Improving the Validity of the Medicaid/CHIP Estimates on the American Community Survey: The Role of Logical Coverage Edits

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I. Introduction

A number of important policy questions depend on obtaining valid national, state, and local estimates of the insurance distribution of adults and children. Sound estimates of the number of uninsured and their characteristics are critical to developing valid projections of the costs and coverage impacts associated with implementation of the Affordable Care Act (ACA) and related health reforms.[1] In addition, estimates of the extent to which Medicaid and the Children's Health Insurance Program (CHIP) are reaching their target populations provide useful information to guide policy actions at both the state and federal levels of government.[2] Having valid coverage estimates at the state level is also critical to obtaining sound projections of federal outlays given variation in federal matching rates across states. Moreover, understanding variation in coverage rates and the distribution of the uninsured across local areas provides federal, state, and local policymakers with vital information for projecting the increased demand for health care resulting from the ACA and for the need for safety net providers.

The American Community Survey (ACS) is uniquely suited to tracking changes in insurance coverage at the state and local level because it has a very large sample (1.9 million non-elderly adults and 700,000 children in the public use file for 2009), including sample cases in every US county, which enables analysts to derive direct estimates of small areas and small sub-populations that are not possible to obtain from other surveys. The ACS is the only ongoing survey that provides local estimates in all states. Moreover, other national surveys such as the Current Population Survey Annual Social and Economic Supplement (CPS-ASEC) and state surveys that are designed to provide reliable state coverage estimates do not have comparable capacity to the ACS to drill down to sub-state areas and subgroups, such as Native Americans. And while the National Health Interview Survey (NHIS) is considered the most valid source of insurance coverage estimates nationally,[3, 4] it does not have a large enough sample or a state-representative sample frame to allow users to develop robust annual state-level estimates.

Overall, the ACS appears to produce reasonable estimates of insurance coverage compared to other surveys, except that estimates of private non-group (PNG) coverage, a relatively rare source of coverage, are high, and estimates of the number of Medicaid/CHIP-enrolled children are low, relative to other surveys.[5, 6] Also, like other surveys, the ACS estimates fall below comparable estimates derived from administrative counts of Medicaid/CHIP-enrolled children.[7] In 2008, the direct estimate of the number of children with Medicaid/CHIP was 22.7 million, compared to the NHIS estimate of 24.1 million.[8, 9, 10] The administrative count for 2008 enrollment in Medicaid and CHIP was 27.9 million.[11, 12]

Record-check studies with the ACS, the NHIS, the CPS-ASEC, the Medical Expenditure Panel Survey (MEPS), and others show that there is a Medicaid undercount – such that estimates of public coverage are lower than administrative counts of enrollees – because respondents often do not report Medicaid for known enrollees.[13, 14] This finding is consistent across variations in

questionnaire design, survey frame, and definition of Medicaid coverage.[15] Compared to corresponding counts of administrative records, estimates were 72.5 percent in the CPS-ASEC in 2001, 78.3 percent in the NHIS in 2001, and 82 percent in the MEPS in 2003. [16, 17, 18, 19] Little information is available on the level of reporting accuracy in the ACS because the coverage question is new and because the only record-check analysis available to date was performed on a small sample of preliminary data for content testing.[20] Moreover, a priori, given differences in survey features, such as the single question about Medicaid and other means-tested coverage, it is not clear that the reasons for under-reporting and the patterns of under-reporting Medicaid/CHIP on the ACS will be similar to what has been observed with respect to Medicaid coverage in other surveys. Explanations for the under-reporting of Medicaid based on other surveys include respondents' confusion about what type of health insurance they/others have, forgetting about coverage they/others have, knowing Medicaid/CHIP by another name, and reluctance to indicate that they or family members receive public benefits.[21, 22, 23]

Respondents are more likely to report another type of coverage in place of Medicaid than to report no coverage whatsoever.[24] The extent of misreporting varies across characteristics of the population such as race, age, family income, and receipt of other forms of public assistance.[25, 26, 27] In addition, there is evidence that the degree of misreporting varies by state and by type of Medicaid plan (capitated managed care vs. fee-for-service), suggesting that programmatic differences may affect respondents' understanding of their coverage.[28, 29] Studies have also examined the risk factors for misreporting Medicaid/CHIP; for example, controlling for other factors, the following were risk factors for misreported Medicaid in the MEPS: being relatively high income, black, dually covered by private insurance, enrolled for a relatively short time, or not having received a Medicaid service in more than a year. Variations in reporting accuracy can lead to biased estimates, such that not only is the estimate of Medicaid/CHIP coverage low but the characteristics of the estimated population are not representative of the truly enrolled population.

Given the shortfall in Medicaid/CHIP coverage for children on the ACS and the bias that under-reporting of enrollment introduces, it is important to explore methods for improving the validity of the Medicaid/CHIP estimates on the ACS. This paper builds on a prior paper[30] that included recommendations on methodological improvements to the ACS. The Census Bureau's edits for the ACS improved the face validity of Medicaid/CHIP estimates by bringing them closer to the NHIS and making the coverage data reported for each sample person more consistent with other information reported about the person.[31] However, even with these edits, the ACS Medicaid/CHIP estimates for children still fall short of those found on the NHIS, as described above. In order to improve the accuracy of the ACS coverage estimates, we developed an additional set of logical coverage edits that take advantage of other coverage-related information collected in the ACS and the results of our eligibility simulation model for Medicaid and CHIP.[32] These new logical coverage edits, which reclassify insurance status for those cases where other data collected about a person imply their coverage status has been misreported, build on the

approach to editing currently being used by the Census Bureau.[33] Editing to make survey responses more consistent is common and is used in some form or another in the CPS-ASEC and NHIS.[34, 35] For example, Medicaid edits in the CPS-ASEC reduced the number of uninsured by 2.3 million people in 2008. In the future, it might be possible to produce coefficients that are designed to partially correct for reporting errors that are not addressed through coverage edits, but that will require analysis of linked administrative enrollment and ACS data.[36, 37]

While we developed additional coverage edits for both children and non-elderly adults, this paper primarily focuses on the edits that were developed for children's Medicaid/CHIP coverage for two reasons. First, the coverage edits have a greater impact on the coverage estimates for children than for adults. Second, more information is available on the ACS to identify misreported coverage for children than for adults.

Following this introductory section, we provide background information on the ACS, including what is known about its limitations with respect to the measurement of Medicaid/CHIP coverage. We also provide background on the NHIS and the administrative counts, both of which we use to inform benchmarking of the ACS estimates. Subsequent sections detail our coverage edits, which we refer to as HPC (for Urban Institute's Health Policy Center) edits, and show how our estimates compare to the publicly released estimates from the Census Bureau, estimates from the NHIS, and Medicaid/CHIP administrative totals nationally and by state. Further, we examine the variation in the impact of the edits across states and the characteristics of the Medicaid/CHIP population with and without the HPC edits. The final section discusses the implications of using these adjusted estimates to track changes in Medicaid/CHIP coverage and provides a road map for further analysis.

II. Data

American Community Survey. The ACS is an annual survey that is fielded continuously over a 12-month period by the U.S. Census Bureau.[38] It was designed to provide estimates on the information formerly contained on the decennial census long form. The ACS uses an area frame that includes households with and without telephones (landline or cellular). It is a mixed-mode survey that starts with a mail-back questionnaire (56.6 percent of the sample was completed by mail in 2008); non-responders are followed-up by telephone, and a sub-sample of remaining non-responders are interviewed in person.[39]

In 2008, a question was added to the ACS to ask the respondent about coverage of each individual in the household by any of the following types of health insurance or health coverage plans at the time of the survey:

a. Insurance through a current or former employer or union (of this person or another family member)
b. Insurance purchased directly from an insurance company (by this person or another family member)

c. Medicare, for people 65 and older, or people with certain disabilities
d. Medicaid, Medical Assistance, or any kind of government-assistance plan for those with low incomes or a disability
e. TRICARE or other military health care
f. VA [Department of Veterans Affairs] (including those who have ever used or enrolled for VA health care)
g. Indian Health Service
h. Any other type of health insurance or health coverage plan – specify

Multiple types of coverage can be identified for each person, and people not identified as having coverage under categories *a* through *f* (or recoded to another category from the write-in option, category *h*) are considered uninsured.[40, 41] Since the data are collected continuously over a 12-month period, the coverage estimates represent an average day in the calendar year. Item nonresponse for this question was not high: just 3.8 percent of people had no responses for all of the coverage categories in 2008, and an additional 23.2 percent responded to one or more but not all of the categories.[42] Missing values were imputed using hot deck imputation methods, and the Census Bureau's logical coverage edits were applied to attempt to correct for Medicaid/CHIP, Medicare, and TRICARE/military coverage under-reporting. For Medicaid/CHIP, the focus of this paper, the Census Bureau edit rules[43] are summarized as follows ("parent" refers to a person with a child under age 18):

Persons who did not claim to be covered by Medicaid/CHIP were assigned it if they were:

1. Less than 19 years old and the unmarried child of a parent with public assistance and/or Medicaid;
2. A citizen parent with public assistance;
3. A citizen parent married to a citizen with public assistance and/or Medicaid;
4. A foster child; or
5. A Supplemental Security Income (SSI) enrollee, if they satisfied one of the following three additional conditions:
   - Does not have children,
   - Has children but is disabled and/or not working, or
   - Group quarters resident.

The ACS has a number of important strengths for studying Medicaid/CHIP relative to other surveys. The most important is its very large sample (containing about 3 million individuals in each year's public use file) and its sample frame (which includes sample in every county and census tract in the country), allowing for a variety of estimates that can be used to study changes in Medicaid/CHIP including:

- Annual coverage estimates for areas with population of 65,000 or more (including each state, the District of Columbia, most Metropolitan Statistical Areas (MSAs), and a quarter of counties or county equivalents);
- Starting in 2011, 3-year coverage estimates for areas with populations of 20,000 or more;
- Starting in 2013, 5-year coverage estimates for all statistical, legal and administrative entities (down to the level of census tracts and block groups).[44]

Another strength of the ACS is that the health insurance coverage information refers to the time of the survey, which is relevant for estimating program costs and less likely to be biased than estimates that pertain to coverage status in a prior period.[45] In addition, the very high response rate achieved on the ACS (the published estimate is 98 percent nationally, ranging from 91.4 percent in Washington, DC to 99.4 percent in Wisconsin in 2008[46]) combined with the inclusion of telephone (cellular and landline) and non-telephone households in the sample should improve the representativeness of the ACS for studying the low-income populations who are eligible for Medicaid and CHIP coverage.

Although the ACS is uniquely suited to track changes in coverage, particularly at the state and local level, it has a number of weaknesses for studying Medicaid/CHIP coverage. The over-arching weakness is the under-reporting of Medicaid/CHIP described above. One apparent reason for the under-reporting of Medicaid/CHIP coverage on the ACS is the wording of the question about PNG coverage, which asks about "insurance purchased directly from an insurance company" without specifying that it must not be connected to either employer or public subsidies. This may cause confusion for participants in Medicaid/CHIP programs that require payment of a premium, such that Medicaid/CHIP may be misclassified as PNG coverage.[47, 48] By inference one can observe that the ACS over-estimates PNG: In 2008, the ACS estimate was 27.8 million nonelderly people with PNG compared to 16.6 million in the CPS-ASEC, which has been shown to over-count PNG coverage.[49] Logic suggests that at least some of these cases should be reporting Medicaid/CHIP since about 1 in 10 of the ACS PNG population is in a means-tested assistance program or has a spouse, parent, or child in one, which suggests that their families do not have the income to afford to buy their own coverage and they are likely misclassifying Medicaid/CHIP as PNG. In addition, there is evidence that some write-in responses for sample people reported to have Medicaid/CHIP may be erroneously allocated to PNG,[50] so we suspect that similar misallocation occurs among Medicaid/CHIP enrollees not reported as having Medicaid/CHIP. The extent of dual coverage in Medicaid/CHIP and PNG is also evidence of misclassification between these types of coverage. The direct estimates show 1.3 million nonelderly people with both PNG and Medicaid/CHIP, and we suspect most of these are misclassified (up to as many as about one-third resulting from a misallocation of write-in responses)[51] because it is unlikely that someone would purchase coverage privately if they were eligible to receive it at greatly reduced cost from the government.[52]

Another aspect of the ACS that may lead to under-reporting of Medicaid/CHIP is its omission of

the term "CHIP" and the state-specific names for the Medicaid and CHIP programs in the respondent's state on the mail version of the survey (they were available to interviewers in CATI/CAPI mode starting in 2009). An additional weakness is that there is only one itemized list of coverage types rather than a detailed series of patterned questioning, defining, and probing as in the NHIS and CPS-ASEC. Furthermore, the question does not ask about full and comprehensive coverage, so it is more ambiguous. Another possible reason for under-reporting is that there is relatively little opportunity to fix misreports in the ACS since the ACS does not include a verification of uninsurance or questions about duration of uninsurance which can prompt changes to reported coverage.[53] The ACS also does less post-collection processing to remedy possible reporting errors compared to the NHIS. In 2008, the Census Bureau's coverage edits reclassified coverage for about 5 million people in the ACS.[54] For the NHIS, discussed further below, NCHS's post-collection processing reclassified coverage for many more (at least 9 million just among the nonelderly persons and not counting reclassification between different types of means-tested coverage).[55]

National Health Interview Survey. We use NHIS methodology and estimates to develop and benchmark adjusted ACS estimates because there is a general consensus that the NHIS produces the most valid Medicaid/CHIP estimates.[56, 57] The NHIS is conducted by the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), and provides detailed information on the health and health care use for a representative sample of the civilian, non-institutionalized population of the United States.[58]

Although the survey results are considered valid, the NHIS has limited use for tracking state and local coverage because there is no state variable on the public use sample and the sample size is too small to produce estimates about key sub-populations. However, we make important use of NHIS's exemplary methods to inform our methodological improvements in the ACS and by using its more valid estimates to benchmark ACS estimates before and after we edit the ACS.

