This document describes the **Urban Institute Health Policy Center’s Medicaid/CHIP Eligibility Simulation Model based on the American Community Survey (ACS) and the Puerto Rico Community Survey (PRCS)**. The model is a microsimulation that uses local-area rules about Medicaid/CHIP eligibility to approximate adults’ and children’s eligibility for Medicaid and CHIP. The model was first developed under a grant from the Robert Wood Johnson Foundation (RWJF) and builds on a model developed for the Current Population Survey Annual Social and Economic Supplement (CPS-ASEC) by Lisa Dubay and Allison Cook. It has been used to simulate eligibility in the 50 states and Washington DC for the years 2008-2012 (before the Affordable Care Act [ACA] was implemented) and 2014 (simulating the new coverage provisions of the ACA). It has also been used to simulate eligibility in Puerto Rico in 2011 and enrollment under hypothetical statehood. Results from the model have been used in a variety of reports and publications (e.g., Kenney et al. 2010, 2011, 2012). Below we describe the ACS and PRCS, explain the data edits we apply, and discuss how we identify eligibility for both children and adults.

**American Community Survey (ACS)**

The ACS is an annual survey fielded by the U.S. Census Bureau. We use an augmented version of the ACS prepared by the University of Minnesota Population Center. Known as the Integrated Public Use Microdata Sample (IPUMS), it employs the public use sample of the ACS and contains edits for family relationships and other variables (Ruggles et al. 2010). The 2009 ACS has a reported household response rate of 98.0 percent, ranging from 94.9 percent in the District of Columbia to 99.4 percent in Indiana and Wisconsin (U.S. Census Bureau 2012). The survey uses an area frame that includes households with and without telephones (land line or cellular). It is a mixed-mode survey that starts with a mail-back questionnaire—52.7 percent of the civilian noninstitutionalized sample was completed by mail in 2009 (Mach and O’Hara 2011)—and is followed by telephone interviews for initial nonresponders; it is further followed by in-person interviews for a subsample of remaining nonresponders (Griffin and Hughes 2010). We restrict our estimates to the civilian noninstitutionalized population.

In 2008, a question was added to the ACS to ask respondents about coverage of each individual in their households by any of the following types of health insurance or health 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 (respondents are asked to specify).

Multiple types of coverage can be identified for each person, and people identified as not having coverage under categories a through f (or recoded to another category from the write-in option, category h) are considered uninsured (Turner and Boudreaux 2010). Since the data are collected continuously over a 12-month period, the coverage estimates represent an average day in the calendar year.

With the exception of private nongroup coverage and, to a lesser extent, Medicaid, research suggests that the ACS coverage estimates released by the Census Bureau are generally valid for policy purposes (Boudreaux et al. 2011), with estimates for the other coverage categories fairly similar to those from the CPS-ASEC and the National Health Interview Survey (NHIS) (Turner and Boudreaux 2010), which are commonly used to study insurance coverage.

In an effort to correct for the apparent misclassification of private nongroup coverage and Medicaid/CHIP in the ACS, and to define coverage as including only comprehensive health insurance as opposed to single-service plans (e.g., dental coverage), we developed a set of logical coverage edits that are applied if other information collected in the ACS implies that coverage for a sample case likely has been misclassified (Lynch et al. 2011; Lynch and Kenney 2011). We draw from approaches that have been applied to other surveys (National Center for Health Statistics 2005) and build on ACS edit rules used by the Census Bureau (Lynch, Boudreaux, and Davern 2010). Preliminary analysis aimed at assessing the validity of these edits suggests that they move the ACS coverage estimates closer to administrative totals for Medicaid (Lynch and Resnick 2013).

