
The Use of Medicare Enrollment Data in the 2010 Demographic Analysis Estimates

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This report is released to inform interested parties of ongoing research and to encourage discussion of work in progress. Any views expressed on statistical, methodological, or technical issues are those of the authors and not necessarily those of the U.S. Census Bureau.

Abstract

This paper was prepared along with three companion documents to facilitate discussion during a Demographic Analysis (DA) technical review workshop.¹ The paper focuses on Medicare enrollment as a source for estimating the population aged 65 and older on April 1, 2010. Three major issues are discussed:

- Not all United States residents aged 65 and older are enrolled in Medicare - either by law, or by preference. Correction factors need to be applied to the Medicare Enrollment Database (MEDB) to obtain an accurate estimate of the size and distribution of the United States population on April 1, 2010 by single year of age, sex, and race.
- There are records in the MEDB that should be excluded from the DA estimates. This includes people under 65 who qualify for Medicare, enrollees with residences outside of the United States, and records for people who were deceased as of April 1.
- The MEDB contains records with unknown and missing race codes. Also, Hispanic origin is recorded as a race category in the MEDB. These records need to be assigned a race code of Black or non-Black.

The paper proposes strategies for meeting the challenges associated with these issues.

¹ The companion documents are: 1) "Coverage of Population in Census 2000 Based on Demographic Analysis: The History Behind the Numbers," by J. Gregory Robinson; 2) "The Use of Vital Statistics in the 2010 Demographic Analysis Estimates," by Jason Devine, Larry Sink, Bethany Desalvo, and Rachel Cortes; and 3) "Estimates of Net International Migration for the 2010 Demographic Analysis Estimates," by Renuka Bhaskar, Melissa Scopilliti, Frederick Hollmann, and David Armstrong. They were presented at the U.S. Census Bureau Workshop: 2010 Demographic Analysis Technical Review, Suitland, Maryland, January 8, 2010.

Introduction

This paper: 1) identifies key issues related to the use of Medicare data in Demographic Analysis (DA), 2) describes how estimates of underenrollment are developed to account for those who delay enrollment or will never enroll, 3) outlines issues related to race characteristics in the Medicare Enrollment Database (MEDB) including options for improvements, and 4) provides an overview of ongoing research.

Demographic Analysis estimates are produced through a basic demographic bookkeeping equation involving administrative records of vital population events or program participation and other information related to population change. The DA estimates are produced for the nation by single year of age, sex, and for two race categories, Black and non-Black using separate methodologies for two different age segments of the population.¹ For the population under age 65, birth cohorts are followed as they age and experience loss through deaths and emigration or growth through immigration.

For the population aged 65 and older, a stock estimate is derived from aggregated Medicare enrollment records.² The demographic component estimates for the population under 65 are then combined with the Medicare-based estimate for the population aged 65 and older to produce the DA estimate for the total population.

The steps in the development of the estimates for the population aged 65 and older using the MEDB are provided in Appendix A.

¹ DA estimates are developed for the Black population, and all other races combined (referred to here as non-Black). Black is used throughout this report to refer to the Black or African American population.

² A different approach is used for the population aged 65 and older primarily because of the lack of completeness of the birth records for the older age groups.

Key Issues With Enrollment Data

When using the MEDB to estimate the population, the quality of the data must be carefully evaluated. Accounting for omissions because of delayed enrollment or because an individual will never enroll and erroneous inclusion of the deceased in the MEDB are areas of concern. Methods for estimating omissions are outlined first, followed by a discussion of erroneous inclusions of individuals in the MEDB. Finally, the race information in the MEDB is presented and strategies for enhancing this information using data from Census 2000 are described.

Eligibility and Coverage

Historically, the DA estimates developed from the Medicare data have indicated nearly complete census coverage for ages 65 and over, with net overcounts for some age groups (Table 1). The overcount was estimated to be 1.2 percent (or 404,000) in Census 2000; a negligible net undercount was measured in 1990 (rounded to 0.0 percent). In the 1990 Census, it was estimated that males were undercounted starting at age 70, as were females ages 75 and over. In Census 2000, males in the age group 65-69 were slightly undercounted (0.2 percent), while females were overcounted in each age group.

Based on preliminary processing of the unadjusted 2007 Medicare data, there were 35.8 million persons aged 65 and older enrolled in Medicare. The Census Bureau's July 1, 2007 estimate of the population aged 65 and older was 37.9 million.