There are three main empirical reasons to believe that the NHIS produces relatively valid estimates:

- Record check studies have found that misreporting of enrollees is much less pervasive on NHIS compared to CPS-ASEC,[59] and since the time of the NHIS study, NCHS has added a follow-up question about Medicaid/CHIP for nonelderly people with no coverage reported.[60]
- NCHS uses other information reported about sample cases to add Medicaid/CHIP coverage for about 3 million people based on other information collected during the survey.[61, 62]
- Estimates are closer to counts from administrative databases compared to other surveys.[63]

There are also a number of qualitative reasons to believe that the NHIS produces relatively valid estimates. In general, relative to the ACS, the NHIS includes many features that likely aid

respondents in understanding questions about coverage and recalling details required to correctly answer them. NHIS features that likely strengthen validity of the coverage estimates include:

- Well-trained interview staff who work exclusively on this survey;
- Interviewing conducted in-person;
- Breadth of content on other health-related data, which potentially helps respondents recall when they had (and used) their coverage and understand distinctions between coverage types;
- A knowledgeable respondent (adults are encouraged to report on coverage for children if they are the most familiar with it or to talk about it with the person most familiar with the coverage of household members);
- A low level of item non-response on the insurance coverage sequence;
- An interview script that defines concepts and probes respondent memory as it collects information;
- Asking about Medicaid and CHIP using state-specific names;
- Asking for many details and probing about coverage,[64] which may help define relevant concepts/distinguish different types of coverage (e.g., whether services are comprehensive or limited, type of managed care, copayments, deductibles, need for referrals) and help respondent recall coverage details;
- Asking about periods without coverage and when the person last had coverage (for use in estimating full-year uninsurance) and why it stopped (potentially helping the respondent to recall more details required to determine the subject's true coverage status);
- Verifying no Medicaid for non-elderly persons with no reported coverage;
- Asking for the name of the insurance plan so the name can be matched to a list of insurance plans by state in a post-collection data processing phase and used to recode misreported coverage type;
- Post-collection manual processing to recode apparent incorrect reporting of coverage based on insurance plan name, verbatim elaboration on coverage given by respondents, and other interviewer observations.[65] Interviewers can also make a note to have coverage status changed in post-collection processing if, after questioning about coverage, it becomes apparent that the person's reported coverage status is not correct. While most people's information about Medicaid/CHIP is collected directly from questions about means-tested coverage, responses representing an additional 3 million additional nonelderly Medicaid/CHIP enrollees in 2008 were found this way, which is about 13 percent of the population according to NHIS estimates. For this reason, NCHS documentation warns users to use the final coverage variables to make coverage estimates and not the as-reported variables.[66]

Benchmarking with Administrative Medicaid/CHIP Counts. An additional benchmark for ACS Medicaid/CHIP coverage is the data available from administrative enrollment records. To create counts of Medicaid/CHIP enrollees to compare to ACS estimates, we used two sources: (1)

enrollment counts from the Medicaid Statistical Information System (MSIS) and (2) enrollment counts from the CHIP Statistical Enrollment Data System (SEDS).[67] For children, the CHIP total from SEDS was added to the Title XIX Medicaid total from the MSIS to produce a combined Medicaid/CHIP enrollment count. Since CHIP enrollment counts for non-elderly adults were not available from the SEDS, the estimates of adult enrollment in CHIP were constructed from the MSIS State Summary Datamart for the small number of states with CHIP coverage for adults, based on the difference between the total and the non-CHIP Medicaid enrollment totals for non-elderly adults. Adding these totals to the enrollment counts from the MSIS produced a Medicaid/CHIP enrollment total for adults. The resulting totals for children and adults include both those receiving full benefits and those receiving restricted benefits such as Emergency Medicaid services or Family Planning services. Alternative estimates were also created that reflect full benefit enrollment. To create these, 2007 MSIS data representing Title XIX Medicaid full-year equivalency enrollment totals for children and non-elderly adults were used to create state-level adjustments for the exclusion of enrollment in restricted benefit programs; these adjustments were then applied to the 2009 MSIS Title XIX Medicaid data for children and nonelderly adults by state to produce alternative Medicaid enrollment counts. Our analyses compare the ACS estimates to counts both with and without these restricted-benefit enrollees, because prior research has found that restricted-benefit enrollees in other surveys do report Medicaid/CHIP coverage (but at about half the rate of those receiving full benefits), and we were unsure whether ACS respondents would or would not include such benefits as coverage in the ACS Medicaid/CHIP question.[68]

These administrative data suggest that the total numbers of children (age 0 to 18) and non-elderly adults (age 19 to 64) enrolled in full-benefit Medicaid or CHIP coverage as of June 2009 were 30.1 million and 15.3 million, respectively. Including those with restricted benefits as well, the totals are 30.6 million children and 19.8 million non-elderly adults. As expected given Medicaid eligibility rules, enrollment in Medicaid/CHIP is much higher among children than non-elderly adults. Non-elderly adults are also much more likely than children to be enrolled in restricted-benefit plans as opposed to full-benefit coverage. This is consistent with the lower availability of full-benefit Medicaid/CHIP coverage for adults compared to children.

Notably, while administrative totals are considered to be more consistent than the Medicaid/CHIP coverage estimates reported on the ACS, they may not accurately reflect Medicaid/CHIP enrollment totals on a given day, since there is evidence of across- and within-state duplicate counts of children and non-elderly adults among administrative records and there is known under-reporting of CHIP on the MSIS. In addition, some people may remain represented in the administrative data after they have obtained another type of coverage, and others may not be aware that they are enrolled in public coverage, due, for example, to misunderstanding about continuous eligibility or to automatic re-enrollment/enrollment, and thus may behave as though they are uninsured. Further, both retroactive and presumptive eligibility may produce an over-count of enrollees relative to survey respondents' beliefs regarding their

coverage. Finally, it is notable that the Medicaid/CHIP enrollment totals do not reflect enrollment in state- or locally-financed plans, which ACS respondents are assumed to report in the public coverage question and which are more commonly available for adults than children because of their more limited access to full Medicaid/CHIP coverage.[69]

III. Methods

As indicated above, we developed a set of logical coverage edits, known as the HPC edits, that supplement those used by the Census Bureau to recode health insurance coverage. We attempt to improve the validity of the ACS Medicaid/CHIP estimates by editing individual sample cases to have Medicaid/CHIP if other information collected in the ACS, including information on other household members, implies that the sample case is an enrollee in Medicaid or CHIP. We apply refinements to the original Census Bureau logical edit rules, and we also apply additional edits based on eligibility rules and enrollment procedures for Medicaid and CHIP, evidence of misreported coverage, and other information suggesting that the survey's Medicaid/CHIP enrollment indicator may not be accurate.[70]

Motivation/Background. There are a number of reasons that we developed this additional set of coverage edits for the ACS:

1. *Possible bias due to unidentified Medicaid/CHIP enrollees in the sample.* One of the primary motivations behind our development of methods to address validity problems with the ACS Medicaid/CHIP indicators are the findings described above suggesting that even with the original Census Bureau edits, the ACS does not identify as many Medicaid/CHIP-covered individuals as expected in the sample. This could lead to biased estimates, as the Medicaid/CHIP under-estimation appears to produce in other surveys.[71] A related motivation (also described above) is the observation that NCHS appears to conduct more editing of coverage in the NHIS than the Census Bureau does in the ACS even though we suspect that response errors are higher in the ACS given the relative weaknesses described above. Thus, ideally the ACS should have relatively more sample cases edited to Medicaid/CHIP.

2. *Evidence of inconsistent reporting of enrollees across family members.* Examination of variations in coverage status within families suggests that some respondents are misreporting coverage for some but not all enrollees in the family, such as when we see Medicaid/CHIP-eligible children with Medicaid/CHIP-covered parents or siblings but who do not have Medicaid/CHIP coverage. This is in line with prior research suggesting that Medicaid/CHIP reporting error may vary across different types of family members.[72] In addition, since failing to report Medicaid/CHIP for enrollees is much more common than incorrectly reporting Medicaid/CHIP for non-enrollees, we often assume that non-reported children, siblings, or spouses of reported enrollees are misreported enrollees (given other indicators of likely Medicaid/CHIP eligibility) rather than that the person

reported to be enrolled was done so erroneously.[73] Most of our edits for children can be summarized as editing a Medicaid/CHIP-eligible child to have Medicaid/CHIP because some combination of information on the parent's coverage, employment, and participation in means-tested assistance programs suggest the child's coverage is misreported. We believe the HPC edits improve on those implemented by the Census Bureau because the HPC edits use eligibility status to determine which cases are edited to have Medicaid/CHIP, match a higher proportion of children to their parents, and use evidence of misreporting of types of coverage besides Medicaid/CHIP. Most of our edits for adults can be summarized as editing the adult to have Medicaid/CHIP because the person has PNG coverage but is low-income and thus very likely could not afford to purchase coverage directly, is enrolled in a means-tested assistance program, and does not appear to have misreported employer-sponsored insurance (ESI). By contrast, the original edits performed on adult cases at the Census Bureau, like the child edits, do not take into account likely eligibility status or edit on the basis of likely misreported coverage other than Medicaid/CHIP.

3. *Evidence that other information collected in the survey may be more valid than the health insurance status indicator and that using less technical questions to indirectly determine coverage status is valid.* The primary motivation for using logical coverage edits as a method to improve the validity of survey results are findings that people may lack the knowledge to answer technical questions correctly but for which correct answers can be derived from other information respondents are able to provide.[74] Literature on cognitive interviewing demonstrates how official definitions of health insurance often do not map to respondent perceptions, but interviewees are able to indirectly answer the health insurance question by providing the interviewer with information that can be used to infer coverage status.[75] In essence, measurement error varies by topic and question, and some responses are more valid than others. Thus, conflicting information from multiple sources can sometimes be resolved based on the relative validity of the conflicting sources.[76] It is also common practice for surveys to use information collected throughout the interview to infer status about another question but to not actually ask the respondent to try to answer the question (so there is no conflict to resolve). For example, labor status used in official employment estimates and poverty level used in official poverty estimates are derived this way (i.e., the interviewer asks a number of relatively non-technical questions rather than having respondents make judgments about what counts as officially employed [e.g., various job absences] or who is officially part of the family and what sources of income should be summed to derive a total family income for comparison to official poverty standards).[77]

   Using this rationale, we combine information from other ACS variables, which we believe are less error-prone, into edits to the insurance coverage indicator, which the

evidence suggests may not be as valid. Reporting about coverage has become increasingly complex as private managed care companies deliver more Medicaid/CHIP services, states use different names for Medicaid and CHIP, states experiment with different policies such as premiums, employers sometimes help new employees get enrolled in Medicaid and CHIP, and members of a family have different types of coverage. Although we do not know the relative validity of ACS reporting about Medicaid/CHIP compared with other survey indicators, we do know that surveys generally appear to have high rates of misreporting of Medicaid/CHIP, as described above, and we know of no research suggesting that the variables we use in the edits have similarly high rates of error. SNAP and cash-assistance programs have been shown to have problems with reporting errors[78] but we usually use these variables in combination, including with simulated Medicaid/CHIP eligibility status and poverty level, so an error in one of these variables would not lead to an edit of Medicaid/CHIP unless other variables also suggest likely Medicaid/CHIP coverage. There may also be errors in the relationship data used for connecting family members to each other, but since most families are small and their relationships reasonably unambiguous, we believe that most relationships are coded correctly.

4. *Common use of coverage edits in population surveys.* As described above, this technique has been in practice for insurance coverage in the CPS-ASEC and the NHIS for many years and was originally developed for the ACS in 2009. We take confidence from the fact that people who work very closely with the data, especially the high quality NHIS data, have seen no cause to decide that coverage editing does not make the resulting data more valid.[79] Our edits build on the logic behind these other edits, so their rationale is strengthened by the long history of using coverage edits in other surveys.

5. *The availability of information about federal and state eligibility rules and enrollment procedures for Medicaid and CHIP*. We can use known Medicaid/CHIP eligibility rules to identify children who seem to be Medicaid/CHIP-eligible and in turn only apply edited Medicaid/CHIP enrollment indicators to those who are eligible (with few exceptions, noted below). We use the Medicaid/CHIP eligibility indicator derived from the Urban Institute Health Policy Center's ACS Medicaid/CHIP Eligibility Simulation Model, which simulates eligibility for these programs using the available information in the survey data and the Medicaid/CHIP rules in place in each person's state of residence.[80] The availability of information about Medicaid/CHIP eligibility and enrollment procedures also helps us to identify situations where respondents are likely to be confused or forget about enrollment, and we code the ACS to check each case for such situations and edit them if certain other indicators of enrollment also exist. For example, the eligibility rules suggest that it is very unlikely that a parent who does not have a

disability would be enrolled, but that their eligible child would not also be enrolled, so our edits usually recode such children as having Medicaid/CHIP coverage.

Description and Impact of Medicaid/CHIP Edits. We conducted two different sets of Medicaid/CHIP edits; descriptions of these edits and the impact of each on the number of cases covered by Medicaid/CHIP and the number uninsured in 2009 are presented in Exhibits 1 and 2. These edits are performed after we edit for illogical PNG coverage (those rules and their impact will be described in a forthcoming paper). Our first set of Medicaid/CHIP edits simply refines the original Census Bureau edits. While applying the original edits to the public use file after they were finalized, we identified aspects of several rules that were not optimally applied: these mostly involved being able to identify previously unidentified parents, more refined application of eligibility based on other program participation, and passing edited Medicaid/CHIP from parents to children. As shown in the exhibits, these refinements added 152,982 children and 250,213 non-elderly adults to the Medicaid/CHIP-covered population in 2009.

The main edits discussed in this paper – a new set of logical coverage edits focusing on Medicaid/CHIP – are a further refinement that use eligibility status, coverage, employment, program participation, and other family- and person-level data to check each case for 15 different logical edit rules representing likely Medicaid/CHIP enrollment for children and five different logical edit rules for adults. We check each case against each edit rule and recode the case to have Medicaid/CHIP if it meets the conditions of the rule. In contrast to the Census Bureau edits, we also change the original coverage type when a rule flags a case because we believe it is misreported. The order of the rules as presented in Exhibits 1 and 2 reflects the order in which they are applied and our confidence that the situation implies enrollment in Medicaid/CHIP. Although some rules are subsets of other more general rules, we check for more specific situations first if we believe they are better indicators of enrollment. We do this so we have a more concrete understanding of who is being edited and with what degree of confidence.

