Medicaid Analytic Extract Date of Death (MAX DOD) Master File, 2009 Update

Final Report

June 14, 2013

Julie Sykes
Shinu Verghese

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Contract Number:
HHSM-500-2005-00025I

Mathematica Reference Number:
06759.123

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ACKNOWLEDGMENTS

The authors would like to acknowledge the contributions of several individuals to the preparation of this report. We wish to express our sincere thanks to Allison Hedley Dodd, who reviewed a draft of the report; Betty Teller, who edited the report; and Sharon Clark, who prepared the final manuscript. We also want to thank Cara Petroski in the Office of Enterprise Management, Centers for Medicare & Medicaid Services, for her guidance during this project.

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ACRONYMS

ACA	Affordable Care Act
BIRLS	Beneficiary Identification Records Locator Subsystem
CER	Comparative effectiveness research
CHIP	Children's Health Insurance Program
CLIST	Command list
CMMI	Center for Medicare and Medicaid Innovation
CMS	Centers for Medicare & Medicaid Services
CY	Calendar year
DMF	Death Master File
DOB	Date of birth
DOD	Date of death
EDB	Medicare Enrollment Database
FAQ	Frequently asked question
FFS	Fee-for-service
IRS	Internal Revenue Service
MAX	Medicaid Analytic Extract
MSIS	Medicaid Statistical Information System
MSIS ID	MSIS identification number
NCHS	National Center for Health Statistics
NDI	National Death Index
PS	Person Summary
SSA	Social Security Administration
SSN	Social Security number
VA	Veterans Affairs

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I. INTRODUCTION

As a result of the Affordable Care Act (ACA), the Centers for Medicare & Medicaid Services (CMS) and its Center for Medicare and Medicaid Innovation (CMMI) are stimulating a number of revolutionary changes in the health care delivery system in the quest for better health care at a more affordable price. Numerous innovation strategies and comparative effectiveness research (CER) are underway to improve care. To gauge whether these innovations are working successfully, researchers need complete and accurate data about the people receiving the care, the types of services received, and the costs of the services.

Since 1999, all states and the District of Columbia have submitted Medicaid enrollment, expenditures, and service utilization records in a standard format to the Medicaid Statistical Information System (MSIS). Mathematica, on behalf of CMS, has produced research files derived from these data for each state by calendar year. MAX files are a more research-friendly set of Medicaid administrative files. The enrollment information in MAX identifies monthly enrollment after the retroactive/correction records have been applied and after certain state-specific data elements are transformed into a consistent, national format. The claims in MAX identify the services rendered and the cost of those services after the adjustments—such as voids, credits, and debits—have been applied. In addition, the enrollment data pertain to people enrolled in the given calendar year (CY), and the claims and encounter records pertain to the services rendered in that same time period, thereby making a consistent—and more meaningful—time period for analyses of enrollment, service utilization, and expenditures.

Researchers sometimes use death as an outcome measure, typically measuring duration until death or including an indicator of death in a specific time period. To support these analyses, the MAX Person Summary (PS) file contains three dates of death: (1) the MSIS date of death, which is reported by the state in the MSIS file; (2) the Medicare Enrollment Database (EDB) date of

death, which is linked to the MAX PS file during MAX production (and is available only for people who are dually enrolled in Medicare and Medicaid); and (3) the date of death extracted from the Social Security Administration's (SSA) Death Master File (DMF), which is linked to the MAX PS file during MAX production. All three dates of death (DOD) are right-censored, meaning they contain dates of death that occurred prior to or during the MAX CY. For example, no one in the MAX 2007 PS file has a date of death after 2007.

CMS requested the development of the MAX DOD master file, which is a file of all persons enrolled in Medicaid since 1999 who subsequently died, so that researchers could have the most up-to-date information on the date of death, including deaths that occurred after the MAX CY. Last year, we created a MAX DOD 1999–2008 master file that contained all Medicaid enrollees in 1999–2008 who had died before October 29, 2011. In conjunction with the newly released MAX 2009 data, CMS requested that the MAX DOD master file be updated to include both new Medicaid enrollees in 2009 who died and the most up-to-date DOD information for people enrolled in 1999–2008 who died. To accomplish this, we created two files: (1) a MAX DOD 1999–2009 master file and (2) a MAX DOD 2009 "update file." The MAX data warehouse contractor will apply the update file to the existing MAX DOD 1999–2008 master file. When the contractor is finished, their new master file will be identical to our MAX DOD 1999–2009 master file. The MAX data warehouse contractor will disseminate the MAX DOD master file to approved research activities.

In this report, we describe the creation of the MAX DOD update file for 2009 and the MAX DOD 1999–2009 master file. In Chapter II, we provide a brief synopsis of the data sources used in this process. In Chapter III, we describe the creation of the MAX DOD update file and present quality control statistics about the number of records in the update file and in the new MAX DOD 1999–2009 master file. In Appendix A, we provide a data flow diagram describing

how the MAX DOD 2009 update file and the new MAX DOD 1999–2009 master file were created. Appendix B contains the file layout and data dictionary for the update file, and Appendix C contains the file layout and data dictionary for the MAX DOD master file. Appendix D includes some frequently asked question about the DOD information.

