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Chronic Condition Warehouse Technical Guidance

Options for Determining Which CMS Medicare Beneficiaries are Dually Eligible for Medicare and Medicaid Benefits

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Revision Log

Date	Changed by	Revisions	Version
June 2021	K. Schneider R. VanGilder	Converted to 2020 template and CCW voice updates	1.4
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Chapter 1: Overview

It is often desirable to be able to ascertain the number of Medicare beneficiaries also enrolled in Medicaid. People enrolled in Medicare who have limited income and resources may receive help paying for their out-of-pocket expenses from their state Medicaid program, and some people may be eligible for additional Medicaid benefits (reference https://www.cms.gov/MLNProducts/downloads/Medicare_Beneficiaries_Dual_Eligibles_At_a_Glance.pdf). Cost-sharing may include assistance with premium payments and may also include assistance with deductible, coinsurance or copayments. Some investigators may find it helpful to understand detailed entitlement information for Medicare and Medicaid benefits, such as Medicare and Medicaid entitling the beneficiary to full benefits or only partial benefits, or simply a subsidy to offset a Medicare Part B or Part D premium. Determining who these dually eligible (DE) beneficiaries are can be accomplished using a few variables available in Centers for Medicare & Medicaid Services (CMS) administrative databases for the Medicare and Medicaid programs. The appropriate methodology may vary depending on the particular study needs and available data.

The objective of this paper is to describe the options for determining who is DE and to document the relative advantages and disadvantages of the different methods for making this determination. First, we will examine different CMS data sources; second, we will describe methods for determining who is dually enrolled; and, finally, Chronic Condition Warehouse (CCW) analytic team members share recommendations regarding these methods. The data available to researchers has varied somewhat over time. For example, with the onset of the Medicare Part D benefit in 2006, additional enrollment data fields became available (i.e., the state-reported dual status code and the Part D cost-share group).

For the purposes of illustration within this document, the data used are from the 2008 CCW Medicare Beneficiary Summary file (currently delivered as the Medicare Master Beneficiary Summary File [MBSF]) or the 2008 Medicaid Analytic eXtract (MAX) Person Summary (PS) file. We started with the assumption that the person was Medicare-eligible, that is, the person was enrolled in Medicare Part A or B at least one month in 2008. The objective was to determine which people also have Medicaid benefits. We use three classifications when describing DE status: 1) Full dual coverage — entitled to the full scope of Medicaid benefits, and enrolled in Medicare Part A or B; 2) Partial dual coverage — benefits restricted to certain types of Medicaid care (e.g., pregnancy only); and 3) Not dual — not Medicaid eligible.

Chapter 2: Data Sources for Medicare and Medicaid Enrollment Information

A. Medicare Data

1. Medicare Entitlement/Buy-in Code

This data field, a monthly Medicare entitlement/buy-in indicator (MDCR_ENTLMT_BUYIN_IND_<MM>), has been historically available in the Medicare enrollment data files. Values for this variable (refer to Table 1) provide information regarding whether a state Medicaid program is buying Medicare coverage (i.e., paying the Medicare premiums) on behalf of the Medicaid enrollee.

Table 1. Medicare entitlement/buy-in code values

Values	Description
0 =	Not entitled
1 =	Part A only
2 =	Part B only
3 =	Part A and Part B
A =	Part A, state buy-in
B =	Part B, state buy-in
C =	Part A and Part B state buy-in

Generally, we consider a person DE if the value of this field is A, B, or C. However, this field does not give an indication of the level of Medicaid buy-in.

2. State Reported Dual Eligible Status Code

This variable, a monthly state reported dual eligible status code (DUAL_STUS_CD_<MM>), became available starting in 2006, as a result of state Medicaid Management Information System (MMIS) reporting requirements from the Medicare Modernization Act (MMA) of 2003. CMS designed this variable to offer more granularity than the state buy-in variable regarding the person's level of Medicaid benefits (refer to Table 2). CMS has provided a detailed description of the meaning of the value options for this variable on the CMS website.