Our rules are more detailed than the documentation that is publicly available about the NHIS, and we believe this reflects differences in the design of the surveys: the NHIS is sufficiently small to permit manual editing from verbatim details collected about coverage, and it includes notes from interviewers reporting suspicions about misreported coverage based on the combination of information that is provided on the survey.[81, 82] In contrast, the ACS is far too large to manually edit, it does not use interviewers that are trained to probe and collect details to help classify coverage, and it does not collect information about as many health-related topics (e.g., source of coverage). Lacking the ability to implement those strategies on the ACS, our approach uses combinations of variables to code likely Medicaid/CHIP scenarios. Instead of probing respondents about suspected Medicaid/CHIP in real time or using interviewer notes to later edit coverage status as in the NHIS, we check to see if each person without Medicaid/CHIP has any of the likely Medicaid/CHIP situations codified in the rules. Appendix Exhibits 1 and 2 provide details about the rules and the rationale behind each rule.

Overall, the HPC edits increase the number of children with Medicaid/CHIP in the ACS by 2.8 million and increase the Medicaid coverage rate from 32.1 percent to 35.6 percent. The vast majority of these cases are determined to be Medicaid/CHIP-eligible in our model, and the others are ones that could be eligible based on information that our model is not able to take into account (e.g., changes in parents' marital status). Based on what we know about Medicaid/CHIP eligibility rules within families (i.e., that it is unlikely that a non-disabled parent would be enrolled but that their child would not), rules 2 through 7 reclassify eligible children with illogical combinations of coverage within a family to Medicaid/CHIP where appropriate, accounting for most of the difference (1.9 million) from the Census Bureau estimate. Rules 8 through 13 target Medicaid/CHIP-eligible children with PNG, Medicare, or ESI coverage but family circumstances suggesting this coverage is incorrect; very few children meet the conditions for being classified in this category. Finally, we identify a small number of children (rules 14-16) not eligible for Medicaid/CHIP according to our simulation but possibly eligible and with illogical coverage.

For adults, the new edits to Medicaid/CHIP focus on those adults identified as having PNG coverage but with a combination of low family income, other means-tested program participation, an indication of a disability, Medicaid/CHIP coverage of another family member, and/or no full-time workers in the family who could afford privately-purchased coverage. These edits add 1.4 million adult Medicaid/CHIP enrollees and take away the same number from the PNG estimate. We also examined the impact of our edits by edit rule in 2008 to examine whether our approach was consistent across years; indeed, the impact was very similar in both years (data not shown).

We examine the impact of the HPC edits nationally, by state, and by a variety of family and individual characteristics. Age, sex, citizenship status, race/ethnicity, and disability status (which is defined as having cognitive, ambulatory, independent living, self-care, or vision difficulties) are individual-level variables. The linguistic isolation, language of interview, SNAP (formerly food stamps) enrollment, geographic region, and geographic area categorizations are household-level indicators. The remainder of the variables —poverty level (gross income compared with the Census Bureau's poverty thresholds), educational achievement, employment sector, and employment type – are based on family-level information, where families were defined based on the health insurance unit (HIU). The HIU represents members of a nuclear family who could be covered under one private health insurance policy. Estimates and standard errors were derived using weights that reflect the complex sample design of the ACS.

Limitations to our Methods. Our approach is limited by the information available to us from the ACS and from state eligibility rule sources, so the HPC edits only represent Medicaid/CHIP coverage scenarios that could be coded from ACS variables and the results of our eligibility simulation model. As a result, we suspect we are only able to identify a non-random subset of true Medicaid/CHIP enrollees who are not reported. We are also not able to edit away Medicaid/CHIP coverage because the ACS does not collect data about scope of coverage that

can be used to identify single service plans[83] which are identified and edited from coverage on the NHIS[84] and because, to our knowledge, no logical edits have been developed that recode reported Medicaid/CHIP to ESI coverage. However, we assume that this is not a relatively large source of error, as record-check studies have not found much false-positive reporting compared to false-negative reporting, and many of the false-positive cases observed in record-check studies of Medicaid are likely cases that could not be linked or are misclassified CHIP.[85]

IV. Results

The logical coverage edits we apply to the ACS data move the ACS coverage distributions closer to the NHIS coverage distributions. Exhibit 3 shows the 2009 insurance coverage distribution of children in the ACS (1) as reported by respondents without any edits (except imputation for missing responses, allocation for written-in responses, and editing for partial responses [e.g., one coverage item checked 'yes' and the others left blank]), (2) after the original Census Bureau edits, and (3) after our additional logical coverage edits (both the refinement of the original edits and our new edits). It also shows the distribution of NHIS responses as reported and after editing. (The top panel shows the coverage distribution when people identified as having dual ESI and Medicaid/CHIP coverage are classified as having Medicaid/CHIP; the bottom panel shows them classified as having ESI.) Compared to the unedited responses, children in the ACS after the original Census Bureau edits have higher rates of any Medicaid/CHIP coverage (from 29.0 percent to 32.1 percent) and lower rates of uninsurance (from 12.9 percent to 9.0 percent), confirming that the original edits primarily identify coverage among children previously classified as uninsured. Our logical coverage edits further increase the number of children with Medicaid/CHIP coverage by 2.8 million, from 32.1 percent of the population to 35.6 percent. The majority of the reclassified cases – 1.5 million – had previously been identified as having PNG coverage, and an additional 0.7 million were reclassified from ESI. The edits decrease the number of children identified as uninsured by 0.5 million, reducing the uninsured rate for children from 9.0 percent to 8.4 percent.

Edits in the NHIS also raise the share of children with Medicaid/CHIP coverage, but the effect is smaller, increasing the number with Medicaid/CHIP by only 1.4 million, from 32.5 percent to 34.3 percent of the population in 2009. Notably, the NHIS edits draw more heavily from those previously classified as uninsured, pulling 1.0 million from the uninsured and 0.5 million from ESI but virtually no cases from PNG coverage. The HPC edits bring the ACS estimate of PNG coverage much more closely in line with the NHIS, at 3.6 percent compared with 3.4 percent in the NHIS. We also examined the impact of our edits for the 2008 data for both surveys to examine whether our approach was consistent across years. The impact of our edits was similar for both years of data; our derived estimate of the number of uninsured children after the edits is 7.2 million in 2008, which is slightly lower than, but close to, the NHIS uninsured estimate of 7.4 million for 2008 (data not shown).

The lower panel of Exhibit 3 shows the same distributions, but tabulating ESI before Medicaid in the coverage hierarchy for those identified as having multiple sources of coverage, including cases edited to Medicaid/CHIP from ESI by the Census Bureau (because the Bureau does not edit away ESI from cases identified as misreported Medicaid/CHIP enrollees). Thus, the Medicaid/CHIP coverage category only includes those who did not also identify ESI. This exhibit illustrates that our edits almost exclusively avoid adding to the population identified as having dual ESI-Medicaid/CHIP coverage. After the edits are applied, we estimate that 25.9 million children, or 32.8 percent, have Medicaid/CHIP but not ESI, compared with 25.8 million, or 32.8 percent, in the NHIS.

As shown in Exhibit 4, the original Census Bureau edits also decrease the uninsurance rate for nonelderly adults from the levels before editing, from 23.6 percent to 20.8 percent. About half of these recoded cases are reclassified to Medicaid/CHIP and about half are reclassified by the military edits to ESI. Our edits identify an additional 1.4 million cases with Medicaid/CHIP and 1.1 million with ESI, increasing the rate of Medicaid/CHIP from 9.2 to 9.9 percent, and the rate of ESI from 62.2 to 62.8 percent. These cases had almost all been previously identified as having PNG coverage; the edits reduce the number with PNG by over 2 million, from 6.9 percent to 5.6 percent, lining up more closely with the NHIS estimate of 5.0 percent after the edits. The HPC edits do not change the uninsured rate for nonelderly adults, at 20.8 percent before and after the edits, although the NHIS edits raise the adult uninsured rate in that survey from 20.9 percent to 21.2 percent, because the NHIS collects enough detail for some reported coverage to be recoded as uninsured based on it being a single service plan. As is the case for children, the impact of the edits to the 2008 coverage distribution of nonelderly adults was similar to the impact in 2009: the uninsurance rate remained constant at 19.5 percent, but the rates of both Medicaid/CHIP (shifting from 8.6 percent to 9.4 percent) and ESI (shifting from 64.1 percent to 64.7 percent) increased (data not shown). The lower panel of Exhibit 4, which places ESI coverage above Medicaid/CHIP in the hierarchy, shows a similar pattern, and the resulting ACS estimate for the number of nonelderly adults with Medicaid/CHIP but no ESI is 16.1 million, or 8.7 percent, compared with 16.5 million, or 8.9 percent, in the NHIS.

Our logical coverage edits align the ACS Medicaid/CHIP coverage estimates closer to counts of Medicaid/CHIP-enrolled children from administrative databases as well (Exhibits 5A and 5B). The original Census Bureau estimate of 25.3 million child enrollees nationally represents 84.1 percent of the administrative count of 30.1 million children nationally receiving full Medicaid/CHIP benefits (Exhibit 5A). The HPC edits bring the ACS estimate to 93.3 percent of the administrative total. A second set of tabulations includes in the administrative counts those receiving restricted, in addition to full, Medicaid benefits (Exhibit 5B) and suggests the number of Medicaid/CHIP-enrolled children with either full or restricted benefits is 30.6 million; using this definition, the ACS estimate is 82.8 percent of the administrative total before the edits and 91.8 percent after the edits. The small difference between the administrative counts of enrolled children with and without restricted-benefits enrollees included confirms that most children

enrolled in public coverage receive full benefits; remaining results for children focus on these totals only.[86] Although the edits bring the ratio of ACS Medicaid/CHIP enrollees closer to the administrative totals, the ACS estimate remains below the administrative total; furthermore, the ACS estimate includes those with other publicly-financed coverage (such as state and local plans) that the administrative count does not, meaning that the ratio we observe is smaller than it would be if the administrative count included public coverage besides only Medicaid and CHIP.

The edits to children's coverage increase the estimate of Medicaid/CHIP enrollment for every state and bring the estimates closer to the administrative counts in almost every state. For every state but two, the Census Bureau's ACS estimates are more than three-quarters of the administrative total and the revised HPC-edited estimates are more than 80 percent of the administrative total (estimates for Delaware and North Dakota are 48.0 percent and 69.0 percent of the administrative total before the edits and 52.7 percent and 78.2 percent after the edits, respectively). In fact, for 17 states, the original counts of enrollees are significantly below the administrative totals, but the edits bring the Medicaid/CHIP totals to 95 percent or more of the total and are no longer significantly different from the total. For only five states – Arizona, Colorado, Oregon, Nevada, and Utah – the edits have the effect of producing an apparent overcount, with a ratio of ACS total to administrative total of over 100 percent that is higher than the administrative count. However, to some extent, this is not surprising given that, as indicated above, the administrative data only include those enrolled in federally-funded Medicaid and CHIP programs.

There is considerable variation in the ratio between the ACS and administrative totals across states, both before and after applying the edits. But the edits have a larger impact in some states than others: in Vermont, the state with the smallest change, the ratio of ACS to administrative counts increased by only 1.9 percentage points after applying the edits, while for 16 states, the increase was 10 percentage points or higher. However, there does not appear to be a noticeable relationship between how close the ACS and administrative estimates were before the edits and the size of the edits' impact.

As shown above, the impact of the edits on estimated Medicaid/CHIP enrollment is less dramatic for adults than for children; however, the determination of which administrative count to use for examining how well the edits correct for under-reporting among adults is more complicated because, compared to children, enrollee adults are more likely to receive partial benefits and to have public coverage through state or local programs that are not captured in the administrative counts.[87] According to administrative records, 15.3 million nonelderly adults were enrolled in Medicaid/CHIP and receiving full benefits in 2009 (Exhibit 6A), and this number increases to 19.8 million when also including adults receiving restricted benefits (Exhibit 6B). Thus, the Census Bureau's ACS estimate of 16.9 million enrolled adults is 85.2 percent of the total enrollment count but 110.2 percent of only full-benefit enrollees. The inclusion of state and local plans in the ACS estimate could account for why it is higher than the full-benefit administrative count, but we suspect that some adults receiving restricted benefits may be reporting public

coverage in the ACS and being classified as Medicaid/CHIP enrollees even though they do not receive full benefits. This pattern would support findings from other surveys that restricted benefit enrollees do sometimes report Medicaid enrollment, albeit at lower rates than full-benefit enrollees,[88] and the assumption that respondents enrolled in other types of public coverage such as state/local plans may be reporting Medicaid/CHIP in the ACS. As a result, the administrative data and survey data are not measuring exactly the same concepts, particularly for adults, where restricted-benefit plans are more commonly available. The administrative data and the survey data could be more directly compared if the survey data could distinguish full- versus restricted-benefit cases or could more precisely distinguish between Medicaid/CHIP enrollees and enrollees in other types of public health insurance plans. The differences between the full-benefit and restricted-benefit counts also vary across states. Of the 4.5 million restricted-benefit enrollees in administrative records, about half (2.1 million) are in California, which is not surprising considering the wide availability of limited public coverage there, such as family planning coverage, and is consistent with prior research using the CPS-ASEC finding fewer matches between survey respondents identifying public coverage and persons receiving full Medicaid benefits according to administrative records in California than in other states.[89, 90]

Although the comparisons of administrative counts and survey estimates are not expected to help us evaluate how well the edits are working for adults as for children because of these measurement issues, we find that the edits do, as expected, increase the rate of Medicaid/CHIP enrollment, to 92.4 percent of the total administrative count and 119.5 percent of the full-benefit administrative count. As is the case for children, the edits increase the share of nonelderly adults with public coverage in every state. Both when excluding and including restricted-benefits cases from the administrative counts, our edits increase the correspondence between ACS counts and administrative counts for some states but lead to larger gaps in other states; however, without having counts of state and local public coverage that is not financed through Medicaid or CHIP or knowing whether adult enrollees are reporting restricted-benefit coverage as Medicaid/CHIP, it is not clear how closely the counts should align.

To further examine the impact of the HPC edits across states, Exhibits 7 and 8 map the ratio of the HPC-edited Medicaid/CHIP enrollment counts to the counts before applying the HPC edits, for children and adults, respectively. For children, the national average is 110.9 percent, meaning the edits increase the Medicaid/CHIP enrollment estimate by 10.9 percent, ranging from 2 percent in Vermont to 24 percent in Utah. For adults, the average ratio is 108.4 percent: the edits increase the Medicaid/CHIP enrollment estimate by 8.4 percent nationally, with a similar range across states. Although the impact of the edits to national enrollment estimates is greater for children than for adults, this varies by state; for instance, in North Dakota, the ratio is 124 percent for adults (the highest increase), but it is only 113 percent for children. It appears that where the ratio is high for adults, it tends to be high for children, and visa-versa[91] suggesting that the factors that lead to higher ratios in some states compared to others may be similar for both children and adults.

