National Health Statistics Reports

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 concordant if there was no report of Medicaid/CHIP coverage based on the interview response and no match to the CMS administrative records for Medicaid enrollment. Between NHANES and MAX, 88% of observations were concordant with respect to Medicaid or CHIP enrollment, yielding a Kappa of 0.71. Between NHIS and MAX, 89% of observations were concordant with respect to Medicaid or CHIP enrollment, yielding a Kappa of 0.73. These concordance rates provide support for the use of both administrative and NHANES and NHIS as a valuable tool for public health researchers and survey methodologists.

Keywords: National Health and Nutrition Examination Survey • National Health Interview Survey • linkage

Introduction

The Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS) has developed a record linkage program designed to maximize the scientific value of the Center's population-based surveys. Recently, the 1999–2008 Centers for Medicare & Medicaid Services (CMS) Medicaid Analytic eXtract (MAX) files were linked to several surveys conducted by NCHS, including the National Health and Nutrition Examination Survey (NHANES) and the National Health Interview Survey (NHIS).

NHANES is a nationally representative, cross-sectional survey that collects information on the health and nutritional status of adults and children in the United States. NHIS is a nationally representative, cross-sectional, population health survey of children and adults in the United States. Both surveys also collect information on current health insurance coverage of respondents. The linked data offer the opportunity to explore the accuracy of program participation reporting in a self-reported survey.

Previous studies have assessed validity of health insurance and utilization survey data compared with administrative records. Recent research (1) compared household reported Medicare use in the Medical Expenditure Panel Survey with Medicare enrollment and claims data. The authors found strong agreement for reporting of inpatient stays and number of nights in a hospital stay; however, the authors observed an undercount of approximately one-third for visits to emergency departments and a 19% undercount for office-based visits. Similarly, a multiphase research project referred to as the Medicaid Undercount project was undertaken to explain why discrepancies exist between survey estimates of enrollment in Medicaid and the number of enrollees reported in state and national administrative data (2). The project is called the SNACC project

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Health Statistics

CDC

(SNACC is an acronym for the agencies conducting the project: the University of Minnesota's State Health Access Data Assistance Center, NCHS, the Agency for Healthcare Research and Quality, the U.S. Department of Health and Human Services Assistant Secretary for Planning and Evaluation, CMS, and the U.S. Census Bureau). The main conclusion from the project is that the undercount is due to multiple factors, including survey measurement error and the reference periods being examined through each method.

This analysis focuses on the reporting of Medicaid in both NHIS and NHANES compared with the MAX files. While the SNACC project used NHIS 2001 and 2002, this project is unique because it is the first time a comparison to the MAX files has been done with NHIS data since the Medicaid question was redesigned in 2004 and the first time this has ever been done using NHANES data. This report will assess concordance between a participant's report in the survey of Medicaid or Children's Health Insurance Program (CHIP) enrollment at the time of their household interview in NHANES or NHIS compared with the presence of a Medicaid or CHIP enrollment record in the MAX files for children under age 18 years. Children under age 18 were chosen for this study because Medicaid and CHIP provide a major source of insurance for children (3). In addition, Medicaid and CHIP eligibility criteria change greatly at age 19. The prevalence and characteristics of the concordant and discordant pairs will be compared. These results will be discussed in the context of challenges encountered in linkage and accurately collecting self-report of Medicaid/CHIP enrollment in the surveys.

Methods

Background on NHANES

NHANES is a continuous survey (1999–present) that includes an interview in the household followed by an examination in a mobile examination center (MEC). NHANES is a nationally representative, cross-sectional sample of the U.S. civilian noninstitutionalized population that is selected using a complex, multistage probability design. Detailed descriptions of the NHANES sample design have been described elsewhere (4). Participants can be any age.

The NHANES household interview contains a section that includes sampled participant (SP) level interview data on health insurance coverage. One reference person in each family responds for each individual SP in the family. The reference person or responsible adult may or may not be an SP. This section of the family interview is asked for each individual SP.

The 1999–2004 NHANES data were the most recent NHANES data available that had been linked to the MAX files and are, therefore, used in this analysis. The sample size for the 1999–2004 NHANES was 31,126. The interview response rate was 82% (5). The 1999–2004 NHANES oversampled black, Mexican-American, low-income white persons, adolescents aged 12–19, and persons aged 60 and over.

Background on NHIS

NHIS is a nationally representative, cross-sectional household interview survey that serves as an important source of information on the health of the civilian population of the United States. It is a multistage sample survey with primary sampling units of counties or adjacent counties, secondary sampling units of clusters of houses, tertiary sampling units of households, and finally, persons within households. It has been conducted continuously since 1957. Detailed descriptions of the NHIS design have been described elsewhere (6,7).