Table 2. Medicare dual status indicator values

Values	Description
00 =	Not Medicare enrolled for the month
01 =	QMB only (qualified Medicare beneficiaries; Medicaid pays Part A and B premiums)
02 =	QMB and Medicaid coverage including RX (aka QMB Plus; full Medicaid)
03 =	SLMB only (Specified Low-Income Medicare Beneficiaries; Medicaid pays Part B premium)
04 =	SLMB and Medicaid coverage including RX (aka SLMB Plus; full Medicaid)
05 =	QDWI (Qualified Disabled and Working Individuals; Medicaid purchases Part A benefits, but no Medicaid benefits)
06 =	Qualifying individuals (QI; Medicaid pays Part B premium, but no Medicaid benefits)
08 =	Other dual eligibles (Non-QMB, SLMB, QWDI, or QI) with Medicaid coverage including Rx
09 =	Other dual eligibles but without Medicaid coverage
99 =	Unknown

Values	Description
NA =	Non-Medicaid

CMS considers a person a full DE if the value of this field is 02, 04, or 08. The values 01, 03, 05, and 06 indicate a partial or restricted level of Medicaid benefits (i.e., a partial-benefit DE)— meaning the person had some sort of assistance from Medicaid, possibly limited to premium payments and/or coinsurance.

NOTE: CMS created a derived field which counts the number of months during the reference calendar year that each Medicare beneficiary had some level of dual coverage using this dual status code variable as the input. The count of months (DUAL_ELGBL_MONS) for this variable uses the following logic: count of all months where DUAL_STUS_CD_<MM> is equal to '01', '02', '03', '04', '05', '06', '08', '09', or '99'. and the beneficiary has Medicare enrollment. Researchers may want to use caution when using this variable; it counts people in the '09' category, which is a group not enrolled in Medicaid.

3. Cost-Share Group

CMS created a monthly cost-share group (CST_SHR_GRP_CD_<MM>), when Part D enrollment information became available with the 2006 benefit year. The Part D benefit allows for premium and/or coinsurance subsidies for low-income Medicare enrollees who do not qualify for Medicaid (https://www.medicare.gov/your-medicare-costs/get-help-paying-costs/find-your-level-of-extra-help-part-d). The level of subsidy varies by income level; therefore the cost-share group variable contains some interesting information regarding poverty, which is more granular than just knowing that someone was Medicaid-eligible (refer to Table 3). It contains information regarding who we "deem" eligible for the low-income subsidy. The CMS Medicare website (reference http://www.cms.gov/Medicare/Eligibility-and-Enrollment/LowIncSubMedicarePresCov/Downloads/StateLISGuidance021009.pdf) contains additional details regarding the Low-Income Subsidy (LIS) provisions within the Part D benefit.

Table 3. Medicare Part D cost-share group values

Values	Description
00 =	Not Medicare enrolled for the month
01 =	Enrolled in Medicare A and/or B and in Part D and deemed with 100% premium-subsidy and no copayment
02 =	Enrolled in Medicare A and/or B and in Part D and deemed with 100% premium-subsidy and low copayment
03 =	Enrolled in Medicare A and/or B and in Part D and deemed with 100% premium-subsidy and high copayment
04 =	Enrolled in Medicare A and/or B and in Part D and LIS, 100% premium-subsidy and high copayment
05 =	Enrolled in Medicare A and/or B and in Part D and LIS, 100% premium-subsidy and 15% copayment
06 =	Enrolled in Medicare A and/or B and in Part D and LIS, 75% premium-subsidy and 15% copayment
07 =	Enrolled in Medicare A and/or B and in Part D and LIS, 50% premium-subsidy and 15% copayment
08 =	Enrolled in Medicare A and/or B and in Part D and LIS, 25% premium-subsidy and 15% copayment
09 =	Enrolled in Medicare A and/or B and in Part D and No premium subsidy nor cost sharing subsidy
10 =	Enrolled in Medicare A and/or B, but not Part D and employer receives RDS subsidy
13=	Enrolled in Medicare A and/or B, but not Part D and cannot determine whether the beneficiary has creditable prescription drug coverage elsewhere

CMS considers a person a full DE if the value of this field is 01, 02, or 03. Those who are not DE but have low-incomes and receive a Part D subsidy (e.g., as a proxy for socioeconomic status) are people with values of 04–08. The remaining values indicate that the individual is not eligible for subsidized Part D coverage.

