

Does the Decade Matter? Examining the Impact of Using Geocodes from Different Decades in the Analysis of Merged Survey and Contextual Data

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Background and outline

- The National Center for Health Statistics (NCHS) Data Linkage Program enhances the analytic utility of NCHS survey data by linking with administrative records
- Additionally, NCHS geocodes survey participant addresses which allows researchers to merge the survey data with geographic information from other sources
- This presentation will cover:
 - The NCHS Data Linkage Program
 - Introduction to geocodes
 - Examples of research using NCHS geocodes
 - A brief demonstration comparing 2010 and 2020 geocodes
 - How to access NCHS linked data

NCHS surveys used in linkages and geocoding



National Health Interview Survey (NHIS)

A nationally representative, cross-sectional sample of the US civilian noninstitutionalized population, which includes a household interview survey that serves as an important source of information on the nation's health

National Health and Nutrition Examination Survey (NHANES)

A nationally representative, cross-sectional sample of the US civilian noninstitutionalized population, which includes a household interview followed by an examination in a mobile examination center that serves as an important source of information on the health and nutritional status of adults and children

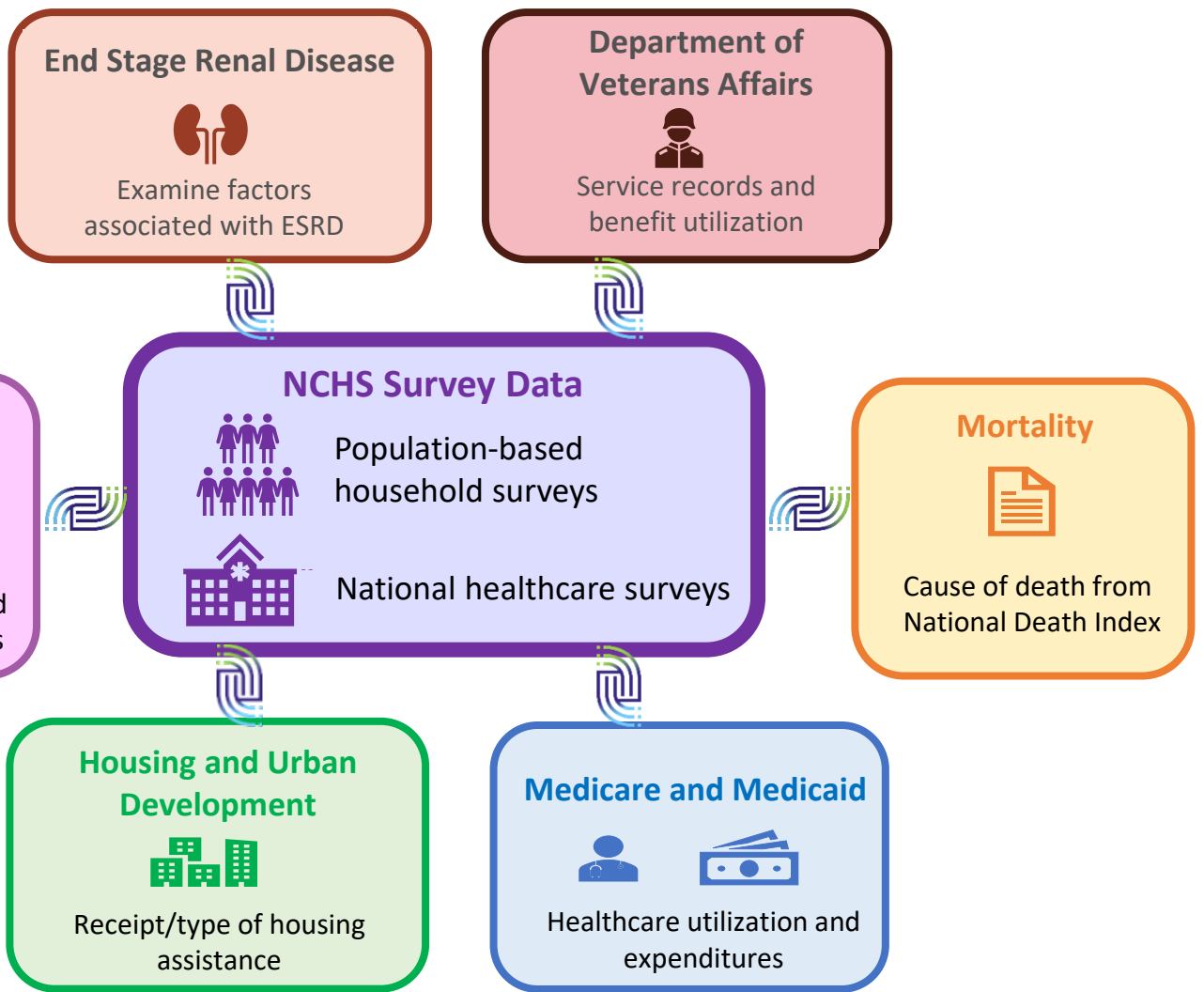


National Hospital Care Survey (NHCS)

NHCS collects data on patient care in hospital-based settings (inpatient, emergency, and outpatient departments) to describe patterns of health care delivery and utilization in the US



NCHS linked data



What is geocoding?