In general, U.S. citizens or permanent residents are eligible for Medicare benefits if they have worked for at least ten years in a job that has paid money into the Medicare system. The eligibility rule also applies to spouses. If either spouse paid money into the Medicare system, then they are both covered at full or partial cost.

- Persons with at least 40 quarters (10 years) of Social Security covered employment are eligible for Medicare, at no cost for the Hospitalization Insurance (Part A).

- Persons with 30 to 39 quarters of Social Security covered employment are eligible for Medicare, but at partial cost for Part A.³
- Federal employees with at least 40 quarters of federal employment are eligible for Medicare, at no cost for Part A.
- U.S. citizens with less than 30 quarters of Social Security covered employment are eligible for Medicare, but at the full age-based actuarial cost.
- Legal immigrants with at least 5 years continuous residency in the United States and with less than 30 quarters of Social Security covered employment are eligible for Medicare, but at the full age-based actuarial cost.

Our tabulation from the MEDB for use in DA includes all persons in the MEDB except:

- those not residing in the United States;
- those who are not aged 65 and older as of April 1 of the estimate year (some individuals under age 65 may be eligible for Medicare if diagnosed with permanent disability or permanent kidney failure that requires dialysis or a kidney transplant);
- those with no date of birth;
- those with a date of death before April 1 of the estimate year (Kim and Sater, 2001a; Kim and Sater, 2001b; Sater, 2001a; Sater 2001b).

Medicare enrollment is generally presumed to be a nearly complete source of information on the size of the U.S. resident population aged 65 and older. In the late 1990s, the Social Security Administration estimated the Medicare coverage of the population to be about 96 percent (U.S. House of Representatives Committee on Ways and Means, 1998). Research by Kim and Sater (2001a) puts the estimate of overall coverage at about 95 to 97 percent of the population.

³ The 2009 Medicare premium for persons with 30-39 quarters is \$244 per month. For persons with less than 30 quarters, the cost is \$433 per month. Full age-based actuarial costs are calculated by taking into account the estimated cost of benefits for age-specific cohorts. Source: <http://www.cms.hhs.gov>.

Estimates of Underenrollment

Because registration in Medicare is not 100 percent complete, estimates of those who are not enrolled need to be developed to estimate the total population aged 65 and older. The adjustments for underenrollment must also account for differences in enrollment rates by age, sex, and race (Black/non-Black). For DA in 2000, there were two components of the estimates of underenrollment: an estimate of those who delayed enrolling past their initial age of eligibility, and an estimate of those who would never enroll. Information from the MEDB itself on age at the time of enrollment was used to estimate the number of people who delayed their enrollment. Data from the Current Population Survey (CPS) were used to derive an estimate of those who will never enroll. Details of how the estimates are developed are provided in the following sections.

Delayed Enrollment

To use the MEDB as a source for the DA population estimates, adjustments for underenrollment need to account for differences in enrollment at each age to ensure that the single year of age distribution derived from the MEDB is representative of the age distribution in the United States resident population at ages 65 and over. Eligibility for Medicare coverage starts at age 65 (three months before your 65th birthday to three months after). If an individual does not enroll at that time, then the individual must wait until the general enrollment period, which is January 1 to March 1 each year. Some individuals delay their entry into the Medicare program past the month in which they turn age 65 even though they will eventually enroll in Medicare. We call this “delayed enrollment.”

We derive information on delayed enrollment from the Medicare database itself using current age and age at enrollment to estimate the number that have not enrolled but eventually will, by single year of age, sex, and race. Assuming that above a certain age those enrolled represent a closed population (i.e., individuals on the file represent the entire population above that age and they were all eligible to enroll at each younger year of age) allows us to estimate the number of people that have not enrolled but eventually will (classified by single year of age, sex, and race).

In 2000, ages 65-72 were excluded from the derivation of the delayed enrollment estimate because the age at enrollment for these ages would only reflect the limited number of years when they were able to enroll.

It should be noted that since the estimates of delayed enrollment are based on information from those currently enrolled above a certain age, the estimates are sensitive to changes in enrollment patterns.