B. Medicaid/MAX Data

If an investigator has access to MAX data files, there are additional options for determining which people are DE. People appearing in the MAX PS files are those enrolled in Medicaid at some time during the calendar year. Medicare enrollees do not appear in the MAX PS files unless they also have Medicaid benefits.

NOTE: The MAX PS includes a small number of records for people who received a Medicaid service and were later determined to be ineligible.

1. Medicare Enrollment as It Appears on Medicaid Files

The MAX PS file has a variable for the eligible Medicare Health Insurance Claim (HIC) number (variable called EDB_HIC) — which CMS populates from the Medicare Enrollment Database (EDB), if it's available. The EDB also has the beneficiary Claim Account Number (CAN) and Beneficiary Identification Code (BIC) — the two data elements which comprise the HIC (**NOTE:** there is a similar variable available from Medicaid Statistical Information System [MSIS], called the MDCD_HIC_NUM; we did not use that variable for this study). Presumably, a non-null value for the HIC indicates Medicare enrollment (Table 4).

Table 4. Medicaid EDB HIC number

Value	Description
Up to 11 characters	Medicare Health Insurance Claim (HIC) number

Some investigators may consider a person DE if this variable is not null. Alternatively, we can use more complex logic to determine whether a value appears to conform to a valid HIC number format. For example, one could determine whether the length of the value is either 10 or 11 digits, both of which could potentially be valid HICs. For this paper, we assumed a person was DE, either full or partial, if this variable had a value conforming to a HIC format.

2. MAX Crossover Field (Currently known as the Medicare Dual Monthly Code)

In MAX PS for 2005 and earlier, dually enrolled beneficiaries were known as crossovers, and CMS captured enrollment in a data field known as the MAX crossover field. Annual and quarterly variables were available starting in 1999 (EL_MDCR_ANN_XOVR_OLD; quarterly versions of this variable are: EL_MDCR_ANN_XOVR_OLD_1–EL_MDCR_ANN_XOVR_OLD_4). Monthly crossover variables were available in 2005 (EL_MDCR_XOVR_MO_<M>, where M= months 1–12). The monthly cross-over variable(s) added values indicating Medicare covers the eligible beneficiary, and also the level of Medicaid benefits (known as crossover, dual or Medicare eligibility), according to Medicaid (MSIS), Medicare enrollment database (EDB) or both; the new values are 50–59.

For 2006 forward, an updated dual classification variable is available (the eligible dual code; SAS name EL_MDCR_DUAL_MO_<M>)). This field is the same as the EL_MDCR_XOVR_MO _<M> field (for each month of the calendar year: M=1–12), which CMS retired in 2005.

