AHRQ Quality Indicators™

2017 POPULATION FILE FOR USE WITH AHRQ QUALITY INDICATORS™
Version 7.0

Prepared for:

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1.0 Overview

The Agency for Healthcare Research and Quality (AHRQ) Quality Indicators (QIs)™ include 25 area-level indicators (Table 1). These indicators are intended to measure health care quality across the population in a geographic area rather than for a single facility or provider. With a few exceptions, as noted in Table 1, the denominators for area-level indicators are the population of the area being examined, subset by age or (for some indicators) sex. The

denominators for these indicators must be constructed from an outside source rather than being drawn from a subset of discharges in the user's input file.

The objective of this document is to describe how the population data estimates are derived from public-use Census data for use with the SAS® QI Software Version (SAS QI v7.0 beta) and Microsoft Windows® QI Software Version (WinQI v7.0 beta). Population figures through 2017 for use with SAS QI v7.0 beta are provided in the file POP95T17.txt, which is available as a separate download on the AHRQ QI website. Population data are built into the installation package for WinQI v7.0 beat.

Table 1. AHRQ QI Area-Level Indicators

PQI 01 Diabetes Short-Term Complications Admission Rate	PDI 14 Asthma Admission Rate
PQI 02 Perforated Appendix Admission Rate*	PDI 15 Diabetes Short-Term Complications Admission Rate
PQI 03 Diabetes Long-Term Complications Admission Rate	PDI 16 Gastroenteritis Admission Rate
PQI 05 Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate	PDI 17 Perforated Appendix Admission Rate1
PQI 07 Hypertension Admission Rate	PDI 18 Urinary Tract Infection Admission Rate
PQI 08 Heart Failure Admission Rate	PDI 90 Pediatric Quality Overall Composite
PQI 09 Low Birth Weight Rate*	PDI 91 Pediatric Quality Acute Composite
PQI 10 Dehydration Admission Rate	PDI 92 Pediatric Quality Chronic Composite
PQI 11 Bacterial Pneumonia Admission Rate	PDI 92 Pediatric Quality Chronic Composite
PQI 12 Urinary Tract Infection Admission Rate	
PQI 14 Uncontrolled Diabetes Admission Rate	
PQI 15 Asthma in Younger Adults Admission Rate	
PQI 16 Lower-Extremity Amputation among Patients with Diabetes Rate	
PQI 90 Prevention Quality Overall Composite	
PQI 91 Prevention Quality Acute Composite	
PQI 92 Prevention Quality Chronic Composite	
PQI 93 Prevention Quality Diabetes Composite (Numerator)	
IQI 26 Coronary Artery Bypass Graft (CABG) Rate	
IQI 27 Percutaneous Coronary Intervention (PCI) Rate	

*These indicators use discharge data from the input data file to estimate the denominator rather than demographic data from the population file.

2.0 Data and Methodology

Every year, the Census Bureau releases postcensal population estimates[1] (as of July 1 of each

[1] "Estimates are for the past, while projections are based on assumptions about future demographic trends. Estimates generally use existing data collected from various sources, while projections must assume what demographic trends will

year) that are generated with the assistance of the Federal State Cooperative Program for Population Estimates (FSCPE) using residence, total births, total deaths, and net migration. With each new issue of July 1 estimates from the Census Bureau, the Census Bureau makes revisions to all years back to the last decennial census. Each decade, after a decennial census, the Census Bureau produces a set of intercensal estimates that provide annual population estimates that are adjusted to smooth the transition from one decennial census to the next. These estimates are used to derive the AHRQ QI Population File to be used with the AHRQ QI software.

2.1 Census Data Files

We acquired public-use files of intercensal and postcensal estimates of county-level population by 5-year age group, sex, race, and Hispanic origin covering the years 1995 through 2016 from the Census Bureau (http://www.census.gov/popest/). Table 2 presents detailed information and sources for the specific files acquired and used to generate the POP95T17.txt file for use within the AHRQ QI software.