To show how information on age at enrollment could be used, a tabulation of age at first enrollment for all enrollees from the 2000 MEDB is provided in Table 2. Of the 33.2 million persons in the 2000 MEDB, 30.6 million (or 92.2 percent) enrolled within the first month of their 65th birthday. A total of 2.6 million delayed their enrollment into the Medicare program. As might be expected, the pace of enrollment declines with age: 763,000 (2.3 percent) enroll when they are age 65, another 411,000 (1.2 percent) enroll at age 66, and 0.8 percent enroll at age 67. The enrollment percents become very small beyond the mid-70's.

Expressed differently, for any given age, the cumulative percent that enroll at that age or after is derived by summing the percents (Table 2, column 4). For example, at age 66, 5.5 percent of the Medicare population enrolls at age 66 or after. Because of the relatively high rates of enrollment between ages 65 and 69, the cumulative delayed enrollment at age 70 drops to 2.4 percent. By age 80, only another 0.6 percent of persons will enroll at that age or later. It is assumed that no one enrolls after age 85.

The cumulative delayed enrollment factors derived from the MEDB provide an empirical basis for inflating the Medicare enrolled population at each age for those who are not in the MEDB because they are delaying their enrollment.

Table 3 shows the DA 2000 delayed enrollment adjustment factors for the total population, summed across age groups. The delayed enrollment rates are higher for males (2.6 percent) than females (1.8 percent), highest for Black males (4.3 percent), and lowest for non-Black females (1.6 percent).

Estimates of the Number of Persons Who Never Enroll in Medicare

Conceptually, the delayed enrollment adjustments relate to the population that ultimately enrolls in Medicare at some age. In order to estimate the total population not enrolled, we also need an estimate of those who will never enroll. Previous research has assumed that individuals who delay enrollment will have enrolled by age 85. Thus, we use the percent of the age 85 and over population that is not enrolled in Medicare to derive an estimate of the population aged 65 and older who will never enroll in Medicare.

The CPS Annual Social and Economic Supplement (ASEC)-Health Insurance Data have been used as the source for the development of the never-enrolled adjustment factor.⁴ For 2000, this correction factor was assumed to account for the entire population 65 and over residing in the United States who would never enroll. The CPS ASEC produces national and state-level estimates of health insurance coverage. The CPS ASEC respondents are asked whether they had any medical insurance coverage during the previous calendar year based on interviews conducted in February-April of the survey year. A specific question on the survey inquires about enrollment in Medicare (See Appendix B). For 2010, we plan to develop the correction factors from the CPS and we are currently compiling the data for the years 2002-2008 to examine the trend in this decade.

In the 2000 DA, the percentages not enrolled in Medicare at ages 85 and over were 3.5 for Black males; 2.5 for Black females; 2.0 for non-Black males; and 1.5 for non-Black females (see last row of Table 4). The percents were based on the CPS estimates of Medicare coverage by age, sex, and race. Given the issue of sampling variability, an average of the CPS estimates for the 1990s for the population aged 75 and over was used to determine the percent that will never enroll in Medicare (at ages 85 and over). The CPS estimates for 75 and over and 85 and over were similar overall (this is expected based on the low percent who enroll after age 75); possibly due to the small sample for each age, the individual estimates for ages 85 and over exhibited much variability from year to year and were not consistent across sex-race categories.

⁴ The Current Population Survey (CPS) is a monthly survey of about 50,000 households conducted by the Bureau of the Census for the Bureau of Labor Statistics. The survey has been conducted for more than 50 years.

Those who will never enroll must also be accounted for in the ages 65-84. For non-Black males and non-Black females, the percents for the 85 and over population in 2000 were used (2.0 and 1.5 percent, respectively). For the 85 and over Black male and Black female population, the percents were higher than for non-Black males and females. In 2000, the never enrolled rate at age 65-69 for Black males and females was assumed to be higher and set at 0.5 percentage points above the percent for the corresponding non-Black populations. As shown in Table 4, the percent never enrolled for Black males drops from 3.5 for age 85 and over in 2000 to 2.5 for age 65-69; the percent for Black females moves slightly from 2.5 for age 85 and over to 2.0 for age 65-69. The never enrollment rates for ages 70-84 for Black males and females were interpolated.

Total Corrections to the Medicare Enrollment Database (MEDB)

As described, the series of correction factors that are applied to the Medicare data to derive an estimate of the total population aged 65 and older consists of a combination of estimates of those who are delaying enrollment and those who will never enroll. The percents for both the delayed enrollment factor and never enrolled factor are added to derive the total percent unenrolled, specific to each single year of age, sex, and race (Black, non-Black) combination. The Medicare enrollment total (by age, sex, race) is divided by the enrollment rate (100 minus percent unenrolled divided by 100) to produce the DA estimates.

