



A Half Century of Health Data for the U.S. Population

The Integrated Health Interview Series

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Abstract. The U.S. National Health Interview Survey (NHIS) is the world's longest survey time series of health data and a rich source of information on health conditions, behaviors, and care from the 1960s to the present. NHIS public-use files are difficult to use for long-term analysis, due to complex file structure, changes in questionnaire content, and evolving variable names and coding schemes. Researchers at the Minnesota Population Center have created the Integrated Health Interview Series (IHIS) to overcome these problems. IHIS provides access to thousands of consistently coded and well-documented NHIS variables on the Internet and makes it easy to analyze health trends and differentials. IHIS multiplies the value of NHIS data by allowing researchers to make consistent comparisons over half a century and thus to study U.S. health status as a dynamic process. This article describes the main features of IHIS and suggests fruitful avenues for historical research using these invaluable health data.

Keywords: demography, health data, microdata, Minnesota Population Center, NHIS, United States

First fielded in 1957, the United State's annual National Health Interview Survey (NHIS) is the longest time series on health data in the world.¹ The NHIS is a national treasure; no other country has health survey data approaching the same chronological breadth and depth of subject coverage. Until recently, however, incompatibilities across years and survey design periods have made the cost of long-run chronological analysis of NHIS data prohibitive.

The Integrated Health Interview Series (IHIS, available at <http://www.ihis.us>) is unlocking this great resource for historical analysis, opening a doorway to new research on health behaviors, health care, and health disparities in the United States across five decades of transformative change. A collaborative project between researchers in the School of Public Health and the Minnesota Population Center (MPC) at the University of Minnesota, with funding from the National Institute of Child Health and Human Development (NICHD),

IHIS is making it easy for researchers to access and use thousands of variables and multiple years of data (1963 to present) from the National Health Interview survey.

Like other MPC-integrated databases (e.g., the Integrated Public Use Microdata Series, IPUMS), IHIS facilitates multiyear analyses by harmonizing and documenting multiple years of data collected by a government agency and then disseminating these data free of charge through a Web-based data extraction system and an online tabulator. IHIS is unique among MPC microdata projects in two respects: (1) its primary focus on health status, health care, and health determinants; and (2) its scope, with approximately 7,000 variables available now (and with an estimated 15,000 variables that should be available by 2014).

IHIS multiplies the value of NHIS data by allowing researchers to make consistent comparisons over half a century and thus to study U.S. health status as a dynamic process. These rich data are an essential resource for creating historically grounded and policy-relevant research into health behavior and health disparities, access to medical care, population aging, and many other health-related topics.

Strengths of National Health Interview Survey Data

The National Health Interview Survey is not only one of the longest-running U.S. national surveys, it is also one of the largest cross-sectional surveys. Representative of the U.S. noninstitutionalized civilian population, the survey samples include 60,000–130,000 persons per year (with numbers dependent on funding levels for the National Center for Health Statistics [NCHS], which is responsible for the survey). With annual microdata preserved from 1963 to the present, NHIS files offer extensive information on approximately five million persons grouped in households and families. The data are collected in person by trained interviewers who visit the household, and response rates have remained high into the twenty-first century (i.e., currently almost 90 percent of

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eligible households) (Centers for Disease Control and Prevention 2010).

The most impressive aspect of the NHIS is its topical scope. The survey covers an enormously diverse range of subjects but maintains enough consistency across years to support innumerable analyses of long-term trends and differentials in health status, health behaviors, and health-care access and use.

From its inception to the late 1990s, the NHIS consisted of core questions fielded every year, plus topical supplements whose content varied (NCHS 1985, 1990, 1993). Occasionally, topics were covered only once (e.g., adoption). More commonly, topical supplements with consistent content were fielded year after year (e.g., insurance coverage, immunization) or according to a predictable schedule. For example, supplements on cancer control and epidemiology have been fielded at five-year intervals from 1987 through 2010. In 1997, NHIS was redesigned to reduce respondent burden. Information on demographic characteristics, disability, general health status, and access to care was still collected for all household members, but many health questions were limited to one randomly selected adult and one randomly selected child per family (NCHS 1999, 2000). The redesign did not substantially undermine the *potential* for multidecade analyses, however, because most question content for 1997 and later came from the long-standing core module and from topical supplements that had been fielded many times before.