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II. DATA SOURCES

In this chapter, we describe the data sources used in the creation of the MAX DOD 2009 update file: (1) the date of death source file, (2) the Medicaid enrollment files, and (3) the most recent MAX DOD information, the MAX DOD 1999–2008 master file.

A. Source Data for Dates of Death

There are several sources of information that could have been used for the dates of death, including the National Death Index (NDI), the SSA DMF, the Beneficiary Identification Records Locator Subsystem (BIRLS) Death File, Veterans Affairs (VA) beneficiary death records, and Internal Revenue Service (IRS) records (Baugh et al. 2012). Each of these data sources has strengths and weaknesses. The two most prominent DOD files are the NDI and the DMF, which are described in more detail here.

1. NDI

The NDI is a centralized repository of death records at the National Center for Health Statistics (NCHS). The records are purchased by NCHS from each state's vital statistics office (NCHS 2013). The data include not only the date of death but the cause of death, information that could be potentially useful to researchers. However, there are two big drawbacks that make these data less desirable: cost and timeliness. NCHS charges $350 plus $0.15 per record per year, which means that for just one year of MAX (approximately 60 million enrollees), the price equates to more than $9 million. In addition, to allow enough time for data collection and processing, there is a two-year lag between the date of death and the reporting of the death in the NDI.

2. SSA DMF

The DMF is an SSA file compiled from SSA payment records and other sources of death information, including decedent's family members, funeral homes, hospitals, and financial institutions (SSA 2013). There is a public version and a federal agency version of the file. The

public version excludes death records collected through SSA's contracts with the states but the federal version does not. CMS, in partnership with SSA, obtains the federal version of the SSA DMF on a weekly basis and makes the information available on a need-to-know, mission-critical basis. The drawbacks of the DMF are: (1) it does not include the cause of death, and (2) over time, the content of the DMF can change (for example, dates of death can be removed or updated) as new information is obtained. Because of the DMF's timeliness and affordability, CMS selected the DMF as its source file for the MAX DOD file. During this update process, we used the latest version of the SSA DMF, version April 20, 2013.

B. Source Data for Medicaid Enrollment

The MAX PS file is the source file for Medicaid enrollment. There is one PS file for each state for each year, and each file contains one record for each person enrolled in Medicaid or the Children's Health Insurance Program (CHIP). Each file uniquely identifies a person by the MSIS identification number (MSIS ID). States can use their own state-assigned identifier or the person's Social Security number (SSN) as the MSIS ID. CMS instructions to the states request that an enrollee be assigned one and only one MSIS ID over time, but states do sometimes assign more than one MSIS ID or change the MSIS ID over time. As a condition of eligibility, federal regulations require that all Medicaid applicants furnish their SSNs, with the exception of nonqualified aliens and individuals with well-founded religious objections. For the most part, the SSN and date of birth (DOB) are stable, but there are instances in which that information changes over time.[1] It is generally accepted that the most recent information about the enrollee is the most accurate information (the "last is best" rule).

[1] A state's Medicaid agency may eventually learn that the SSN or DOB for a Medicaid enrollee was incorrect. When this happens, the state changes the SSN and/or DOB on the person's enrollment record. Consequently, there are instances in the MAX PS files in which a Medicaid enrollee (as identified by STATE and MSIS_ID) has more than one SSN and/or DOB over time. Therefore, we *could* encounter a situation in which more than one date of

C. MAX DOD Master File, 1999–2008

After MAX 2008 files were completed for all states, we created the MAX DOD master file for 1999–2008 using the following steps:

- Extract enrollee records from the MAX PS file for each state for each year, excluding records with a missing SSN or missing DOB[2]; this forms the set of all possible Medicaid enrollees who could link to the DMF
- For each year for each state, merge the DMF to the MAX PS record using the person's SSN and DOB (both must match exactly, gender is not available on the DMF)
- For each state, concatenate all of the enrollees' records by MSIS ID and year of enrollment and take the last record per person ("last is best")
- Retain only the enrollees who died
- Concatenate all state DOD files to form the national MAX DOD master file

The file contains one record for each enrollee in 1999–2008 who died (10,182,290 records).

(continued)
death was assigned to the same person at different times. Our algorithm assumes that the latest (most recent) SSN and DOB are the most accurate and uses the corresponding date of death associated with that SSN and DOB.

[2] SSN is classified as missing if it contains all 0's, 8's, 9's, or spaces. DOB is classified as missing if it contains all 0's, 8's, or 9's, or equals 101.

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III. CREATION OF THE MAX DOD 2009 UPDATE FILE AND THE MAX DOD 1999–2009 DOD MASTER FILE

In this chapter, we describe the file-creation process of the MAX DOD 2009 update file and provide helpful quality control statistics to persons using either the MAX DOD 2009 update file or the MAX DOD 1999–2009 master file.