Exhibit 9 describes the characteristics of Medicaid/CHIP-covered children before and after the edits. Overall, the Medicaid/CHIP population is not substantively different in terms of age, sex, citizenship status, race/ethnicity, family poverty level, language, participation in other public programs, or geographic region after the edits are applied. The edits increase Medicaid/CHIP coverage rates in every subgroup examined. However, the edits have somewhat greater impacts in some groups than others, slightly changing the distribution of the Medicaid/CHIP population in the ACS. For example, among children, the population after the HPC edits is relatively older; more likely to be white non-Hispanic, higher income, and English-speaking; and less likely to be in a SNAP household. Despite the differences between the ACS and other surveys and the types of analyses that have been conducted to evaluate the accuracy of their Medicaid/CHIP reporting, these shifts are fairly consistent with findings from studies of other surveys, most notably, that relatively high-income enrollees are more at risk of being mis-reported.[92]

The distribution of adult Medicaid/CHIP enrollees is also broadly similar before and after the edits, with slight changes to the distribution, making the Medicaid population somewhat older, more male, more white non-Hispanic, higher income, more highly educated, and more likely to be disabled (Exhibit 10). As is the case for children, there are no major shifts in the distribution across regions, despite the differences across states and regions in program features such as distinct program names that might cause more misreporting in some states than others.

V. Discussion

Despite the fact that the ACS survey instrument does not include detailed questions on health insurance status or specific Medicaid and CHIP names in each state and that the majority of respondents complete the survey by mail, without the benefit of an interviewer, the estimates of Medicaid/CHIP coverage and of the uninsured derived from the ACS based on the HPC edits are quite close to the NHIS results for both adults and children.

As indicated at the outset, the ACS has a number of unique features that are not found in any other household survey that tracks health insurance status for children and adults. Together with its notably high response rates and a sample frame that includes non-telephone and cellular-only households, these features make the ACS well suited for measuring the characteristics of the entire U.S. population and particularly for capturing the population targeted by Medicaid and CHIP coverage. Moreover, the large ACS sample size and the inclusion of ACS sample in each state and county combine to enhance the usefulness of the ACS for monitoring changes in coverage at the state and local level. The passage of the Affordable Care Act has made it even more important to be able to track how the number and characteristics of the uninsured are changing over time and how the number and characteristics of those with coverage are changing by coverage type.

Given the policy importance of having accurate coverage estimates at the state and local level, we believe that the most valid ACS estimates currently available are those that use the HPC edits

that are described here. The Medicaid/CHIP coverage estimates based on the HPC edits have more face validity at the micro level since there are fewer sample people who look like Medicaid/CHIP enrollees but are not identified as such. The national and state-level HPC estimates for Medicaid/CHIP also have more face validity because they are closer to the estimates derived from the NHIS on a national basis and to the administrative counts in almost all states. The edits also have face validity because the Medicaid/CHIP population identified on the ACS through the HPC edits is relatively higher income and older, which is consistent with findings from studies of the risk factors for under-reporting Medicaid coverage in the NHIS and the CPS-ASEC in the early 2000s.[93]

Without the HPC edits, we believe that the number of children and adults with Medicaid/CHIP coverage on the ACS is being understated. The impact of apparent under-reporting on the number of children currently classified as uninsured is notable; the HPC edits reclassified over 400,000 children from being uninsured to having Medicaid/CHIP coverage and also decreased the share with ESI. In addition, the number of children who have PNG coverage is also being overstated without the HPC edits, and a large share of adults with PNG coverage should be reclassified to both Medicaid/CHIP and ESI (issues regarding misreported PNG will be discussed in a forthcoming paper). The results of this analysis suggest that ignoring the problem of Medicaid/CHIP under-reporting in the ACS would be unwise.

Using the publicly released ACS estimates that incorporate only the Census Bureau edits appears to lead to overestimates of uninsurance for children of 7 percent and underestimates of Medicaid/CHIP coverage of 11 percent. In addition, the Census Bureau estimates for children appear to overstate ESI by 2 percent and PNG coverage by 35 percent. For adults, ESI appears to be underestimated by 1 percent and PNG coverage to be overestimated by 19 percent before the edits. Not using the HPC edits appears to lead to a Medicaid/CHIP underestimate of 8 percent for adults. Therefore, using unedited ACS coverage estimates is likely to produce biased estimates, leading to overestimates of the new costs associated with the ACA, a biased picture of the characteristics of the population that will be brought into Medicaid under the ACA, and underestimates of the extent to which public programs are reaching their target populations. It also appears that there is bias in the estimated characteristics of the populations in each coverage status; for example, the HPC-edited Medicaid population has slightly more disabled adults than the population before the edits, which would affect the projected health needs and costs associated with covering more adults under the ACA. However, that issue is not as large as the bias in the counts.

We recommend that the Census Bureau consider making available 2009 ACS coverage estimates that are based on HPC edits to the public through the IPUMS-USA project at the University of Minnesota Population Center. In addition, as we and others learn more about the patterns of misreporting on the ACS, it is likely that we will develop new approaches to editing the data or revise the edits we have proposed.

Despite the face validity of the HPC coverage estimates, there are a number of outstanding questions that should be addressed in order to confirm that these edits are valid and to further strengthen the validity of the ACS estimates. We focus the remainder of this discussion on subsequent research that could shed light on how well these edits are they working and how they could be improved.

To understand what the edits mean for inference we need to know more about their weaknesses in terms of the errors from editing non-enrollees and the errors from not editing true enrollees. We know very little about these errors, so we do not know what they may lead us to incorrectly infer about the population. Besides potentially identifying possible weaknesses by having additional experts on eligibility and enrollment review the edits, we see several options.

1. *Re-interview people who look like enrollees but do not have Medicaid/CHIP reported*. We think this is quite feasible because the Census Bureau could do this on a trial basis, starting with the sample of interviews from just one month and using both the Census Bureau edits and the ones discussed here to identify (1) suspect cases to call for re-interview and (2) a sample of non-edited cases to be used for comparison purposes. Retrospective questioning could introduce errors, but we suspect that those could be minimized with an appropriate instrument and survey approach. Results of re-interviews would be used to both directly fix misreporting of re-interviewed cases and indirectly fix others by providing information about the validity of the edits and insights about how to improve them.

2. *Perform a record-check analysis to see how well the Census Bureau and HPC edits identify enrollees who are found in the database of Medicaid/CHIP enrollment records but not reported in the ACS.* We have proposed a linked ACS-Medicaid/CHIP record-check study which could identify the covariates associated with misreported coverage. Such analysis could be used to enhance the edits and also improve the ACS questionnaire. Currently, we also recommend that the questionnaire be changed to explicitly distinguish PNG from ESI, to include state names for Medicaid/CHIP, and to improve the questionnaire instructions.

3. *Conduct cognitive interviewing to inform improvements to the questionnaire and also tell us more about the dynamics of misreport and the covariates associated with misreporting*. Cognitive interviewing could help identify whether respondents are seeing the PNG question as separate from the ESI question that comes before it or the public coverage questions that follow it. It could also help determine what word or format changes would help respondents understand what is meant by PNG coverage, as well as whether state-specific Medicaid and CHIP names would help respondents map coverage to Medicaid/CHIP, possibly identifying a subset of states where state names would assist respondents, to reduce the costs associated with such a change.

While we have focused on how well the HPC-edited Medicaid/CHIP coverage estimates line up with comparable NHIS and administrative totals for 2008 and 2009, it will also be important to use future years of data to assess the validity of the derived estimates of change since estimates of whether coverage is improving or deteriorating overall and for particular subgroups are important from a policy perspective. Thus, it will be essential to assess both how the coverage edits could be improved for current estimates and whether the edits need to change over time in response to changes in the policy environment and in the nature of insurance coverage.

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Exhibit 1. Impact of HPC Edits to Medicaid/CHIP* on Estimates of Medicaid/CHIP and Uninsurance by Edit Rule, US Children (0-18), 2009

Rule #	Rule Summary *(See appendix table 1A for restrictions and other details)*	Any Medicaid/CHIP Number	Any Medicaid/CHIP Rate	Uninsured Number	Uninsured Rate
0	Direct estimate from Census	25,339,842	32.11%	7,055,468	8.94%
1	Refined application of rules applied at Census	25,492,824	32.30%	6,995,382	8.86%
	Child is identified as eligible for Medicaid/CHIP…				
2	Child has no coverage reported but has a sibling with Medicaid/CHIP (restrictions apply)	25,806,539	32.70%	6,681,667	8.47%
3	Child has private reported but has a sibling enrollee and no parent with private coverage (restrictions apply)	26,043,036	33.00%	6,681,667	8.47%
4	Child has military reported but no parent with military coverage (restrictions apply)	26,096,353	33.07%	6,681,667	8.47%
5	Child has other ESI reported but no parent with it (restrictions apply)	26,684,450	33.81%	6,681,667	8.47%
6	Child has Medicare reported but no parent with it (restrictions apply)	26,860,850	34.04%	6,681,667	8.47%
7	Child with parent edited to Medicaid from nongroup	27,370,596	34.68%	6,643,048	8.42%
8	Child has nongroup reported and child is a parent	27,375,721	34.69%	6,643,048	8.42%
9	Child has nongroup reported, does not live with parents, and either lives in a SNAP household, has a disability (and is not a college student), or lives with a low-income grandparent (restrictions apply)	27,414,564	34.74%	6,643,048	8.42%
10	Child has nongroup reported and no parent is self-employed or has nongroup, military, or other ESI coverage (restrictions apply)	27,529,086	34.88%	6,643,048	8.42%
11	Child has nongroup (after editing for logical ESI) and reported SNAP/cash public assistance	27,570,295	34.93%	6,643,048	8.42%
12	Child has Medicare reported but does not live with parents or have a disability (restrictions apply)	27,570,295	34.93%	6,643,048	8.42%
13	Child has ESI reported, no indication of coverage from outside the household, no full-time employment in the family, and reported SNAP/cash public assistance	27,809,283	35.24%	6,643,048	8.42%
	Not identified as eligible but might be eligible and/or might have been earlier in year and has a flag for possible logical Medicaid/ illogical reported other coverage and is not identified as an undocumented immigrant…				
14	Identified as immigrant eligible for Medicaid/CHIP and has a parent who was married in the past year or no parent employed most/all of year or with military coverage	28,115,384	35.62%	6,643,048	8.42%
15	Identified as immigrant eligible for Medicaid/CHIP and in a SNAP household, and family poverty level less than 400 percent, and no parent with military coverage	28,122,110	35.63%	6,643,048	8.42%
16	Same as above but does not have to be found immigrant eligible	28,123,123	35.63%	6,643,048	8.42%
	Difference from unedited estimate	***2,783,281***	***3.52%***	***-412,420***	***-0.52%***

Source: Urban Institute analysis of American Community Survey (ACS) 2009 data from the Integrated Public Use Microdata Series (IPUMS).

The Urban Institute Health Policy Center's ACS Medicaid/CHIP Eligibility Simulation Model and coverage estimates were developed under a grant from the Robert Wood Johnson Foundation.

Notes: Medicaid/CHIP includes Medicaid, CHIP, state, and other public coverage.

ESI refers to employer-sponsored insurance not including military.

*Editing to Medicaid/CHIP is done after editing to ESI, so the people edited to Medicaid/CHIP are people who could not be edited to ESI.

Exhibit 2. Impact of HPC Edits to Medicaid/CHIP* on Estimates of Medicaid/CHIP and Uninsurance by Edit Rule, US Nonelderly Adults (19-64), 2009

Rule #	Rule Summary *(See appendix table 2A for restrictions and other details)*	Any Medicaid/CHIP Number	Any Medicaid/CHIP Rate	Uninsured Number	Uninsured Rate
0	Direct estimate from Census	16,903,536	9.15%	38,400,459	20.80%
1	Refined application of rules applied at Census	17,153,749	9.29%	38,315,537	20.75%
2	19 or 20 year old in poverty with nongroup and ESI with SNAP/cash assistance and a parent but none with nongroup or ESI	17,211,661	9.32%	38,315,537	20.75%
3	Has nongroup and ESI and SNAP/cash assistance and not in an HIU with a full-time worker	17,652,226	9.56%	38,315,537	20.75%
4	Has nongroup, FPL less than 200%, and is a citizen with a functional limitation	17,870,408	9.68%	38,315,537	20.75%
5	Has nongroup, FPL less than 200%, and is a citizen in an HIU with a Medicaid enrollee	17,890,146	9.69%	38,315,537	20.75%
6	Has nongroup, FPL less than 200%, and is not in an HIU with a worker who is full-time public-sector, self-employed, or unemployed	18,330,379	9.93%	38,315,537	20.75%
	Difference from unedited estimate	***1,426,843***	***0.78%***	***-84,922***	***-0.05%***

Source: Urban Institute analysis of American Community Survey (ACS) 2009 data from the Integrated Public Use Microdata Series (IPUMS).

The Urban Institute Health Policy Center's ACS Medicaid/CHIP Eligibility Simulation Model and coverage estimates were developed under a grant from the Robert Wood Johnson Foundation.

Notes: Medicaid/CHIP includes Medicaid, CHIP, state, and other public coverage.

ESI refers to employer-sponsored insurance not including military. HIU is health insurance unit, defined here as the family unit that is typically eligible under the same private plan, usually a nuclear family.

*Editing to Medicaid/CHIP is done after editing to ESI, so the people edited to Medicaid/CHIP are people who could not be edited to ESI.