Detailed information on survey participants' family income, employment status and occupation, education, race and ethnicity, immigration history, veteran status, and family relationships provide social context for thousands of health-related variables. Because questions were asked of individuals grouped within families and households, NHIS public-use files also contain the raw material for elucidating how the health status and health-related behaviors of individuals shape and are shaped by the actions and well-being of their coresident relatives.

Barriers to Crosstemporal Analysis Using NHIS

Although the NHIS has been "Monitoring the Nation's Health"² for more than 50 years, NHIS data were rarely used to study long-term change before the creation of IHIS. The complicated structure of the original NHIS public-use files, together with the complexities of the survey design, made analyzing more than a single year unwieldy. Incompatibilities across multiple years and survey design periods meant the cost of long-run chronological analysis was prohibitive. The breadth of the source material—hundreds to thousands of variables created every year, thousands of pages of documentation for each year, with no multiyear search tools or indices—contributed to the dearth of long-term analyses based on the original NHIS public-use files. And although the NCHS made a substantial effort to maintain consistency in questionnaire content across time, subtle changes in question wording, universes, coding schemes, variable names,

and variable locations (particularly before 1997) obscured that underlying consistency and introduced high risks of inadvertent errors.

Understandably, then, few researchers exploited the range of chronological NHIS data available in public-use files, thereby compromising the historical perspective required for informed policymaking and scholarly understanding. IHIS data and Web site features (at <http://www.ihis.us>) are designed to overcome these obstacles, making historical analyses based on this invaluable survey not just hypothetically possible but also feasible.

Overview of IHIS Methods

When evaluated as source data for single-year analyses, the NHIS public-use files disseminated by the National Center for Health Statistics are in many ways exemplary: clean, well-documented, and downloadable from the Internet. Yet even for single years, the file structure is complex, particularly for the period before 1997.

The first task for the IHIS project was linking and reformatting more than 500 original data files into one standardized file per year and then creating extensive XML-encoded metadata describing these files. Only after this task was completed, and each source variable had been assigned a computer-generated unique identifier, could substantively comparable source variables be combined in a single integrated variable, regardless of the original survey year or file type.

The second major task for the IHIS staff was to trace survey questions across years, to create consistently named and coded variables. For example, the question "Have you smoked at least 100 cigarettes in your entire life?" has been fielded nearly 30 times in the NHIS, beginning in 1970. Although the question wording is largely consistent, the variable based on this question is given 10 different names and appears in seven different types of files in the NHIS public-use files.

IHIS, by contrast, offers a single integrated variable (SMOKEV) that is based on the aforementioned survey question and that covers all relevant survey years. For each integrated variable, we develop a variable transformation table that provides information on the source variables from the original public-use files and maps each original NHIS data value to the new IHIS standardized data value. The actual recoding operations are carried out using a computer program operating with data stored in a relational database.

Working with IHIS data, researchers can concentrate on following a topic over time instead of managing multiple complex files or single-handedly tracking down variables across years, and the potential for historical analyses of the data thereby dramatically improves. Evaluating the effectiveness of antismoking public policies and public health education campaigns with different population subgroups (e.g., defined by race/ethnicity, veteran status, age, sex, and SES)

cross 40 years becomes far more feasible when NHIS source data are accessed through IHIS.

A third major task that has facilitated long-term data analysis is the construction of comprehensive documentation, including variable-specific discussion of comparability issues. Each evolution of the survey has introduced discontinuities in variables that complicate and confound analysis of change. To use variables appropriately in a crosstemporal analysis, researchers must be aware of—and adjust for—changes in universes, the survey instruments, data processing, and response categories. For example, respondents to the question about ever smoking 100 cigarettes ranged in age from 17 years or older to 20 years or older, depending on the survey year, and were selected under different sampling schemes that demand different weights. IHIS's online documentation—in this case, the variable description for SMOKEV—alerts researchers to issues such as these, so analysts do not draw false conclusions based on incorrect assumptions about data consistency.