Table 5 summarizes the derived underenrollment factors used in the 2000 DA estimates, for sex and race categories. The overall underenrollment in the MEDB is estimated to be 3.9 percent (or 1.3 million). The delayed enrollments (2.1 percent) and never enrollments (1.8 percent) are of a similar magnitude. The estimated total Medicare underenrollment was highest for Blacks (7.1 percent for Black males, 5.5 for Black females); the delayed enrollment component was the largest piece of the estimate of underenrollment.

Table 6 shows the total underenrollment rates by single years of age, sex, and race used for DA in 2000. For all race-sex groups, the incompleteness in the MEDB is most pronounced at the ages immediately after turning 65, especially for Blacks. The rates exceed 10 percent for Black

males under age 68, for Black females under age 67, and for non-Black men at age 65. The underenrollment percents fall with advancing age as more persons sign up for Medicare each year after turning 65. By age 74, the underenrollment rates are less than 5 percent for all groups; the percents at ages over age 85 reflect the assumptions about the populations who never enroll.

Other Issues Associated With Underenrollment

Two “universe” issues impact the estimates of underenrollment described in this section. First, the estimates of the percent of population who never enroll in Medicare (see Table 5) are derived from CPS data. The universe of the CPS is the civilian noninstitutionalized population, so military personnel or those residing in institutions (including nursing homes) are not surveyed. The military is not a factor for the older population; however, the institutionalized population is, especially for the population age 85 and over which is the key estimate for developing the never-enrolled factors. About 21.4 percent of females age 85 and over were enumerated in institutions in 2000 (primarily nursing homes); the percent was 12.1 for males. The underenrollment rates in Table 5 will be biased to the extent that the rates of elderly residents in institutions differ appreciably from the rates for the household population.

Second, no explicit allowance is made for undocumented immigrants aged 65 and older living in the country. A portion of this population would not be enrolled in Medicare or picked up by any of the underenrollment factors (those who delay their enrollment and those who never enroll in Medicare). Some could be long-term residents and included in the Medicare system.

Undercoverage of this population in the CPS and the Medicare data would cause the DA estimates for the population at ages 65 and over to be too low.

Erroneous Inclusion in the Medicare Enrollment Database

The reported dates of death in the MEDB are used to exclude persons that were deceased as of April 1 of the estimate year from the DA Medicare-based estimates. Some records in the MEDB have invalid dates or a date of death after April 1 of the year of the cut for the data extract. Also,

some records have missing values for this variable, even though their date of birth implies they are deceased.

Work by Kim and Sater (2001a) and Sater (2001a) showed a small number of missing values for date of deaths at the uppermost ages (ages 100 and older). However, at these ages where the population is small, a small number of cases with missing dates of death might have an impact, especially if the end goal is census coverage evaluation. This overstatement is evident in comparing the Census 2000 count of the population age 100 and over (50,454) with the number based on the 2000 MEDB (129,518). Given that the census count may overstate the “true” number of centenarians (Krach and Velkoff, 1999), the Medicare total is clearly too high and includes a relatively large number of deceased persons.

Assignment of Race to Records in the Medicare Enrollment Database

Information on race obtained from the Social Security Administration (SSA) is available from the MEDB. While only a small percentage has missing, unknown, or invalid race codes (less than 0.2 percent in 2007) a larger issue for DA is the categories for which the information is available. In the MEDB, Hispanic origin is included as an additional race category, rather than as an ethnicity. The MEDB also includes an “Other” category. Together, in 2007, these two categories represent almost 4 percent of the records on the file.

The DA estimates are produced for two race categories: Black and non-Black, making it necessary to identify a method to redistribute records that cannot be directly assigned to either the Black or non-Black categories.

For DA in 2010, we are looking to the Census Bureau’s Person Characteristics File (PCF) as a data source that could be used to improve how records in the MEDB are assigned to the Black and non-Black categories. We are researching the option of utilizing the linkages between the PCF, Social Security data, and the MEDB to obtain the Census 2000 and a modeled race for each of the Medicare records.