A. File-Creation Process for the MAX DOD Update File

We created the MAX DOD 2009 update file using the following steps. The first four steps create the new master file and the final two steps are specific to the update file:

1. Extract enrollee records from the MAX PS file for each state and year, for 1999–2009, excluding records with a missing SSN or DOB.[3,4]
2. For each state for each year, merge the latest DMF (version April 20, 2013) to the MAX PS record using the SSN and DOB. When both variables match exactly, retain the DMF DOD; otherwise set the DOD to missing (all 8's).
3. For each state, concatenate all PS records for 1999–2009, sort by MSIS ID and year, set a dummy flag (0, 1) for each year in which the person was enrolled, and keep the last nonmissing DOD record in the stack for each unique MSIS ID (last is best).
4. Concatenate all state DOD files to form the new, national MAX DOD master file.
5. Merge the new MAX DOD master file (1999–2009) to the old master file (1999–2008) by state and MSIS ID and classify the records into four distinct groups. If the record is in the new but not the old master file, classify the record as an "Insert" record (record type = I). If the record is in both files but the dates of death differ, classify the record as an "Update" record (record type = U). If the record is in the old but not the new file, classify the record as a "Delete" record (record type = D). All other records in the new master file are classified as "No action" (record type = " ").
6. Restrict the update file to records with record type = I, U, or D.

Appendix A contains a data flow diagram describing how the file was created.

[3] SSN is classified as missing if it contains all 0's, 8's, 9's, or spaces. DOB is classified as missing if it contains all 0's, 8's, or 9's, or equals 101.

[4] If we had preserved the PS extracts during the MAX DOD 1999–2008 file-creation process, we would have only needed to extract MAX PS records from one year: 2009. Going forward, we will preserve these extract files to save resources.

B. MAX DOD 2009 Update File

In Table III.1, we display the number of records in the original MAX DOD master file (1999–2008) by state (10.2 million decedents). The "number of insert records (1999–2008)" column shows that 1.2 million people who were enrolled in 1999–2008 died since the MAX DOD 1999–2008 master file was created (approximately one year ago). The "number of insert records (2009 enrollees)" column shows that 321,725 enrollees were new to the Medicaid program in 2009 and died by the time of the updated DMF. The "number of update records" column shows that the date of death changed for 1,929 enrollees. The "number of deletion records" column shows that 3,818 enrollees had a date of death in the original MAX DOD 1999–2008 master file but either SSA removed that person's record from the DMF or the person's SSN or DOB changed in MAX in such a way as to disconnect the record from the DMF. Because we assume the last status is the most accurate, we allow these records to be removed from the MAX DOD master file.

The MAX DOD update file, which is sorted by state and MSIS ID, is called MW00.@BF32955.US.PS.DOD.UPDATE.V130429. The file contains the following four variables: state, MSIS ID, SSA DOD, and record type. Appendix B contains the data dictionary, which describes the file layout and valid values for each variable in this file.

To apply the MAX DOD update records to the MAX DOD 1999–2008 master file, link the files by state and MSIS ID. Use the record type to control how the record is used. When the record type = I, add the record to the master file. When the record type = U, replace the DOD in the master file with the DOD in the update file. When the record type is D, remove the record from the master file.

Table III.1. Number of MAX DOD Records Before and After Applying the Update Records

State	Number of Records in the MAX DOD 1999–2008 Master File (Before Update)	Number of Insert Records (1999–2008 Enrollees)	Number of Insert Records (2009 Enrollees)	Number of Update Records	Number of Deletion Records	Number of Records in the MAX DOD 1999–2009 Master File (After Update)
United States	**10,182,290**	**1,214,659**	**321,725**	**1,929**	**3,818**	**11,714,856**
Alabama	192,730	24,159	4,206	42	53	221,042
Alaska	13,541	2,037	345	5	5	15,918
Arizona	159,163	29,666	5,750	31	93	194,486
Arkansas	124,547	16,662	3,362	28	50	144,521
California	992,327	121,597	24,538	174	328	1,138,134
Colorado	89,838	16,275	3,517	13	91	109,539
Connecticut	112,857	10,494	4,073	20	12	127,412
Delaware	25,032	3,471	755	5	11	29,247
District of Columbia	35,464	4,249	893	16	20	40,586
Florida	904,033	98,070	27,050	125	269	1,028,884
Georgia	294,990	34,871	9,146	158	250	338,757
Hawaii	35,861	4,962	1,045	7	2	41,866
Idaho	33,462	3,866	1,258	7	6	38,580
Illinois	475,050	58,081	13,364	98	133	546,362
Indiana	204,131	20,660	6,441	19	22	231,210
Iowa	95,845	8,951	3,492	9	10	108,278
Kansas	83,830	8,304	3,229	6	10	95,353
Kentucky	183,343	21,932	4,910	37	227	209,958
Louisiana	194,253	21,598	6,035	45	52	221,834
Maine	80,880	9,548	1,568	11	8	91,988
Maryland	150,604	16,979	4,793	50	64	172,312
Massachusetts	245,729	28,221	9,108	81	196	282,862
Michigan	298,875	36,657	10,497	67	81	345,948
Minnesota	219,630	20,630	10,866	15	16	251,110
Mississippi	150,861	16,802	3,460	23	69	171,054
Missouri	225,362	23,097	6,954	80	75	255,338
Montana	28,595	3,459	1,184	3	3	33,235
Nebraska	52,669	4,958	1,936	3	6	59,557
Nevada	48,549	7,039	1,782	8	18	57,352
New Hampshire	32,916	3,090	1,382	3	6	37,382
New Jersey	223,748	21,083	7,191	36	105	251,917
New Mexico	56,775	7,852	2,852	19	37	67,442
New York	716,970	85,510	21,584	129	422	823,642
North Carolina	342,788	35,848	10,710	49	69	389,277
North Dakota	24,007	2,558	860	3	0	27,425