The fourth major task for the IHIS project is data dissemination. IHIS leverages software tools that were developed at the Minnesota Population Center for disseminating data over the Internet. First used in the mid-1990s, these tools have evolved to meet changing technology and user needs and now serve more than 60,000 researchers worldwide. The IHIS data extract system merges files on the fly and allows researchers to create a customized file with just the years and variables they need. The system records every extract made by a researcher, so changes can easily be made by reloading and modifying an old extract and adding or subtracting years and variables as needed. Creating an extract takes only a few minutes, and the system sends an e-mail when the extract (in the form of an ASCII file plus a SAS, Stata, and SPSS codebook) is ready to be downloaded for analysis on the researcher's computer.

Online data analysis is also supported on the IHIS Web site. Using an online tabulation system, individuals who do not have experience with statistical packages can create tables and frequency distributions, calculate means, run significance tests, and answer their own questions about public health. Online data analysis is particularly appropriate for classroom use, bringing the excitement of discovery to high-school and undergraduate statistics, public health, public policy, and medical history classes. Experienced data users employ online tabulation when they need quick numbers for reference or exploratory work and do not want to bother with downloading data. IHIS uses high-speed tabulation software developed at University of California, Berkeley's Computer Assisted Survey Methods Program, in a version that is appropriate for complex stratified samples like NHIS.³

Variable Harmonization Scope and Approach

IHIS currently includes approximately 7,000 integrated variables covering the 1960s to 2009. These integrated vari-

ables incorporate nearly 25,000 source variables from the NHIS public-use files, as well as information on survey participants' mortality status for 1986–2004 (based on linkages to the National Death Index by NCHS). Table 1 provides a summary overview of the substantive content of currently available IHIS variables.

Over the next four years, the number of publicly available integrated IHIS variables will more than double, and material from each new survey year will be incorporated. As the number of variable groups increases each year, the range of topics amenable to long-run analysis will dramatically expand.

Across all subject areas, our data integration approach is designed to meet two goals: retain all the detail provided in the source variables from the original public-use files and keep variables simple and easy to use for comparisons across time. We have employed several strategies to achieve these competing goals.

In some cases (e.g., age, sex), the original variables are compatible, and recoding them into a common classification is straightforward. For many variables, it is impossible to construct a single uniform classification without losing information. Some years and supplements provide far more detail than others do, so a coding system using the lowest common denominator would inevitably lose important information.

TABLE 1. Overview of Variable Availability in the Integrated Health Interview Series Database for 1960s to the Present

IHIS variable groups
Demographic
Socioeconomic status
General health
Mortality
Cancer family history
Health conditions
Health behaviors
Alcohol
Tobacco
Exercise
Health knowledge
Limitation
Activity limitation
Hearing problems
Vision problems
Medical care/access
Access and use of care
Insurance
Immunization, drugs
Mental health
Adult mental health
Child mental health
Alternative medicine

Note. Not all of the 7,000+ variables in IHIS are available for every year.

In these cases (e.g., race), we construct composite coding schemes. The first one or two digits of the numeric codes provide information available across all or most survey years, while trailing digits provide detail that is less commonly available.

Other types of integration problems require alternative solutions. For example, in the NHIS public-use files, educational attainment was measured in intervals of years of completed schooling prior to 1982 (e.g., 0–6, 12+), in single years of completed schooling for 1982–96, and in highest degree or diploma obtained for high school graduates beginning in 1997. To facilitate analysis over time, IHIS offers three variables: intervals of years of completed schooling for 1963–96; single years of completed schooling for 1982–96; and a bridging variable that translates post-high-school years of schooling into degrees obtained and spans the entire data series. Sometimes IHIS creates new summary variables by using customized programming and input from multiple source variables. As is subsequently described in detail, some discontinuities in variables across years are inevitable; in these cases, the only recourse is to note any remaining problems and possible workarounds in the documentation.