Background for Assignment of Race

In order to understand how information from the PCF could improve the estimates by race from the MEDB it is useful to know the process through which race was obtained for the Medicare records and the history of the race categories on the current MEDB (McBean, 2006).⁵

The Centers for Medicare and Medicaid Services (CMS) is responsible for enrollment in the Medicare program. The SSA provides demographic information (including race) about individuals enrolled in Medicare to CMS and also certifies that an individual is eligible to enroll in Medicare. The SSA collects information on race at the time of application for a Social Security Number (SSN).

The information from SSA is maintained on the SSA Master Beneficiary Record (MBR) and provided to the CMS for inclusion in the MEDB.

From 1936 (the beginning of Social Security) to 1980, race data were collected in only three race categories: White, Black, and Other with an additional category of Unknown race. Starting in 1980, the race category ‘Other’ was split into: 1) Asian, Asian American or Pacific Islander, 2) Hispanic, and 3) American Indian or Alaskan Native. However, the MBR does not have provisions for these additional race categories. In the MBR, the information is collapsed to the original format and maintained as ‘Other’ race.

In 1980, SSA established a master file of SSN holders, (known as the Numident file). In 1994, the Numident race was incorporated into the MEDB for all current Medicare beneficiaries. Since 2000, updates have occurred annually. The 2007 MEDB has race distributed in the five 1980 race categories plus Other, Unknown, and Blank (missing). However, for the majority of those enrolled in Medicare who applied for a Social Security card before 1980, their race classification will not be updated from the three pre-1980 race categories unless they submit a new application, for example to change their name or request a replacement card. Despite some

⁵ A Medicare Brief from the National Academy of Social Insurance served as the source for the background information on race available from the Medicare Enrollment Database (McBean, 2006).

efforts to update the race information in the MEDB, there is no process for updating the race information when the standards for categorizing race and ethnicity are revised by the Office of Management and Budget (OMB).⁶

In the MEDB, some records are classified as race unknown or have an assigned race because the enrollees did not come in through the regular application route. Below are four examples of how Social Security card holders could have no race classification or an assigned race in the MEDB.

- Former railroad workers enrolled through the Railroad Retirement Board. The Board did not collect information on race and ethnicity.
- Since 1984, many newborn infants have been assigned an SSN through a process known as Enumeration at Birth. In the 1990's this became a requirement to get a child deduction by the Internal Revenue Service (IRS). The information is provided from the vital statistics office in each state. There is no race information generated in this process. When these persons become eligible for Medicare, they will need to have a race assigned. This will not impact DA for 2010.
- If an individual is enrolled in Medicare through the Medicare Health Plan there is no requirement to report information regarding the race and ethnicity of plan members.
- There are also enrollees with an assigned race. Beneficiary spouses who never applied for an SSN of their own have their race variable information populated by the race of their wage-earner spouse. This race may or may not accurately reflect the race/ethnicity they would have provided. It is estimated that as many as 18 percent of all Medicare beneficiaries (not all enrollees are aged 65 and older) fall into this category (Arday et al., 2000).

⁶ CMS does attempt to update the race information for some enrollees. CMS gets quarterly updates on American Indians and Alaska Natives from the files of the Indian Health Service (McBean, 2006). Also, in 1997, CMS initiated a mailing to those beneficiaries classified as other or unknown and to those with Hispanic surname (as identified by an algorithm developed by the Census Bureau). The CMS asked 2.2 million beneficiaries to provide their race and Hispanic origin. More than 850,000 replies were received.

The Census Bureau's Person Characteristics File

In 1997, the Office of Management and Budget (OMB) revised the standards for categorizing race and Hispanic origin. The revision created five main race categories: 1) White, 2) Black or African American, 3) Asian, 4) American Indian or Alaskan Native, and 5) Native Hawaiian or Other Pacific Islander. The revision also allowed for the selection of one or more categories. Hispanic origin was collected as a separate category and someone who selected Hispanic could be of any race. The U.S. Census Bureau adopted the revised standards for Census 2000.

Over the last decade, the Census Bureau has built a person-level file from administrative records primarily for application to decennial census research and development. The file starts with the SSA's Numident file. This file is processed to produce a file of unique SSNs, the 100 percent Census Numident file.⁷ The file is then enhanced with demographic data to create the Person Characteristics File (PCF) (see Miller, Judson, and Sater, 2000 for a more complete description and analysis of the demographic properties of this file).

