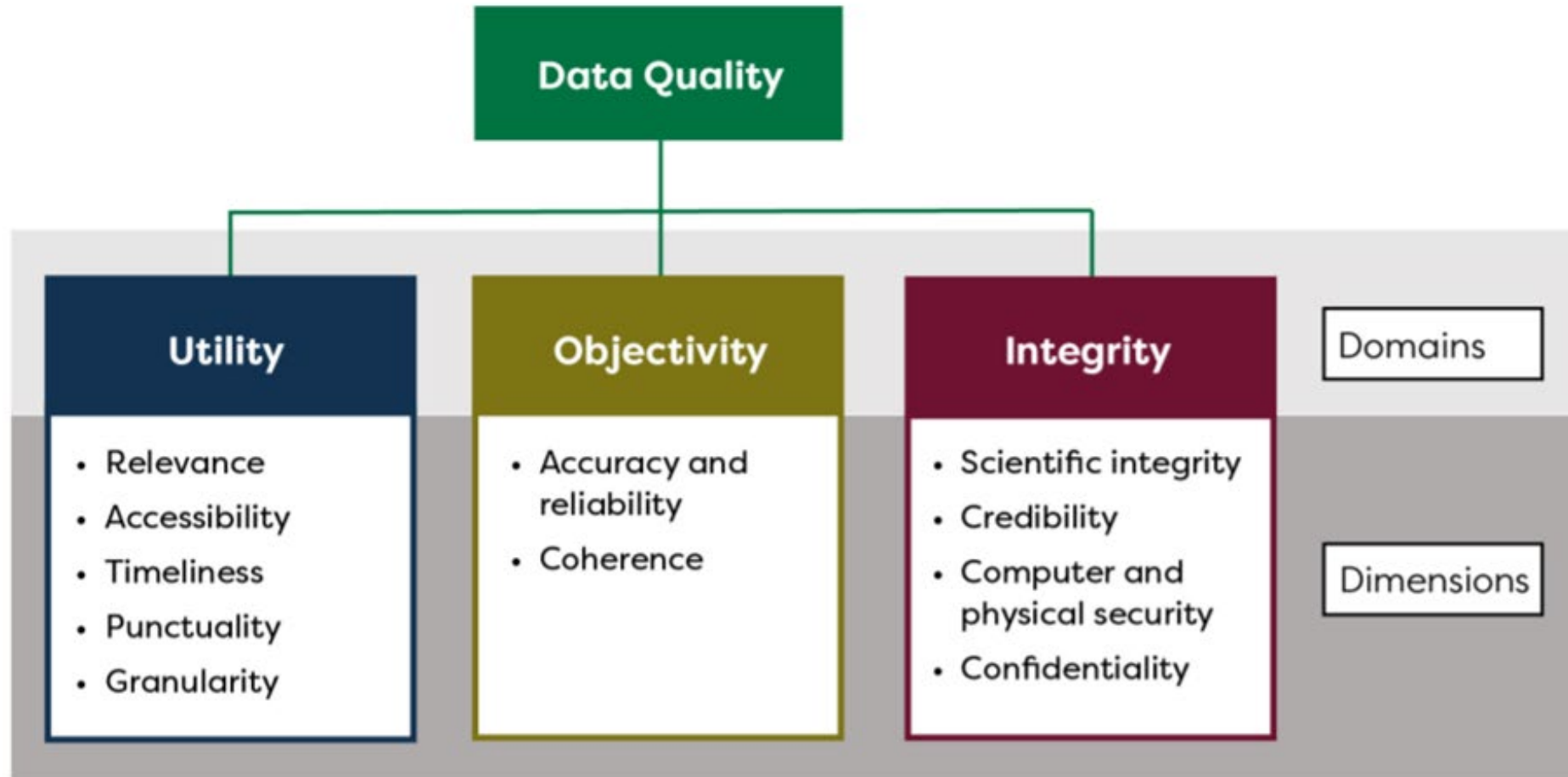
Utility: User Documentation and Analytic Support
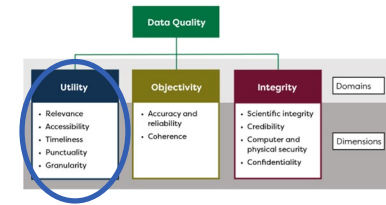
- Linkage Methodology and Analytic Considerations document available on the website