- Geocoding is the process of assigning an address to:
 - A specific location on a map
 - Exact coordinates (latitude, longitude)
 - Other statistical/administrative areas (e.g., census tracts)
- Requires a frame of reference (e.g., street map) and locational information (e.g., residential address) for each entity
- NCHS partners with the Department of Housing and Urban Development to leverage their enterprise geocoding services



Why do we geocode?



- Allow researchers to combine neighborhood and ecological information with individual survey data
- Expand use of geocoded data to improve public health
- Types of geocoded data sources
 - Air quality and climate data
 - Built environment indicators (e.g., traffic, walkability scores)
 - Neighborhood-level socioeconomic and demographic characteristics
 - Food deserts
 - Access to healthcare



Examples of research using geocoded data

Zip codes

D Huang et al. Twitter-Derived Social Neighborhood Characteristics and Individual-Level Cardiometabolic Outcomes: Cross-Sectional Study in a Nationally Representative Sample. JMIR Public Health Surveill. 2020 Jul-Sep; 6(3): e17969.

Census tracts

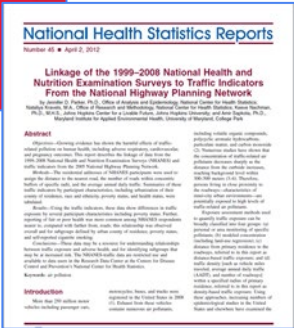
MA Fleisch et al. Relationships between social isolation, neighborhood poverty, and cancer mortality in a population-based study of US adults. PLoS One, 2017 12(3): p. e0173370.

Census blocks

J Barry. The Relationship Between the Supply of Primary Care Physicians and Measures of Breast Health Service Use. J Womens Health (Larchmt). 2017 May;26(5):511-519.

Residential addresses

Parker JD, Kravets N, Nachman K, Sapkota A. Linkage of the 1999–2008 National Health and Nutrition Examination Surveys to traffic indicators from the National Highway Planning Network. National Health Statistics Reports; no 45. Hyattsville, MD: National Center for Health Statistics. 2012.



Geocoded NCHS restricted use survey data

- Available: 2000, 2010, 2020 Census Codes

Variables	Description
Block	Census block
Block Group	Census block group
Tract	Census tract
County	FIPS county code
LAT	Latitude
LON	Longitude
MSA	Metropolitan Statistical Area Code

- Surveys are geocoded to census blocks/tracts across multiple decennials to support longitudinal analysis



What survey years have geocode data available?

NCHS Survey	Census 2000	Census 2010	Census 2020
NHIS 1986-2016	***	***	***
NHIS 2017-2021		***	***
NHANES 1999-2016	***	***	***
NHANES 2017-2020		***	***
NHCS 2016		***	***

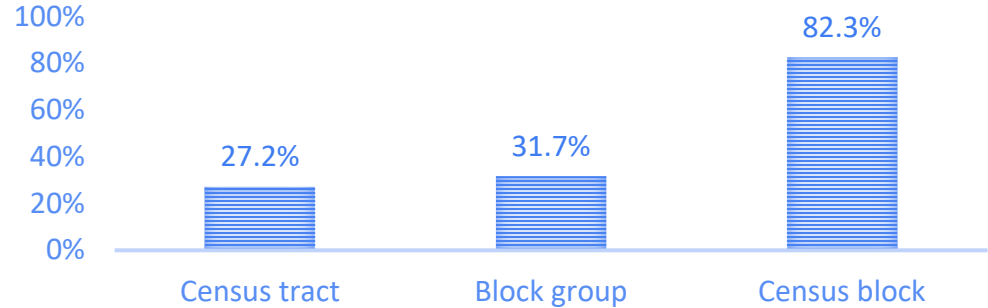
Examples of contextual information available at geocode level