Table III.1 *(continued)*

State	Number of Records in the MAX DOD 1999–2008 Master File (Before Update)	Number of Insert Records (1999–2008 Enrollees)	Number of Insert Records (2009 Enrollees)	Number of Update Records	Number of Deletion Records	Number of Records in the MAX DOD 1999–2009 Master File (After Update)
Ohio	393,874	42,014	14,895	42	83	450,700
Oklahoma	174,275	21,552	4,963	38	59	200,731
Oregon	114,030	15,449	3,557	13	16	133,020
Pennsylvania	438,666	45,024	16,386	92	57	500,019
Rhode Island	42,784	3,984	3,616	5	3	50,381
South Carolina	172,659	19,740	4,175	18	99	196,475
South Dakota	26,274	2,433	997	3	5	29,699
Tennessee	285,344	67,474	6,115	77	234	358,699
Texas	639,045	75,568	21,249	80	294	735,568
Utah	37,467	4,483	1,418	4	3	43,365
Vermont	31,435	4,286	708	3	7	36,422
Virginia	192,499	20,677	6,893	46	59	220,010
Washington	173,532	23,241	6,096	42	33	202,836
West Virginia	81,484	9,853	2,777	17	15	94,099
Wisconsin	215,719	24,170	7,156	23	30	247,015
Wyoming	13,948	1,475	588	1	2	16,009

Source: MAX DOD 1999–2008 Master File, insert/update/delete records generated by linking the MAX 1999–2009 Person Summary File to the SSA Death Master File (version 04/20/2013) and then linking those records to the MAX DOD 1999–2008 Master File, and the MAX DOD 1999–2009 Master File

C. MAX DOD 1999–2009 Master File

In the last column of Table III.1, we display the number of records in the MAX DOD 1999–2009 master file by state, after all update records have been applied. The new total record count is 11,714,856 records.

The new MAX DOD master file is called MW00.@BF32955.US.Y2009.PS.DOD.[5] The file is sorted by state and MSIS ID and contains three variables: state, MSIS ID, and SSA DOD. Appendix C contains the data dictionary, which describes the file layout and valid values for each variable in this file.

D. Decedents by State and Year

As shown in Table III.2, the number of records in the MAX DOD file varies considerably by state. However, the number of decedents is not solely a function of the number of Medicaid enrollees, as evidenced by the variation in the percentage of enrollees with a DOD (Table III.3). The proportion of decedents is highest in 1999 and gradually reduces with each subsequent year. This downward trend is expected; enrollees get older as time passes, and there is more time for a death to occur. In other words, Medicaid enrollees in 1999 have a greater likelihood of dying by April 2013 than Medicaid enrollees in 2009, all other things being equal.

E. Limitations

The number of MAX PS records that linked to the DMF is a function of the accuracy of both the DMF and the SSN and DOB in the MAX PS file. The SSN in the PS file is supposed to be verified by the state's Medicaid agency, but there is no way to identify whether this verification occurred. There could be incorrect SSNs and DOBs, which could generate false positives if incorrect records were linked, or false negatives if records could not be linked. However, an

[5] The MAX DOD 1999–2008 master file is called MW00@BF32955.US.Y2008.PS.DOD.

analysis of the reporting and validity of the SSNs in 2009 Medicaid administrative data was encouraging (Czajka and Verghese 2013): among records with SSNs reported in the valid range, only 0.6 percent were classified as having incorrect SSNs by the Census Bureau.