The 2005 NHIS data were the most recent data available linked to the MAX files, and are, therefore, used in this analysis. The 2005 NHIS design has Core questions and Supplemental questions. The Core NHIS consists of three major components: Family, Sample Adult, and Sample Child. The Family component collects limited demographic information on all of the individuals living in the household. The Family component verifies and collects additional information on all members of each family in the house and collects data on topics such as health status and limitations, injuries, health care access and utilization, health insurance, and income and assets.

NHIS data are collected through a personal household interview conducted by interviewers employed by the U.S. Census Bureau. In 2005, the sample consisted of 38,509 households, which yielded interviews with 98,649 persons in 39,284 families. The 2005 NHIS oversampled black and Hispanic persons. The total household response rate for 2005 was approximately 86.5% (6).

Background on Medicaid/ CHIP

Detailed information on Medicaid and CHIP can be found on the CMS website (8). Medicaid is a needs-based entitlement program administered by CMS in collaboration with each state to provide health care coverage to some vulnerable populations in the United States, including low-income children, and the aged or disabled poor. The MAX files are research-oriented Medicaid claims files. Eligibility for Medicaid varies by state. Federal law during 1999–2005, when the surveys assessed here were conducted, required mandatory eligibility for pregnant women with a family income below 133% of the U.S. Department of Health and Human Services (HHS) poverty guidelines, children under age 6 years with family income below 133% of the HHS poverty guidelines, and children aged 6–18 years with family income below 100% of the HHS poverty guidelines. Additionally, as described below, states may set eligibility requirements that are less stringent, allowing eligibility for those in families of higher incomes.

CHIP is a state-based program offered to children and pregnant women whose incomes are too high to qualify for Medicaid eligibility. CHIP funds are capped with each state receiving a set allotment. The federal government matches state funding for CHIP. States

receive higher federal funding matching rates for CHIP than Medicaid. Of particular note for this project, the MAX files are incomplete on CHIP because states have the option of not reporting standalone CHIP program data to the Medicaid Statistical Information System from which the MAX files are created.

Data linkage background

NHANES and NHIS participants were eligible for linkage if they did not refuse to provide their social security number (SSN) or their health insurance claim number (HIC) at the time of the interview and if they provided sufficient personally identifiable information for linkage. SSNs for these participants were verified at the U.S. Social Security Administration and then sent to CMS where data were extracted based on exact matches for SSN, sex, and month and year of birth. Eligibility for linkage for an SP to obtain a CMS administrative record was independent of the questionnaire responses to the health insurance question and independent of a participant's Medicaid eligibility. Details of the linkage methodologies and the linked data files have been published previously (9).

Variables of interest

Health insurance was assessed in NHANES as follows. An initial set of questions in the health insurance section of the NHANES interview determined which SPs had health insurance coverage. For those who had health insurance coverage, respondents were then asked, "What kind of health insurance [do you/does SP] have?" The respondent was shown a hand card and asked to choose one from a list that included both Medicaid and CHIP. The state plan name for Medicaid was indicated on the hand card. For the 1999–2004 NHANES, Medicaid and CHIP were reported together. This was changed after 2004.

Health insurance coverage, and whether that coverage was Medicaid or not, was assessed in the 2005 NHIS, using multiple questions. Respondents were asked, "What kind of health

insurance or health care coverage [does the child] have?" Extensive response choices were provided that included both Medicaid and CHIP as separate response categories. Also, another question was asked that probed further about the possibility of Medicaid coverage. This question stated: "There is a program called Medicaid that pays for health care for persons in need. In this State it is also called [fill in State name]. Are you covered by Medicaid?" Based on affirmative responses to either of these questions, Medicaid and CHIP coverage were determined in the survey.

The main research goal was to assess the accuracy of the survey response to the questions on Medicaid/CHIP by comparing the response with the matched CMS records. 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. The presence of a CMS administrative record in the same month and year of the interview indicated active Medicaid enrollment status. Records were also considered concordant if there was no report of Medicaid/CHIP coverage based on the interview response and no match to the CMS administrative records for Medicaid/CHIP enrollment. Discordance was defined as a report of Medicaid/CHIP in the interview without CMS evidence of enrollment, or, conversely, no report of Medicaid/CHIP in the interview while actually being enrolled, according to the MAX files.

Analytic plan

The first step of the analysis was to examine the overall analytic sample breakdown and assess the overall matched results, using weighted percentages. All analyses included sample weights from the survey that accounted for the unequal probabilities of selection and nonresponse. The statistical weights were further adjusted for linkage "nonresponse;" that is, adjustment for respondents who were not eligible to be linked (10). Then, the percentage of concordance and

discordance between the response to the Medicaid/CHIP question in the survey and Medicaid or CHIP enrollment in the same month and year that the survey was conducted, according to the MAX files, was explored. The denominator for these analyses included all linkage eligible SPs. Kappa statistics, adjusting for survey weights, were used to assess the overall concordance and discordance.

