Linking Survey and Administrative Data: Outcomes and Lessons Learned from the NCHS-HUD Data Linkage Project

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention or the US Department of Housing and Urban Development.
Motivation to Link Health and Housing Data (Bottom-up)

- Little was known about the health of tenants living in households that were assisted through the US Department of Housing and Urban Development (HUD)

- By using nationally-representative surveys linked to HUD administrative data, analysts and researchers are now able to study health issues among recipients of federal housing assistance, including:
  - Health status, including prevalence of disability and chronic disease
  - Health behavior and risk factors
  - Health care coverage
  - Access to health care
  - Utilization of health services

- Temporal correspondence between survey and program data enables examination of health status before or after entry into HUD program
Motivation to Link
Health and Housing Data
(Top Down)

HHS Strategic Goals FY14-18

• Strengthen health care
• **Advance scientific knowledge and innovation**
• Advance health, safety, and well-being of Americans
• **Ensure efficiency, transparency, accountability, and effectiveness of HHS programs**

HUD Strategic Goals FY14-18

• Strengthen the Nation’s housing market to bolster the economy and protect consumers
• Meet the need for quality, affordable rental homes
• **Use housing as a platform to improve quality of life**
• Build strong, resilient, and inclusive communities
Brief History

• Long-term effort – evolved organically over many years
• Collaborative interagency Geospatial and Public Health Workshops
• HUD geocodes addresses of participants from surveys administered by the National Center for Health Statistics (NCHS)
  • Original Memorandum of Understanding (MOU) signed in 2007, included surveys as early as 1999
  • Recent MOUs add more NCHS surveys
• Pilot project linked the National Health Interview Survey (NHIS) and HUD administrative records via address
  • MOU with NCHS Research Data Center (RDC), 2010
• Current NCHS-HUD data linkage project links participants of two NCHS surveys to HUD administrative data via personally identifiable information
  • Data are available for research through the NCHS RDC
  • MOU with NCHS Office of Analysis and Epidemiology, 2014
NCHS-HUD Partnership

• NCHS brings subject experts on health, and HUD brings subject experts on housing

• The MOU between HUD and NCHS describes the role of both agencies:
  • NCHS performs the NCHS-HUD data linkage, creates the linked NCHS-HUD data files, manages access of the linked NCHS-HUD data through the NCHS RDC, and underwrites RDC access for HUD researchers
  • HUD provides geocoding services for NCHS
Win/Win for CDC/NCHS & HUD

Geocoding Services

• HUD geocoding increases value of NCHS data, leverages $150,000,000 annual investment in health data – locational specificity
• Standardized, timely, high quality, within secure confidential environment
• Cost-effective, less duplication of effort

Data Linkage Product

• Enables analysis of health outcomes associated with housing and community development investments by federal government
NCHS surveys provide:

- Detailed demographic information and family structure
- Socioeconomic and educational factors
- Underlying health characteristics and health behaviors
- Biomarkers and physical measurements

Population health surveys linked to administrative records add:

- Analytic potential
- Longitudinal component (administrative program eligibility)
- Reduction in participant burden
HUD’s Largest Rental Assistance Programs

Public Housing (PH)
• Housing for eligible low-income families, the elderly, and persons with disabilities
• Federally funded and regulated but managed by local housing authorities

Housing Choice Voucher (HCV)
• HUD’s largest rental assistance program
• Monthly rental assistance payment to assist very low income families in renting decent, safe, and sanitary housing on the privately owned rental market
• Voucher subsidy is tied to the family instead of the unit

Multifamily (MF)
• Contract is between HUD and owners of development
• Assistance to owners of multifamily rental developments that house seniors, families with children, and persons with disabilities
• If the tenant moves, the assistance stays with owner
### Health Surveys Linked to HUD Administrative Data

<table>
<thead>
<tr>
<th>National Health Interview Survey (NHIS)</th>
<th>National Health and Nutrition Examination Survey (NHANES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Cross-sectional household interview survey</td>
<td>• Cross-sectional survey, interview and examination components</td>
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<tr>
<td>• Collects data on broad range of health characteristics among the civilian, noninstitutionalized population of the US</td>
<td>• Collects demographic, socioeconomic, dietary, and health-related data during interview; collects medical, dental, and physiological measurements, and laboratory tests administered by highly trained medical personnel during examination</td>
</tr>
<tr>
<td>• Oversamples select demographic populations</td>
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</tr>
<tr>
<td>• Conducted annually, released annually</td>
<td>• Conducted annually, released bi-annually</td>
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<tr>
<td>• Nationally representative sample of about 35,000 households, containing about 87,500 persons</td>
<td>• Nationally representative sample of about 5,000 persons each year</td>
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http://www.cdc.gov/nchs/nhis

http://www.cdc.gov/nchs/nhanes
Overview of NCHS-HUD Data Linkage

NCHS Survey Data

Eligible for linkage

Ineligible for linkage

Data Linkage

Matched records

Non-matched records

HUD Finder File:
- HUD unique ID
- Social Security Number
- Last Name
- First Name
- Date of Birth
- Sex