Table III.2. Number of MAX Person Summary Records with SSA DOD, 1999–2009

State	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
United States	**5,498,717**	**5,410,540**	**5,343,568**	**5,419,431**	**5,209,565**	**4,943,605**	**4,647,781**	**4,131,066**	**3,680,851**	**3,269,150**	**2,812,556**
Alabama	115,798	117,337	115,032	118,211	110,804	104,760	98,251	90,857	79,833	69,837	57,705
Alaska	8,170	8,145	8,040	7,921	7,613	7,226	6,838	6,205	5,589	4,810	4,088
Arizona	55,815	56,810	69,669	85,697	90,468	86,816	82,581	71,488	65,319	59,923	51,839
Arkansas	74,946	73,005	70,449	68,857	65,236	61,987	58,992	54,962	51,097	45,347	37,449
California	672,703	643,345	627,956	605,428	582,369	546,086	501,628	448,468	395,713	346,084	291,920
Colorado	50,683	50,813	49,274	48,320	45,436	43,731	43,326	39,510	35,783	32,085	27,525
Connecticut	60,914	59,362	60,069	58,817	56,775	53,071	49,251	45,117	40,861	36,645	31,947
Delaware	12,593	12,867	13,242	13,660	13,421	12,883	12,458	11,615	10,407	9,182	7,905
District of Columbia	17,870	17,725	19,555	15,489	14,836	14,375	13,421	12,249	10,891	9,509	8,187
Florida	306,272	319,591	311,532	322,357	302,715	291,142	276,878	252,639	221,978	202,813	182,690
Georgia	157,615	153,443	149,933	164,676	157,536	150,221	135,838	122,360	107,788	96,129	81,724
Hawaii	22,245	21,377	20,562	20,083	19,327	18,359	17,120	15,516	13,666	12,163	10,471
Idaho	14,677	15,167	15,618	15,529	15,164	14,594	14,882	13,992	12,801	11,596	9,880
Illinois	182,805	177,056	172,018	270,241	274,281	266,525	257,489	166,732	138,014	118,503	102,652
Indiana	100,454	100,300	99,712	98,807	94,608	91,830	86,651	78,427	71,544	65,981	56,000
Iowa	50,593	49,126	47,369	46,297	44,161	41,995	40,943	38,578	35,428	31,927	27,590
Kansas	42,171	41,072	40,319	39,458	37,749	36,172	34,915	32,383	30,032	27,330	23,646
Kentucky	115,979	113,458	109,001	105,840	97,667	90,490	84,039	77,438	69,883	61,566	52,170
Louisiana	110,523	112,343	109,820	110,165	104,013	100,208	94,162	84,518	74,340	66,245	56,841
Maine	36,054	35,571	60,927	61,928	34,975	32,764	31,175	29,933	32,602	28,748	25,235
Maryland	81,273	77,741	74,839	79,141	77,830	74,474	69,406	60,257	51,863	45,997	40,118
Massachusetts	153,442	151,445	146,859	138,729	127,733	114,586	107,737	100,348	90,402	83,815	73,860
Michigan	168,185	163,847	159,795	155,255	148,300	149,414	139,930	128,173	114,520	101,253	88,051
Minnesota	76,400	81,525	92,029	90,881	86,163	82,056	78,242	73,455	67,170	60,942	53,129
Mississippi	94,184	95,783	97,880	94,789	90,609	83,169	76,890	68,964	60,655	51,182	42,774
Missouri	126,494	126,112	125,664	123,663	118,733	114,879	103,332	89,268	79,061	69,988	59,582
Montana	14,816	14,618	14,271	13,860	13,053	12,293	11,673	10,671	9,497	8,503	7,705
Nebraska	28,145	27,438	26,864	26,257	24,881	23,410	22,250	20,656	18,659	16,558	14,257
Nevada	20,741	21,902	21,794	23,077	22,791	22,723	20,296	18,428	16,778	15,045	12,761
New Hampshire	15,378	15,281	14,844	15,134	14,728	14,154	13,439	12,528	11,607	10,554	9,231
New Jersey	131,264	127,456	123,163	117,406	111,242	103,942	98,172	88,297	78,350	68,536	58,786
New Mexico	33,151	32,394	31,562	31,071	30,249	28,897	27,285	25,332	22,677	20,206	18,526
New York	448,390	432,257	414,281	409,115	394,691	366,959	349,971	316,760	282,782	250,118	215,988
North Carolina	201,115	198,241	195,134	186,389	178,214	168,089	159,130	145,431	130,933	115,442	98,363
North Dakota	11,522	11,221	11,336	11,055	10,682	9,812	9,025	8,477	7,408	6,556	5,714
Ohio	199,617	195,673	195,465	193,445	189,936	179,450	175,950	163,968	149,439	133,960	114,709
Oklahoma	75,114	73,738	72,097	75,001	67,871	63,833	61,334	56,934	51,602	46,560	39,642
Oregon	64,132	63,677	63,091	63,776	58,040	51,156	45,544	41,010	36,786	33,393	29,230
Pennsylvania	237,658	235,529	226,442	222,326	215,664	209,674	198,776	183,698	165,688	148,393	128,838
Rhode Island	23,347	23,300	22,867	22,587	21,592	20,285	18,999	17,198	15,311	13,321	13,747

Table III.2 *(continued)*

State	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
South Carolina	90,134	89,408	88,485	88,700	111,503	106,556	98,331	66,354	58,148	51,186	43,142
South Dakota	14,010	13,792	13,350	13,190	12,601	11,892	11,196	10,450	9,374	8,330	7,244
Tennessee	232,401	221,365	217,607	207,221	192,744	178,257	161,982	132,797	112,551	98,453	83,101
Texas	359,528	357,508	351,274	346,754	334,398	319,063	302,011	279,248	251,789	223,701	189,749
Utah	17,433	16,916	16,670	17,363	17,692	17,011	16,259	14,666	13,019	11,398	9,919
Vermont	21,060	21,345	21,136	20,079	18,762	17,587	15,843	14,126	12,444	11,037	9,435
Virginia	108,900	105,371	101,579	98,143	93,235	89,344	84,474	78,077	70,029	62,771	54,055
Washington	93,538	93,661	93,092	89,821	85,659	81,849	77,272	69,737	62,733	55,460	47,519
West Virginia	48,417	46,444	44,466	43,308	40,829	38,535	35,982	35,665	32,640	29,184	25,018
Wisconsin	93,415	91,099	89,031	117,592	123,607	118,963	110,652	101,973	88,712	76,698	67,189
Wyoming	6,633	6,540	6,504	6,522	6,379	6,058	5,560	5,133	4,655	4,187	3,710