Sociodemographic characteristics were also examined, including the ratio of family income to the poverty level, sex, age, and race or ethnicity, for the concordant and discordant pairs. The concordant groups were "Yes/Yes" (those who linked to the CMS MAX file and reported Medicaid/CHIP in the survey), and "No/No" (those who did not link to the CMS MAX file and did not report Medicaid/CHIP in the survey). The discordant groups were "No/Yes" (those who did not link to the CMS MAX file but had reported Medicaid/CHIP in the survey), and "Yes/No" (those who linked to the CMS MAX file but did not report Medicaid/CHIP in the survey). Comparisons between each concordant group and both discordant groups were made. A t test was used to compare means and proportions for the demographic characteristics between concordant and discordant groups, using a two-sided p value < 0.05. Variances were estimated using Taylor series linearization, accounting for the complex design. All statistical analyses were performed using SAS (version 9.3 SAS Institute Inc., Cary, N.C.) and SAS-callable SUDAAN (version 10.0, RTI International, Research Triangle Park, N.C.) software. All estimates were assessed for statistical reliability based on the relative standard error and degrees of freedom. Results are presented for both NHANES and NHIS.

Results

NHANES

From the 1999–2004 NHANES, 11,586 participants under age 18 years had responses to the questions about type of health insurance and about

Medicaid/CHIP (less than 2% were missing a response, n = 237). About 84% of these participants were eligible for linkage. Of the 9,750 participants who were eligible for linkage, 4,062 participants matched to the Medicaid file within the same month and year of the NHANES interview (Figure 1).

There are several different ways to assess the matched results. First, the overall concordant and discordant weighted percentages for all NHANES linkage-eligible participants (n = 9,750) were assessed. The overall concordance, using weighted percentages, was 88%. Twenty-three percent said ''Yes'' in NHANES and linked in the same month and year of the NHANES interview to the CMS MAX file. Sixty-five percent said ''No'' in NHANES and did not link to the CMS MAX file in the same

month and year of the NHANES interview (Table 1). The Kappa statistic was 0.71.

Of the respondents who responded ''Yes'' to the question in NHANES about Medicaid/CHIP health insurance coverage, using weighted percentages, 15% were not found in the CMS MAX file (85% agreement among those who responded ''Yes'' in the NHANES interview). Of the respondents who responded ''No'' to the question in NHANES, using weighted percentages, 11% linked in the same month and year of the NHANES interview (making the agreement level of those who said ''No'' in NHANES 89%).

In NHANES, both discordant groups had higher mean income-to-poverty ratio than the ''Yes/Yes'' group (Table 2). There were no statistically

significant differences between the ''Yes/Yes'' group and either of the discordant groups with regard to the percentage of children in the group who were male and the percentage of children who were under age 6 years. The distributions of race and ethnicity in the ''Yes/Yes'' group were similar to those in both discordant groups, with the exception of the percentage of Mexican-American children. The percentage of Mexican-American children was lower in the ''Yes/Yes'' group than in the group of children who did not link to the MAX file but reported Medicaid/CHIP insurance in NHANES.

Both discordant groups had a lower mean income-to-poverty ratio than the ''No/No'' group. The percentage of children under age 6 years was higher in

