

**Technical Appendix: Non-Group and Uninsured Population Database**  
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## Overview

This technical appendix describes the input data sources (Table 1) and steps required to build the analytic database for the analyses presented in the main report. The creation of this database involved five steps:

- 1) Identify Marketplace enrollees, off-Marketplace enrollees, and uninsured individuals in the National Health Interview Survey (NHIS).
- 2) Adjust NHIS population weights to account for state-specific population characteristics, as estimated in the American Community Survey (ACS).
- 3) Further adjust population weights to match external enrollment benchmarks from the Congressional Budget Office (CBO) and Centers for Medicare & Medicaid Services (CMS).
- 4) Use plan data from HIX Compare to estimate average state-level Marketplace and off-Marketplace premiums by metal level.
- 5) Determine family premiums for Marketplace enrollees by imputing a metal level selection and applying ACA non-group rating rules to assign premiums and subsidies to each family.

### Step 1. Identify non-group and uninsured enrollment in the NHIS

We selected the NHIS, a large annual household survey administered by the National Center for Health Statistics (NCHS) that collects information on health insurance coverage, as the primary data source for this project. The NHIS has two advantages relative to other surveys: the NHIS-based estimates of non-group coverage better align with administrative estimates than other national surveys; and the NHIS distinguishes between Marketplace and non-Marketplace enrollees.

We defined non-group enrollees as those under age 65 with private non-employer-based insurance. The NHIS directly asks whether non-group enrollees obtained coverage through the Marketplaces, and then supplements this information with a recoding algorithm. This algorithm involves cross-referencing the plan and insurer names reported by the respondent with Marketplace options available in the respondent's region.

### Step 2. Adjust NHIS population weights to match ACS-based state population estimates

The NHIS is designed for regional rather than state-level estimates. To develop state-level estimates, we modified the NHIS population survey weights using each state's population characteristics from the American Community Survey, a large annual household survey administered by the U.S. Census Bureau.

Specifically, we performed the following three step procedure for each state and year:

1. We used the ACS to estimate the state's population across every combination of the following characteristics (540 total categories):
  - a. Sex (2-levels: Male, Female)
  - b. Race (3-levels: Non-Hispanic White, Non-Hispanic Black, Other)
  - c. Family Income (2-levels: Below \$50k, Above \$50k)
  - d. Insurance Coverage (3-levels: Employer-Based, Uninsured, Other)
  - e. Age (15-levels: 5-year age groups, top-coded at 70 years)

2. We extracted respondents from the NHIS in the state’s region. For example, if the state were Maryland, we limited the sample to all NHIS respondents in the Northeast region.
3. For each combination, we scaled the population weights among the selected NHIS respondents to match the corresponding ACS-based population estimate.

This procedure resulted in a population database that allowed for state estimates. In this database, NHIS-respondents were duplicated for each state in the respondent’s region. For example, each Northeastern NHIS respondent appeared in the database nine times - once for each of the nine Northeastern states. The population weight assigned to that respondent would vary in each of these nine instances.

**Table 1. Data sources used to construct the synthetic population file**

Resource	Use
2013 – 2018 NCHS National Health Interview Survey <sup>a,b</sup>	Characteristics on Marketplace enrollees, off-Marketplace enrollees, and uninsured populations
2013 – 2018 U.S. Census American Community Survey <sup>c,d</sup>	Population estimates by state, age, sex, race, approximate coverage category, and approximate income
2013 – 2018 CBO National coverage estimates <sup>e,f</sup>	National estimates for Marketplace enrollment, off-Marketplace enrollment, and uninsured
2013 – 2018 CMS Medical Loss Ratio Public Use Files <sup>g</sup>	State non-group enrollment
2014 – 2018 CMS Marketplace Enrollment Files <sup>h</sup>	State-level Marketplace enrollment by age, subsidy status, income, and metal level
2015 – 2018 RWJF HIX Compare Individual Files <sup>i</sup>	Average Marketplace and off-Marketplace premiums by state
2015 – 2018 KFF Marketplace Benchmark Premiums <sup>j</sup>	Estimating Advanced Premium Tax Credits for each family

NCHS= National Center for Health Statistics

CBO = Congressional Budget Office

KFF= Kaiser Family Foundation

CMS = Centers for Medicare & Medicaid Services

RWJF= Robert Wood Johnson Foundation

### Step 3. Adjust population weights to match external benchmarks

We further adjusted the population file to match administrative non-group coverage counts. We combined estimates from both CBO and the CMS actuaries to produce national enrollment benchmarks. We divided the national non-group enrollment among individual states based on state-specific estimates

<sup>a</sup> National Health Interview Survey. National Center for Health Statistics. 2019. <https://bit.ly/2EI3Z4Q>.