For example, we edit sample adults reporting private nongroup coverage to Medicaid if they are simulated as eligible for Medicaid, a parent of a dependent child, and enrolled in the Supplemental Nutrition Assistance Program (SNAP)/food stamps or public assistance, assuming that the reported private nongroup coverage is an error (perhaps the report of a premium payment) because families with incomes low enough to qualify for other public benefits likely cannot afford to purchase nongroup health insurance coverage on the individual market. We also edit sample adults reporting both Medicaid and employer-sponsored insurance (ESI) to ESI only if they are not simulated as
Medicaid-eligible (assuming that the reported Medicaid coverage is a survey-processing error or that it is for wrap-around coverage or for narrowly defined services, such as for family planning). In 2009, the additional edits increased the estimated number of uninsured adults from the ACS by 1 million and decreased the number of adults with Medicaid coverage by 58,000. After editing, our derived estimate of the number of uninsured adults is 39.4 million, relative to the NHIS uninsured estimate of 39.2 million for 2009, and our derived estimate of the number of adults with Medicaid is 16.8 million, compared with 17.1 million from the NHIS (authors’ tabulations). The impact of the edits is similar in other data years.

For children, the ACS edits address inconsistent coverage reporting based on what we know about Medicaid/CHIP eligibility rules and what we know about the children’s families from the survey (e.g., that it is unlikely that a non-disabled parent would be enrolled but that their eligible child would not), reclassifying children with illogical combinations of coverage and family data to Medicaid/CHIP where appropriate. For instance, in 2008, the edits reduced the estimated number of uninsured children in the survey from 8.2 million to 7.3 million, which is slightly lower than the NHIS estimate of 7.4 million uninsured children for the same period. Our edits increased the estimated number of children with Medicaid/CHIP as their primary coverage by roughly 4.4 million to a level that is just about 7 percent lower than the comparable administrative count for June 2008.

**Puerto Rico Community Survey**

The Puerto Rico Community Survey (PRCS) is the Puerto Rico implementation of the ACS that is conducted in the 50 states and the District of Columbia. The design is very similar to the ACS, and we use an augmented version of the public-use PRCS prepared by the University of Minnesota Population Center because it contains edits for family relationships and other variables (Ruggles et al. 2010).

We edited a small number of cases with illogical coverage based on an analysis in which we compared the direct Medicaid and Medicare estimates to administrative counts of Medicare and Medicaid and also evaluated them for internal consistency (primarily within families with respect to income and Medicaid/CHIP eligibility). We also edited the coverage of people in families with government employees because they receive coverage through the Medicaid system but it is not Medicaid.

**Eligibility Simulation**

The Urban Institute Health Policy Center Medicaid/CHIP Eligibility Simulation Model for the ACS and PRCS simulates eligibility for Medicaid/CHIP using available information on eligibility guidelines, including income thresholds for the appropriate family size, asset tests, parent/family status (for adults), and the amount and extent of income
disregards, for each program and state in place as of the middle of that data year (Cohen Ross et al. 2008; Cohen Ross et al. 2009; Heberlein et al. 2011, 2012; Kaiser Commission on Medicaid and the Uninsured 2010, 2011a). For noncitizens, as in some prior studies, the model also takes into account length of residency in the United States in states where this is a factor in eligibility (National Immigration Law Center 2011; Sullivan 2010). Because the ACS does not contain sufficient information to determine whether an individual is an authorized immigrant and therefore potentially eligible for Medicaid coverage, we impute documentation status for noncitizens in the 50 states and the District of Columbia based on a model used in the CPS-ASEC (Resnick 2013). Documentation status is imputed to immigrant adults in two stages using individual and family characteristics, based on an imputation methodology that was originally developed by Passel (Passel and Cohen 2009). The approach is designed to produce imputations that match, in the aggregate, published summary estimates of the U.S. undocumented population, nationally and in a subset of large states (California, New York, New Jersey, Florida, Illinois, and Texas).

Pre-ACA Nonelderly Adult Eligibility in the 50 States and the District of Columbia

For adults (those ages 19 to 64), our ACS model identifies eligibility for comprehensive Medicaid or Medicaid-equivalent benefits using state rules for major pathways for adults. The following pre-ACA eligibility pathways are modeled (they correspond roughly to the order in which caseworkers or state eligibility-determination software typically check for eligibility):

1. Aged-out foster children (young adults who were foster children who qualify for Medicaid);
2. Supplemental Security Income (SSI) (adults who receive SSI income are deemed Medicaid-eligible because they are enrolled automatically in most states);
3. Section 1931 (usually parents of minors whose incomes fall below the Temporary Assistance for Needy Families [TANF] income cut-offs);
4. Aged/Blind/Disabled (adults with functional limitations who meet the qualifications for aged/blind/disabled coverage);
5. Section 1115 Waivers (adults who meet the qualifications for eligibility in states with Section 1115 programs that provide comprehensive Medicaid or Medicaid-equivalent benefits);
6. Medically Needy (adults categorically eligible for medically needy coverage who meet the income qualifications for eligibility);
7. Relative caretakers (adults who are not parents of minors but appear to be relative caretakers of Medicaid-enrolled minors not living with their parents).