[1]Indicates that participants did not refuse to provide a social security number (SSN) or health insurance claim (HIC) number at the NHANES interview; participants provided sufficient personally identifiable information for linkage and their SSN was verified at the Social Security Administration.
NOTES: All percentages in figure are unweighted. NHANES is National Health and Nutrition Examination Survey; CMS is Centers for Medicare & Medicaid Services; MAX is Medicaid Analytic eXtract; CHIP is Children's Health Insurance Program.
SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey/Centers for Medicare & Medicaid Services MAX linked data files, 1999–2004.
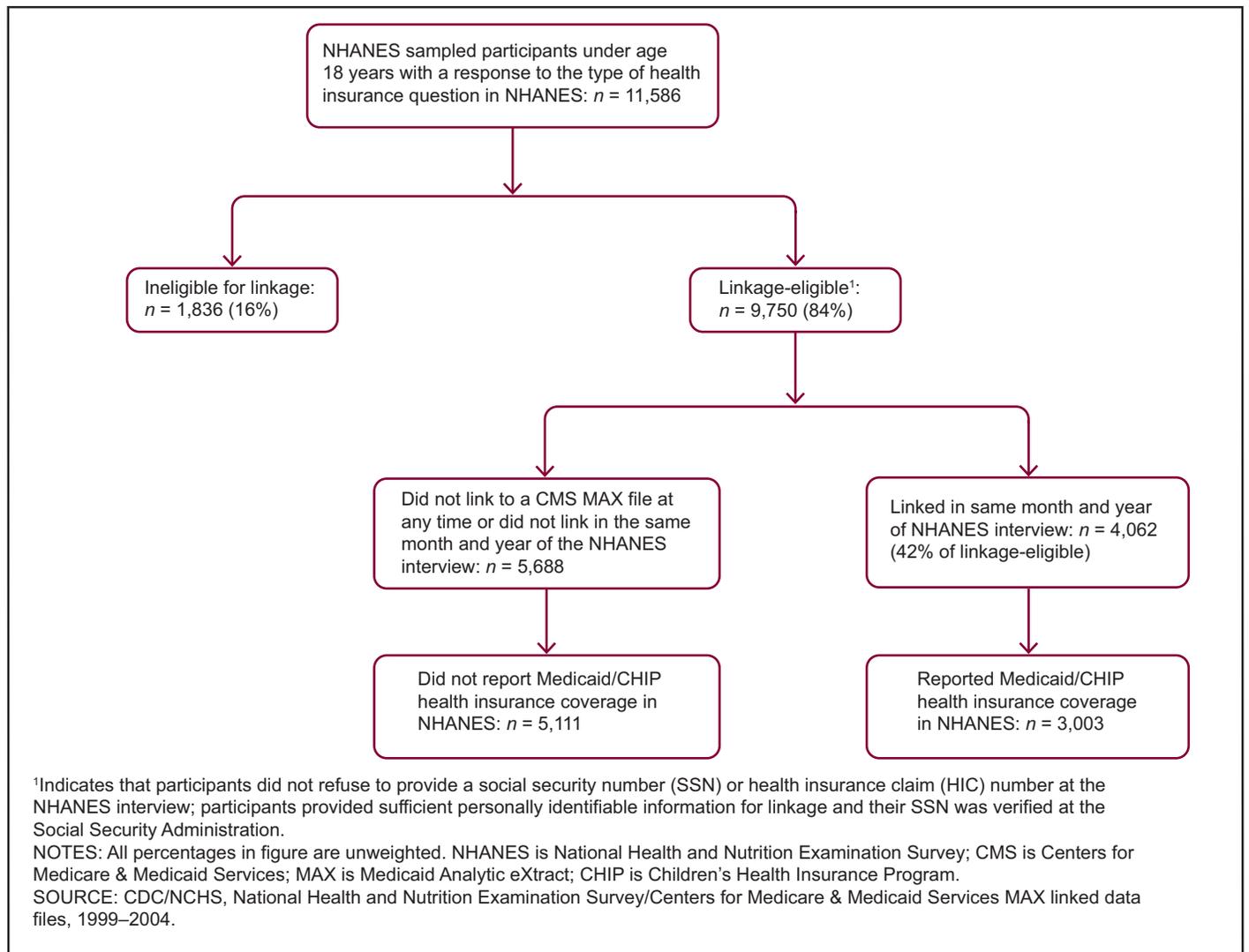
Figure 1. Analytic sample for 1999–2004 NHANES sampled participants under age 18 years linked to CMS MAX file

both discordant groups than in the "No/No" group. The percentage of male children was lower in the "No/No" group than in the discordant group of those who linked to the MAX file but reported that they did not have Medicaid/CHIP in NHANES. However, the percentage of male children in the "No/No" group was similar to the percentage of male children in the discordant group of those who did not link to the MAX file but did report Medicaid/CHIP in NHANES. The percentage of non-Hispanic white children in the "No/No" group was higher than the non-Hispanic white children in both discordant groups, and the percentage of non-Hispanic black children in the "No/No" group was lower than the percentage of non-

Hispanic black children in both discordant groups. The percentage of Mexican-American children in the "No/No" group was lower than the percentage in the discordant group who did not link to the MAX files but reported Medicaid/CHIP in NHANES. The percentage of Mexican-American children in the "No/No" group was similar to the percentage in the discordant group of those who did link to the MAX files but reported that they did not have Medicaid/CHIP in NHANES.

NHIS

From the 2005 NHIS, 26,646 participants under age 18 years had a response to the type of health insurance question in NHIS (less than 1% were

missing a response, $n = 168$). About 49% of these participants were eligible for linkage. Of the 13,034 eligible for linkage, 4,197 participants matched to the Medicaid file within the same month and year of the NHIS interview (Figure 2).

The overall concordant weighted percentage for all NHIS linkage-eligible participants ($n = 13,034$) was 89%. Twenty-three percent said "Yes" in NHIS and linked within the same month and year of the NHIS interview to the CMS MAX file, and 66% said "No" in NHIS and did not link to the CMS MAX file in the same month and year of the NHIS interview or at any time (Table 3). The Kappa statistic was 0.73.