Exhibit 3. Number and Percent of US Children (0-18) by Survey, Logical Edit Status, and Health Insurance Type, 2009

	ACS						NHIS			
	Before Census Edits		After Census Edits		After HPC Edits		As Reported		After NCHS Edits	
	#	%	#	%	#	%	#	%	#	%
Total	***78.9***	***100%***	***78.9***	***100%***	***78.9***	***100%***	***78.5***	***100.0%***	***78.5***	***100.0%***
Medicaid/CHIP	22.8	29.0%	25.3	32.1%	28.1	35.6%	25.5	32.5%	26.9	34.3%
ESI	41.3	52.4%	42.0	53.2%	41.3	52.3%	42.0	53.5%	41.5	52.9%
PNG	4.3	5.4%	4.3	5.5%	2.8	3.6%	2.7	3.5%	2.7	3.4%
Medicare	0.3	0.4%	0.2	0.3%	0.1	0.1%	0.3	0.3%	0.2	0.3%
Uninsured	10.2	12.9%	7.1	9.0%	6.6	8.4%	7.6	9.7%	6.6	8.5%
Other*							0.5	0.6%	0.5	0.6%

	ACS						NHIS			
	Before Census Edits		After Census Edits		After HPC Edits		As Reported		After NCHS Edits	
	#	%	#	%	#	%	#	%	#	%
Total	***78.9***	***100%***	***78.9***	***100%***	***78.9***	***100%***	***78.5***	***100.0%***	***78.5***	***100.0%***
ESI	42.5	53.9%	44.2	56.0%	43.5	55.1%	43.1	54.9%	42.7	54.4%
Medicaid/CHIP	21.6	27.4%	23.1	29.3%	25.9	32.8%	24.4	31.1%	25.8	32.8%
PNG	4.3	5.4%	4.3	5.5%	2.8	3.6%	2.7	3.5%	2.7	3.4%
Medicare	0.3	0.4%	0.2	0.3%	0.1	0.1%	0.3	0.3%	0.2	0.3%
Uninsured	10.2	12.9%	7.1	9.0%	6.6	8.4%	7.6	9.7%	6.6	8.5%
Other*							0.5	0.6%	0.5	0.6%

Source: Urban Institute analysis of American Community Survey (ACS) 2009 data from the Integrated Public Use Microdata Series (IPUMS).

The Urban Institute Health Policy Center's ACS Medicaid/CHIP Eligibility Simulation Model and coverage estimates were developed under a grant from the Robert Wood Johnson Foundation.

Notes: Medicaid/CHIP includes Medicaid, CHIP, state, and other public coverage.

ESI is employer-sponsored insurance and includes military. PNG is private nongroup coverage.

"After HPC Edits" estimates reflect an adjustment for the misreporting of coverage on the ACS.

"Before Census Edits" estimates do not contain coverage edits but do include imputation for missing responses, allocation for written-in responses, and editing for partial responses (e.g. only one coverage item checked 'yes').

Insurance type shown hierarchically. Upper panel classifies joint ESI-Medicaid/CHIP cases as Medicaid/CHIP; lower panel classifies joint ESI-Medicaid/CHIP cases as ESI. Numbers shown in millions.

*Other includes don't know, refused, not ascertained.

Exhibit 4. Number and Percent of US Nonelderly Adults (19-64) by Survey, Logical Edit Status, and Health Insurance Type, 2009

	ACS						NHIS			
	Before Census Edits		After Census Edits		After HPC Edits		As Reported		After NCHS Edits	
	#	%	#	%	#	%	#	%	#	%
Total	***184.6***	***100.0%***	***184.6***	***100.0%***	***184.6***	***100.0%***	***184.9***	***100.0%***	***184.9***	***100.0%***
Medicaid/CHIP	14.2	7.7%	16.9	9.2%	18.3	9.9%	16.7	9.0%	17.1	9.3%
ESI	112.2	60.8%	114.8	62.2%	115.9	62.8%	115.8	62.6%	115.0	62.2%
PNG	12.5	6.8%	12.7	6.9%	10.3	5.6%	9.3	5.0%	9.2	5.0%
Medicare	2.1	1.2%	1.9	1.0%	1.8	1.0%	2.9	1.6%	2.8	1.5%
Uninsured	43.6	23.6%	38.4	20.8%	38.3	20.8%	38.7	20.9%	39.2	21.2%
Other*							1.6	0.8%	1.6	0.8%

	ACS						NHIS			
	Before Census Edits		After Census Edits		After HPC Edits		As Reported		After NCHS Edits	
	#	%	#	%	#	%	#	%	#	%
Total	***184.6***	***100.0%***	***184.6***	***100.0%***	***184.6***	***100.0%***	***184.9***	***100.0%***	***184.9***	***100.0%***
ESI	113.2	61.3%	116.8	63.3%	118.2	64.0%	116.3	62.9%	115.7	62.6%
Medicaid/CHIP	13.3	7.2%	14.9	8.1%	16.1	8.7%	16.2	8.8%	16.5	8.9%
PNG	12.5	6.8%	12.7	6.9%	10.3	5.6%	9.3	5.0%	9.2	5.0%
Medicare	2.1	1.2%	1.9	1.0%	1.8	1.0%	2.9	1.6%	2.8	1.5%
Uninsured	43.6	23.6%	38.4	20.8%	38.3	20.8%	38.7	20.9%	39.2	21.2%
Other*							1.6	0.8%	1.6	0.8%

Source: Urban Institute analysis of American Community Survey (ACS) 2009 data from the Integrated Public Use Microdata Series (IPUMS).

The Urban Institute Health Policy Center's ACS Medicaid/CHIP Eligibility Simulation Model and coverage estimates were developed under a grant from the Robert Wood Johnson Foundation.

Notes: Medicaid/CHIP includes Medicaid, CHIP, state, and other public coverage.

ESI is employer-sponsored insurance and includes military. PNG is private nongroup coverage.

"After HPC Edits" estimates reflect an adjustment for the misreporting of coverage on the ACS.

"Before Census Edits" estimates do not contain coverage edits but do include imputation for missing responses, allocation for written-in responses, and editing for partial responses (e.g. only one coverage item checked 'yes').

Insurance type shown hierarchically. Upper panel classifies joint ESI-Medicaid/CHIP cases as Medicaid/CHIP; lower panel classifies joint ESI-Medicaid/CHIP cases as ESI. Numbers shown in millions.

*Other includes don't know, refused, not ascertained.

Exhibit 5A. Number of Medicaid/CHIP-Enrolled US Children (0-18) in Administrative Records (with Full Benefits Only) and the ACS Before and After HPC Edits, by State, 2009

		ACS					
		After Census Edits			After HPC Edits		
State	Admin. Record Total[1]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]
US Total	30,123,345	25,339,842	84.1%		28,110,399	93.3%	
Alabama	485,541	442,528	91.1%		487,551	100.4%	***
Alaska	64,501	57,013	88.4%	***	61,782	95.8%	***
Arizona	646,610	638,956	98.8%	***	703,715	108.8%	
Arkansas	385,788	348,818	90.4%		372,903	96.7%	***
California	4,228,310	3,451,623	81.6%		3,836,874	90.7%	
Colorado	349,448	315,184	90.2%		370,362	106.0%	
Connecticut	260,452	216,789	83.2%		238,297	91.5%	
Delaware	147,619	70,896	48.0%		77,742	52.7%	
District of Columbia	73,626	60,408	82.0%		63,423	86.1%	
Florida	1,684,276	1,367,705	81.2%		1,532,673	91.0%	
Georgia	1,059,418	896,264	84.6%		994,213	93.8%	
Hawaii	98,455	81,727	83.0%		93,872	95.3%	***
Idaho	140,958	129,198	91.7%		148,636	105.4%	***
Illinois	1,471,857	1,202,416	81.7%		1,292,041	87.8%	
Indiana	606,177	490,068	80.8%		540,975	89.2%	
Iowa	237,110	201,988	85.2%		234,204	98.8%	***
Kansas	207,993	187,013	89.9%		213,125	102.5%	***
Kentucky	439,602	401,331	91.3%		440,487	100.2%	***
Louisiana	681,185	529,564	77.7%		563,815	82.8%	
Maine	116,385	112,669	96.8%	***	119,017	102.3%	***
Maryland	450,681	371,634	82.5%		414,603	92.0%	
Massachusetts	495,223	426,609	86.1%		462,942	93.5%	
Michigan	974,314	874,303	89.7%		963,321	98.9%	***
Minnesota	337,991	288,220	85.3%		326,200	96.5%	***
Mississippi	407,492	357,422	87.7%		387,671	95.1%	
Missouri	534,947	459,641	85.9%		523,914	97.9%	***
Montana	68,401	62,976	92.1%	***	74,201	108.5%	***
Nebraska	144,442	127,448	88.2%		144,710	100.2%	***
Nevada	155,266	136,446	87.9%		168,723	108.7%	
New Hampshire	84,085	73,645	87.6%		81,846	97.3%	***
New Jersey	619,026	494,765	79.9%		554,004	89.5%	
New Mexico	300,892	251,958	83.7%		266,058	88.4%	
New York	1,996,340	1,609,783	80.6%		1,780,914	89.2%	
North Carolina	976,868	832,609	85.2%		915,125	93.7%	

		ACS					
		After Census Edits			After HPC Edits		
State	Admin. Record Total[1]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]
North Dakota	36,807	25,397	69.0%		28,784	78.2%	
Ohio	1,063,192	888,816	83.6%		972,383	91.5%	
Oklahoma	431,743	361,433	83.7%		395,196	91.5%	
Oregon	267,602	258,804	96.7%	***	299,813	112.0%	
Pennsylvania	1,193,558	929,369	77.9%		1,040,572	87.2%	
Rhode Island	93,713	74,396	79.4%		81,227	86.7%	
South Carolina	447,740	398,733	89.1%		446,869	99.8%	***
South Dakota	73,708	65,602	89.0%		71,142	96.5%	***
Tennessee	696,368	556,437	79.9%		634,772	91.2%	
Texas	2,859,679	2,438,616	85.3%		2,698,609	94.4%	
Utah	153,939	160,376	104.2%	***	199,304	129.5%	
Vermont	61,599	57,493	93.3%	***	58,671	95.2%	***
Virginia	543,427	418,776	77.1%		482,837	88.9%	
Washington	612,120	545,014	89.0%		601,062	98.2%	***
West Virginia	184,693	161,692	87.5%		174,887	94.7%	***
Wisconsin	425,302	393,187	92.4%		434,578	102.2%	***
Wyoming	46,876	36,084	77.0%		39,754	84.8%	

Source: Urban Institute analysis of American Community Survey (ACS) 2009 data from the Integrated Public Use Microdata Series (IPUMS), Medicaid Statistical Information System (MSIS), and CHIP Statistical Enrollment Data System (SEDS).

The Urban Institute Health Policy Center's ACS Medicaid/CHIP Eligibility Simulation Model and coverage estimates were developed under a grant from the Robert Wood Johnson Foundation.

Notes: "HPC-Edited" estimates reflect an adjustment for the misreporting of coverage on the ACS.

1. Administrative totals include those with full benefits only; those with restricted benefits were excluded.

2. Indicates not significantly different from the administrative record total at the 0.05 level.

Exhibit 5B. Number of Medicaid/CHIP-Enrolled US Children (0-18) in Administrative Records (with Full or Restricted Benefits) and the ACS Before and After HPC Edits, by State, 2009

		ACS					
		After Census Edits			After HPC Edits		
State	Admin. Record Total[1]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]
US Total	30,611,785	25,339,842	82.8%		28,110,399	91.8%	
Alabama	485,708	442,528	91.1%		487,551	100.4%	***
Alaska	64,501	57,013	88.4%	***	61,782	95.8%	***
Arizona	676,871	638,956	94.4%		703,715	104.0%	
Arkansas	388,212	348,818	89.9%		372,903	96.1%	
California	4,577,761	3,451,623	75.4%		3,836,874	83.8%	
Colorado	349,916	315,184	90.1%		370,362	105.8%	
Connecticut	260,452	216,789	83.2%		238,297	91.5%	
Delaware	149,216	70,896	47.5%		77,742	52.1%	
District of Columbia	73,634	60,408	82.0%		63,423	86.1%	
Florida	1,686,612	1,367,705	81.1%		1,532,673	90.9%	
Georgia	1,059,617	896,264	84.6%		994,213	93.8%	
Hawaii	98,455	81,727	83.0%		93,872	95.3%	***
Idaho	140,958	129,198	91.7%		148,636	105.4%	***
Illinois	1,471,860	1,202,416	81.7%		1,292,041	87.8%	
Indiana	613,076	490,068	79.9%		540,975	88.2%	
Iowa	240,781	201,988	83.9%		234,204	97.3%	***
Kansas	208,008	187,013	89.9%		213,125	102.5%	***
Kentucky	439,890	401,331	91.2%		440,487	100.1%	***
Louisiana	681,462	529,564	77.7%		563,815	82.7%	
Maine	116,425	112,669	96.8%	***	119,017	102.2%	***
Maryland	454,298	371,634	81.8%		414,603	91.3%	
Massachusetts	516,574	426,609	82.6%		462,942	89.6%	
Michigan	984,488	874,303	88.8%		963,321	97.8%	***
Minnesota	342,144	288,220	84.2%		326,200	95.3%	***
Mississippi	411,464	357,422	86.9%		387,671	94.2%	
Missouri	535,507	459,641	85.8%		523,914	97.8%	***
Montana	68,496	62,976	91.9%	***	74,201	108.3%	***
Nebraska	144,442	127,448	88.2%		144,710	100.2%	***
Nevada	155,668	136,446	87.7%		168,723	108.4%	
New Hampshire	84,085	73,645	87.6%		81,846	97.3%	***
New Jersey	619,310	494,765	79.9%		554,004	89.5%	
New Mexico	300,997	251,958	83.7%		266,058	88.4%	
New York	2,006,461	1,609,783	80.2%		1,780,914	88.8%	
North Carolina	977,317	832,609	85.2%		915,125	93.6%	

		ACS					
		After Census Edits			After HPC Edits		
State	Admin. Record Total[1]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]
North Dakota	36,807	25,397	69.0%		28,784	78.2%	
Ohio	1,063,195	888,816	83.6%		972,383	91.5%	
Oklahoma	431,880	361,433	83.7%		395,196	91.5%	
Oregon	275,354	258,804	94.0%		299,813	108.9%	
Pennsylvania	1,195,009	929,369	77.8%		1,040,572	87.1%	
Rhode Island	93,723	74,396	79.4%		81,227	86.7%	
South Carolina	450,289	398,733	88.6%		446,869	99.2%	***
South Dakota	73,708	65,602	89.0%		71,142	96.5%	***
Tennessee	696,396	556,437	79.9%		634,772	91.2%	
Texas	2,860,302	2,438,616	85.3%		2,698,609	94.3%	
Utah	154,047	160,376	104.1%	***	199,304	129.4%	
Vermont	61,622	57,493	93.3%	***	58,671	95.2%	***
Virginia	543,536	418,776	77.0%		482,837	88.8%	
Washington	622,258	545,014	87.6%		601,062	96.6%	
West Virginia	193,974	161,692	83.4%		174,887	90.2%	
Wisconsin	427,929	393,187	91.9%		434,578	101.6%	***
Wyoming	47,090	36,084	76.6%		39,754	84.4%	

Source: Urban Institute analysis of American Community Survey (ACS) 2009 data from the Integrated Public Use Microdata Series (IPUMS), Medicaid Statistical Information System (MSIS), and CHIP Statistical Enrollment Data System (SEDS).