Source: MAX DOD 1999–2009 Master File

Table III.3. Percentage of MAX Person Summary Records with SSA DOD, 1999–2009

State	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
United States	**12.6**	**11.7**	**10.7**	**9.8**	**9.0**	**8.2**	**7.6**	**6.7**	**6.0**	**5.1**	**4.2**
Alabama	17.5	15.9	14.4	13.6	12.3	11.2	10.2	9.3	8.7	7.5	5.9
Alaska	7.8	7.1	6.7	6.3	5.9	5.5	5.1	4.7	4.4	3.7	3.1
Arizona	8.4	8.0	7.8	7.5	6.7	6.0	5.5	4.7	4.2	3.6	2.8
Arkansas	15.2	13.7	12.0	10.6	9.5	8.5	7.7	7.1	6.5	5.8	4.8
California	8.7	7.5	6.9	6.0	5.4	4.9	4.6	4.1	3.6	3.1	2.5
Colorado	13.9	13.1	11.6	10.6	9.3	7.5	6.7	6.1	5.6	4.8	3.8
Connecticut	14.6	14.0	13.0	11.8	11.1	10.2	9.3	8.4	7.6	6.5	5.3
Delaware	10.7	10.0	9.5	7.4	8.4	7.6	6.9	6.3	5.5	4.6	3.7
District of Columbia	12.1	11.7	12.1	10.0	9.3	8.7	8.0	7.2	6.4	5.5	4.5
Florida	14.3	13.7	12.1	11.5	10.4	9.9	9.0	8.3	7.6	6.4	5.1
Georgia	11.8	10.1	8.7	9.1	8.3	7.5	6.4	5.8	5.4	4.8	3.9
Hawaii	10.9	10.8	10.2	9.5	8.7	8.0	7.2	6.5	5.7	4.8	3.7
Idaho	10.9	9.6	8.5	7.8	7.2	6.5	6.4	6.1	5.4	4.8	3.9
Illinois	10.6	9.9	9.1	12.7	12.2	10.9	9.9	6.4	5.2	4.3	3.5
Indiana	14.4	12.9	11.7	10.6	9.8	8.9	8.2	7.4	6.6	5.7	4.6
Iowa	16.1	15.3	14.0	12.7	11.5	10.5	9.5	8.2	7.3	6.4	5.1
Kansas	16.2	15.0	13.6	12.5	10.3	9.5	9.7	9.0	8.4	7.5	6.2
Kentucky	16.6	15.1	13.9	13.1	11.8	10.6	9.4	8.7	7.8	6.6	5.4
Louisiana	13.4	12.9	11.8	10.3	9.2	8.2	7.6	6.6	6.4	5.4	4.4
Maine	17.3	16.1	18.4	16.9	11.6	10.4	9.5	8.9	9.0	7.9	6.8
Maryland	11.8	11.4	10.4	10.0	9.3	8.7	8.0	6.9	6.1	5.1	4.0
Massachusetts	14.3	13.4	12.6	11.3	10.7	9.7	8.6	7.6	6.6	5.1	4.2
Michigan	12.3	11.7	10.8	9.3	8.9	8.1	7.4	6.5	5.8	5.0	4.0
Minnesota	12.8	13.0	13.6	12.5	11.3	10.6	9.9	9.1	8.2	7.2	5.9
Mississippi	17.0	15.7	14.1	13.1	11.8	10.4	9.8	8.9	8.1	6.9	5.7
Missouri	14.1	12.5	11.6	10.9	10.0	9.2	8.5	8.0	7.3	6.4	5.2
Montana	15.0	13.5	12.3	11.5	10.6	9.6	9.0	8.3	7.4	6.5	5.4
Nebraska	12.4	11.4	10.5	9.8	9.4	8.9	8.5	7.9	7.1	6.2	5.1
Nevada	13.5	13.0	11.4	9.9	9.0	8.7	7.4	7.2	6.5	5.4	4.1
New Hampshire	14.4	13.9	13.2	11.9	10.8	10.0	9.2	8.4	7.7	6.7	5.5
New Jersey	14.5	13.1	11.6	10.2	9.7	9.2	8.7	7.4	6.4	5.4	4.3
New Mexico	8.7	7.9	7.2	6.6	6.0	5.5	5.1	4.9	4.3	3.6	3.0
New York	13.2	12.6	11.0	9.0	8.4	7.4	6.8	6.2	5.6	4.9	4.0
North Carolina	16.0	14.9	13.2	12.4	11.2	10.1	9.2	8.2	7.2	6.1	4.9
North Dakota	17.5	16.9	15.8	14.1	13.0	12.1	11.3	10.5	9.2	8.3	6.7
Ohio	14.3	13.3	11.2	10.5	9.7	8.8	8.3	7.6	6.9	6.1	4.8
Oklahoma	14.0	12.5	11.3	10.1	10.1	9.2	8.4	7.5	6.6	5.7	4.6
Oregon	11.4	10.9	10.0	9.5	9.0	8.5	8.1	7.4	6.7	5.8	4.6
Pennsylvania	14.0	14.0	13.6	12.8	11.7	10.5	9.8	8.7	7.8	6.6	5.5
Rhode Island	13.7	12.4	11.4	10.7	9.9	9.1	8.4	7.6	6.9	6.1	6.0
South Carolina	11.9	11.1	9.8	9.5	10.8	10.6	9.7	7.0	6.3	5.6	4.5