In addition, the modeling can include exploratory analysis of eligibility and participation where we include adults who are ineligible for comprehensive Medicaid in the simulation but either: 1) are eligible for federally funded Section 1115 Medicaid.
coverage (such as Commonwealth Care in Massachusetts) or state-funded coverage (such as the Basic Health Plan in Washington) that is more limited in scope than comprehensive Medicaid (Heberlein et al. 2011) (we refer to these adults as “limited benefit eligibles”viii), or 2) fall into particular Medicaid categorically eligible groups but do not meet all the requirements for eligibility according to the information available on the ACS and the rules we have (known as “imputed eligibles”). In 2009, of the 7.4 million adults with Medicaid coverage who do not appear eligible for comprehensive Medicaid services through the main pathways that are simulated, 1.4 million are eligible for limited coverage (0.7 million for limited Medicaid coverage and 0.7 million for state-funded coverage), and 3.6 million meet the categorical requirements for eligibility for comprehensive Medicaid coverage but have reported income levels slightly above the eligibility thresholds that are modeled (i.e., these are so-called imputed eligibles, many of whom are likely eligible for pregnancy-related services but are not modeled in the core eligibility model because we do not have information on pregnancy status).ix Our core estimates do not include these groups.

**Pre-ACA Child Eligibility in the 50 States and the District of Columbia**

Children are defined as those 18 and younger in the civilian noninstitutionalized population, including college students in dorms and a small number of other children living in group quarters, such as residential treatment facilities. Children’s individual and family characteristics, including income and citizenship status, are compared to the rules for Medicaid and CHIP in their state of residence. The following eligibility pathways are modeled:

1. Title IV-E (foster children)
2. SSI-related
3. AFDC-related/Section 1931 (usually children whose family incomes fall below the Temporary Assistance for Needy Families [TANF] income cut-offs)
4. Poverty-related (by age group for children above the AFDC thresholds)
5. CHIP (both Medicaid expansion CHIP and separate CHIP programs)

We define participation rates as the ratio of eligible children enrolled in Medicaid/CHIP to those children plus uninsured children who are eligible for Medicaid/CHIP. In our core estimates, we excluded from these counts children enrolled in one of the programs who also have other coverage (such as private or military coverage) and those with Medicaid/CHIP coverage who do not have a known eligibility pathway.x We do not currently have a method for including in the denominator of the participation rate those uninsured children who may similarly be eligible for Medicaid/CHIP coverage but do not appear to be based on the information that is available on the survey.

**Post-ACA Child Eligibility in the 50 States and the District of Columbia**
A number of changes under the ACA could affect some children’s Medicaid/CHIP eligibility, including: (1) children below 133 percent of FPL in separate CHIP programs are moving to the Medicaid delivery system and benefits package as a new national Medicaid floor of 133 percent of FPL is established; (2) the determination of how much income families have in comparison to the thresholds is changing from being based on states’ income counting rules to being based on Modified Adjusted Gross Income (MAGI), and certain types of income will be treated differently (Department of Health and Human Services 2013, Centers for Medicare and Medicaid Services 2012, Department of Health and Human Services 2012, Kaiser Commission on Medicaid and the Uninsured 2012); (3) instead of using income disregards that vary across states and across families’ circumstances, Medicaid/CHIP eligibility is now calculated using a flat 5 percent disregard; (4) states have converted their pre-ACA Medicaid/CHIP eligibility thresholds to MAGI-based thresholds such that the new thresholds are not less than the effective income levels that were in place at the time of enactment of the ACA (which will be used not only to determine who is eligible for Medicaid or CHIP, but also to determine the federal match for each enrollee); and (5) definitions of families and whose income is included when comparing to Medicaid/CHIP thresholds is changing from states’ definitions of families to the tax filing unit (Kaiser Commission on Medicaid and the Uninsured 2011b). As of January 2014, reflecting many of these changes, the median upper income limit for Medicaid/CHIP for children is 255 percent of the FPL, with almost all children below 138 percent of FPL eligible for Medicaid (Heberlein et al. 2013). To estimate projected Medicaid/CHIP eligibility for children under ACA implementation, we added modules to our model of current eligibility to address the relevant policy changes (Lynch et al. 2013). Our ACA simulation reflects the current Centers for Medicare and Medicaid Services (CMS) guidance at the time it was constructed regarding how eligibility would be determined under the ACA. We also added modules for testing different assumptions about how the law would be implemented.