Documentation Features

Clear, consistent, and accessible documentation is our highest priority. To create variable descriptions, we review codebooks, survey forms, field representative manuals, annual survey descriptions, and notes in the original NHIS public-use files. We often draw on other documentation, such as NCHS reports and scholarly publications, and consult experts at NCHS for clarification or additional information (e.g., on data cleaning and processing).

When variables cannot be made fully comparable across time, IHIS documentation explains the limits of comparability and proposes solutions. Changes in the question universes of variables and in subsampling for supplements are often subtle, and clear documentation about who was asked a question in each year is essential. Variable descriptions also supply year-specific information on the appropriate weight to match the sampling scheme, specify the NHIS source file(s) for the variable in the original public-use data, and provide access to online unweighted codes and frequencies with a single mouse click.

IHIS variable descriptions guide users through complex groups of interrelated variables. For example, the 1999 public-use files contain 39 different variables related to adult depression. Without IHIS documentation, researchers are likely to be confused by the apparent overlap in variable content, overwhelmed by the number of variables on this topic, and uncertain about how to combine these elements in a meaningful way. IHIS descriptions of these variables guide users through the official categorization of depression; they clarify the meaning of and interrelationship between these

variables; and they direct users to an IHIS-created summary variable scoring the likelihood that the person would have been diagnosed as clinically depressed by a mental health professional.

IHIS provides links within each variable description to the relevant survey text for each year. Creating linked survey text required considerable effort; undergraduate research assistants retyped and formatted thousands of pages of survey text, while experienced research staff linked appropriate sections of survey text to integrated variables, using XML tags and the unique identification numbers assigned to each source variable in the project metadata. For IHIS users, the result of this effort is useful and easy to use. By clicking on a “survey text” link within a variable description, the researcher can view the question wording, response categories, and universe information for every year, just as they appeared on the survey form. A second mouse click displays the text within the context of the entire survey form. Easy access to the source materials underpinning IHIS integrated variables empowers users to make their own judgments about comparability issues, rather than relying exclusively on the judgment of IHIS research staff who harmonize the data and write documentation.

Other Key Features

Tools for Identifying Relevant Variables

As the number of IHIS variables has climbed into the thousands, researchers increasingly need tools to identify all variables relevant to a specific research topic. The IHIS Web site interface supports quick and economical variable browsing and helps researchers isolate relevant material by organizing variables into broad groups and narrower subgroups. For example, a researcher interested in studying asthma can identify many relevant variables by looking at variables available in the broad “Condition” group and in the narrower subgroups “Conditions—Asthma” and “Conditions—Asthma Symptoms.” The variable display shows at a glance the years when a variable is available, brings up the description and the codes and frequencies with a mouse click, and adds the variable to a data extract if a box next to the name is checked.

A search engine allows researchers to identify further material of interest. The aforementioned “condition” group and subgroups show 36 variables related to asthma, but searching variable names and labels for the term “asthma” yields 59 variables (e.g., covering asthma as a cause of activity limitation and the use of alternative medicine to treat asthma).

For researchers interested only in variables from a specific period, the IHIS Web site’s sample-filtering capacity will limit material. Users can indicate their years of interest (e.g., 1997–2009) using a “select samples” feature on the variable browsing and documentation pages. Once the user selects a subset of samples, the Web site only displays the variables (and the associated codes, frequencies, and linked survey

text) found in the specified years. Users can change this setting at any time and opt to display the full set of years or a different subset of years.

Simplified Sample Weights

The use of weights with NHIS data is essential to derive valid population estimates, due to the complex sample design and intentional oversampling of some population subgroups. Weighting is also needed to adjust for subsampling within the survey, such as questioning one sample adult and one sample child per family to collect much of the material for 1997 forward, and the fielding of some pre-1997 supplements for part of the year or to half of households.