The race information in the MEDB could be enhanced by matching the Census 2000 file to the MEDB through the link with the Census Numident file. The Census 2000 race and Hispanic origin would then be available for each matched Medicare record. A modeled race based on information contained in the PCF would also be available for each record in the MEDB. For a more detailed discussion of the use of administrative records to model race and Hispanic origin, see Resnick, 2002.

With the availability of the PCF, we have an opportunity to improve the assignment of the Medicare enrollees to the Black and non-Black categories by merging the Medicare and the PCF file to obtain two additional race variables for each matched record: Census 2000 race and modeled race.

⁷ The SSNs are replaced by randomly assigned Protected Identity Keys (PIKs) to maintain confidentiality (Farber and Miller, 2002).

Ongoing Research

More effort is being directed towards using the information obtained from the PCF file. Two options are outlined below. The only difference between the two options is the order in which either the Census or the modeled race is used. If the race in the MEDB is Hispanic, Unknown, or Blank, Option 1 turns to the Census race first, and then if both the Medicare and Census race cannot be classified as being in either the Black or non-Black race categories the modeled race is used. In Option 2, the modeled race is used if the Medicare race is Hispanic, Unknown, or Blank. If both Medicare and modeled race cannot be classified as either Black or non-Black, then the information is obtained from the census form. A third option would be to use the PCF to replace the Medicare race altogether.

Option 1: Use the Medicare race first, the Census race second, and then the modeled race.

Race			
Medicare	Census	Modeled	Assigned as
White			
Asian			
American Indian	Not used	Not used	Non-Black
Other			
Black	Not used	Not used	Black
Hispanic	White		
	Asian		
	Pacific Islander	Not used	Non-Black
	American Indian		
	Black	Not used	Black
Unknown	Multiple	White	
		Asian	
		Pacific Islander	Non-Black
		American Indian	
Blank	Blank	Black	Black
		Multiple	Distributed
		Blank	Proportionally

Option 2: Use the Medicare race first, the modeled race second, and then the Census race.

Race			
Medicare	Modeled	Census	Assigned as
White			
Asian			
American Indian	Not used	Not used	Non-Black
Other			
Black	Not used	Not used	Black
Hispanic	White		
	Asian		
	Pacific Islander	Not used	Non-Black
	American Indian		
	Black	Not used	Black
Unknown	Multiple	White	
		Asian	
		Pacific Islander	Non-Black
		American Indian	
		Black	Black
Blank	Blank	Multiple	Distributed
		Unknown	Proportionally
		Blank	

Other Sources for Benchmarking the Medicare Estimates

We are examining other sources of health insurance coverage measures, particularly from the American Community Survey (ACS), the Health and Retirement Study (HRS), the Medical Expenditure Panel Study (MEPS), and the National Health Interview Survey (NHIS) to get several benchmarks for coverage.

The Medicare-based DA estimates of the population 65 and over can also be benchmarked against estimates developed using the age-period-cohort approach used by Preston et al. (1998) to analyze the size of the Black population in 1990. For 1990 (the last year available in their reconstructed estimates), Preston et al.'s estimates of the Black population for ages 65 and over were based on an age-period-cohort model that included historical census counts and adjustments to account for the error in each census. While their estimates differed from the Medicare-based DA estimate for ages 65 to 84 by only 0.3 percent, the discrepancies were larger for individual 5-year age groups. An evaluation of the Preston et al. estimates and the DA estimates was conducted as part of the review of the DA estimates in 2000 (McDevitt et al., 2001). The work of Preston et al. or a similar approach could serve as a benchmark for the population aged 65 and older or replace the Medicare-based estimates altogether.

Overlap between the Vital Statistics Based Estimates and the Medicare Based Estimates

The Medicare data have been used in previous DA efforts because of the incompleteness of the vital statistics data prior to 1935. With those born in 1935 turning 75 in 2010, it is now possible to extend the vital statistics based DA estimates to age groups older than age 65. The age group overlap will allow for an assessment of the Medicare estimates for the 65 to 74 year old population that was not possible in 2000.

Summary

When using the MEDB to estimate the population aged 65 and older corrections must be made for delayed enrollment, persons who never enroll, and persons who should no longer be on the file. Furthermore, race characteristics derived from the MEDB may be different from those of other data sources. In this paper, we have described how we can use information from the MEDB and the Current Population Survey to compensate for persons who will never enroll. We also have described how we might use the Census Bureau's Person Characteristics File to enhance the race information in the MEDB. When these measures are utilized, the DA estimates for the population aged 65 and older will be combined with the DA estimates for the population less than age 65 to produce a benchmark for census evaluation.

