Chronic Condition Data Warehouse

Your source for national CMS Medicare and Medicaid research data

CCW Technical Guidance:

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

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Version 1.3

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Revision History

Revision Date	Version Number	Description
01/2018	1.2	Updated data file source references from CCW Beneficiary Summary to CCW MBSF.
4/2018	1.3	Clarified Medicaid/MAX section (all MAX content).

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Chapter 1: Overview

It is often desirable to be able to ascertain the number of Centers for Medicare & Medicaid Services (CMS) Medicare beneficiaries who are 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 (see 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 information regarding the extent of Medicare and Medicaid benefits a person is entitled to receive: 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 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, different data sources will be examined; second, methods for determining who is dually enrolled are described; and, finally, Chronic Condition Data Warehouse (CCW) analytic recommendations are shared. 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 Beneficiary Summary File (currently delivered as the 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. Three classifications are used when describing DE status: 1) Full dual coverage – entitled to the full scope of Medicaid benefits, and enrolled in Medicare A or B; 2) Restricted 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 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

The input data source for this variable is the "unloaded" CMS Enrollment Database. The data are loaded to CCW and disseminated to researchers through the MBSF. MDCR_ENTLMT_BUYIN_IND_<*MM*> (for each month of the calendar year: *MM*=01-12) Values: 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

Generally, a person is considered 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. This variable was designed to offer more granularity than the state buy-in variable with regard to the type of Medicaid benefits to which the person was entitled. CMS has provided a detailed description of the meaning of the value options for this variable on the CMS website (see

https://www.cms.gov/Medicare-Medicaid-Coordination/Medicare-and-Medicaid-Coordination/Medicare-Medicaid-Coordination-Office/Downloads/DualEligibleDefinitions.pdf).

Table 2. Medicare Dual Status Indicator

The input data source for this variable is the CMS Part D Denominator file, using information from the state MMA files. The data are loaded to CCW and disseminated to researchers through the MBSF.

DUAL_STUS_CD_<*MM*> (for each month of the calendar year: *MM*=01-12)

Values:

00 = Not Medicare enrolled for the month
01 = QMB only (Qualified Medicare Beneficiaries; Medicaid pays Part A & 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) w/Medicaid coverage including RX
09 = Other Dual Eligibles but without Medicaid coverage
99 = Unknown
NA = Non-Medicaid
XX = Enrolled in Medicare A and/or B, but no MIIR* record for the month

** MIIR = CMS Management Information Integrated Repository; source of Medicare enrollment data*

Often, a person is considered a full DE if the value of this field is 02, 04, or 08. A restricted level of Medicaid benefits (i.e., a restricted DE) is indicated for values 01, 03, 05 and 06 – meaning the person had some sort of assistance from Medicaid, which may be 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*> not in ('00','XX','NA','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

This variable, a monthly cost share group (CST_SHR_GRP_CD_<*MM*>), was created 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 (http://www.ncoa.org/assets/files/pdf/center-for-benefits/part-d-lis-eligibility-and-coverage.pdf). 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. It contains information regarding who is "deemed" eligible for the low-income subsidy. Additional details regarding the Low-Income Subsidy (LIS) provisions within the Part D benefit can be found on the CMS Medicare website (see http://www.cms.gov/Medicare/Eligibility-and-Enrollment/LowIncSubMedicarePresCov/Downloads/StateLISGuidance021009.pdf).

Table 3. Medicare Part D Cost Share Group

The input data source for this variable is the CMS Denominator file. The data are loaded to CCW and disseminated to researchers through the MBSF.

CST_SHR_GRP_CD_<*MM*> (for each month of the calendar year: *M*M=01-12)

Values:

00=	Not Medicare enrolled for the month
XX=	Enrolled in Medicare A and/or B, but no MIIR* record 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
10=	Enrolled in Medicare A and/or B, but not Part D and employer is entitled for RDS subsidy
11=	Enrolled in Medicare A and/or B, but not Part D and other non-RDS creditable coverage
12=	Enrolled in Medicare A and/or B, but not Part D and no other creditable coverage
13=	Enrolled in Medicare A and/or B, but not Part D and cannot determine if any other creditable coverage

** MIIR = CMS Management Information Integrated Repository; source of Medicare enrollment data*

A person is considered 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.