Each of the original NHIS public-use data files comes with its own set of weights. By identifying common patterns across the weights and sampling schemes, IHIS staff member Dr. Brian Lee developed a simplified set of *names* for the weights while retaining the original weight *values*. Thus, rather than containing hundreds of separate year-, supplement-, and file-specific weights, IHIS contains a total of seven weights: a household weight; a person weight; three subsample weights; and two weights for use with variables on the mortality status of survey participants. Variable descriptions supply information about the appropriate weight to use in each year. The simplified system of naming weights loses no substantive information from the original public-use files, but it is easy to document and use.

Adjustments for Changing Survey Designs

NHIS public-use files contain two technical variables essential for calculating variance and standard errors: STRATA, which represents the impact of sample design stratification; and PSU, which represents the impact of sample design clustering. In their original form, both these technical variables change between sample design periods. In consultation with statisticians at NCHS, we modified these survey design variables in IHIS, so they can be used when examining data from one year or from many years. The approach used—the concatenated design period pooling approach—is described in an IHIS user note. Here it is sufficient to report that these technical variables in IHIS are valid for estimating variance by using data from the 1960s to the present.

Data Enhancements under Construction

Family-Interrelationship Pointers

We are creating family-interrelationship pointer variables that will allow IHIS users to link husbands with wives, unmarried partners to each other, and parents with children. For example, a spouse pointer will indicate the sequence number within the household of each individual's spouse (if present), and a mother pointer will indicate the sequence number of

each person's mother (if present). As in other MPC data projects, these variables will allow users to capitalize on the hierarchical structure of the data and to construct individual-level variables representing the characteristics of coresident persons. Users can then easily include in their analyses such variables as the occupation of an individual's spouse, whether an elderly coresident parent is disabled, the smoking habits of children's parents, and the alcohol consumption level of a person's spouse or unmarried partner.

Once the family-interrelationship pointer variables are in place in late 2011 or early 2012, users will be able to attach characteristics of other persons in the household (head, spouse/partner, mother, or father) to an individual's record through the IHIS data access system. Because the information on family relationships used to construct the pointer variables varies across years, IHIS will provide variables indicating the rules and information used to construct links, and researchers will be able to limit their analysis to links that are consistent across all the years they are studying.

Person-Level Variables from Pre-1997 Condition Data

In the pre-1997 files, information on whether a person ever had or recently had a particular health problem was stored in condition records. Each person in the sample had zero to more than 20 associated health condition records. After the NHIS survey redesign was put in place in 1997, information about health conditions was instead stored in person-level variables covering survey question responses. This change complicated analysis of specific health conditions before and after 1997.

To bridge this divide on condition-related information, we are creating new person-level condition variables from the pre-1997 episode-based records.⁴ Our strategy uses the “ever had/had in the past year” questions that are parallel across the survey design divide, to produce a limited number of largely comparable condition variables.

The NHIS questionnaire for 1963–77 asked whether any family member had any of a small number of specified conditions (e.g., asthma, diabetes) in the past 12 months. The results were stored in episode-level condition records, but another condition-record variable indicates whether that record was generated based on an affirmative response to the question, “Has anyone in the family had . . .?” For 1978–96, households were randomly assigned one of six condition checklists, with questions on whether any family member had specific conditions “ever” or “in the past 12 months.” The results were stored in condition records, but a person-level variable reports which condition-question list was associated with each individual and whether those condition questions were answered.

This information allows us to determine whether individuals were directly asked about specific conditions before 1997 and, if so, whether they responded affirmatively or negatively to questions about having those conditions. All that remains

is to implement supplemental programming that will convert the relevant subset of the condition-level data of 1963–96 into person-level condition variables roughly equivalent to the person-level condition variables for 1997 and later and to document the results.⁵ We anticipate releasing these new pre-1997 person-level condition variables in late 2011 or early 2012.

Opportunities for Historical Research

Using IHIS, researchers can now take a long-term perspective when analyzing how health status, access to medical care, insurance coverage, morbidity, and mortality differ according to social class, race, ethnicity, and living arrangements. The complexity of the original NHIS public-use files has, until now, largely restricted use of the survey material to public health researchers.⁶ Understanding trends and disparities in health status, behaviors, and care demands not only chronological depth but also multiple disciplinary perspectives—including the attention to social context and overarching questions that are the province of historians.