- Match rate and sample size tables

- Web tutorial on how to utilize public use feasibility files

NCHS Data Linkage

NCHS-CMS Medicare Linkage (2014-2018)

- The Linkage of National Center for Health Statistics Surveys to Medicare Enrollment, Claims/Encounters and Assessment Data (2014-2018): Methodology and Analytic Considerations [PDF – 777 KB]
  Contains an overview of the data sources, the methods used for linkage, descriptions of the resulting linked data files, and analytic considerations

- Match Rate Table for NCHS-CMS Medicare Files (2014-2018) [PDF – 693 KB]
  Table providing NCHS-CMS Medicare linked file sample sizes and percentage linked, by survey and age at interview

- Sample Sizes for Restricted-Use NCHS-CMS Medicare Files (2014-2018) [PDF – 457 KB]
  Tables providing sample sizes for each NCHS-CMS Medicare linked files by NCHS survey, type of Medicare file and Medicare enrollment/claims/encounter/assessment year

- Medicare Advantage Enrollment Table for NCHS-CMS Medicare Files (2014-2018) [PDF – 1 MB]
  Table providing unweighted percentage of NCHS-CMS Medicare linked sample aged 65 and over at time of interview enrolled in a Medicare Advantage plan (for at least 1 month during year)

NHANES–CMS Linked Data Tutorial

Welcome to the NHANES-CMS Linked Data Web Tutorial! The National Center for Health Statistics (NCHS) developed this tutorial to meet the growing needs of NHANES-CMS linked data users.

This tutorial is one of several NHANES Tutorials that have been developed to promote broader and more proficient use of NHANES data.

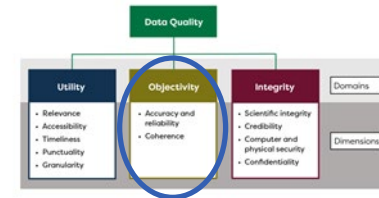https://www.cdc.gov/nchs/tutorials/NHANES-CMS/index.htm

https://www.cdc.gov/nchs/data-linkage/medicare.htm

Objectivity/Integrity: Concordance Analyses

National Health Statistics Reports

Number 72 ■ January 6, 2014

Concordance Between Survey Report of Medicaid Enrollment and Linked Medicaid Administrative Records in Two National Studies

by Lisa B. Mirel, M.S., Agency for Healthcare Research and Quality; Alan E. Simon, M.D., Cordell Golden, B.A., Catherine R. Duran, B.S., and Kenneth C. Schoendorf, M.D., M.P.H., National Center for Health Statistics

Abstract

The National Health and Nutrition Examination Survey (NHANES) and the National Health Interview Survey (NHIS) are population-based surveys that have each been linked to administrative data from the Centers for Medicare & Medicaid Services (CMS): the Medicaid Analytic eXtract (MAX) files. These linked data were used to examine, among children under age 18 years, respondent-level concordance between Medicaid or the Children's Health Insurance Program (CHIP) enrollment as reported in each survey (NHANES and NHIS) and as indicated by administrative data from the MAX files. Concordance was defined as having Medicaid/CHIP reported as a health insurance source in the survey questionnaire and having a CMS Medicaid/CHIP administrative record in the same month and year as the interview. Records were also considered

National Health Statistics Reports

Number 69 ■ November 1, 2013

Self-report of Diabetes and Claims-based Identification of Diabetes Among Medicare Beneficiaries

by Hannah R. Day, Ph.D., and Jennifer D. Parker, Ph.D., Office of Analysis and Epidemiology

Introduction

Diabetes is an endocrine disorder characterized by impaired insulin production or insulin resistance, which leads to increased blood glucose levels (1). In adults aged 65 and over, diabetes can be classified as Type 1 (previously called juvenile diabetes), or Type 2 (previously called adult-onset diabetes) (1). Type 1 diabetes is an autoimmune disorder with a strong genetic