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Table 1. Demographic Analysis Estimates of Percent Coverage Error by Age and Sex: 1990 and 2000

Age	Total		Male		Female	
	1990	2000	1990	2000	1990	2000
65+	0.0	1.2	0.3	0.8	-0.3	1.4
65-69	1.5	0.9	1.6	-0.2	1.5	1.9
70-74	0.3	1.2	-0.1	0.5	0.6	1.8
75+	-1.4	1.3	-0.6	1.7	-1.9	1.0

Note: A minus sign denotes a net undercoverage. Source: Robinson et al., 2002

Table 2. Age at Time of Medicare Enrollment: 2000

Age at time of first enrollment (1)	Number enrolled (2)	Percent enrolled at specified age (3)	Cumulative percent enrolled at specified age or later (4)
65+	33,245,101		
65 ¹	30,645,122	92.18	100.00
65 ²	762,704	2.29	7.82
66	410,854	1.24	5.53
67	258,157	0.78	4.29
68	185,982	0.56	3.51
69	173,865	0.52	2.95
70	108,713	0.33	2.43
71	79,747	0.24	2.10
72	69,499	0.21	1.86
73	61,355	0.18	1.66
74	55,493	0.17	1.47
75	52,875	0.16	1.30
76	47,453	0.14	1.15
77	45,376	0.14	1.00
78	43,100	0.13	0.87
79	41,538	0.12	0.74
80	39,201	0.12	0.61
81	37,625	0.11	0.49
82	34,597	0.10	0.38
83	31,444	0.09	0.28
84	30,319	0.09	0.18
85	30,083	0.09	0.09

Note: Enrollment is assumed to be zero after age 85.

¹ Enrolled within the first month of turning 65 or earlier.

² Enrolled between one month after turning 65 and before age 66.

Source: U.S. Census Bureau, tabulations of Medicare enrollment data.

Table 3. Estimates of Delayed Underenrollment of Medicare Enrollees by Race and Sex: 2000

Race and sex	Medicare enrolled	Delayed enrollment percent
Total	33,245,101	2.11
Male	13,627,322	2.61
Female	19,617,779	1.76
Black		
Male	1,007,412	4.29
Female	1,655,941	3.30
Non-Black		
Male	12,619,910	2.47
Female	17,961,838	1.62

Source: U.S. Census bureau, tabulations from Medicare enrollment data.

Table 4. Estimates of the Percent of Population Aged 65 and Over Who Never Enroll in Medicare by Age, Race, and Sex: 2000

Age	Black male	Black female	Non-Black male	Non-Black female	Total male	Total female
65+	2.82	2.20	2.00	1.50	2.06	1.56
65-69	2.50	2.00	2.00	1.50	2.04	1.55
70-74	2.75	2.13	2.00	1.50	2.06	1.55
75-79	3.00	2.25	2.00	1.50	2.07	1.55
80-84	3.25	2.38	2.00	1.50	2.08	1.55
85+	3.50	2.50	2.00	1.50	2.11	1.58

Source: Based on Estimates of Medicare Coverage from the Current Population Survey, 2000.

Table 5. Medicare Enrollment, Estimates of Percent Underenrollment, and Adjustments and Estimated Total Population Aged 65 and Over by Race and Sex on April 1, 2000

Race and sex	Medicare enrolled	Underenrollment percents			Medicare adjusted population estimate
		Total	Delayed enrollment	Never enrolled	
Total	33,245,101	3.88	2.11	1.77	34,587,440
Male	13,627,322	4.67	2.61	2.06	14,294,920
Female	19,617,779	3.32	1.76	1.56	20,292,520
Black Population					
Male	1,007,412	7.11	4.29	2.82	1,084,602
Female	1,655,941	5.50	3.30	2.20	1,752,320
Non-Black Population					
Male	12,619,910	4.47	2.47	2.00	13,210,318
Female	17,961,838	3.12	1.62	1.50	18,540,200

Source: Tables 3 and 4.