Selecting just one of a multitude of possible topics for historical analysis, consider the wealth of NHIS data on activity limitation and disability. This information is key to assessing whether gains in life expectancy come at the cost of additional years of disabling chronic conditions and activity limitation. Data on limitations on activity, used in conjunction with other variables, also illuminate the relationship between disability and various social and economic outcomes, such as labor force participation, poverty status, and receipt of disability benefits.

Although some excellent scholarship has used NHIS data to study disability impacts,⁷ much remains to be done, particularly in terms of the multidecade analyses that IHIS makes possible. Only by taking a long-term view can we answer questions like the following: Has legislation, such as the Americans with Disabilities Act of 1990, altered the relationship between disability and employment? Across multiple decades, to what extent have chronic illness and disability shaped the living arrangements of the elderly? How do the health problems of other family members constrain women's labor force participation—and was the effect different in the 1970s than it is today?

Good health, long life, freedom from disability and chronic illness, and access to preventive, curative, and palliative medical treatment are highly valued social goods. Inequality in these domains may be as pronounced—and arguably more central to quality of life—than inequality in more commonly measured domains such as income, wealth, and educational attainment. Widening or narrowing gaps in general health status, in the prevalence of specific chronic conditions, in longevity, and in health-care access are important dimensions of long-term trends in inequality on the basis of race, ethnicity, immigrant status, and social class. Conversely, sweeping social changes, such as the civil rights movement, transfor-

mations in gender roles, and economic restructuring, may influence health in important but overlooked ways and merit serious investigation.⁸ Powerful new insights on health and its social context can be gained by including an assessment of change over time—and IHIS provides historians with the tools for such research.

Conclusion

IHIS is specifically designed to overcome the barriers built into the original NHIS public-use files and to facilitate chronological analysis. Before we developed IHIS, multi-sample NHIS-based studies required a large initial investment to prepare data for use. Investigators using a series of survey years had to merge files and create special-purpose compatible extracts, sort through thousands of pages of documentation, and face high risks of introducing inadvertent errors, given the often subtle changes in variables over time. This ad hoc approach led to duplication of effort and an inefficient use of scarce resources for health-related research. Most researchers sidestepped these challenges by focusing on NHIS data from a single year. IHIS removes these barriers by offering integrated and well-documented microdata and a data access system that combines material from multiple years into a single file tailor-made for each research project.

Among the more than 1,000 registered IHIS data users, multiyear analysis of NHIS data is the norm rather than the exception. Over 70 percent of IHIS data extracts include multiple survey years, and over 40 percent include data from 10 or more years. Because IHIS makes working with multiple years of data easy, publications based on this source have frequently taken a long-term view of health disparities or of relationships between health indicators (Chiu and Johnson 2008; Yu et al. 2010; Macmillan et al. forthcoming). The ease in combining survey years through IHIS also makes it practical to pool data across NHIS survey years to study small population subgroups, such as immigrants and their children from specific geographic regions (Elo, Mehta, and Huang 2008; Blewett, Johnson, and Mach 2010).

Integrated, well-documented, and easily accessible public health microdata from IHIS are essential for evaluating historical trends and assessing policy outcomes. Five decades of integrated data—spanning transformational changes in demography, medicine, economic conditions, and public policy—compose an invaluable resource for analyzing the causes and consequences of change in our nation's health. Integrated NHIS microdata via IHIS will allow social science and health researchers to address additional fundamental questions about the impact of the extraordinary social and economic transformations that have reshaped the nation during the past half century.

NOTES

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1. For an informative summary of the origin and evolution of the NHIS, including major milestones in NHIS history, see Jane F. Gentleman 2010.

2. The NCHS uses the slogan "Monitoring the Nation's Health" as the title of a Web-based newsletter reporting upcoming statistical releases and findings from recent NCHS surveys, such as the NHIS. See <http://www.cdc.gov/nchs/pressroom/MNH.htm>.