Table 2. Census Dataset Descriptions and Sources

Data Name	Years	Base Decenniel Year	Type	Source
Intercensal Estimates of the Resident Population by 5- Year Age Groups, Sex, Race, and Hispanic Origin for Counties	2010–2016	2010	Intercensal	https://www2.census.gov/programs-surveys/popest/datasets/2010-2016/counties/asrh/
Intercensal Estimates of the Resident Population by 5-Year Age Groups, Sex, Race, and Hispanic Origin for Counties	2010–2014	2010	Intercensal	
Intercensal Estimates of the Resident Population by Single Year of Age and Sex for States and the United States	2000–2010	2010	Intercensal	http://www.census.gov/popest/data/intercensal/state/state2010.html
State Single Year of Age and Sex Population Estimates	2010–2016	2010	Postcensal	https://www.census.gov/data/datasets/2016/demo/popest/nation-detail.html
State Single Year of Age and Sex Population Estimates	2010–2014	2010	Postcensal	https://www.census.gov/data/datasets/2016/demo/popest/nation-detail.html

be in the future." U.S. Census. Population Projections. https://www.census.gov/glossary/#term_Populationprojections. Accessed June22, 2017.

State and County Intercensal Estimates by Demographic Characteristics	1990–1999	2000	Intercensal	https://census.gov/data/datasets/time-series/demo/popest/intercensal-1990-2000-state-and-county-characteristics.html

2.1.1 Notable Differences of Population Estimates From 2000 Census to 2010 Census

Four counties existed for the 2000 Census but not for the 2010 Census:[2]

- 02201 – Prince of Wales-Outer Ketchikan Census Area, AK
- 02232 – Skagway-Hoonah-Angoon Census Area, AK
- 02280 – Wrangell-Petersburg Census Area, AK
- 51560 – Clifton Forge city, VA

In the 2010 Census, the populations from these four counties are distributed to other surrounding counties. This means that although the POP95T17.txt file contains estimates for these four defunct counties for the years 1995–1999, the POP95T17.txt file estimates for the years 2000–2017 are listed as "0" because they are based on 2010 Census county boundaries.

2.1.2 Modifications to Census Estimates for Use in the POP95T17.txt File

Modifications to the census estimates were required to fit the specifications of the AHRQ QI software. The first modification is the categorization of race and Hispanic origin. Table 3 depicts how the race categories used by the AHRQ QI software were defined from the census race and Hispanic origin groupings. This set of race categorizations captures the entire U.S. population.

Table 3. Race Category Aggregations Based on Census Reporting Categories

Race Category	Description
1	Non-Hispanic, White Alone
2	Non-Hispanic, Black Alone
3	Hispanic
4	Non-Hispanic, Asian Alone OR Non-Hispanic, Native Hawaiian, and Other Pacific Islander Alone
5	Non-Hispanic, American Indian, and Alaska Native Alone
6	Non-Hispanic, Two or More Races

In addition, the population of interest for the area-level indicators in the Pediatric Quality Indicator (PDI) module is the population aged 17 years and under, whereas the population of interest for the other indicator modules is the population aged 18 years and older. The default 5-year age groups reported by the Census Bureau are 15–19 years and 20–24 years. To capture the separation between the pediatric and adult populations, the POP95T17.txt file contains the 18

[2] U.S. Census. Geography: Substantial Changes to Counties and County Equivalent Entities: 1970–Present. https://www.census.gov/geo/reference/county-changes.html. Accessed July 1, 2015.

through 24-year age span, which is constructed using the two default census age groups. To generate this age group, we used State-level estimates of population by sex and single year of age (see Table 2) to calculate the percentage of the population aged between 15 and 19 years (the age grouping for the county-level data) who are between 18 and 19 years old. Then, we subtracted the county-level population of 18- and 19-year-olds from the census-defined 15 through 19-year age group (to form the 15 through 17-year age group) and added it to the 20 through 24-year age group (to form the 18 through 24-year age group).

2.1.3 Census Data File Mapping to AHRQ QI Population File

The POP95T17.txt file population estimates for 1995 through 1999 are based on intercensal estimates by demographic characteristics (Table 2). Because these data are adjusted to the 2000 Census, the Census Bureau no longer updates them with more recent postcensal estimates and the estimates are unchanged from version release to version release of the AHRQ QI software.

The POP95T17.txt file population estimates for 2000 through 2010 are based on intercensal estimates by demographic characteristics that are adjusted to the 2010 Census. The POP95T17.txt file population estimates for 2011–2017 are based on postcensal estimates by demographic characteristics that use the 2010 Census as the base.