The Urban Institute Health Policy Center's ACS Medicaid/CHIP Eligibility Simulation Model and coverage estimates were developed under a grant from the Robert Wood Johnson Foundation.

Notes: "HPC-Edited" estimates reflect an adjustment for the misreporting of coverage on the ACS.

1. Administrative totals include those with full or restricted benefits.

2. Indicates not significantly different from the administrative record total at the 0.05 level.

Exhibit 6A. Number of Medicaid/CHIP-Enrolled US Nonelderly Adults (19-64) in Administrative Records (with Full Benefits Only) and the ACS Before and After HPC Edits, by State, 2009

		ACS					
		After Census Edits			After HPC Edits		
State	Admin. Record Total[1]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]
US Total	15,339,998	16,903,536	110.2%		18,330,379	119.5%	
Alabama	184,446	243,517	132.0%		278,810	151.2%	
Alaska	29,679	31,422	105.9%	***	32,327	108.9%	***
Arizona	495,533	510,365	103.0%	***	534,159	107.8%	
Arkansas	111,440	153,537	137.8%		166,850	149.7%	
California	2,052,052	2,208,746	107.6%		2,350,701	114.6%	
Colorado	140,535	189,640	134.9%		210,458	149.8%	
Connecticut	196,409	197,309	100.5%	***	215,943	109.9%	
Delaware	65,865	65,769	99.9%	***	68,037	103.3%	***
District of Columbia	63,883	79,120	123.9%		80,790	126.5%	
Florida	682,585	794,629	116.4%		869,670	127.4%	
Georgia	338,283	384,196	113.6%		426,545	126.1%	
Hawaii	72,381	70,880	97.9%	***	80,904	111.8%	
Idaho	45,884	56,748	123.7%		66,360	144.6%	
Illinois	814,320	717,676	88.1%		792,650	97.3%	***
Indiana	279,217	303,489	108.7%		353,029	126.4%	
Iowa	150,354	139,836	93.0%	***	154,089	102.5%	***
Kansas	78,382	93,175	118.9%		104,684	133.6%	
Kentucky	238,215	260,502	109.4%		280,053	117.6%	
Louisiana	262,260	234,711	89.5%		259,045	98.8%	***
Maine	141,892	138,674	97.7%	***	141,844	100.0%	***
Maryland	197,278	230,742	117.0%		248,082	125.8%	
Massachusetts	697,008	652,368	93.6%		673,771	96.7%	
Michigan	643,690	723,379	112.4%		777,745	120.8%	
Minnesota	260,713	321,682	123.4%		351,118	134.7%	
Mississippi	138,894	193,190	139.1%		208,903	150.4%	
Missouri	261,996	281,297	107.4%		328,082	125.2%	
Montana	19,667	35,528	180.6%		40,942	208.2%	
Nebraska	49,519	60,869	122.9%		72,501	146.4%	
Nevada	55,066	74,441	135.2%		81,586	148.2%	
New Hampshire	35,811	45,901	128.2%		55,100	153.9%	
New Jersey	297,410	372,594	125.3%		397,662	133.7%	

		ACS					
		After Census Edits			After HPC Edits		
State	Admin. Record Total[1]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]
New Mexico	140,385	142,488	101.5%	***	148,298	105.6%	***
New York	1,540,443	1,721,923	111.8%		1,804,563	117.1%	
North Carolina	429,742	465,812	108.4%		506,747	117.9%	
North Dakota	17,816	18,967	106.5%	***	23,556	132.2%	
Ohio	659,919	684,558	103.7%		769,027	116.5%	
Oklahoma	153,843	150,322	97.7%	***	177,119	115.1%	
Oregon	118,711	164,019	138.2%		188,452	158.7%	
Pennsylvania	691,951	759,252	109.7%		823,873	119.1%	
Rhode Island	74,868	67,733	90.5%		72,977	97.5%	***
South Carolina	200,994	242,171	120.5%		265,460	132.1%	
South Dakota	24,799	30,728	123.9%		35,387	142.7%	
Tennessee	498,327	421,907	84.7%		456,008	91.5%	
Texas	655,901	883,132	134.6%		952,588	145.2%	
Utah	51,366	87,072	169.5%		102,170	198.9%	
Vermont	69,792	63,200	90.6%	***	64,946	93.1%	***
Virginia	200,342	240,129	119.9%		291,292	145.4%	
Washington	247,083	369,516	149.6%		395,225	160.0%	
West Virginia	120,093	130,097	108.3%		135,480	112.8%	
Wisconsin	327,974	375,093	114.4%		393,088	119.9%	
Wyoming	14,982	19,485	130.1%		21,683	144.7%	

Source: Urban Institute analysis of American Community Survey (ACS) 2009 data from the Integrated Public Use Microdata Series (IPUMS), Medicaid Statistical Information System (MSIS), and CHIP Statistical Enrollment Data System (SEDS).

The Urban Institute Health Policy Center's ACS Medicaid/CHIP Eligibility Simulation Model and coverage estimates were developed under a grant from the Robert Wood Johnson Foundation.

Notes: "HPC-Edited" estimates reflect an adjustment for the misreporting of coverage on the ACS.

1. Administrative totals include those with full benefits only; those with restricted benefits were excluded.

2. Indicates not significantly different from the administrative record total at the 0.05 level.

Exhibit 6B. Number of Medicaid/CHIP-Enrolled US Nonelderly Adults (19-64) in Administrative Records (with Full or Restricted Benefits) and the ACS Before and After HPC Edits, by State, 2009

		ACS					
		After Census Edits			After HPC Edits		
State	Admin. Record Total[1]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]
US Total	19,830,355	16,903,536	85.20%		18,330,379	92.40%	
Alabama	276,950	243,517	87.90%		278,810	100.70%	***
Alaska	29,679	31,422	105.90%	***	32,327	108.90%	***
Arizona	586,510	510,365	87.00%		534,159	91.10%	
Arkansas	185,488	153,537	82.80%		166,850	90.00%	
California	4,203,587	2,208,746	52.50%		2,350,701	55.90%	
Colorado	147,196	189,640	128.80%		210,458	143.00%	
Connecticut	196,585	197,309	100.40%	***	215,943	109.80%	
Delaware	80,157	65,769	82.10%		68,037	84.90%	
District of Columbia	65,162	79,120	121.40%		80,790	124.00%	
Florida	837,464	794,629	94.90%		869,670	103.80%	
Georgia	383,969	384,196	100.10%	***	426,545	111.10%	
Hawaii	73,074	70,880	97.00%	***	80,904	110.70%	
Idaho	46,393	56,748	122.30%		66,360	143.00%	
Illinois	880,640	717,676	81.50%		792,650	90.00%	
Indiana	320,802	303,489	94.60%		353,029	110.00%	
Iowa	174,675	139,836	80.10%		154,089	88.20%	
Kansas	85,220	93,175	109.30%		104,684	122.80%	
Kentucky	265,810	260,502	98.00%	***	280,053	105.40%	***
Louisiana	325,305	234,711	72.20%		259,045	79.60%	
Maine	147,879	138,674	93.80%	***	141,844	95.90%	***
Maryland	296,065	230,742	77.90%		248,082	83.80%	
Massachusetts	729,966	652,368	89.40%		673,771	92.30%	
Michigan	699,593	723,379	103.40%		777,745	111.20%	
Minnesota	279,948	321,682	114.90%		351,118	125.40%	
Mississippi	203,489	193,190	94.90%		208,903	102.70%	***
Missouri	284,699	281,297	98.80%	***	328,082	115.20%	
Montana	28,033	35,528	126.70%		40,942	146.00%	
Nebraska	50,793	60,869	119.80%		72,501	142.70%	
Nevada	62,349	74,441	119.40%		81,586	130.90%	
New Hampshire	39,093	45,901	117.40%		55,100	140.90%	
New Jersey	318,655	372,594	116.90%		397,662	124.80%	
New Mexico	170,135	142,488	83.70%		148,298	87.20%	
New York	2,241,868	1,721,923	76.80%		1,804,563	80.50%	
North Carolina	493,373	465,812	94.40%		506,747	102.70%	***
North Dakota	19,034	18,967	99.60%	***	23,556	123.80%	

		ACS					
		After Census Edits			After HPC Edits		
State	Admin. Record Total[1]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]	Number	Pct. of Ad. Rec. Ttl.	Not Signif. Diff.[2]
Ohio	705,428	684,558	97.00%	***	769,027	109.00%	
Oklahoma	186,151	150,322	80.80%		177,119	95.10%	***
Oregon	165,679	164,019	99.00%	***	188,452	113.70%	
Pennsylvania	732,689	759,252	103.60%		823,873	112.40%	
Rhode Island	75,967	67,733	89.20%		72,977	96.10%	***
South Carolina	251,601	242,171	96.30%	***	265,460	105.50%	***
South Dakota	27,184	30,728	113.00%	***	35,387	130.20%	
Tennessee	514,048	421,907	82.10%		456,008	88.70%	
Texas	735,677	883,132	120.00%		952,588	129.50%	
Utah	73,879	87,072	117.90%		102,170	138.30%	
Vermont	74,971	63,200	84.30%		64,946	86.60%	
Virginia	234,897	240,129	102.20%	***	291,292	124.00%	
Washington	314,302	369,516	117.60%		395,225	125.70%	
West Virginia	132,932	130,097	97.90%	***	135,480	101.90%	***
Wisconsin	358,868	375,093	104.50%		393,088	109.50%	
Wyoming	16,444	19,485	118.50%	***	21,683	131.90%	

Source: Urban Institute analysis of American Community Survey (ACS) 2009 data from the Integrated Public Use Microdata Series (IPUMS), Medicaid Statistical Information System (MSIS), and CHIP Statistical Enrollment Data System (SEDS).

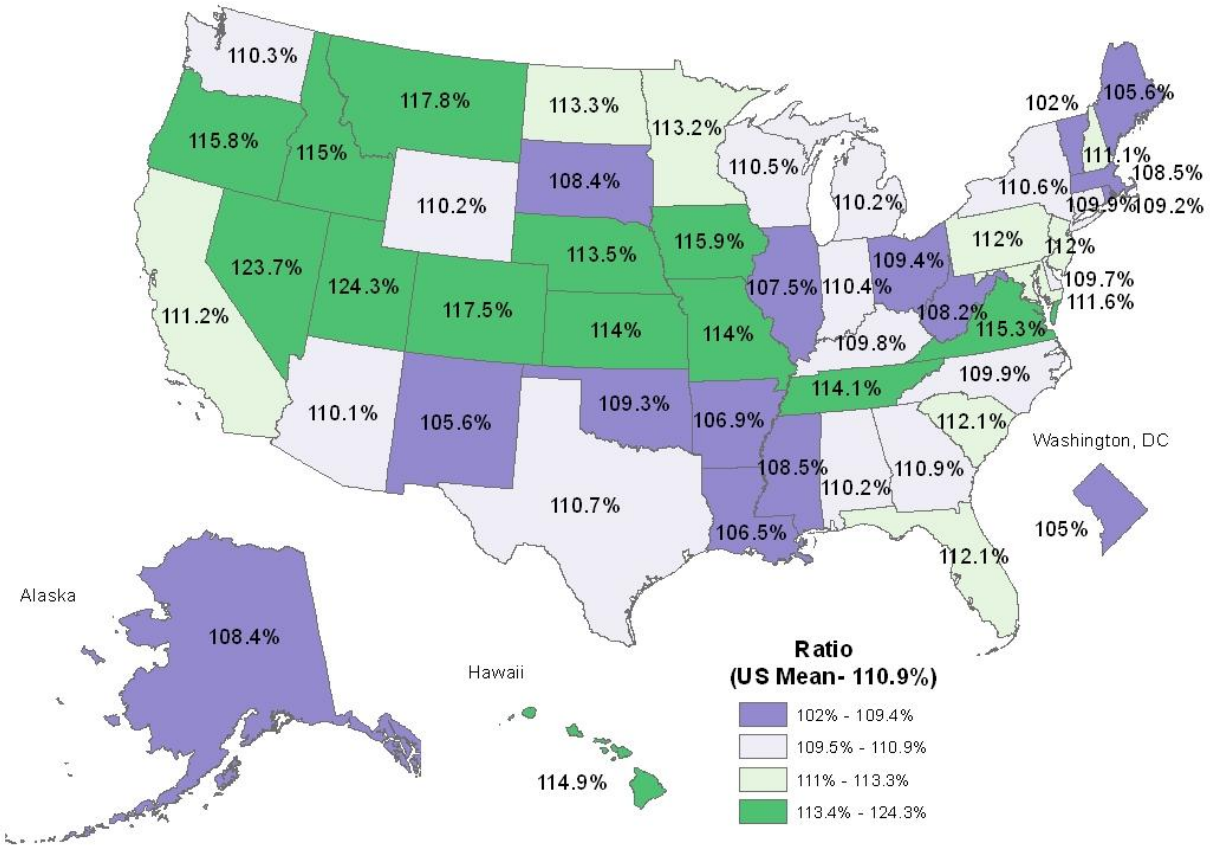
The Urban Institute Health Policy Center's ACS Medicaid/CHIP Eligibility Simulation Model and coverage estimates were developed under a grant from the Robert Wood Johnson Foundation.

Notes: "HPC-Edited" estimates reflect an adjustment for the misreporting of coverage on the ACS.