<sup>b</sup> IPUMS Health Surveys. University of Minnesota. [www.ipums.org](http://www.ipums.org).

<sup>c</sup> American Community Survey. US Census Bureau. 2019. <https://bit.ly/2PQIW0v>.

<sup>d</sup> IPUMS USA. University of Minnesota. [www.ipums.org](http://www.ipums.org).

<sup>e</sup> Health Insurance Coverage for People Under Age 65: Definitions and Estimates for 2015 to 2018. Congressional Budget Office. 2019.

<https://bit.ly/2Z0MXTe>.

<sup>f</sup> Federal Subsidies for Health Insurance Coverage for People Under Age 65: Tables from CBO’s May 2019 Projections Table. Congressional Budget Office. 2019. <https://bit.ly/2Eo39EE>.

<sup>g</sup> Medical Loss Ratio Data and System Resources. Centers for Medicare & Medicaid Services. 2019. <https://go.cms.gov/2Ek9BfP>.

<sup>h</sup> Quarterly Marketplace Effectuated Enrollment Snapshots by State. Centers for Medicare & Medicaid Services. 2019.

<https://go.cms.gov/2rlqr5p>.

<sup>i</sup> HIX Compare Datasets 2014 to 2019. Robert Wood Johnson Foundation. 2019. <https://hixcompare.org/>.

<sup>j</sup> Marketplace Average Benchmark Premiums. Kaiser Family Foundation. 2019. <https://www.kff.org/health-reform/state-indicator/marketplace-average-benchmark-premiums/>

of covered lives from the CMS Medical Loss Ratio public use files. We allocated Marketplace enrollment similarly using state-specific Marketplace enrollment estimates from CMS. We estimated non-Marketplace enrollment in each state based on the difference between Marketplace enrollment and total non-group enrollment.

CMS distinguishes between two Marketplace enrollment concepts. Plan-selection enrollment refers to Marketplace enrollees who have selected a plan. Effectuated enrollment refers to Marketplace enrollees who have both selected a plan and paid a premium. We allocated Marketplace enrollment to states using effectuated enrollment, but these data were only available through 2016. For years 2017 and 2018, we estimated effectuated enrollment based on state-specific growth in plan-selection enrollment. We also further decomposed our Marketplace enrollment benchmark into age categories, for states that reported such data.

We further adjusted the file to distinguish subsidized and non-subsidized enrollees. First, we calibrated family income in our database to be consistent with the Marketplace income distributions reported in CMS administrative data. We identified individuals eligible for Advanced Premium Tax Credits (APTCs) (family income was between 100% and 400% of the Federal Poverty Level (FPL)) and cost sharing reduction (CSR) plans (family income was between 100% and 250% of the FPL). We compared state-specific APTC-eligible and CSR-eligible estimates to CMS estimates for the number receiving APTCs and enrolling in CSR plans. We recoded individuals to receive or not receive subsidies to match these external benchmarks.

#### **Step 4. Estimate average state-level Marketplace and off-Marketplace premiums by metal level**

HIX Compare is a database created by the Robert Wood Johnson Foundation that includes nearly every plan in the ACA-compliant individual market. We used HIX Compare to estimate premiums by state, year, metal level (e.g. “bronze”, “silver”, “gold”), and market (e.g. Marketplace vs. Off-Marketplace). Within HIX Compare, each plan is assigned to a unique state and rating area. A rating area represents the intrastate geographic regions that issuers must use when establishing rating areas. Most states define rating areas by grouping counties. To compute premiums, we first identified the lowest cost premium option for each rating area, metal level, and market combination. Next, we calculated the average lowest-cost-premium across all rating areas within the state.

#### **Step 5. Determine premium levels for each family**

CMS administrative data includes metal level selections by age and income level. We used these data to derive a metal-level distribution for each family in our database and impute a metal-level selection for each family.

The state average premiums (determined in step 4) were applicable for a 50-year old individual. The ACA allows insurers on the non-group market to vary premiums based on age rating, tobacco rating, and family structure. For each family in our database, we used the ACA rating rules to convert the state-level averages into family-specific premiums. For families receiving APTCs, we calculated the APTC amount using average benchmark premiums from the Kaiser Family Foundation.