Table III.3 *(continued)*

State	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
South Dakota	14.7	13.4	12.0	11.1	10.2	9.3	8.5	7.9	7.0	6.1	5.1
Tennessee	14.4	13.8	12.9	12.0	12.0	10.9	10.1	8.9	7.5	6.4	5.4
Texas	13.1	12.8	11.9	10.3	8.9	8.0	7.3	6.7	5.8	5.0	4.0
Utah	7.4	6.9	6.3	5.8	5.4	4.9	4.5	4.3	4.0	3.2	2.5
Vermont	14.7	14.1	13.2	12.3	11.3	10.4	9.6	8.6	7.6	6.2	5.0
Virginia	15.3	14.2	13.3	12.3	11.3	10.2	9.1	8.2	7.3	6.2	5.0
Washington	10.2	9.4	8.8	7.3	7.2	6.4	6.0	5.6	5.1	4.5	3.6
West Virginia	13.3	13.0	12.4	11.4	10.5	9.7	9.1	9.1	8.2	7.2	6.0
Wisconsin	16.1	14.4	12.9	14.4	13.3	12.0	10.7	9.7	8.4	6.8	5.3
Wyoming	12.6	12.0	10.7	9.2	8.1	7.5	6.8	6.4	5.9	5.3	4.4

Sources: MAX DOD 1999–2009 Master File and the MAX 1999–2009 Person Summary Files

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APPENDIX A

DATA PROCESSING STEPS FOR THE MAX DOD 2009 UPDATE FILE

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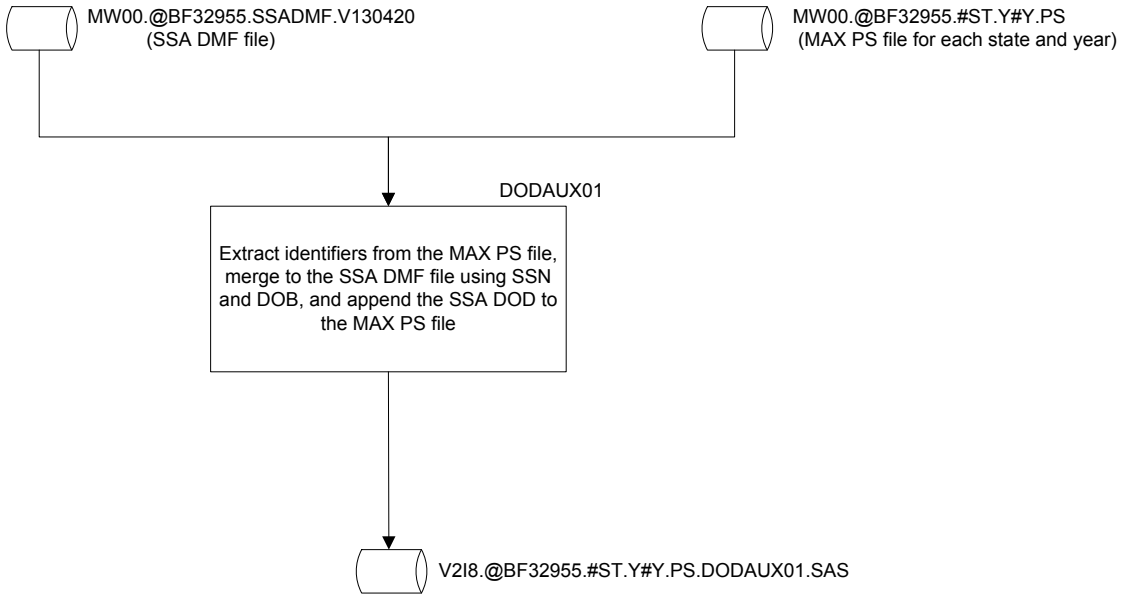
We used three programs to create the MAX DOD update file. The programs were written in SAS and were designed to maximize efficiency and reusability.

1. DODAUX01 extracts identifiers and demographic data from the MAX PS file and merges them to the SSA DMF file using SSN and DOB. The SSA DOD is appended to the output file. We execute the program separately for each state and the District of Columbia (hereafter referred to as "51 states").
2. DODAUX02 concatenates the files for all years for each state and keeps the latest record with nonmissing SSN and DOB per MSIS ID to ensure one date of death per person.[6] We keep only the records that linked to the DMF and have a nonmissing date of death.
3. DODAUX03 concatenates the MAX DOD files for all 51 states and retains the state code, the MSIS ID, and the SSA date of death. This forms the new MAX DOD 1999–2009 master file. We save the master file as a SAS file and as a text file. We merge the new MAX DOD master file (1999–2009) to the old master file (1999–2008) by state and MSIS ID and classify the records into four distinct groups. If the record is in the new but not the old master file, we classify the record as an "Insert" record (record type = I). If the record is in both files but the dates of death are different, it is classified as an "Update" record (record type = U). If the record is in the old but not the new file, it is classified as a "Delete" record (record type = D). All other records in the new master file are classified as "No action" (record type = " ").