Table 5. Dual crossover code values from MAX

Values	Description
00 =	in MSIS, eligible is not a Medicare beneficiary
01 =	in MSIS, eligible is entitled to Medicare-QMB only
02 =	in MSIS, eligible is entitled to Medicare-QMB and full Medicaid coverage
03 =	in MSIS, eligible is entitled to Medicare-SLBM only
04 =	in MSIS, eligible is entitled to Medicare-SLBM and full Medicaid coverage
05 =	in MSIS, eligible is entitled to Medicare-QDWI
06 =	in MSIS, eligible is entitled to Medicare-qualifying individuals (1)
07 =	in MSIS, eligible is entitled to Medicare-qualifying individuals (2)
08 =	in MSIS, eligible is entitled to Medicare-other dual eligible
09 =	in MSIS, eligible is entitled to Medicare-dual eligibility category unknown
50 =	a record was found in the Medicare EDB for the eligible and codes 01–09 do not apply
51 =	a record was found in the Medicare EDB for the eligible and code 01 applies
52 =	a record was found in the Medicare EDB for the eligible and code 02 applies
53 =	a record was found in the Medicare EDB for the eligible and code 03 applies
54 =	a record was found in the Medicare EDB for the eligible and code 04 applies
55 =	a record was found in the Medicare EDB for the eligible and code 05 applies
56 =	a record was found in the Medicare EDB for the eligible and code 06 applies
57 =	a record was found in the Medicare EDB for the eligible and code 07 applies
58 =	a record was found in the Medicare EDB for the eligible and code 08 applies
98 =	a record was found in the Medicare EDB for the eligible and code 09 applies
99 =	in MSIS, eligible's Medicare status is unknown

Often, CMS considers a person a full DE if the value of the EL_MDCR_DUAL_MO_<M> field is 02, 04, 08, 52, 54, or 58. Values 01, 03, 05, 06, 51, 53, 55, and 56 indicates a partial or restricted level of dual benefits.

Chapter 3: Methods for Determining Who Has Dual Coverage

We have considered several coding schemes to indicate which people have full dual benefits (full duals), partial dual benefits (e.g., state buy-in for some Medicaid services, but not eligible for the full range of Medicaid services), and which people are not DE (not enrolled in Medicaid at all). Note that some beneficiaries may not be DE but may receive a subsidy, available to low-income beneficiaries, toward purchase of Medicare Part D coverage. For the purposes of this guide, we consider Medicare Part D low-income subsidy (LIS) not dual (i.e., the not dual classification doesn't necessarily mean the person is not receiving a Part D premium subsidy). We used the following classifications of DE for the remainder of this document:

- **Full dual coverage** — entitled to the full scope of Medicaid benefits, and enrolled in Medicare Part A or B
- **Partial dual coverage** — benefits restricted to certain types of Medicaid care (e.g., pregnancy only, prescription drug coverage only, and/or premium/copayments for services)
- **Not dual** — not Medicaid eligible; it is possible that some of these people may receive a subsidy — such as LIS

Table 6 summarizes the variables available to determine DE status, and the years the variable is available.

Table 6. Summary of DE variable options, and timing of availability*

Medicare or Medicaid	Variable	Data file source	Years available*	Time lag to availability
Medicare	1. Medicare entitlement buy-in	CCW MBSF	1999+	12 months after end of year
	2. State reported dual eligible status code	CCW MBSF	2006+	12 months after end of year
	3. Cost-share group	CCW MBSF	2006+	12 months after end of year
MAX	4. Medicare EDB HIC	MAX PS	1999+	Several years — pending MAX PS file availability**
	5. MAX crossover (Eligible Dual Code)	MAX PS	1999+ (**NOTE:** the monthly codes started in 2006)	Several years — pending MAX PS file availability**

* Updated data files are available annually. Years indicate when data were first available.
**Currently, Medicaid data are available as the T-MSIS RIFs; refer to the ccwdata.org site for details.

A. Categories of Variables Indicating DE

You can use particular values within each variable to identify DE and, for some variables, the values may offer granularity in terms of the extent of the benefits. Table 7 demonstrates some algorithms you may use to identify the categories of DE.

Table 7. Values within DE variables and classification

Option	Variable	Dual — full	Dual — partial	Not dual
1	State buy-in	A, B, C*	*	All other values
2	Dual status code	02, 04, 08	01, 03, 05, 06	All other values
3	Cost-share group	01, 02, 03*	*	All other values
4	Medicare EDB HIC	If not null (and conforms to a HIC format)*	*	All other values, including null
5	MAX crossover/ Eligible dual code	02 (QMB plus), 04 (SLMB plus), 08 (other dual eligible), 52 (QMB plus), 54 (SLMB plus), or 58 (other dual eligible)	01 (QMB only), 03 (SLMB only), 05 (QDWI), 06 (QI-1), 51 (QMB only), 53 (SLMB only), 55 (QDWI), or 56 (QI-1)	All other values

* It is not possible to distinguish between full or partial dual benefits for these variables.