- Social Determinants of Health (SDOH) Database
 - Created by the Agency for Healthcare Research and Quality (AHRQ)
 - Contains information across five key SDOH domains: social context, economic context, education, physical infrastructure, and healthcare context
 - Available at county, ZIP code, and census tract levels
- Census Demographic Profile
 - Created by US Census Bureau
 - Contains demographic and housing information
 - Available at census tract level as lowest level of geography
- EJScreen: Environmental Justice Screening and Mapping Tool
 - Created by Environmental Protection Agency (EPA)
 - Contains information on pollution, health disparities, climate change, and more
 - Available at census block group and tract level

Exploratory demonstration

- Linked geocoded 2016 NHIS participants to census tract level information in the AHRQ SDOH database
- Address information is from the time of the survey (2016 for all participants)
- Limited to sample adults (n=33,028)
- Analysis is unweighted

PERCENT OF NHIS 2016 SAMPLE ADULTS WITH CHANGE IN GEOCODE ID, 2010 VS 2020



Variables selected from AHRQ SDOH Database

Domain	Topic	Data Source	Variable Name	Variable Label
Economic context	Poverty	ACS	ACS_PCT_PERSON_I NC_BELOW99	Percentage of population with an income to poverty ratio under 1.00
Education	Attainment	ACS	ACS_PCT_LT_HS	Percentage of population with less than high school education (ages 25 and over)

ACS = American Community Survey (US Census Bureau)

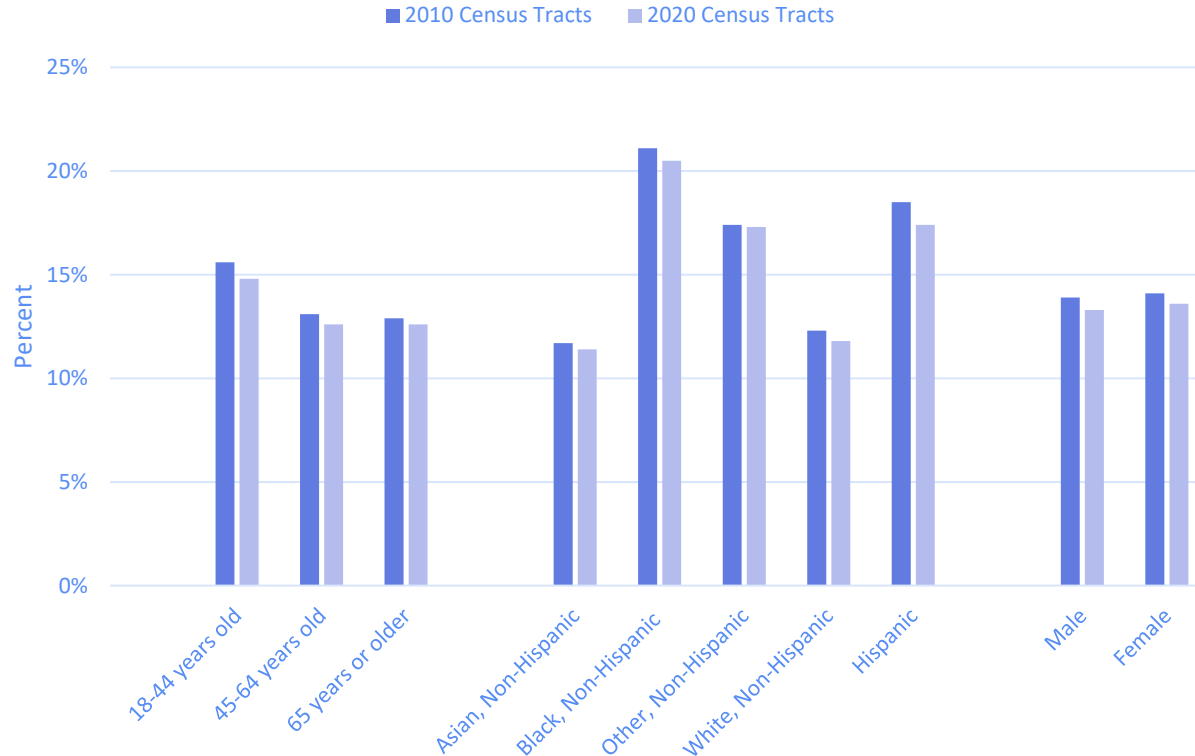
Change over time by census tract for 2016 NHIS sample adults*

	2010 Census Tracts mean (median)	2020 Census Tracts mean (median)
Percentage of population with income to poverty ratio under 1.00	14.0% (10.9%)	13.5% (10.3%)
Percentage of population with less than high school education	14.0% (11.4%)	10.7% (8.2%)