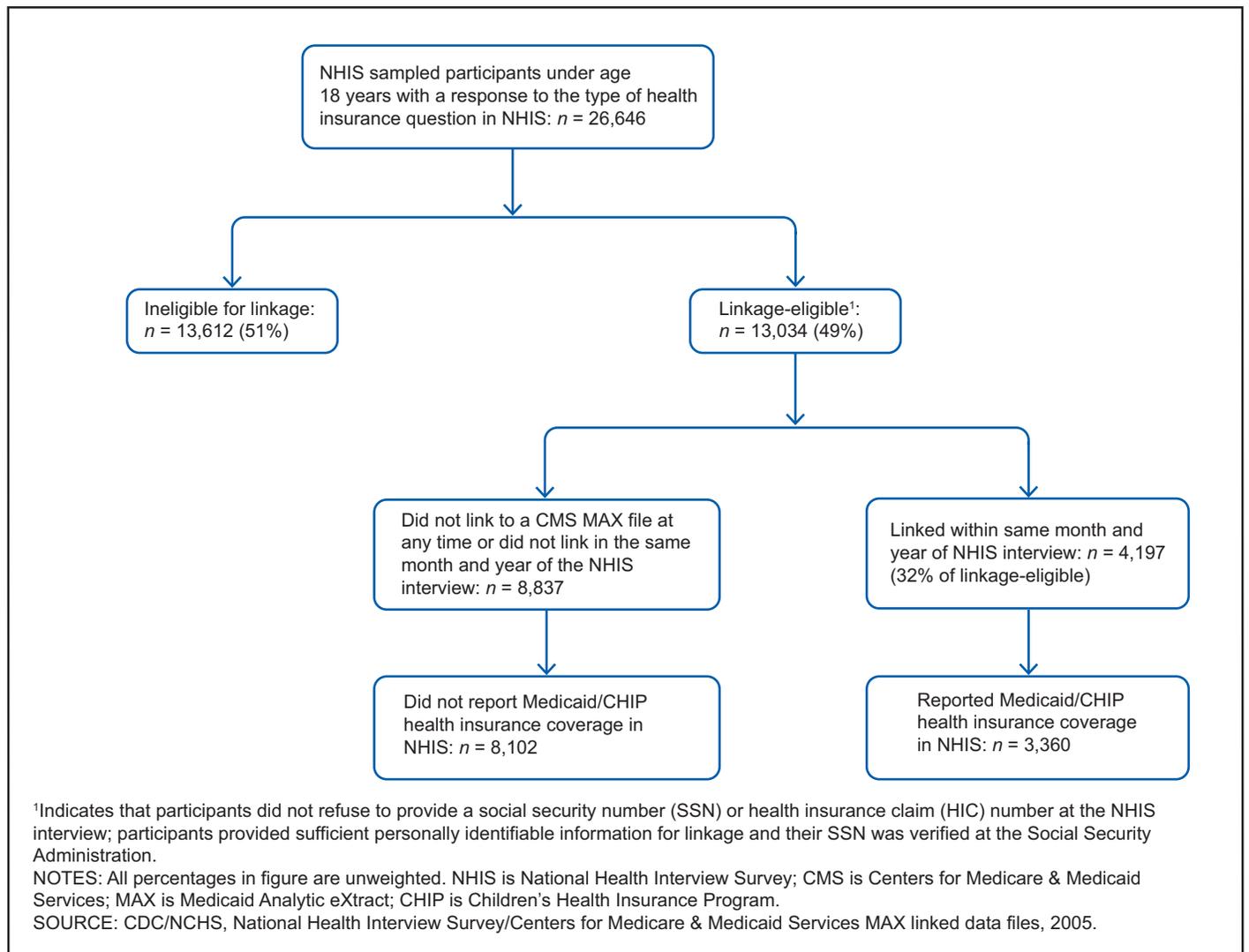As in NHANES, both discordant groups in NHIS had higher mean

¹Indicates that participants did not refuse to provide a social security number (SSN) or health insurance claim (HIC) number at the NHIS interview; participants provided sufficient personally identifiable information for linkage and their SSN was verified at the Social Security Administration.
NOTES: All percentages in figure are unweighted. NHIS is National Health Interview Survey; CMS is Centers for Medicare & Medicaid Services; MAX is Medicaid Analytic eXtract; CHIP is Children's Health Insurance Program.
SOURCE: CDC/NCHS, National Health Interview Survey/Centers for Medicare & Medicaid Services MAX linked data files, 2005.