1. Administrative totals include those with full or restricted benefits.

2. Indicates not significantly different from the administrative record total at the 0.05 level.

Exhibit 7. Ratio of HPC-Edited Medicaid/CHIP Enrollment Counts to Census-Edited Enrollment Counts, US Children (0-18), 2009

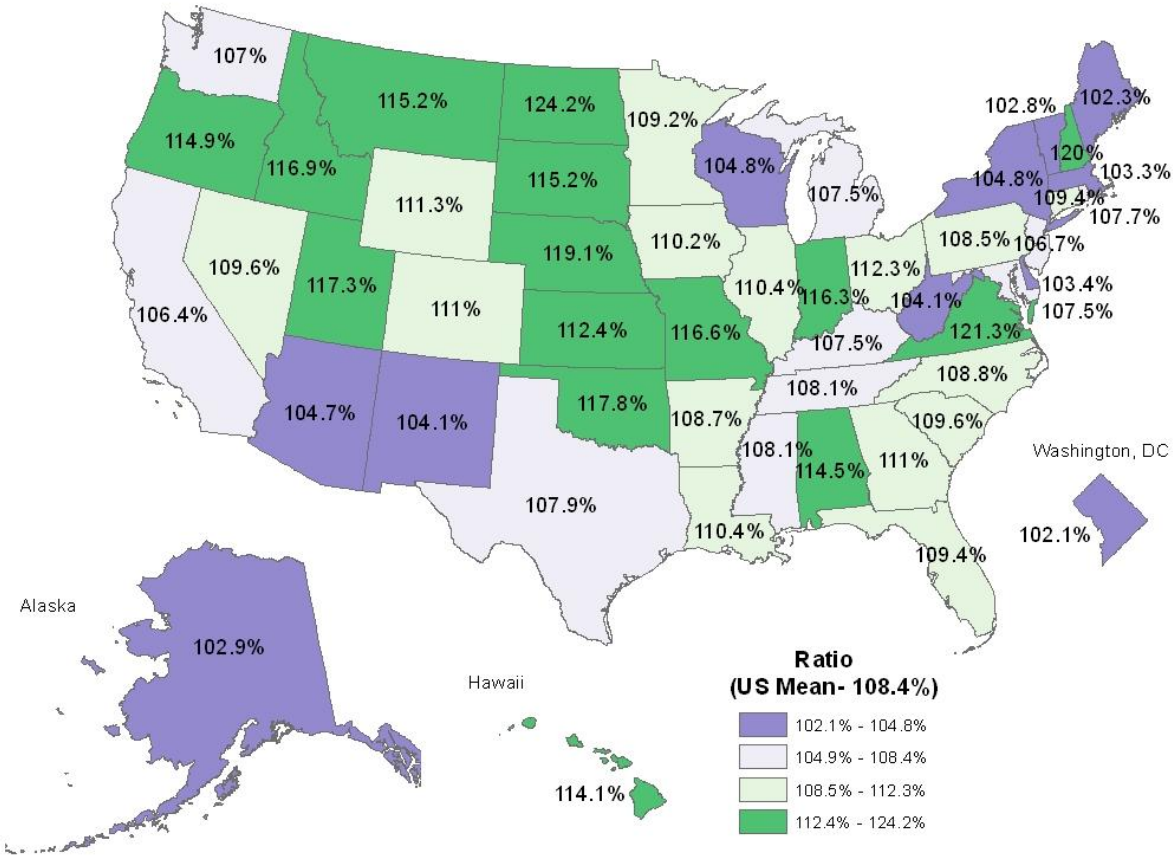


Source: Urban Institute analysis of American Community Survey (ACS) 2009 data from the Integrated Public Use Microdata Series (IPUMS).

The Urban Institute Health Policy Center's ACS Medicaid/CHIP Eligibility Simulation Model and coverage estimates were developed under a grant from the Robert Wood Johnson Foundation.

Notes: "HPC-Edited" estimates reflect an adjustment for the misreporting of coverage on the ACS.
Medicaid/CHIP includes Medicaid, CHIP, state, and other public coverage.

Exhibit 8. Ratio of HPC-Edited Medicaid/CHIP Enrollment Counts to Census-Edited Enrollment Counts, US Nonelderly Adults (19-64), 2009



Source: Urban Institute analysis of American Community Survey (ACS) 2009 data from the Integrated Public Use Microdata Series (IPUMS).

The Urban Institute Health Policy Center's ACS Medicaid/CHIP Eligibility Simulation Model and coverage estimates were developed under a grant from the Robert Wood Johnson Foundation.

Notes: "HPC-Edited" estimates reflect an adjustment for the misreporting of coverage on the ACS.
Medicaid/CHIP includes Medicaid, CHIP, state, and other public coverage.

Exhibit 9. Number and Percent of Medicaid/CHIP-Enrolled US Children (0-18) in the ACS Before and After HPC Edits, by Selected Characteristics, 2009

Characteristic	After Census Edits			After HPC Edits		
	Number	Pct. of Total	Enrl. Rate	Number	Pct. of Total	Enrl. Rate
Age						
< 1	1,789,581	7.1%	44.1%	1,917,888	6.8%	47.3%
1 to 5	8,193,152	32.3%	38.8%	8,908,485	31.7%	42.2%
6 to 12	8,986,602	35.5%	31.7%	10,017,063	35.6%	35.3%
13 to 18	6,370,507	25.1%	25.1%	7,266,963	25.9%	28.6%
Sex						
Male	12,905,605	50.9%	32.0%	14,343,608	51.0%	35.5%
Female	12,434,237	49.1%	32.3%	13,766,791	49.0%	35.7%
Citizenship Status						
US Citizen-Native	24,489,284	96.6%	32.3%	27,204,641	96.8%	35.9%
US Citizen-Naturalized	155,753	0.6%	23.9%	183,380	0.7%	28.2%
Non-Citizen, 0-5 Years	378,143	1.5%	29.5%	389,491	1.4%	30.3%
Non-Citizen, 6-10 Years	223,871	0.9%	27.4%	234,417	0.8%	28.7%
Non-Citizen, 11+ Years	92,791	0.4%	27.9%	98,470	0.4%	29.6%
Race/Ethnicity						
White Only	9,413,353	37.1%	21.6%	10,842,210	38.6%	24.8%
Hispanic Only	8,296,132	32.7%	47.4%	8,950,140	31.8%	51.2%
Black Only	5,580,951	22.0%	51.3%	6,054,399	21.5%	55.6%
Asian Only	686,334	2.7%	21.3%	777,189	2.8%	24.2%
Pacific Islander Only	43,349	0.2%	37.8%	48,607	0.2%	42.4%
American Indian/Alaskan Native Only	271,931	1.1%	47.2%	288,884	1.0%	50.1%
Other/Multiple	1,047,792	4.1%	35.5%	1,148,970	4.1%	38.9%
Income/Poverty Thresh. Ratio						
< 51% FPL	8,612,339	34.0%	71.9%	9,205,963	32.7%	76.8%
51%-100% FPL	6,232,368	24.6%	70.6%	6,730,068	23.9%	76.3%
101%-138% FPL	3,583,326	14.1%	55.8%	3,995,678	14.2%	62.2%
139%-250% FPL	4,892,413	19.3%	30.5%	5,763,141	20.5%	35.9%
251%-400% FPL	1,345,704	5.3%	9.1%	1,574,068	5.6%	10.7%
401%+ FPL	598,097	2.4%	3.0%	759,686	2.7%	3.8%
Linguistic Isolation						
No	22,411,362	88.4%	30.3%	25,024,259	89.0%	33.8%
Yes	2,928,480	11.6%	58.8%	3,086,140	11.0%	62.0%

Characteristic	After Census Edits			After HPC Edits		
	Number	Pct. of Total	Enrl. Rate	Number	Pct. of Total	Enrl. Rate
Language						
English	11,883,843	46.9%	26.0%	13,528,485	48.1%	29.6%
Spanish	3,933,616	15.5%	45.4%	4,248,616	15.1%	49.0%
Chinese	102,614	0.4%	25.1%	116,981	0.4%	28.6%
Indic	83,279	0.3%	25.4%	95,274	0.3%	29.1%
Filipino	23,610	0.1%	15.7%	26,275	0.1%	17.5%
Korean	27,312	0.1%	16.5%	33,604	0.1%	20.3%
Vietnamese	85,061	0.3%	35.6%	93,259	0.3%	39.0%
Other	9,200,507	36.3%	39.5%	9,967,905	35.5%	42.8%
SNAP Enrollment						
No	11,859,863	46.8%	18.9%	13,848,718	49.3%	22.0%
Yes	13,479,979	53.2%	83.7%	14,261,681	50.7%	88.5%
Region						
New England	961,601	3.8%	28.4%	1,042,000	3.7%	30.8%
Middle Atlantic	3,033,917	12.0%	30.9%	3,375,490	12.0%	34.4%
East North Central	3,848,790	15.2%	32.6%	4,203,298	15.0%	35.7%
West North Central	1,355,309	5.3%	26.2%	1,542,079	5.5%	29.8%
South Atlantic	4,578,717	18.1%	31.0%	5,102,372	18.2%	34.6%
East South Central	1,757,718	6.9%	37.7%	1,950,481	6.9%	41.8%
West South Central	3,678,431	14.5%	36.2%	4,030,523	14.3%	39.7%
Mountain	1,731,178	6.8%	28.3%	1,970,753	7.0%	32.2%
Pacific	4,394,181	17.3%	33.6%	4,893,403	17.4%	37.4%
Area						
Northeast	3,995,518	15.8%	30.3%	4,417,490	15.7%	33.5%
Midwest	5,204,099	20.5%	30.7%	5,745,377	20.4%	33.9%
South	10,014,866	39.5%	33.9%	11,083,376	39.4%	37.5%
West	6,125,359	24.2%	31.9%	6,864,156	24.4%	35.8%

Source: Urban Institute analysis of American Community Survey (ACS) 2009 data from the Integrated Public Use Microdata Series (IPUMS).

The Urban Institute Health Policy Center's ACS Medicaid/CHIP Eligibility Simulation Model and coverage estimates were developed under a grant from the Robert Wood Johnson Foundation.

Notes: "HPC-Edited" estimates reflect an adjustment for the misreporting of coverage on the ACS.

Linguistic isolation, language of interview, and SNAP (formerly food stamps) enrollment are household-level indicators.

Family poverty level (gross income compared with the Census Bureau's poverty thresholds) is a family-level indicator, where families were defined based on the health insurance unit (HIU).

Exhibit 10. Number and Percent of Medicaid/CHIP-Enrolled US Nonelderly Adults (19-64) in the ACS Before and After HPC Edits, by Selected Characteristics, 2009

Characteristic	After Census Edits			After HPC Edits		
	Number	Pct. of Total	Enrl. Rate	Number	Pct. of Total	Enrl. Rate
Age						
19 to 24	2,737,611	16.2%	10.9%	2,888,800	15.8%	11.5%
25 to 34	4,226,693	25.0%	10.6%	4,489,263	24.5%	11.2%
35 to 54	7,112,159	42.1%	8.4%	7,785,128	42.5%	9.2%
55 to 64	2,827,073	16.7%	8.2%	3,167,188	17.3%	9.2%
Sex						
Male	6,570,516	38.9%	7.2%	7,199,877	39.3%	7.9%
Female	10,333,020	61.1%	11.0%	11,130,502	60.7%	11.9%
Citizenship Status						
US Citizen-Native	14,298,226	84.6%	9.3%	15,560,698	84.9%	10.1%
US Citizen-Naturalized	1,108,073	6.6%	8.8%	1,221,032	6.7%	9.7%
Non-Citizen, 0-5 Years	372,593	2.2%	7.8%	385,224	2.1%	8.1%
Non-Citizen, 6-10 Years	335,258	2.0%	7.4%	349,879	1.9%	7.7%
Non-Citizen, 11+ Years	789,386	4.7%	9.4%	813,546	4.4%	9.7%
Race/Ethnicity						
White Only	8,749,896	51.8%	7.2%	9,718,693	53.0%	8.0%
Hispanic Only	3,120,110	18.5%	11.3%	3,253,215	17.7%	11.8%
Black Only	3,754,288	22.2%	17.2%	3,980,245	21.7%	18.2%
Asian Only	660,765	3.9%	7.3%	723,491	3.9%	8.0%
Pacific Islander Only	35,437	0.2%	13.4%	38,650	0.2%	14.6%
American Indian/Alaskan Native Only	210,601	1.2%	17.8%	220,778	1.2%	18.6%
Other/Multiple	372,439	2.2%	13.3%	395,307	2.2%	14.1%
Income/Poverty Thresh. Ratio						
< 51% FPL	4,629,965	27.4%	24.8%	4,919,738	26.8%	26.4%
51%-100% FPL	5,326,773	31.5%	33.3%	5,648,694	30.8%	35.3%
101%-138% FPL	2,168,212	12.8%	18.0%	2,428,974	13.3%	20.2%
139%-250% FPL	2,596,999	15.4%	8.1%	3,048,448	16.6%	9.5%
251%-400% FPL	985,443	5.8%	2.7%	1,028,545	5.6%	2.9%
401%+ FPL	657,087	3.9%	1.0%	691,804	3.8%	1.0%
Linguistic Isolation						
No	15,804,345	93.5%	9.0%	17,184,893	93.8%	9.8%
Yes	1,099,191	6.5%	11.7%	1,145,486	6.2%	12.2%
Language						
English	12,921,397	76.4%	8.9%	14,114,926	77.0%	9.7%
Spanish	2,623,481	15.5%	11.1%	2,743,477	15.0%	11.6%
Chinese	178,298	1.1%	9.9%	194,151	1.1%	10.7%
Indic	108,080	0.6%	7.4%	119,084	0.6%	8.2%
Filipino	51,636	0.3%	4.2%	56,475	0.3%	4.6%
Korean	32,421	0.2%	4.3%	36,244	0.2%	4.8%
Vietnamese	111,275	0.7%	12.6%	122,772	0.7%	13.9%
Other	876,948	5.2%	9.9%	943,250	5.1%	10.7%

Characteristic	After Census Edits			After HPC Edits		
	Number	Pct. of Total	Enrl. Rate	Number	Pct. of Total	Enrl. Rate
Educational Achievement						
Less than High School	5,078,942	30.0%	22.3%	5,302,922	28.9%	23.3%
Diploma or Equivalent	5,990,735	35.4%	12.0%	6,455,843	35.2%	12.9%
Some College	3,835,104	22.7%	8.3%	4,204,263	22.9%	9.1%
Associate's Degree	862,253	5.1%	5.8%	978,838	5.3%	6.6%
Bachelor's Degree or Higher	1,136,502	6.7%	2.2%	1,388,513	7.6%	2.7%
SNAP Enrollment						
No	8,088,969	47.9%	4.9%	9,122,383	49.8%	5.6%
Yes	8,814,567	52.1%	42.1%	9,207,996	50.2%	43.9%
Employment Sector						
Public	579,358	3.4%	6.1%	623,568	3.4%	6.5%
Private	5,887,109	34.8%	9.3%	6,326,933	34.5%	10.0%
Other	507,243	3.0%	9.1%	584,270	3.2%	10.5%
None	4,968,412	29.4%	41.4%	5,240,237	28.6%	43.6%
Employment Type						
Full-Time Worker	2,857,972	16.9%	2.8%	3,138,628	17.1%	3.1%
Part-Time Worker	2,720,154	16.1%	9.1%	3,045,653	16.6%	10.2%
Unemployed	2,175,006	12.9%	15.8%	2,299,950	12.5%	16.7%
Not in Labor Force	9,150,404	54.1%	23.3%	9,846,148	53.7%	25.1%
Region						
New England	1,165,185	6.9%	13.0%	1,224,581	6.7%	13.7%
Middle Atlantic	2,853,769	16.9%	11.4%	3,026,098	16.5%	12.1%
East North Central	2,804,195	16.6%	10.0%	3,085,539	16.8%	11.0%
West North Central	946,554	5.6%	7.8%	1,069,417	5.8%	8.8%
South Atlantic	2,632,665	15.6%	7.5%	2,892,103	15.8%	8.2%
East South Central	1,119,116	6.6%	10.2%	1,223,774	6.7%	11.2%
West South Central	1,421,702	8.4%	6.7%	1,555,602	8.5%	7.4%
Mountain	1,115,767	6.6%	8.5%	1,205,656	6.6%	9.2%
Pacific	2,844,583	16.8%	9.5%	3,047,609	16.6%	10.2%
Area						
Northeast	4,018,954	23.8%	11.9%	4,250,679	23.2%	12.6%
Midwest	3,750,749	22.2%	9.3%	4,154,956	22.7%	10.3%
South	5,173,483	30.6%	7.7%	5,671,479	30.9%	8.4%
West	3,960,350	23.4%	9.2%	4,253,265	23.2%	9.9%
Disability Status						
Has a Disability	6,336,198	37.5%	34.8%	6,955,468	37.9%	38.2%
Does Not Have a Disability	10,567,338	62.5%	6.3%	11,374,911	62.1%	6.8%

Source: Urban Institute analysis of American Community Survey (ACS) 2009 data from the Integrated Public Use Microdata Series (IPUMS).