* Analyses are unweighted

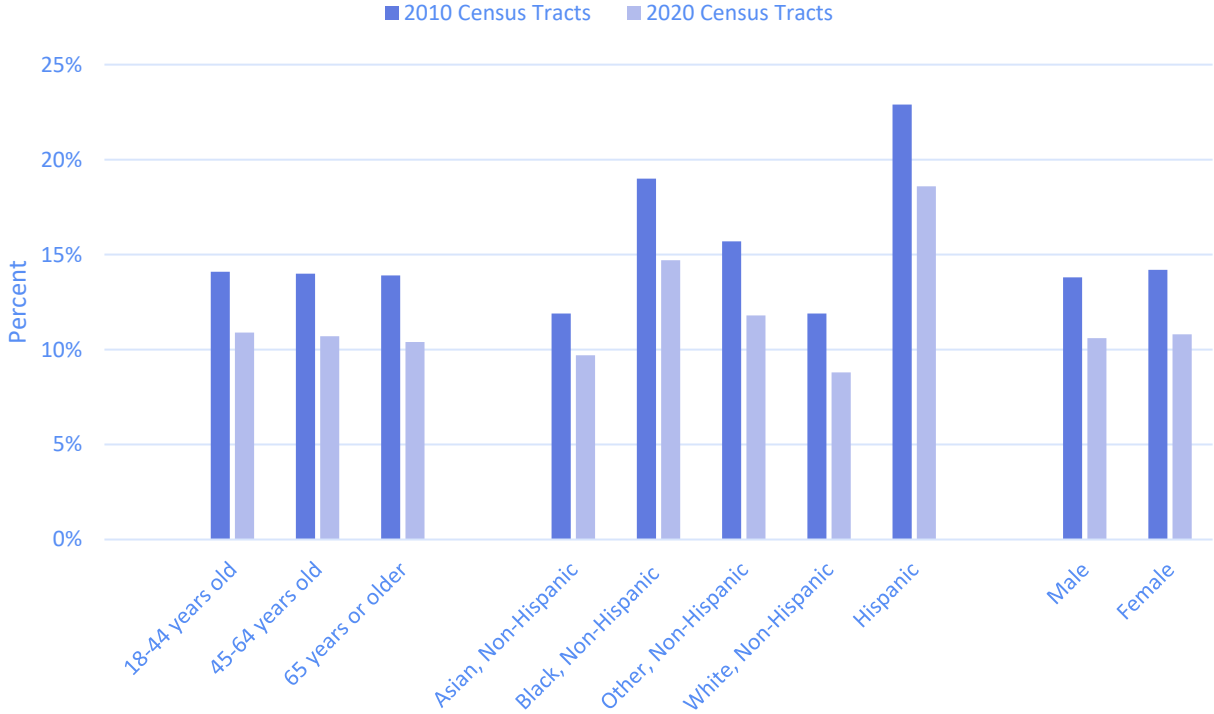
- Change is due to both administrative changes (boundary redefinitions and renumbering) and real change over time (2010 vs 2020)

Percentage of population in 2016 NHIS sample adult's census tract with income to poverty ratio under 1.00, 2010 vs 2020*



* Analyses are unweighted

Percentage of population in 2016 NHIS sample adult's census tract with less than a high school education, 2010 vs 2020*



* Analyses are unweighted

Key summary points

- In addition to maintaining and updating linkages between NCHS survey data and administrative data, the NCHS Data Linkage Program also geocodes survey participant addresses
- Contextual information on the geographic area, including socioeconomic and environmental characteristics, can be merged into the linked data and examined along with survey and administrative data
- While address is always from the time of the interview, the time period of the geocodes should be carefully considered as the choice may impact results, due to real change over time and/or administrative changes

How to access restricted-use NCHS linked data


- Research Data Portal allows users to search all available data and use proposal building tool for data requests following the Standard Application Process (SAP): <https://www.researchdatagov.org/>

National Health and Nutrition Examination Survey (NHANES) Restricted Data: 1999 to Present

 Dataset

Description

The National Health and Nutrition Examination Survey (NHANES) is designed to assess the health and n...
[show more](#)

 Request access

Begin an application for these data by adding them to your request.

NCHS Data Linkage Program

Subscribe to the NCHS Data Linkage Program LISTSERV to receive updates! Email a message to list@cdc.gov. Leave the subject line blank. In the body of the message, type:

– SUBSCRIBE NCHS-DATA-LINKAGE-PROGRAM lastname, firstname

Contact me at: Jessie.Parker@cdc.hhs.gov

Contact the Data Linkage Program: datalinkage@cdc.gov

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Thank you!

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