B. Frequency of DE for Each Variable

The unit of analysis for the data examples is a person enrolled in Medicare. There are cases where we may count a single person more than once. This happens if a Medicare enrollee has more than one Medicaid enrollment record during the year and the state Medicaid agency assigns different MAX identification numbers (known as MSIS_IDs). Please refer to the paper, *CCW Technical Guidance: Getting Started with MAX Data Files*, for additional details on potential duplicate people in MAX.

For the illustration in Table 8, the counts are all people who are Medicare enrolled and if the person appears in the MAX files, there is a record for each person/Medicaid state combination. We manipulated the MAX data to reduce records to one person per year per state before linkage to Medicare. There were 47,850,425 people Medicare-enrolled at least one month during 2008. After linkage to the MAX PS there were 47,986,728 Medicare/MAX records (including those enrolled for at least one month of Medicaid coverage) for the purposes of this analysis; the larger number in MAX PS is due to a small number of people having Medicaid enrollment in more than one state during the year. Therefore, there is not a completely unduplicated count of people in the MAX examples.

Table 8. Analysis of the frequency of dual eligibility by variable (2008)

Variable	Dual (DE) — full	Dual — partial	Not dual — number	Not dual — percentage
State buy-in	7,684,274 (16.01%)*	*	40,302,454	83.99%
Dual status code	6,179,661 (12.88%)	1,790,041 (3.73%)	40,017,026	83.39%
Cost-share group	8,452,059 (17.61%)*	*	39,534,669	82.39%
Medicare EDB HIC	9,296,752 (19.37%)*	*	38,689,976	80.63%
MAX crossover/ Eligible dual code	6,221,407 (12.96%)	1,776,343 (3.70%)	39,988,978	83.33%

* It is not possible to distinguish between full or partial dual benefits for these variables.

The variable resulting in the highest percentage of people counted as DE is the MAX variable for the Medicare EDB HIC. It is possible that some of the HICs which are in the correct format do not, in fact, indicate a valid Medicare enrollment record. Also the beneficiary may have had a HIC at some point in time but is not Medicare eligible during the part of the reference year that they were Medicaid eligible. The variable resulting in the lowest percentage of people considered DE is the Medicare variable for state buy-in.

C. Correspondence Between Variables

Based on the findings illustrated in Table 8 and discussions with CMS, **the remainder of the analyses use the variable for the state reported DE status code as the preferred variable for examining correspondence between classification variables.** We compared each of the other four methods for identifying a dual code to the DE status code (i.e., the Medicare variable DUAL_STUS_CD_<MM>). Then, for each of the variable comparisons, we calculated a Positive Predictive Value (PPV) and Negative Predictive Value (NPV). That is, we determined how often the variable in question (i.e., each of the remaining four options) agreed with the DE classification from the dual status code. Reference Tables 9–12 below.

Table 9. State buy-in compared with dual status code (2008)

Type	Dual status code = full	Dual status code = partial	Dual status code = Not Dual	Totals
State buy-in=Dually enrolled	5,579,720	1,767,654	336,900	7,684,274
State buy-in=Not dually enrolled	599,941	22,387	39,680,126	40,302,454
Totals	**6,179,661**	**—**	**40,017,026**	**47,986,728**

	Calculation	Percentage
PPV of state buy-in full DE or partial DE	5,579,720 + 1,767,654/ 7,684,274	95.62%
NPV of state buy-in not dual	39,680,126/ 40,302,454	98.46%

The state buy-in variable has a higher PPV for capturing DE (either full or partial benefits) than the other Medicare variable which we studied (cost-share group; reference Table 10). The buy-in variable is not able to ascertain which DE is full or partial. The NPV is the lowest for buy-in that we see for any of the variables, indicating that we are more likely to incorrectly label a person as not being DE with this variable as compared to the others, when in fact s/he is Medicaid enrolled.