The Urban Institute Health Policy Center's ACS Medicaid/CHIP Eligibility Simulation Model and coverage estimates were developed under a grant from the Robert Wood Johnson Foundation.

Notes: "HPC-Edited" estimates reflect an adjustment for the misreporting of coverage on the ACS.

Linguistic isolation, language of interview, and SNAP (formerly food stamps) enrollment are household-level indicators.

Family poverty level (gross income compared with the Census Bureau's poverty thresholds), educational achievement, employment sector, and employment type are family-level indicators, where families were defined based on the health insurance unit (HIU).

Appendix Exhibit 1. Detailed Summary of Logical Coverage Edit Rules for ACS Medicaid/CHIP and Uninsurance Estimates, US Children (0-18), 2009

Row in Table 1	Rule	Explanation
0	No HPC edit	Value as released to the public after Census performs logical coverage editing.
1	Refined Census rules	See Census working paper[a] but note that we use the modifed version discussed among the edit group for implementation in 2010 ACS (apply SSI rule regardless of state and require spouses of Medicaid enrollees to have children and no family member in SSI and spouses of public assistance enrollees to have children). We also find more children with parents because we use augmented relationship data.[b] We also edit children with public-assistance income (not just those with parents with public-assistance income). We also edit children if their parent is edited to Medicaid for a reason other than SSI.
	Child is identified as eligible for Medicaid or CHIP…	Eligibility is from a simulation model using state eligibility rules combined with income, relationship, citizenship and other variables.
2	Eligible child has no coverage reported and has a sibling enrollee. Restricted to: citizens or children with the same citizenship status as the enrollee sibling.	We assume these eligible children are misreported enrollees because siblings usually qualify for coverage on the same basis as one another and the intake process usually asks about other members of the family who may be eligible. A child may qualify on account of disability that a sibling does not have, however those families are usually poor enough for other children to qualify on a poverty basis. Older siblings do not always qualify for the Medicaid that younger siblings qualify for; however, they would qualify for CHIP if their younger sibling qualifies for Medicaid. Since states sometimes exclude noncitizens, we restrict the edit to citizens unless the enrolled child is a noncitizen (implying that it is a state that does not exclude noncitizens).
3	Eligible child has ESI or nongroup reported and has a sibling enrollee and no parent with ESI or nongroup.	Same as above.
4	Eligible child has military reported but no parent with military coverage (after editing military personnel and some of their spouses to military coverage). Restricted to children who do not have evidence of possible coverage from outside the household (proxy indicator: has a single parent with "other income" or does not live with parents) and do not also have VA reported.	We assume these eligible children are misreported enrollees because a parent must be in the military for a civilian child to get coverage. The exclusion of children who have single parents with "other income" is to avoid editing children who may get military coverage through a non-resident parent, with the possible evidence being that child support is one of the types of income the ACS indicates should be included in the "other income" question. We believe this exclusion (here and in the edits below) is quite conservative because other types of income are included in the item and just because a nonresident parents provides monetary supports does not mean the parent is providing insurance coverage. The restriction to children living with their parents is meant to exclude children who may get coverage through another guardian. All edits are restricted to civilians so this edit would not be performed on 18-year olds in the military.
5	Eligible child has ESI reported but no parent with ESI; excluding children who might have coverage from outside the household (i.e, with single parents who have "other income" and children not living with parents).	We assume these eligible children are misreported enrollees because a parent usually has ESI if a child does (since eligibility comes through the parent). The exclusion is to avoid editing children who may get ESI through a non-resident parent or other guardian or on their own.
6	Eligible child has Medicare reported but no parent has it; excluding children who might have coverage from outside the household (i.e, with single parents who have "other income" and children not living with parents).	We assume these eligible children are misreported enrollees because children usually qualify for Medicare through their parents. It is unlikely that a child would be eligible for the Medicare of a non-resident parent but we exclude children who may have supports from a nonresident parent as well as children who may somehow get Medicare on their own or through a guardian.

Row in Table 1	Rule	Explanation
7	Eligible child has nongroup reported and a parent who we edited to Medicaid for reasons other than implied enrollment based on reported SSI (i.e., reported cash assistance or SNAP or family member in Medicaid and low income).	Since we know many respondents report nongroup who do not have it and we know many respondents do not report Medicaid enrollment, we believe that Medicaid is sometimes misclassified as nongroup in ACS. Nongroup coverage usually costs several hundred dollars a month so we assume many low-income people cannot afford it. We also assume families enrolled in public assistance programs are relatively likely to know about Medicaid and to be eligible.
8	Eligible child has nongroup (after editing for logical ESI) and child is a parent.	We assume this is misreported Medicaid/CHIP because minor parents and their children have relatively more access to Medicaid/CHIP and the minor's child will not qualify for military/ESI through the minor's parent. Also it is unlikely that someone would be willing or able to afford to buy coverage for an eligible child.
9	Eligible child has nongroup (after editing for logical ESI) is not living with parents but is not in college and is in a SNAP household.	We do not have dependency status or parental income to evaluate eligibility of children who are not living with their parents. However we can tell that many are likely college students and since college students often get nongroup coverage through their school and come from families with moderate to high incomes, we do not edit them unless they also have a disability. Ones with disabilities may be edited because college coverage is not considered very comprehensive and children with disabilities have more access to coverage through Medicaid/CHIP. We edit non-college sample children without parents if they are living in a food stamp household because it's evidence that the child is in a low-income environment and the household has some awareness of public assistance programs. As with all the nongroup edits, these edits are made with the recognition that nongroup on the ACS is hugely over-reported.
10	Eligible child has nongroup (after editing for logical ESI) and a parent and not any one of following conditions: Disability, possible coverage from outside household, a parent with nongroup or military coverage, a parent with a full-time public-sector job, a parent with ESI and a full-time private-sector job if no one in household has SNAP, a parent with full-time self-employment and no one in household has SNAP, or both parents were employed part of year.	We assume many eligible nongroup children are misreported enrollees because being low-income is one of the main criterion for eligibility and thus eligibility implies that that their families probably cannot afford to buy coverage. However, to be conservative we do not edit sample children with reported nongroup if their parents also have nongroup (after editing away likely misreported nongroup). This is because we expect families to be more likely to buy a family policy than just a policy for the child so we think it is more likely that child-only reported nongroup is misreported Medicaid/CHIP (particularly because families sometimes pay a premium for their child's Medicaid/CHIP). We also do not usually edit if a parent has military or has a full-time public sector job because we believe virtually all those children are eligible for military/ESI and it is unlikely that a low-income family would buy private coverage for a child eligible for subsidized coverage. We also do not edit if there is a parent with a full-time private-sector job with ESI and no one has SNAP because we think it is likely that nongroup is misreported ESI and that it is possible that the family really is buying nongroup for the child. We also exclude children with self-employed parents unless there is evidence of means-tested assistance, to avoid editing children who really are covered by nongroup coverage (self-employed have high rates of nongroup coverage and even if low-income they may be able to afford to purchase coverage at better rates through assocations). And we do not edit if children have two parents who were employed part of the year because between two, we expect that they have COBRA or purchase coverage with assets that our model could miss (also many states have waiting periods for Medicaid/CHIP coverage so having a parent with recent employment makes it less likely that the child would have been able to enroll even if they were found otherwise eligible).
11	Eligible child has nongroup (after editing for logical ESI) and is enrolled in SNAP or cash public assistance.	We assume these eligible children are misreported Medicaid enrollees because people in means-tested assistance programs cannot usually afford to buy private coverage and it is unlikely that someone would buy it for a child who is eligible for Medicaid.
12	Eligible child has Medicare reported but does not live with parents or have a disability.	We assume eligible children with no disability and reported Medicare are misreported Medicaid/CHIP enrollees because children are rarely eligible for Medicare and when they are it is usually through their parent. Also survey respondents often confuse Medicare with Medicaid.

Row in Table 1	Rule	Explanation
13	Eligible child has ESI reported and no indication of coverage from outside the household but no one in the family has full-time employment and the family has SNAP or cash public assistance.	We assume these eligible children have Medicaid/CHIP and not ESI because it is rare for part-time employees to have ESI, especially when they are poor enough to qualify for public assistance programs. with no disability and reported Medicare are misreported Medicaid/CHIP enrollees because children are rarely eligible for Medicare and when they are it is usually through their parent. Also survey respondents often confuse Medicare with Medicaid.
14	Child is not found eligible but is immigrant-eligible for Medicaid/CHIP and has a parent who was married in the past year or no parent was employed most/all of the year or has military coverage.	We assume these children are misreported Medicaid/CHIP cases because they have anomolous reports of coverage and appear to have been eligible earlier in the year.
15	Child is not found eligible but is immigrant-eligible for Medicaid/CHIP, has HIU poverty ratio of less than 400 percent, is in a SNAP household and no parent has military coverage.	We assume these children are misreported Medicaid/CHIP cases because they have anomolous reports of coverage and could be misidentified as ineligible.
16	Child is not found eligible but is in a SNAP household with HIU poverty ratio of less than 400 percent, and no parent has military coverage.	We assume these children are misreported Medicaid/CHIP cases because they have anomolous reports of coverage and could be misidentified as ineligible and immigrant ineligible.

[a]Lynch, V., Boudreaux, M., Davern, M., "Applying and Evaluating Logical Coverage Edits to Health Insurance Coverage in the American Community Survey", Census Bureau, Housing and Household Economic Statistics Division, forthcoming.

[b]Some are from the Integrated Public Use Microdata Series (IPUMS), prepared by the University of Minnesota Population Center, and others use program participation, recent birth, and unmarried partnership to identify likely parents.

[c]Child is age 0-18 and single and childless unless otherwise noted.

Appendix Exhibit 2. Detailed Summary of Logical Edit Rules for ACS Medicaid/CHIP and Uninsurance Estimates, US Nonelderly Adults (19-64), 2009

Row in Table 2	Rule	Explanation
0	No HPC edit	Value as released to the public after Census performs logical coverage editing.
1	Refined Census rules	See Census working paper[a] but note that we use the modifed version discussed among the Technical Assistance Group for implementation in 2010 ACS (e.g., apply SSI rule regardless of state and require spouses of Medicaid enrollees to have children and no family member in SSI and spouses of public assistance enrollees to have children).
2	19 or 20 year old in poverty with nongroup and ESI with SNAP/cash assistance and a parent but none with nongroup or ESI	We assume these sample cases are misclassified Medicaid enrollees because low income 19 and 20 year olds are often eligible for Medicaid and there is no apparent source for the nongroup and ESI. Being in a means-tested assistance program suggests that they cannot afford to buy nongroup coverage. And having no parent with ESI or nongroup suggests they do not get those types of coverge from a parent. And it is rare for a low-income young person to have a job with insurance benefits.
3	Has nongroup and ESI and SNAP/cash assistance and not in an HIU with a full-time worker.	We assume these sample cases are misclassified Medicaid enrollees because people with low enough incomes to be in a means-tested assistance program are often eligible for Medicaid and there is no apparent source for the reported coverage. Low-income people do not often have the type of part-time job that offers insurance benefits. Also being in a means-tested assistance program suggests that they cannot afford to buy nongroup coverage.
4	Has nongroup, FPL less than 200%, and is a citizen with a functional limitation.	We assume these are misclassified Medicaid enrollees because low-income people with disabilities can often qualify for Medicaid and it's unlikely that low-income people can afford to buy nongroup coverage.
5	Has nongroup, FPL less than 200%, and cash assistance or SNAP.	We assume these are misclassified Medicaid enrollees because people in families that have low enough incomes for some members to be enrolled in Medicaid are unlikely to be able to afford nongroup coverage.
6	Has nongroup, FPL less than 200%, and is a citizen in an HIU with a Medicaid enrollee.	We assume these are misclassified Medicaid enrollees because people in a means-tested program often eligible and knowledgeable about Medicaid. It's also unlikely that low-income people can afford to buy nongroup coverage. The eligibility determination process also usually considers all members of a family and in these cases may be finding that the "nongroup" family member must pay a premium to be in Medicaid.
7	Has nongroup, FPL less than 200%, and is not in an HIU with a worker who is full-time public-sector, self-employed, or unemployed.	We assume these are misclassified Medicaid enrollees because it is unlikely that low-income people can afford nongroup and there is apparent source for misclassification with a non-Medicaid source of coverage. Also Medicaid appears to be misclassified more frequently than other major types of coverage.

[a]Lynch, V., Boudreaux, M., Davern, M., "Applying and Evaluating Logical Coverage Edits to Health Insurance Coverage in the American Community Survey", Census Bureau, Housing and Household Economic Statistics Division, forthcoming.