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 who were enrolled in Medicaid at any 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 - from Medicare (note: there is a similar variable available from Medicaid Statistical Information System [MSIS], called the MDCD_HIC_NUM; that variable is not used for this study). This variable is populated with the HIC when it's available. Presumably, a non-null value indicates Medicare enrollment.

Table 4. Medicaid Enrollment Database (EDB) HIC Number

The input data source is the Medicare EDB, which obtains the beneficiary Claim Account Number (CAN) and Beneficiary Identification Code (BIC) – the two data elements which comprise the HIC. EDB_HIC_NUM Values: Up to 11 characters.

A person may be considered DE if this variable is not null. Alternatively, more complex logic can be used 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 was populated with 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 enrollment was captured 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 starting in 2005 (EL_MDCR_XOVR_MO_<*M*>, where *M*= months 1-12). The monthly cross-over variable(s), added values indicating that the eligible beneficiary is covered by Medicare, 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), and is designed to replace it at some future time.

Table 5. Dual Code from MSIS

The input data source for codes 01-09 are derived from MSIS eligibility files. In MSIS, Medicare information for codes 50-59 is obtained from the Medicare EDB during production of the MAX files.

ELIGIBLE DUAL CODE (Monthly)
EL_MDCR_DUAL_MO_<*M*>

Values:
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
59 = a record was found in the Medicare EDB for the eligible and code 09 applies
98 = a record was found in the Medicare EDB for the eligible and code 99 applies
99 = in MSIS, eligible's Medicare status is unknown

Often, a person is considered a full DE if the value of the EL_MDCR_DUAL_MO_<*M*> field is 02, 04, 08, 52, 54, or 58. A restricted level of dual benefits is indicated for values 01, 03, 05, 06, 51, 53, 55, and 56.

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), restricted 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, Medicare Part D low-income subsidy (LIS) is considered not dual (i.e., the not dual classification doesn't necessarily mean the person is not receiving a Part D premium subsidy). The following classifications of DE are used for the remainder of this document:

- Full dual coverage – entitled to the full scope of Medicaid benefits, and enrolled in Medicare A or B
- Restricted dual coverage – benefits restricted to certain types of Medicaid care (e.g., pregnancy only, 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

A summary of the variables available to determine DE status, and the years the variable is available are summarized in Table 6 below.

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+	9 months after end of year
	2. State reported dual eligible status code	CCW MBSF	2006+	9 months after end of year
	3. Cost-share group	CCW MBSF	2006+	9 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.

A. Categories of Variables Indicating DE

Particular values within each variable can be used to identify DE and, for some variables, the values may offer granularity in terms of the extent of the benefits. Some algorithms which may be used to identify the categories of DE are demonstrated in Table 7.

Table 7. Values within DE Variables, and Classification

Option	Variable	Dual		Not Dual
		Full Dual	Restricted	
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
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

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 a single person may be counted more than once. This happens if a Medicare enrollee has more than one Medicaid enrollment record during the year and is assigned different MAX identification numbers (known as MSIS_IDs). Please refer to the MAX Getting Started Technical Guidance Paper for additional details on potential duplicate people in MAX PS (see https://www.ccwdata.org/web/guest/technical-guidance-documentation).

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. MAX data were manipulated to reduce records to one person per year per state prior to 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 these examples.

Table 8. Analysis of the Frequency of Dual Eligibility by Variable (2008)

Variable	Dual (DE)		Not Dual	
	Full Dual	Restricted	#	%
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%

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 validly-formatted HICs do not, in fact, indicate a valid Medicare enrollment record. Also the beneficiary may have had a HIC at some 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.** Each of the other four methods for identifying a dual was compared to the DE status code (i.e., the Medicare variable DUAL_STUS_CD_<*MM*>). For each of the variable comparisons, a Positive Predictive Value (PPV) and Negative Predictive Value (NPV) were calculated. 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. See Tables 9 – 12 below.