NOTES: HUD is the U.S. Department of Housing and Urban Development
Overview of NCHS-HUD Data Linkage

**NCHS survey years**
1999-2012 NHIS, NHANES participants linked to 1996-2014 HUD administrative data

**Years of HUD administrative data files**

- HUD administrative data available for Multifamily programs only.
Linkage Rates for linked NHIS-HUD data

**NHIS**
- N=1,291,224
- NHIS participants (1999-2012)
- N=316,102 (25%)
  - Linkage-eligible participants
- N=27,555 (9%)
  - NHIS linkage-eligible participants linked to HUD at any time

**NHANES**
- N=71,916
- NHANES participants (1999-2012)
- N=50,559 (70%)
  - Linkage-eligible participants
- N=6,628 (13%)
  - NHANES linkage-eligible participants linked to HUD at any time
Examples of publications using the Linked NCHS-HUD data

1. Cigarette smoking and adverse health outcomes among adults receiving federal housing assistance
   - Veronica E. Helms, Brian A. King, Peter J. Ashley
   - Preventive Medicine

   - Katherine A. Ahrens, PhD, Barbara A. Hidy, PhD, Lauren M. Rosan, PhD, Patricia C. Lloyd, PhD, and Yoko Aski, PhD

   - HUD Administrative Data Linked With the National Health Interview Survey

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Objective

• To compare blood lead levels (BLLs) among US children aged 1 to 5 years according to receipt of federal housing assistance

Methods

• 2005-2012 NHANES child participants with family income-to-poverty ratios below 200% and aged 1-5 years who provided sufficient information to be linked to 1999-2014 HUD administrative data

• Compared geometric mean BLLs and the prevalence of BLLs of 3 micrograms per deciliter or higher among children who were living in assisted housing at the time of their NHANES blood draw (or had previously lived in HUD-assisted housing) with data for children who did not receive housing assistance

• Propensity score weighting was used to adjust for differences between those who were living in assisted housing and those who did not receive housing assistance

Results

- After adjustment, children aged 1-5 years currently-living in HUD-assisted housing (n=151) had lower BLLs than comparable children who were not receiving HUD assisted housing (n=1,099).

- After adjustment, children aged 1-5 years who were either living in HUD-assisted housing or had previously lived in HUD-assisted housing (n=208) had lower BLLs than those who were not receiving HUD assisted housing (n=1,099).

Paper 2. HUD Housing Assistance Associated With Lower Uninsurance Rates And Unmet Medical Need

Objective
• Examine whether receiving HUD housing assistance is associated with improved access to health care

Methods
• 2004-2012 NHIS non-disabled participants aged 18-64 years who provided sufficient information to be linked to 2002-2014 HUD administrative data

• Compared the percentage of select outcomes (health insurance coverage, having a usual source of care, unmet need due to cost, including: delay of medical care, mental health care, specialist care, dental care, or prescription drugs) for current and future recipients

• Current recipients were defined as adults living in HUD housing at the time of their interview and future recipients were defined as those who would live in HUD housing within two years of their interview

Results

A smaller share of current recipients (n=3,179) of HUD housing assistance were uninsured, compared to future recipients (n=835) (31.8 percent versus 37.2 percent)

The share of adults without a usual source of care was not significantly different between groups

Fewer current recipients than future recipients had unmet need due to cost (40.0 percent versus 47.8 percent)

Accessing the Linked NCHS-HUD data

Current Linked NCHS-HUD data file
- Restricted-use files accessible in the NCHS Research Data Center following approved research proposal: https://www.cdc.gov/rdc/index.htm
- Public-use feasibility files are available to assist researchers in determining the maximum available sample size for each linked file: http://www.cdc.gov/nchs/data-linkage/hud.htm

Next release of the Linked NCHS-HUD data
- Expected release early 2018
More information about the Linked NCHS-HUD data:
https://www.cdc.gov/nchs/data-linkage/hud.htm

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