National Health Statistics Reports

Number 131 ■ November 4, 2019

Evaluating Survey Report of Social Security Disability Benefit Receipt Using Linked National Health Interview Survey and Social Security Administration Data

by Lisa B. Mirel, Cordell Golden, Jessica M. Keralis, Yeats Ye, Patricia C. Lloyd, and Julie D. Weeks
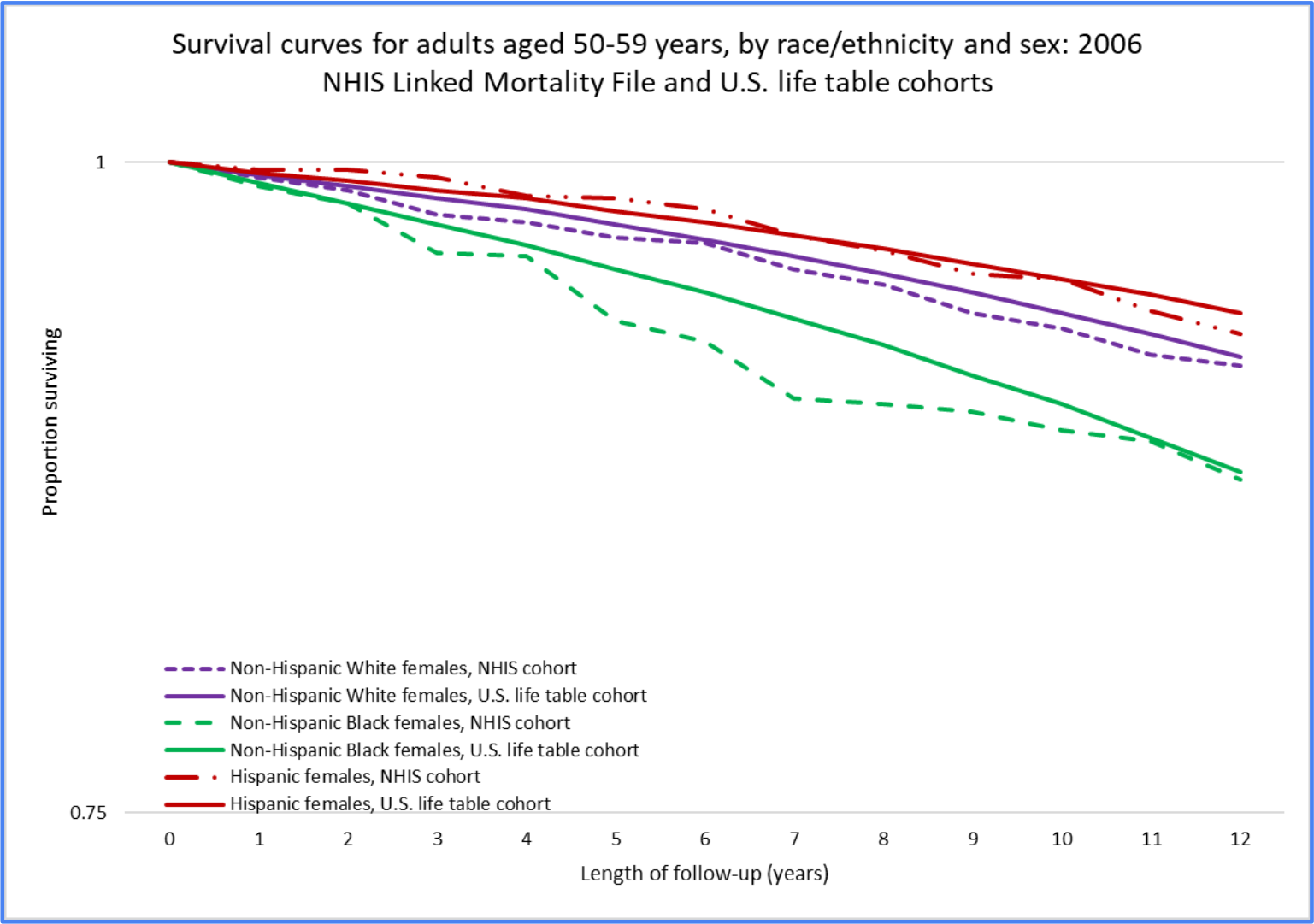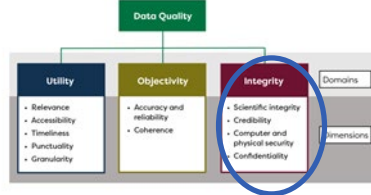
Abstract