Public-use files of postcensal population estimates from the Census Bureau are currently available through 2017. The POP95T17.txt file contains population estimates for 2017 based on linear projections of the population counts for each county, sex, age group, and race combination. The projections were made according to the following model:

$$Y_{ijt} = \alpha_{ij} + \beta_{ijt}$$

$$y_{ijt} = \alpha_{ij} + \beta_{ij}t,$$

where i is the county (1, 2,..., 3147), j is an indicator of demographics representing a combination of sex, age group, and race (1, 2,..., 216), and t is the year (2013, 2016). That is, we fit a county-specific linear growth model for each demographic group. The population estimates for each county and demographic combination, y, for 2017 were calculated using the following equation:

$$\hat{y}_{ij2017} = \hat{\alpha}_{ij} + \hat{\beta}_{ij2017},$$

where $\hat{\alpha}_{ij}$ and $\hat{\beta}_{ij2017}$ are the coefficients estimated from the linear regression models.

2.2 Version History

The population file released with each version of the software is generated with the most recent data available at the time of software development. As such, this file changes from version to version (including the filename) as the Census Bureau updates and releases data. The differences between population files for AHRQ QI software release versions can be caused by changes in population estimates themselves, changes in methodology, or both. Table 4 summarizes the population files for AHRQ QI software release versions. Note that data for population files included with previous releases of the AHRQ QI software are not updated with each new release.

Table 4. Population Files Used With Various Versions of AHRQ QI Software

Software Release (File Name)	Years	Base Decennial Year	Data Summary	Methodology Summary
V7.0 beta (POP95T17.TXT)	Estimates: 1995–1999	2000	(1) Sex/age/race by county (2) Ages 18–24 years by State	Permutated file of sex/age/race by county Used State estimate of population aged 18–24 years to break 15–19-year and 20–24-year age groups into 15–17-year and 18–24-year age groups
	Estimates: 2000–2016 Projections: 2017	2010	(1) Age/sex/race by county (2) Age (single year) by State	Permutated file of sex/age/race by county Used State estimate of single year of age to break 15–19-year and 20–24-year age groups into 15–17 and 18–24-year age groups
V6.0 (POP95T15.TXT)	Estimates: 1995–1999	2000	(1) Sex/age/race by county (2) Ages 18–24 years by State	Permutated file of sex/age/race by county Used State estimate of population aged 18–24 years to break 15–19-year and 20–24-year age groups into 15–17-year and 18–24-year age groups
	Estimates: 2000–2014 Projections: 2015	2010	(1) Age/sex/race by county (2) Age (single year) by State	Permutated file of sex/age/race by county Used State estimate of single year of age to break 15–19-year and 20–24-year age groups into 15–17 and 18–24-year age groups
v5.0 (POP95T14.TXT)	Estimates: 1995–1999	2000	(1) Sex/age/race by county (2) Ages 18–24 years by State	Permutated file of sex/age/race by county Used State estimate of population aged 18–24 years to break 15–19 and 20–24-year age groups into 15–17 and 18–24-year age groups
	Estimates: 2000–2013 Projections: 2014	2010	(1) Age/sex/race by county (2) Age (single year) by State	Permutated file of sex/age/race by county Used State estimate of single year of age to break 15–19-year and 20–24-year age groups into 15–17-year and 18–24-year age groups
v4.5 (POP95T13.TXT)	Estimates: 1995–1999	2000	(1) Sex/age/race by county (2) Ages 18–24 years by State	Permutated file of sex/age/race by county Used State estimate of population aged 18–24 years to break 15–19-year and 20–24-year age groups into 15–17-year and 18–24-year age groups
	Estimates: 2000–2011 Projections: 2012–2013	2010	(1) Age/sex/race by county (2) Age (single year) by State	Permutated file of sex/age/race by county Used State estimate of single year of age to break 15–19-year and 20–24-year age groups into 15–17-year and 18–24-year age groups
v4.4 (POP95T12.TXT)	Estimates: 1995–1999	2000	(1) Sex/age/race by County (2) Ages 18–24 years by State	Permutated file of sex/age/race by county Used State estimate of population aged 18–24 years to break 15–19-year and 20–24-year age groups into 15–17-year and 18–24-year age groups
	Estimates: 2000–2010 Projections: 2011–2012	2010	(1) Sex/age by county (2) Sex/race by county (3) Age (single year) by State	Combined sex/age and sex/race files by county to get estimates of sex/age/race Used State estimate of single year of age to break 15–19-year and 20–24-year age groups into 15–17-year and 18–24-year age groups