Table 10. Cost-share group compared with dual status code (2008)

Type	Dual status code = full	Dual status code = partial	status code = Not Dual	Totals
Cost-share group = Dually enrolled	6,113,227	1,740,015	598,817	8,452,059
Cost-share group = Not dually enrolled	66,434	50,026	39,418,209	39,534,669
Totals	6,179,661	—	40,017,026	47,986,728

	Calculation	Percentage
PPV of cost-share group full DE or partial DE	6,113,227 + 1,740,015/ 8,452,059	92.92%
NPV of cost-share group not dual	39,418,209/ 39,534,669	99.71%

The cost-share group variable is not as accurate in capturing all of the DEs found in the DE status code variable, as indicated by PPV for DE (92.9%; compared to buy-in where the PPV was 95.6%). The NPV is very high, indicating that if the cost-share group variable indicated the person was not DE, then this was highly like to be true (NPV = 99.7%).

A limitation of the cost-share group variable is that it does not provide information regarding the level of Medicaid benefits (i.e., it is not possible to determine whether the person has full or partial Medicaid benefits using the cost-share group variable).

Table 11. MAX EDB HIC compared with dual status code (2008)

Type	Dual status code = full	Dual status code = partial	Dual status code = Not Dual	Totals
MAX EDB HIC = Dually enrolled	6,116,681	1,751,542	1,428,529	9,296,752
MAX EDB HIC = Not dually enrolled	62,980	38,499	38,588,497	38,689,976
Totals	6,179,661	—	40,017,026	47,986,728

	Calculation	Percentage
PPV of EDB HIC full DE or partial DE	6,116,681 + 1,751,542/ 9,296,752	84.63%
NPV of EDB HIC not dual	38,588,497/ 38,689,976	99.74%

The MAX EDB HIC variable incompletely captures DEs (either full, or full and partial benefits) found in the dual status code variable. This is likely due to some invalid HICs being present in the EDB HIC variable; that is, we were not able to link the record to a corresponding Medicare enrollment record. A further limitation of this method of identifying DE is that it is not possible to determine whether the person has full or partial Medicaid benefits using the EDB HIC variable.

If an EDB HIC is missing or invalid (i.e., when we classify EDB HIC as being not dual), the person is extremely unlikely to be DE (NPV=99.7%).

Note that there may be individuals in the MAX file that would classify as dual eligible according to the MAX variables, but Medicare data doesn't show Medicare enrolling them. Tables 9–12 do not include these people, since the starting place for these analyses was the assumption that the person was Medicare-eligible.

Table 12. MAX cross-over/eligible dual code compared with dual status code (2008)

Type	Dual status code = full	Dual status code = partial	Dual status code = Not Dual	Totals
MAX eligible dual code = Full Dual	6,024,730	29,333	167,344	6,221,407
MAX eligible dual code = Partial Dual	17,482	1,693,544	65,317	1,776,343
MAX eligible dual code = Not dually enrolled	137,449	67,164	39,784,365	39,988,978
Totals	6,179,661	1,790,041	40,017,026	47,986,728

	Calculation	Percentage
PPV of MAX eligible dual full DE	6,024,730/ 6,221,407	96.84%
PPV of MAX eligible dual partial dual	1,693,544/ 1,776,343	95.34%
PPV of MAX eligible dual both full and partial dual	(6,024,730 + 1,693,544)/ (6,221,407 + 1,776,343)	97.09%
NPV not dual	39,784,365/ 39,988,978	99.49%

The MAX Eligible Dual Code variable (which is the same as the monthly MAX Crossover filed) had very high correspondence with the dual status code in terms of identification of DE (PPV=97.1%), as well as classifying the person as being full (PPV=96.8%) or partial dual (95.3%). There is very high agreement between these variables regarding who is not DE (NPV=99.5%).