**Eligibility and Enrollment in Puerto Rico**

We apply the model to the PRCS data in much the same way as we do to the ACS data. The model simulates eligibility for Medicaid and CHIP by mimicking how eligibility is determined by a caseworker or with intake software, to the extent possible based on variables included in the PRCS and the Puerto Rico eligibility rules that we were able to collect. We collected detailed eligibility rules, including the income thresholds for family units of different sizes and according to parental status, asset tests, and the amount and extent of income disregards (employment expenses, childcare expenses, etc.) for the different eligibility pathways available as of approximately June of 2011. For each person, the model identifies and takes into account the members of the family whose income and other characteristics the Puerto Rico Medicaid system uses in determining eligibility.
There are a number of important ways in which the simulation for Puerto Rico differs from the 50 states and the District of Columbia. We do not impute undocumented status because we know of no available data on Puerto Rico to use in the model of undocumented status. For computing each person’s family income-to-poverty ratio at baseline we use Puerto Rico’s Commonwealth Poverty Level (CPL) methodology instead of the methodology from the Department of Health and Human Services (HHS) used for the 50 states and the District of Columbia. The eligibility pathways for Puerto Rico also differ from those used in the ACS simulation, and we check for eligibility for the elderly as well as the nonelderly. At baseline, the following eligibility pathways are modeled:

1. The Puerto Rican Federal Medicaid program (for children, parents of dependent children, the disabled, and the elderly with family income less than 100 percent of CPL)
2. The Children’s Health Insurance Program (for children with family income between 100 and 200 percent of CPL)
3. State Medicaid Program (other children and adults and disabled and elderly with family income between 100 and 200 percent of CPL)

We also simulate eligibility under hypothetical statehood. For modeling statehood we applied the federal minimum requirement for eligibility in the states as a hypothetical minimum although all states have substantially more expansive eligibility rules. We also applied a set of rules that met the federal requirements for states and carried over as many of Puerto Rico’s current rules as possible. Under this scenario, the following eligibility pathways are modeled:

1. Title IV-E (foster children)
2. SSI related
3. AFDC/1931 (children, parents, and relative caretakers)
4. Poverty-related (children)
5. CHIP

We also project enrollment under the alternative statehood scenarios. Consistent with simulation models that have been applied to the rest of the country, we assumed 100 percent take-up for current Medicaid/CHIP enrollees (including those not simulated as eligible), SSI enrollees, and TANF enrollees. For all other eligible people, we apply take-up rates observed for current Puerto Rican enrollees in the top part of the distribution of income-to-poverty ratio by subgroup. We applied take-up rates from a matrix of age-group by insurance coverage and disability status.

**Summary of Limitations to the Models**

First, despite our attempts to produce reliable coverage estimates with the ACS/PRCS, there still may be measurement errors, which could introduce bias into our estimates at the national, state, within-state, and subgroup levels. In particular, measurement error
in estimates of Medicaid eligibility and participation may result from: the use of the ACS’s and PRCS’s income data, which collects annual rather than monthly income, and thus does not align with eligibility determination procedures (and which could miscalculate eligibility for those whose income fluctuates from month to month); the misreporting of income or other information, such as immigration status, used in determining eligibility; and the systematic underreporting of income in survey data (Moore, Stinson, and Welnick 2000), which could lead to overstating the number of eligible and understating their participation. The possible inclusion of enrollees in restricted-benefit Medicaid coverage or local public plans (which are not modeled in this simulation) among those classified as having Medicaid coverage could also bias the results.