Figure 2. Analytic sample for 2005 NHIS sampled participants under age 18 years linked to CMS MAX file

income-to-poverty ratios than the "Yes/Yes" group (Table 4). No statistically significant differences were found in NHIS between the "Yes/Yes" group and either of the discordant groups with regard to the percentage of male children in the group. The percentage of children under age 6 years was higher in the "Yes/Yes" group than in both discordant groups. The percentage of non-Hispanic white children and the percentage of non-Hispanic other children in the "Yes/Yes" group were similar to both discordant groups. However, the percentage of Hispanic children in the "Yes/Yes" group was lower than that in the discordant group of those who did not link to the MAX file but reported Medicaid/CHIP in NHIS. The percentage of Hispanic children in the "Yes/Yes" group was higher than in the discordant group of those who linked to the MAX file but did not report Medicaid/CHIP in NHIS. Also, the percentage of non-Hispanic black children who were in the "Yes/Yes" group was higher than the percentage in the discordant group who did not link to the MAX file but reported Medicaid/CHIP in NHIS. The percentage of non-Hispanic black children in the "Yes/Yes" group was similar to the percentage in the discordant group who did link to the MAX file but did not report Medicaid/CHIP in NHIS.

Both discordant groups in NHIS had a lower mean income-to-poverty ratio than the "No/No" group. There were no statistically significant differences in NHIS between the "No/No" group and either of the discordant groups with regard to the percentage of male children in the group. The percentage of children under age 6 years in the "No/No" group was lower than the percentage in the discordant group who linked to the MAX files but did not report Medicaid/CHIP in NHIS. However, the percentage of children under age 6 years in the "No/No" group was similar to the percentage in the discordant group who did not link to the MAX files but did report Medicaid/CHIP in NHIS. The

percentage of non-Hispanic white children in the "No/No" group was greater than the percentage in either discordant group, while the percentages of both non-Hispanic black and Hispanic children in the "No/No" group were lower than the percentages in both discordant groups. The percentage of non-Hispanic other children did not differ between the "No/No" group and either discordant group.

Conclusions

Agreement between reporting of children's Medicaid/CHIP enrollment in these two national health surveys compared with actual CMS enrollment data is "substantial" based on the commonly used Kappa statistic criteria (11). Correspondingly, there does not appear to be substantial misclassification among either the program participants or the nonparticipants; however, some discordance exists.

It is possible that some of the discordant pairs who responded "Yes" to being enrolled in Medicaid/CHIP in NHANES and NHIS but did not link to the CMS MAX file may be participants with CHIP coverage; the MAX files are incomplete on CHIP data (9). This may result in a reduction in concordance. The mean income-to-poverty ratio of 1.2 for respondents with this discordance in NHANES and of 1.6 for respondents with this discordance in NHIS suggests that on average these respondents may be eligible in most states for CHIP, as income eligibility is slightly higher for CHIP than Medicaid. Indeed, only four states limit eligibility for children in families at less than 200% of the federal poverty level (Alaska, Idaho, North Dakota, and Oklahoma). Further, in both NHANES and NHIS, the discordant group that responded "Yes" to being enrolled in Medicaid/CHIP in the surveys but did not link to the MAX files (the "No/Yes" group) were more similar based on the income-to-poverty ratio and race and ethnicity distributions to the "Yes/Yes" group than the "No/No" group.

The other form of discordance was among respondents who did not report enrollment in Medicaid/CHIP in the survey, but were found to be enrolled, according to the MAX files (the "Yes/No" group). Of those who reported "No" in NHANES and linked to the MAX files, 49% (weighted) reported being covered by some other private insurance in the NHANES questionnaire and 52% (weighted) reported they were covered by some other government insurance in the NHANES questionnaire. Similarly in NHIS, of those who reported "No" in NHIS and linked to the MAX files, 44% (weighted) reported being covered by some other private insurance in the NHIS questionnaire and 33% (weighted) reported they were covered by some other government insurance in the NHIS questionnaire. While the specific cause of this discordance is unknown, the demographic characteristics of this discordant group ("Yes/No") in NHANES and NHIS is more similar to those who reported receiving Medicaid/CHIP health insurance coverage and were linked (the "Yes/Yes" group) than those who did not report receiving Medicaid/CHIP and did not link (the "No/No" group) (Tables 2 and 4).

With respect to income, sex, and being non-Hispanic white, both NHANES and NHIS show similar results based on concordant and discordant pairs. The low linkage eligibility rate for NHIS could bias the results; however, the similarities in results between the two surveys suggests otherwise. Lastly, findings from both surveys are similar to those results reported for the Medicaid Undercount, SNACC project (2). One possible limitation in this analysis is the restriction of the linkage to be within the same month as the survey interview. SPs with a change in coverage may be reporting their past coverage, especially if the interview occurred at the beginning of the month.