Table 6. Estimates of Percent Underenrollment in the Medicare File, by Age, Sex, and Race: 2000

Age	Black male	Black female	Non-Black male	Non-Black female
65+	7.12	5.50	4.47	3.12
65-69	11.68	10.05	7.16	5.49
70-74	5.50	4.93	4.12	3.16
75-79	4.27	3.57	3.20	2.39
80-84	3.73	2.86	2.50	1.85
85+	3.52	2.51	2.02	1.51
65	17.53	14.90	10.18	7.91
66	12.96	11.25	7.83	6.04
67	10.29	9.05	6.58	5.06
68	8.61	7.62	5.80	4.44
69	7.37	6.61	5.23	3.99
70	6.51	5.89	4.64	3.60
71	5.83	5.26	4.30	3.33
72	5.33	4.82	4.07	3.12
73	4.96	4.43	3.86	2.94
74	4.64	4.12	3.67	2.78
75	4.64	3.98	3.50	2.63
76	4.40	3.74	3.33	2.49
77	4.21	3.52	3.17	2.37
78	4.03	3.33	3.02	2.25
79	3.87	3.15	2.87	2.14
80	3.95	3.11	2.73	2.03
81	3.81	2.97	2.59	1.93
82	3.70	2.82	2.46	1.83
83	3.53	2.69	2.34	1.74
84	3.44	2.58	2.22	1.66
85	3.61	2.59	2.11	1.58
86	3.50	2.50	2.00	1.50
87	3.50	2.50	2.00	1.50
88	3.50	2.50	2.00	1.50
89	3.50	2.50	2.00	1.50
90+	3.50	2.50	2.00	1.50

Source: U.S. Census Bureau, tabulations of Medicare enrollment data.

Appendix A. Historical Steps for Processing the Medicare Data

The process for producing population estimates of the population aged 65 and older by age, race, and sex for Demographic Analysis purposes from the MEDB has traditionally been as follows:

1. tabulate the number of living Medicare enrollees aged 65 and older from the Medicare micro-data files by age, age at first enrollment, sex, and race and limit to the enrollees living in the United States, not territories;
2. summarize the age by age at time of first enrollment tabulation to define an adjustment factor for persons who delay their enrollment in Medicare past the month in which they turn age 65;
3. develop an adjustment factor for persons that will never enroll in Medicare from annual Current Population Survey data or other sources; and
4. apply the enrollment adjustment factors to the tabulated number of Medicare enrollees to obtain an estimate of the total population.

For the 1990 DA estimation, two additional steps were included:

1. further adjust the Medicare estimate based on differences between the sex ratio for the Medicare estimate and historical sex ratios of the population; and
2. create a “final” Medicare estimate by adding an estimate of undocumented immigration to the sex ratio adjusted Medicare estimate.

Appendix B. The Current Population Survey (CPS) and American Community Survey (ACS) Health Insurance Questions

The Current Population Survey (CPS) is a monthly survey that the Census Bureau conducts for the Bureau of Labor Statistics to provide data on labor force participation and unemployment. Data on health insurance coverage are collected through the Annual Social and Economic (ASEC) Supplement on Health Insurance. The questions are asked at the household level and then if it applies, at the individual level. The respondent is asked to report about the prior year.

“What type of insurance (was/were) (name/you) covered by in the last year?”

1. NIU
2. Medicare
3. Medicaid
4. Tricare or Champus
5. CAMPVA
6. VA health care
7. Military health care
8. Children's health insurance program (CHIP)
9. Indian Health Service
10. Other government health care
11. Employer/union-provided (policyholder)
12. Employer/union-provided (as dependent)
13. Privately purchased (policyholder)
14. Privately purchased (as dependent)
15. Plan of someone outside the household
16. Other

The Health Insurance question on the 2008 American Community Survey (ACS) asks the household respondent to report each household member's coverage at the time of the survey by marking “yes” or “no” for each of eight types listed.

“Is this person currently covered by any of the following types of health insurance or health coverage plans?”

1. Insurance through a current or former employer or union (of this person or another family member)
2. Insurance purchased directly from an insurance company (by this person or another family member)
3. Medicare, for people 65 and older, or people with certain disabilities
4. Medicaid, Medical Assistance, or any kind of government-assistance plan for those with low incomes or disability
5. TRICARE or other military health care
6. VA (including those who have ever used or enrolled for VA health care)
7. Indian Health Service
8. Any other type of health insurance or health coverage plan – Specify