Modeling eligibility for adults is much more difficult than for children for a number of reasons: first, the eligibility rules are more complex for adults and thus harder to derive from summary reports and state manuals; second, the ACS and the PRCS, like other surveys, does not contain the detail needed to correctly capture important elements of all the major eligibility pathways for adults (e.g., pregnancy status, legal disability status, income disregards related to child support, medical spending used to calculate spend-down for medically needy eligibility, or duration of enrollment or income history to determine transitional medical assistance [TMA] and related eligibility); and third, some states offer coverage for adults that is less comprehensive in scope than full Medicaid benefits. While extensive efforts were made to collect information on the different rules for each state and to marshal all the relevant information in the ACS, eligibility in states that have additional pathways that are not captured in our model (particularly for adults) may be understated. Limitations in the survey indicators could also introduce error; for instance, states’ determinations of disability-related eligibility use criteria other than the indicators of functional limitations available on the ACS/PRCS, and the surveys lack data to determine whether custodial parents meet child support cooperation requirements that could preclude them from Medicaid eligibility (Roberts 2003). Thus, some of the adults who appear in our model to be eligible might not qualify when the more detailed information on their characteristics is taken into account. While, taken together, we believe the limitations in our study may bias upward our participation rates and downward our estimates of the number of uninsured adults who are eligible but not enrolled, the direction and extent of bias are not known.
References


Lynch, V., G. M. Kenney, J. Haley, and D. M. Resnick. 2011. Improving the Validity of the


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i The Indian Health Service (IHS) is not typically counted as health insurance coverage because of limitations in the scope of available services and geographic reach of IHS facilities.

ii We benchmarked our estimates to the NHIS because both surveys measure point-in-time coverage status and because of other desirable measurement properties of the health insurance coverage estimates of the NHIS (Kenney, Holahan, and Nichols 2006).

iii According to Urban Institute tabulations of data from the 2008 National Health Interview Survey.

iv The 2008 American Community Survey includes 1.4 million children with employer-sponsored or other coverage who were also reported to have Medicaid/CHIP at the time of the survey. The difference between our adjusted state Medicaid/CHIP total and the respective administrative total varies across states; for more than half of the states, the difference is less than 10 percent.

v Family-level characteristics used in determining eligibility, such as income, are based on the grouping of family members to align with Medicaid rules. Statistics on “family” characteristics in this paper are based on the more straightforward grouping of family members who would be eligible for the same private insurance plan, known as the health insurance unit (HIU).

vi The model takes into account disregards for child care expenses, work expenses, and earnings in determining eligibility, but does not take into account child support disregards because data on such amounts were not available.

vii The model assigns eligibility type hierarchically, and cases are classified by the first pathway for which they are eligible. For instance, if an SSI recipient gets classified as eligible through the SSI pathway, that person would be classified as eligible through disability-related coverage even if the individual also met the qualifications for Section 1931 coverage.

viii We do not model eligibility for restricted Medicaid benefits, such as family planning services or emergency services. As defined in this paper, limited coverage is more...
comprehensive than such restricted-benefit coverage. The limited programs modeled here all cover, at the least, hospitalizations and doctor visits.
ix Estimates from the March 2010 CPS-ASEC that use the same eligibility rules and cover roughly the same time period are similar; a total of 9 million adults with Medicaid coverage do not appear eligible for comprehensive Medicaid services through the main pathways that are simulated, 1.5 million of whom are eligible for limited coverage, and 3.2 million of whom are imputed eligible (authors’ communication with Christine Coyer, January 27, 2012).
\* We also produced additional sets of participation estimates to show the impact of excluding children who appear to have Medicaid as well as other coverage (so-called wrap-around coverage) and of excluding children not found to be eligible. The pattern of findings reported in our reports with these additional estimates in terms of variation across states and subgroups.
\*i Furthermore, asset tests will be eliminated in Medicaid under the ACA; however, since few states have asset tests for children’s Medicaid eligibility, these should not have a large impact on overall eligibility.