v4.3 (POP95T11.TXT)	Estimates: 1995–2009 Projections: 2010–2011	2000	(1) Sex/age/race by county (2) Ages 18–24 years by State	Permutated file of sex/age/race by county Used State estimate of population aged 18–24 years to break 15–19-year and 20–24-year age groups into 15–17-year and 18–24-year age groups

3.0 POP95T17.txt File Specification

The POP95T17.txt file is an ASCII-based text file containing 680,184 records with a fixed logical record length of 150 bytes. It is in fixed column format. Table 5 presents the file's specific fields and the code schema used for each field.

The file is structured for use with AHRQ QI programs PQI_AREA_OBSERVED.sas, PQI_AREA_RISKADJ.sas[3], PDI_AREA_OBSERVED.sas, and PDI_AREA_RISKADJ.sas[3], as well as the Windows QI (WinQI) software. As such, any modification to this file will affect the operation of these programs.

A given county is identified by the Federal Information Processing Standards (FIPS) code for the State in which it is located and by the county's FIPS code. For each county within the United States, the file contains 216 records: a record for each unique combination of sex, 18 age groups, and 6 race groups. Each physical record represents a sex, age group, and race group combination for that county and contains population estimates (rounded to integer values) for that combination for each year from 1995 through 2017.

The file has data for 3,149 counties or "equivalent areas," defined to constitute primary divisions of their States. Equivalent areas include the independent cities of Baltimore, Maryland; St. Louis, Missouri; Carson City, Nevada; and 39 independent cities in Virginia. Because they are independent of any contiguous county, equivalent areas are treated as separate counties with their own population records. Population figures for surrounding counties exclude these cities. Differences in the record count from previous population files are due to changes in county definitions or such independent cities. Definitions for State and county FIPS codes can be found at https://www.census.gov/geo/reference/codes/cou.html

[3] Risk Adjutment is not include in v7.0 beta and hence xx_AREA_RISKADJ is not included with v7.0. It will be included in the future.

Table 5. Data Fields in POP95T17.txt

Field	Variable	Column Position	Format	Codes
1	State	1–2	Zero filled numeric	FIPS code
2	County	3–5	Zero filled numeric	FIPS code
3	Sex	7	Numeric	1=male, 2=female
4	Age group	9–10	Numeric	1=0–4 years 2=5–9 years 3=10–14 years 4=15–17 years 5=18–24 years 6=25–29 years 7=30–34 years 8=35–39 years 9=40–44 years 10=45–49 years 11=50–54 years 12=55–59 years 13=60–64 years 14=65–69 years 15=70–74 years 16=75–79 years 17=80–84 years 18=85+ years
5	Race	12	Numeric	1=White 2=Black 3=Hispanic 4=Asian & Pacific Islander 5=American Indian 6=Other
6	1995 population	13–19	Numeric	Integer Totals
7	1996 population	20–26	Numeric	
8	1997 population	27–33	Numeric	
9	1998 population	34–40	Numeric	
10	1999 population	41–47	Numeric	
11	2000 population	48–54	Numeric	
12	2001 population	55–61	Numeric	
13	2002 population	62–68	Numeric	
14	2003 population	69–75	Numeric	
15	2004 population	76–82	Numeric	
16	2005 population	83–89	Numeric	
17	2006 population	90–96	Numeric	
18	2007 population	97–103	Numeric	
19	2008 population	104–110	Numeric	
20	2009 population	111–117	Numeric	
21	2010 population	118–124	Numeric	
22	2011 population	125–131	Numeric	
23	2012 population	132–138	Numeric	
24	2013 population	139–145	Numeric	
25	2014 population	146–152	Numeric	
26	2015 population	153–159	Numeric	
27	2016 Population	160-165	Numeric	
26	2017 Population	166-171	Numeric	

Abbreviation: FIPS, Federal Information Processing Standards