Linking nationally representative population health survey data with Social Security Administration (SSA) disability program data provides a rich source of information on program recipients. Survey participant data from the 1998–2005 National Health Interview Survey (NHIS) were linked to SSA administrative records from 1997 through 2005. The goal of this study was to assess agreement between the actual benefit receipt based on the SSA administrative records and the survey report of benefit receipt in the linked NHIS and SSA file for the U.S. civilian noninstitutionalized population. This evaluation provides information on the expected accuracy of survey report of Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI) benefit receipt, including how participant

Administration (SSA) disability program data to provide a rich source of information about Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI) program recipients. Survey participant data from the 1998–2005 National Health Interview Survey (NHIS) were linked to SSA administrative records from 1997 through 2005. The resulting linked data provide key information on the demographics, health, and

Integrity:
Comparing Linked Mortality to National Estimates

Survival curves for adults aged 50-59 years, by race/ethnicity and sex: 2006
NHIS Linked Mortality File and U.S. life table cohorts

Compared life expectancy models for national and linked data populations

Alignment of estimates support robust analyses using the linked data

Integrity: Comparison to HUD population
Linked Housing and Urban Development Files
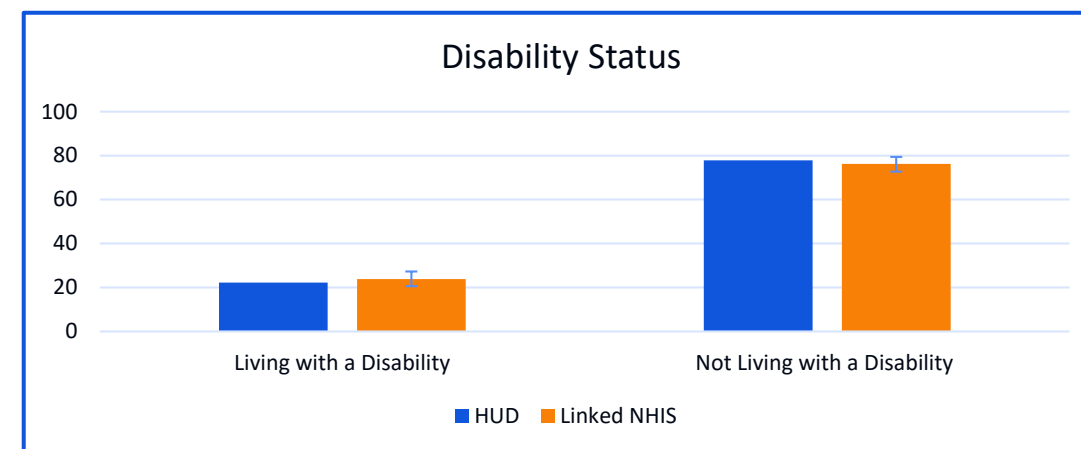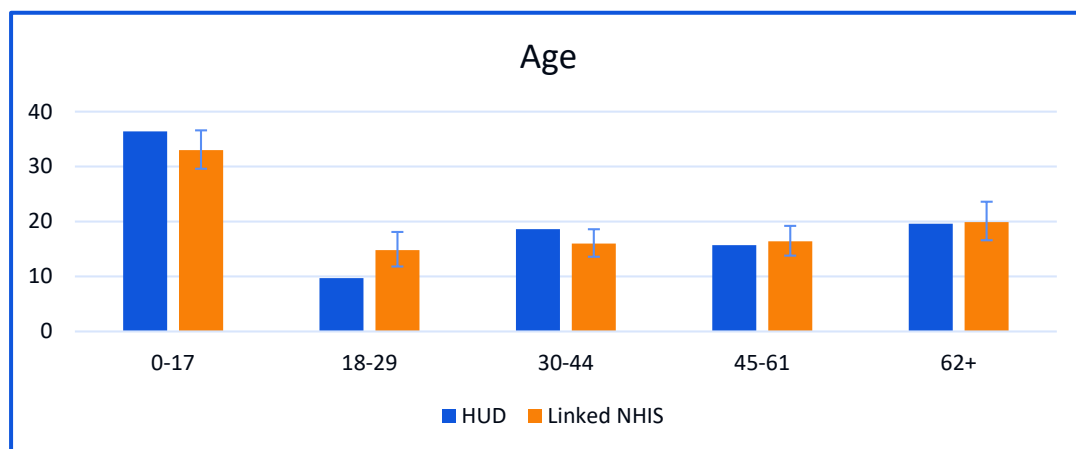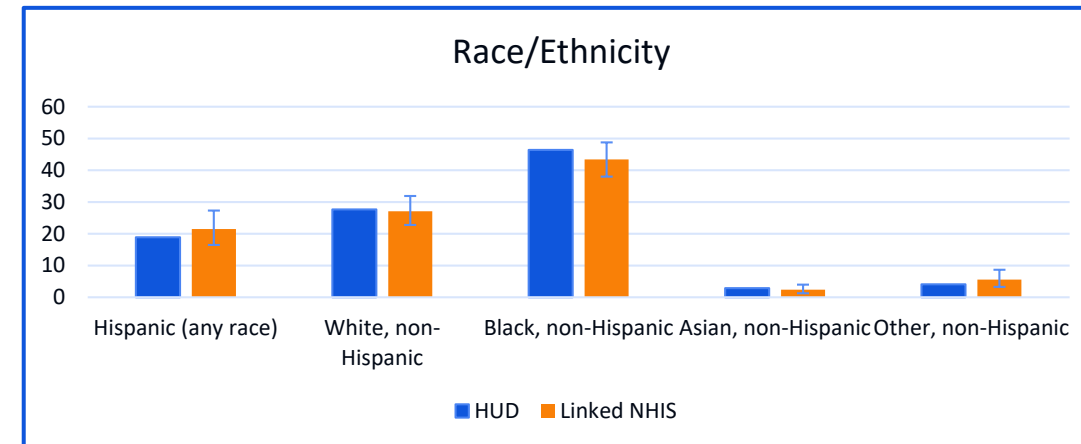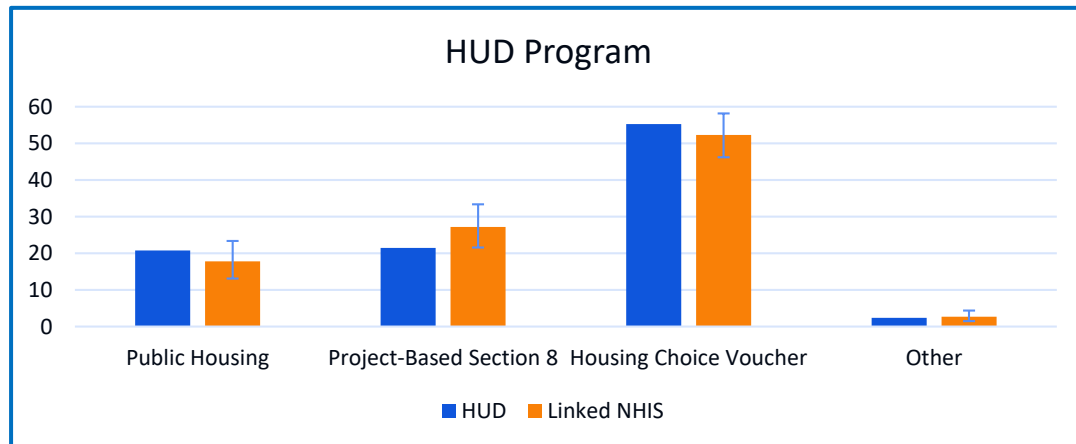
Looking to the Future

- Continue to identify and integrate the data needed to answer key public health and policy questions

- Incorporate innovative technologies

- Embrace alternative data sources

- Expand use of geocoded data for public health and health equity research

More Information

NCHS Data Linkage Program:

datalinkage@cdc.gov

www.cdc.gov/nchs/data-linkage

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