This variable is very useful, as it allows for categorization of full versus partial Medicaid benefits. In the MAX PS file, there is a monthly variable which provides information regarding the nature of restricted Medicaid benefits (EL_RSTRCT_BNFT_FLG_<M> — with M=months 1–12). It is possible that if the MAX Eligible Dual code also included information regarding the nature of restricted benefits, it may be possible to better classify people as full or partial DE. Refer to the paper, *CCW Technical Guidance: Getting Started with MAX Data Files*, on the CCW website.

Chapter 4: CCW Analytic Recommendations

If you would like to use a single variable to understand who had dual coverage a particular month, and also to understand which people had full versus partial benefits, the state-reported dual status indicator variable (i.e., the monthly DUAL_STUS_CD_<MM> variable found in the MBSF), is preferable (when available). Beginning in 2006, when the dual status indicator became available, researchers using Medicare data no longer need to also purchase MAX data files to be able to determine the level of dual benefits (i.e., full or partial) for enrollees.

The state buy-in code (i.e., the monthly MDCR_ENTLMT_BUYIN_IND_<MM> variable), which was historically been the only option in Medicare data for determining who is DE, appears to undercount DEs.

Some investigators may find it appealing to use the cost-share group variable (i.e., the monthly CST_SHR_GRP_CD_<MM> variable), particularly if they are interested in using the information regarding dual coverage and LIS subsidies as a proxy for socioeconomic status of the person. This variable yields the highest PPV of DE, vis a vis the dual status indicator. The dual status indicator variable is more precise than the other Medicare variables which describe dual status.

If investigators have the MAX data, the MAX crossover code (i.e., the monthly ELGBL_MDCR_XOVR_MO_<M> variable; which CMS replaced by the dual eligibility code [EL_MDCR_DUAL_MO_<M>] starting in 2006) is quite accurate at matching the dual status code that appears in the Medicare files. This variable has granularity beyond what most researchers need. However, a limitation of this variable is that there are categories where it is not clear what the actual benefits level for the person might be (e.g., if the value = 50, indicating CMS found a MAX PS record in the Medicare EDB for the eligible, but the person was not dually enrolled). This limitation may make it desirable to use more than just a single MAX variable to make a DE determination.

Researchers might decide to use combinations of variables to meet their particular needs. For example, it would be reasonable to use a combination of the dual status code (to classify who is full or partial dual), then add information regarding LIS from the cost-share group indicator. This sort of algorithm may be helpful to better understand not only the socioeconomic status, but also whether the beneficiary bore the entire cost of drugs or whether subsidies were in effect.

Similarly, if researchers have MAX data, it would be reasonable to use a combination of the MAX Eligible Dual Code, supplemented with information from the restricted benefits flag variable (i.e., monthly variables EL_RSTRCT_BNFT_FLG_<M>).

Appendix A: List of Acronyms and Abbreviations

Acronym	Definition
BIC	Beneficiary Identification Number
CAN	Claim Account Number
CCW	Chronic Condition Warehouse
CMS	Centers for Medicare & Medicaid Services
DE	Dually Eligible
EDB	Medicare Enrollment Database
HIC	Medicare Health Insurance Claim number
LIS	Low-Income Subsidy for Medicare Part D
MAX	Medicaid Analytic eXtract
MBSF	Medicare Master Beneficiary Summary File
MIIR	CMS Management Information Integrated Repository
MMA	Medicare Modernization Act of 2003
MMIS	Medicaid Management Information System
MSIS	Medicaid Statistical Information System
NPV	Negative Predictive Value
PPV	Positive Predictive Value
PS	Person Summary (file in MAX)
QI	Qualifying Individuals
QMB	Qualified Medicare Beneficiaries
QDWI	Qualified Disabled and Working Individuals
SLMB	Specified Low-Income Medicare Beneficiaries