Table 9. State Buy-In Compared with Dual Status Code (2008)

		Dual status code			
		Full Dual	**Restricted**	**Not Dual**	**Totals**
State Buy-in	**Dual**	5,579,720	1,767,654	336,900	7,684,274
	Not Dual	599,941	22,387	39,680,126	40,302,454
	Totals	6,179,661		40,017,026	47,986,728

PPV of Buy-in		
PPV Full or Restricted (DE)	5,579,720 + 1,767,654 / 7,684,274	95.62%
NPV Not Dual	3,968,0126 / 40,302,454	98.46%

The state buy-in variable has a higher PPV for capturing DE (either full or restricted) than the other Medicare variable which was studied (cost-share group; see Table 10). The buy-in variable is not able to ascertain which DE is full or restricted. 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)

		Dual status code			
		Full Dual	**Restricted**	**Not Dual**	**Totals**
Cost-share group	**Dual**	6,113,227	1,740,015	598,817	8,452,059
	Not Dual	66,434	50,026	39,418,209	39,534,669
	Totals	6,179,661		40,017,026	47,986,728

PPV of Cost share		
PPV Full or Restricted (DE)	6,113,227 + 1,740,015 / 8,452,059	92.92%
NPV 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 restricted Medicaid benefits using the cost-share group variable).

Table 11. MAX EDB HIC Compared with Dual Status Code (2008)

		Dual status code			
		Full Dual	**Restricted**	**Not Dual**	**Totals**
Medicare EDB HIC	**Dual**	6,116,681	1,751,542	1,428,529	9,296,752
	Not Dual	62,980	38,499	38,588,497	38,689,976
	Totals	6,179,661		40,017,026	47,986,728

PPV of EDB HIC		
PPV Full or Restricted (DE)	6,116,681 + 1,751,542 / 9,296,752	84.63%
NPV Not Dual	38,588,497 / 38,689,976	99.74%

The MAX EDB HIC variable incompletely captures DEs (either full, or full and restricted) 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 restricted 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 who would be classified as dual eligible according to the MAX variables, but are not found in Medicare data. 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 Eligible Dual Code Compared with Dual Status Code (2008)

		Dual status code			
		Full Dual	**Restricted**	**Not Dual**	**Totals**
MAX crossover/ Eligible Dual Code	**Full Dual**	6,024,730	29,333	167,344	6,221,407
	Restricted	17,482	1,693,544	65,317	1,776,343
	Not Dual	137,449	67,164	39,784,365	39,988,978
	Totals	6,179,661	1,790,041	40,017,026	47,986,728

PPV of MAX crossover Code		
PPV Full Dual	6,024,730 / 6,221,407	96.84%
PPV of Restricted Dual	1,693,544 / 1,776,343	95.34%
PPV Full or Restricted (DE)	(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 restricted 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 restricted 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 restricted DE. Refer to the MAX Getting Started Technical Guidance Paper on the CCW website (see https://www.ccwdata.org/web/guest/technical-guidance-documentation).

Chapter 4: Chronic Condition Data Warehouse (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 restricted benefits, the state-reported dual status indicator variable (i.e., the monthly DUAL_STUS_CD_<MM> variable), 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 restricted) 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; however, it is available somewhat later each year than the state buy-in variable, which may be problematic for some investigators.

If investigators have the MAX data, the MAX crossover code (i.e., the monthly ELGBL_MDCR_XOVR_MO_<M> variable; which is 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 that a MAX PS record was found 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 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 dual or restricted), 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 was expected to bear 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
CCW	Chronic Condition Data 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	MAX PS
MBSF	Master Medicare 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
QI	Qualifying Individuals
QMB	Qualified Medicare Beneficiaries
QWDI	Qualified Disabled and Working Individuals
SLMB	Specified Low-Income Medicare Beneficiaries