3. To match the complex stratified sample design of the NHIS, the version of SDA set up on the IHIS Web site specifies strata and cluster variables and calculates standard errors using the Taylor series method. A short user text providing an overview of the NHIS sample design is available on the IHIS Web site: <http://www.ihis.us/ihis/>

4. The data conversion program that most MPC data harmonization projects use handles two levels of hierarchy: households and persons within households. MPC information technology staff developed for IHIS a data conversion program that can handle three levels of hierarchy: households, persons within households, and varying numbers and types of episode records (e.g., condition records) for persons. The IHIS program is thus structured to handle the episode-level condition records and use their information to create new pre-1997 person-level variables covering the presence or absence of specific conditions.

5. The variables based on condition records will encompass only those pre-1997 condition records that were generated in response to the specific condition questions appearing on the survey form (for 1963-77) or on condition checklists administered to households (for 1978-96).

6. For examples of the types of health topics that can be studied using NHIS and IHIS data, see Catherine Cubbin, Felicia B. LeClere, and Gordon S. Smith 2000; Jay S. Kaufman et al. 1998; Ellen Johnson Silver and Ruth E. K. Stein 2001; Frances Chevarley and Emily White 1997; Paul W. Newacheck et al. 2003; Laura E. Montgomery, John L. Kiely, and Gregory Pappas 1996; LeClere and Mohammed Siahpush 2002; Arlinda Rolett et al. 1997; Gopal K. Singh and Mohammed Siahpush 2002; Arlinda Rolett et al. 2001; John Gary Collins and LeClere 1996; and Richard G. Rogers, Charles B. Nam, and Robert A. Hummer 2002.

7. For examples of research on disability using NHIS data, see Scott Bilder and David Mechanic 2003; Eileen M. Crimmins, Sandra L. Reynolds, and Yasuhiko Saito 1999; Timothy A. Waidmann, John Bound, and Michael Schoenbaum 1995; Mark D. Hayward and Melonie Heron 1999; and Richard V. Burkhauser 2002.

8. George Kaplan, Nalini Ranjit, and Sara Burgard's 2008 work on "Did Civil Rights Improve the Health of African-American Women in the 1960s and 1970s?" is one such provocative effort to link broad social changes to health outcomes.