In conclusion, 85% of those who reported having Medicaid/CHIP health insurance coverage in NHANES and 83% of those who reported having Medicaid/CHIP health insurance coverage in NHIS linked to the MAX files within the same month and year of the survey interview. There was some misreporting in both surveys; however, some differences between the survey response and the administrative record may be due to the lack of reporting of CHIP data in the CMS MAX files. Still, these concordance rates provide support for the use of both administrative and NHANES and NHIS data in research to evaluate data quality and Medicaid utilization. The linkages of NHANES and NHIS to the Medicaid data offer valuable tools for public health researchers and survey methodologists.

References

1. Zuvekas SH, Olin GL. Validating household reports of health care use in the Medical Expenditure Panel Survey. Health Serv Res 44(5 Pt 1):1679–700. 2009.

2. Research Project to Understand the Medicaid Undercount. Phase II Research Results: Examining discrepancies between the National Medicaid Statistical Information System (MSIS) and the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC). 2008. Available from: http://www.census.gov/did/www/snacc/docs/SNACC_Phase_II_Full_Report.pdf [Accessed January 3, 2013].

3. Bloom B, Cohen RA, Freeman G. Summary health statistics for U.S. children: National Health Interview Survey, 2010. National Center for Health Statistics. Vital Health Stat 10(250). 2011.

4. Curtin LR, Mohadjer L, Dohrmann S, et al. The National Health and Nutrition Examination Survey: Sample design, 1999–2006. National Center for Health Statistics. Vital Health Stat 2 (155). 2012.

5. National Health and Nutrition Examination Survey. NHANES response rates and population totals (1999–2004). Available from: http://www.cdc.gov/nchs/nhanes/response_rates_cps.htm [Accessed December 28, 2012].

6. 2005 National Health Interview Survey (NHIS) public use data release: NHIS survey description. 2006. Available from: http://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NHIS/2005/srvydesc.pdf [Accessed November 16, 2012].

7. 2006 National Health Interview Survey (NHIS) public use data release: NHIS survey description. 2007. Available from: ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NHIS/2006/srvydesc.pdf [Accessed November 16, 2012].

8. Medicaid.gov. Keeping America Healthy. 2013. Available from: http://www.medicaid.gov/ [Accessed April 16, 2013].

9. Simon AE, Driscoll AK, Golden C, et al. Documentation and analytic guidelines for NCHS surveys linked to Medicaid Analytic eXtract (MAX) files. Hyattsville, MD: National Center for Health Statistics. 2012. Available from: http://www.cdc.gov/nchs/data/datalinkage/documentation_and_analytic_guidelines_nchs_survey_max_linked_data.pdf [Accessed January 3, 2013].

10. National Center for Health Statistics. Use of survey weights for linked data files—Preliminary guidance. 2011. Available from: http://www.cdc.gov/nchs/data/datalinkage/use_of_survey_weights_for_linked_data_files.pdf [Accessed January 4, 2013].

11. Landis JR, Koch GG. The measurement of observer agreement for categorical data. Biometrics 33(1):159–74. 1977.

Table 1. Weighted percentages and standard errors for linkage-eligible NHANES sampled participants aged 0–17 years, comparing response to NHANES question about Medicaid/CHIP to linkage status to the CMS MAX file

Characteristic	Linked to the CMS MAX in same month of NHANES interview	Did not link to the CMS MAX file in same month of NHANES interview
"Yes" to question in NHANES about Medicaid/CHIP health insurance coverage	Percent (SE)	
Row	85.2 (1.3)	14.8 (1.3)
Column	74.8 (2.1)	5.8 (0.5)
Cell	23.2 (1.2)	4.0 (0.4)
"No" to question in NHANES about Medicaid/CHIP health insurance coverage		
Row	10.7 (1.1)	89.3 (1.1)
Column	25.2 (2.1)	94.2 (0.5)
Cell	7.8 (0.8)	65.0 (1.5)

NOTES: For participants aged 0–15 years, the responses were answered by a knowledgeable adult proxy. NHANES is National Health and Nutrition Examination Survey; CHIP is Children's Health Insurance Program; CMS is Centers for Medicare & Medicaid Services; MAX is Medicaid Analytic eXtract; SE is standard error.