REFERENCES

- Americans with Disabilities Act, U.S. Code* 42 (1990), §126.
- Bilder, S., and D. Mechanic. 2003. Navigating the disability process: Persons with mental disorders applying for and receiving disability benefits. *Milbank Quarterly* 81:75-106.
- Blewett, L. A., P. J. Johnson, and A. L. Mach. 2010. Immigrant children's access to health care: Differences by global region of birth. *Journal of Health Care for the Poor and Underserved* 21(suppl.):13-31.
- Burkhauser, R. V., et al. 2002. Self-reported work-limitation data: What they can and cannot tell us. *Demography* 39:541-55.
- Centers for Disease Control and Prevention (CDC). 2011. National Health Interview Survey: About the National Health Interview Survey. New York: CDC. http://www.cdc.gov/nchs/nhis/about_nhis.htm
- Chevarley, F., and E. White. 1997. Recent trends in breast cancer mortality among white and black U.S. women. *American Journal of Public Health* 87:775-81.
- Chiu, C. F., and P. J. Johnson. 2008. Health disparities from America's health care providers: Evidence from the Integrated Health Interview Series, 1982-2004. *Journal of Occupational and Environmental Medicine* 50:696-704.
- Collins, J. G., and F. B. LeClere. 1996. Health and selected socioeconomic characteristics of the family: United States, 1988-90. *Vital & Health Statistics* 10:i-vi.
- Crimmins, E. M., S. L. Reynolds, and Y. Saito. 1999. Trends in health and ability to work among the older working-age population. *Journals of Gerontology Series B: Psychological Sciences & Social Sciences* 54:S31-S40.
- Cubbin, C., F. B. LeClere, and G. S. Smith. 2000. Socioeconomic status and injury mortality: Individual and neighbourhood determinants. *Journal of Epidemiology & Community Health* 54:517-24.
- Elo, I. T., N. Mehta, and C. Huang. 2008. Health of native-born and foreign-born black residents in the United States: Evidence from the 2000 Census of Population and the National Health Interview Survey. PARC Working Paper Series, WPS 08-04, Population Aging Research Center, University of Pennsylvania, Philadelphia, PA. http://repository.upenn.edu/cgi/viewcontent.cgi?article=1016&context=parc_working_papers
- Gentleman, J. F. 2010. The National Health Interview Survey: 50 years and going strong. *Chance* 21:40-45.
- Hayward, M. D., and M. Heron. 1999. Racial inequality in active life among adult. *Americans Demography* 36:77-91.
- Kallan, M. J. 1997. Effects of sociodemographic variables on adult mortality in the United States: Comparisons by sex, age, and cause of death. *Social Biology* 44:136-47. [Erratum appears in *Social Biology* 44:294.]
- Kaplan, G., N. Ranjit, and S. Burgard. 2008. Lifting gates, lengthening lives: Did civil rights policies improve the health of African-American women in the 1960s and 1970s? In *Making Americans healthier: Social and economic policy as health policy*, ed. R. F. Schoeni, 145-70. New York: Russell Sage Foundation.
- Kaufman, J. S., A. E. Long, Y. Liao, R. S. Cooper, and D. L. McGee. 1998. The relation between income and mortality in U.S. blacks and whites. *Epidemiology* 9:147-55.
- LeClere, F. B. and M. J. Soobader. 2000. The effect of income inequality on the health of selected U.S. demographic groups. *American Journal of Public Health* 90:1892-1897.
- Macmillan, R., et al. Forthcoming. Trends in the association of obesity and self-reported health in 30 years of the Integrated Health Interview Series. *Obesity*.
- Montgomery, L. E., J. L. Kiely, and G. Pappas. 1996. The effects of poverty, race, and family structure on U.S. children's health: Data from the NHIS, 1978 through 1980 and 1989 through 1991. *American Journal of Public Health* 86:1401-5.
- NCHS. See National Center for Health Statistics.
- National Center for Health Statistics. 1985. National Health Interview Survey design, 1973-84, and procedures, 1975-83. *Vital & Health Statistics* 1:1-135.
- _____. 1990. Questionnaires from the National Health Interview Survey, 1980-84. *Vital & Health Statistics* 1:1-212.
- _____. 1993. Questionnaires from the National Health Interview Survey, 1985-89. *Vital & Health Statistics* 1:1-421.
- _____. 1999. National Health Interview Survey: Research for the 1995-2004 redesign. *Vital & Health Statistics* 2:1-119.
- _____. 2000. Design and estimation for the National Health Interview Survey, 1995-2004. *Vital & Health Statistics* 2:1-31.
- Newacheck, P. W., R. E. K. Stein, L. Bauman, and Y.-Y. Hung. 2003. Disparities in the prevalence of disability between black and white children. *Archives of Pediatric & Adolescent Medicine* 157:244-48.
- Rogers, R. G., C. B. Nam, and R. A. Hummer. 1995. Demographic and socioeconomic links to cigarette smoking. *Social Biology* 42:1-21.
- Rolett, A., J. D. Parker, K. E. Heck, and D. E. Makuc. 2001. Parental employment, family structure, and child's health insurance. *Ambulatory Pediatrics* 1:306-13.
- Silver, E. J. and R. E. Stein. 2001. Access to care, unmet health needs, and poverty status among children with and without chronic conditions. *Ambulatory Pediatrics* 1:314-20.
- Singh, G. K. and M. Siahpush. 2002. Ethnic-immigrant differentials in health behaviors, morbidity, and cause-specific mortality in the United States: An analysis of two national data bases. *Human Biology* 74:83-109.
- Waidmann, T., J. Bound, and M. Schoenbaum. 1995. The illusion of failure: Trends in the self-reported health of the U.S. elderly. *Milbank Quarterly* 73:253-87.
- Yu, T. C., C.-F. Chou, P. J. Johnson, and A. Ward. 2010. Persistent disparities in pap test use: Assessments and predictions for Asian women in the U.S., 1982-2010. *Journal of Immigrant and Minority Health* 12:445-53.