Table 2. Estimates and standard errors of demographic characteristics from the 1999–2004 NHANES participants aged 0–17 years who were linkage-eligible to the CMS MAX database, based on concordance and discordance

Characteristic	Concordant "Yes" MAX file and "Yes" NHANES n = 3,003	Discordant "No" MAX file and "Yes" NHANES n = 577	Discordant "Yes" MAX file and "No" NHANES n = 1,059	Concordant "No" MAX file and "No" NHANES n = 5,111
	Estimate (SE)			
Mean income-to-poverty ratio	1.0 (0.03)	[1,2]1.2 (0.06)	[1,2]1.2 (0.05)	3.2 (0.05)
	Percent (SE)			
Male	51.6 (1.0)	52.1 (3.4)	[2]55.8 (2.0)	50.4 (0.8)
Under age 6 years	42.3 (1.6)	[2]39.2 (3.2)	[2]36.5 (2.5)	28.9 (1.1)
Race and ethnicity				
Non-Hispanic white	58.5 (3.3)	[2]56.6 (4.7)	[2]56.2 (4.5)	83.3 (1.2)
Non-Hispanic black	26.4 (2.5)	[2]22.2 (3.7)	[2]32.5 (4.5)	8.0 (0.9)
Mexican American	15.1 (2.3)	[1,2]21.2 (3.8)	11.3 (2.3)	8.7 (1.0)

[1]p value < 0.05 compared with concordant "Yes/Yes" group.
[2]p value < 0.05 compared with concordant "No/No" group.

NOTES: For participants aged 0–15 years, the responses were answered by a knowledgeable adult proxy. NHANES is National Health and Nutrition Examination Survey; CMS is Centers for Medicare & Medicaid Services; MAX is Medicaid Analytic eXtract; SE is standard error.

Table 3. Weighted percentages and standard errors for linkage-eligible NHIS sampled participants aged 0–17 years, comparing response to NHIS question about Medicaid/CHIP to linkage status to the CMS MAX file

Characteristic	Linked to the CMS MAX in same month of NHIS interview	Did not link to the CMS MAX file in same month of NHIS interview
	Percent (SE)	
"Yes" to question in NHIS about Medicaid/CHIP health insurance coverage		
Row	82.7 (0.8)	17.3 (0.8)
Column	79.2 (1.1)	6.9 (0.4)
Cell	23.2 (0.6)	4.8 (0.3)
"No" to question in NHIS about Medicaid/CHIP health insurance coverage		
Row	8.5 (0.5)	91.5 (0.5)
Column	20.8 (1.1)	93.1 (0.4)
Cell	6.1 (0.3)	65.8 (0.7)

NOTES: For NHIS participants aged 0–17 years, the responses were answered by a knowledgeable adult proxy. NHIS is National Health Interview Survey; CHIP is Children's Health Insurance Program; CMS is Centers for Medicare & Medicaid Services; MAX is Medicaid Analytic eXtract; SE is standard error.

Table 4. Estimates and standard errors of demographic characteristics from the 2005 NHIS sampled participants aged 0–17 years who were linkage-eligible to the CMS MAX database, based on concordance and discordance

Characteristic	Concordant "Yes" MAX file and "Yes" NHIS n = 3,360	Discordant "No" MAX file and "Yes" NHIS n = 735	Discordant "Yes" MAX file and "No" NHIS n = 837	Concordant "No" MAX file and "No" NHIS n = 8,102
	Estimate (SE)			
Mean income-to-poverty ratio	1.2 (0.03)	[1,2]1.6 (0.05)	[1,2]1.7 (0.08)	4.2 (0.07)
	Percent (SE)			
Male	50.4 (0.9)	47.6 (2.1)	49.8 (2.0)	49.9 (0.6)
Under age 6 years	42.8 (1.1)	[1]31.9 (2.0)	[1,2]37.1 (2.1)	30.1 (0.6)
Race and ethnicity				
Non-Hispanic white.	36.7 (1.5)	[2]34.2 (2.6)	[2]42.0 (2.9)	69.4 (0.8)
Non-Hispanic black.	26.3 (1.3)	[1,2]18.6 (2.0)	[2]28.9 (2.8)	8.2 (0.4)
Hispanic	31.2 (1.3)	[1,2]42.1 (2.8)	[1,2]22.4 (1.7)	14.9 (0.6)
Non-Hispanic other.	5.8 (0.8)	5.1 (1.2)	6.7 (1.4)	7.5 (0.5)

[1]p value < 0.05 compared with concordant "Yes/Yes" group.
[2]p value < 0.05 compared with concordant "No/No" group.

NOTES: For NHIS participants aged 0–17 years, the responses were answered by a knowledgeable adult proxy. NHIS is National Health Interview Survey; CMS is Centers for Medicare & Medicaid Services; MAX is Medicaid Analytic eXtract; SE is standard error.

National Health Statistics Reports ■ Number 72 ■ January 6, 2014

Suggested citation

Mirel LB, Simon AE, Golden C, et al. Concordance between survey report of Medicaid enrollment and linked Medicaid administrative records in two national studies. National health statistics reports; no 72. Hyattsville, MD: National Center for Health Statistics. 2014.