We display the corresponding data flow diagrams in Figures A.1–A.3.

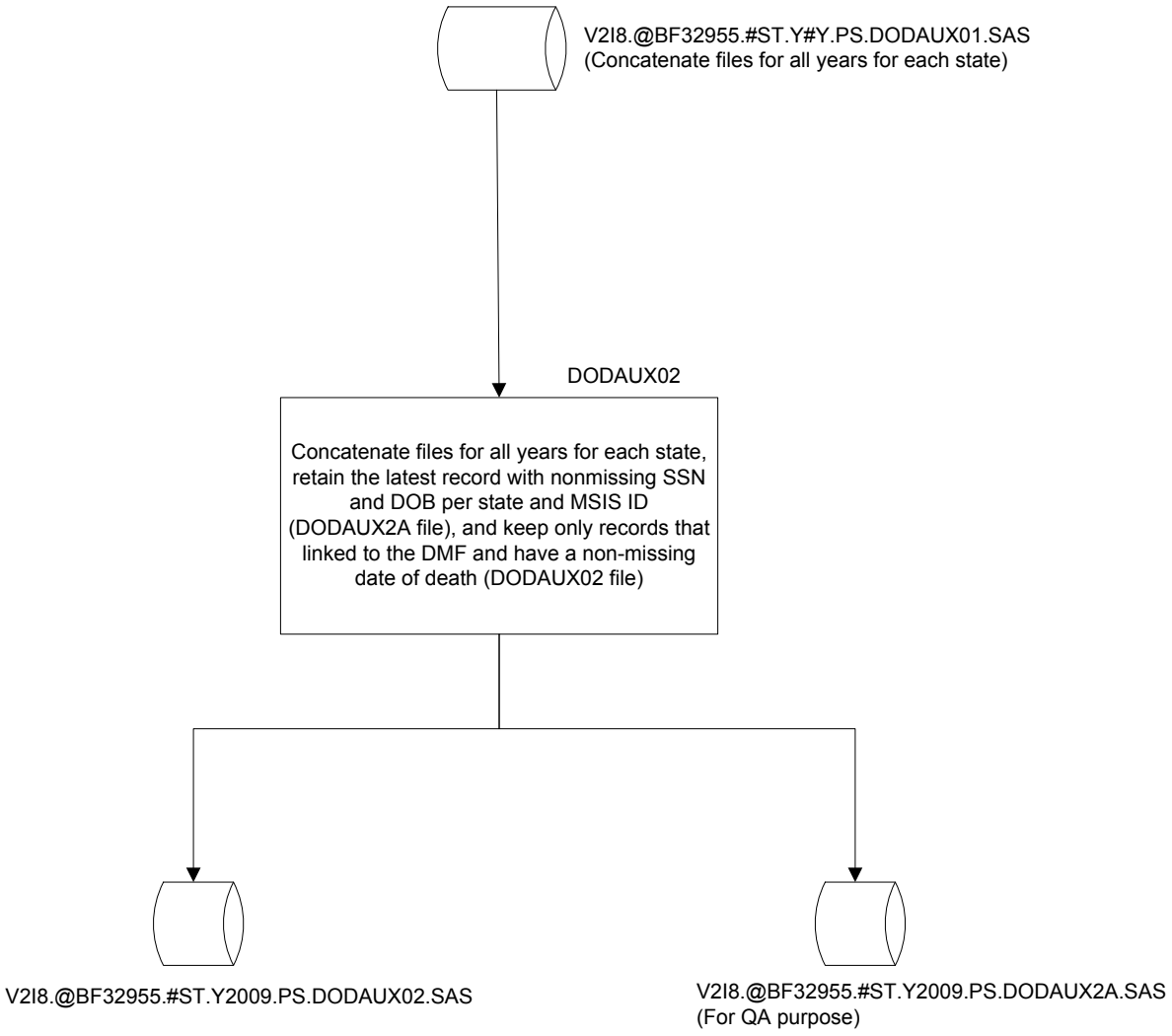
[6] A state's Medicaid agency may eventually learn that the SSN or DOB for a Medicaid enrollee was incorrect. When this happens, the state changes the SSN and/or DOB on the person's enrollment record. Consequently, there are instances in the MAX PS files in which a Medicaid enrollee (as identified by STATE and MSIS_ID) has more than one SSN and/or DOB over time. Therefore, we could encounter a situation in which more than one date of death was assigned to the same person at different times. Our algorithm assumes that the latest (most recent) SSN and DOB are the most accurate and uses the corresponding date of death associated with that SSN and date of birth.

FIGURE A.1. DODAUX01



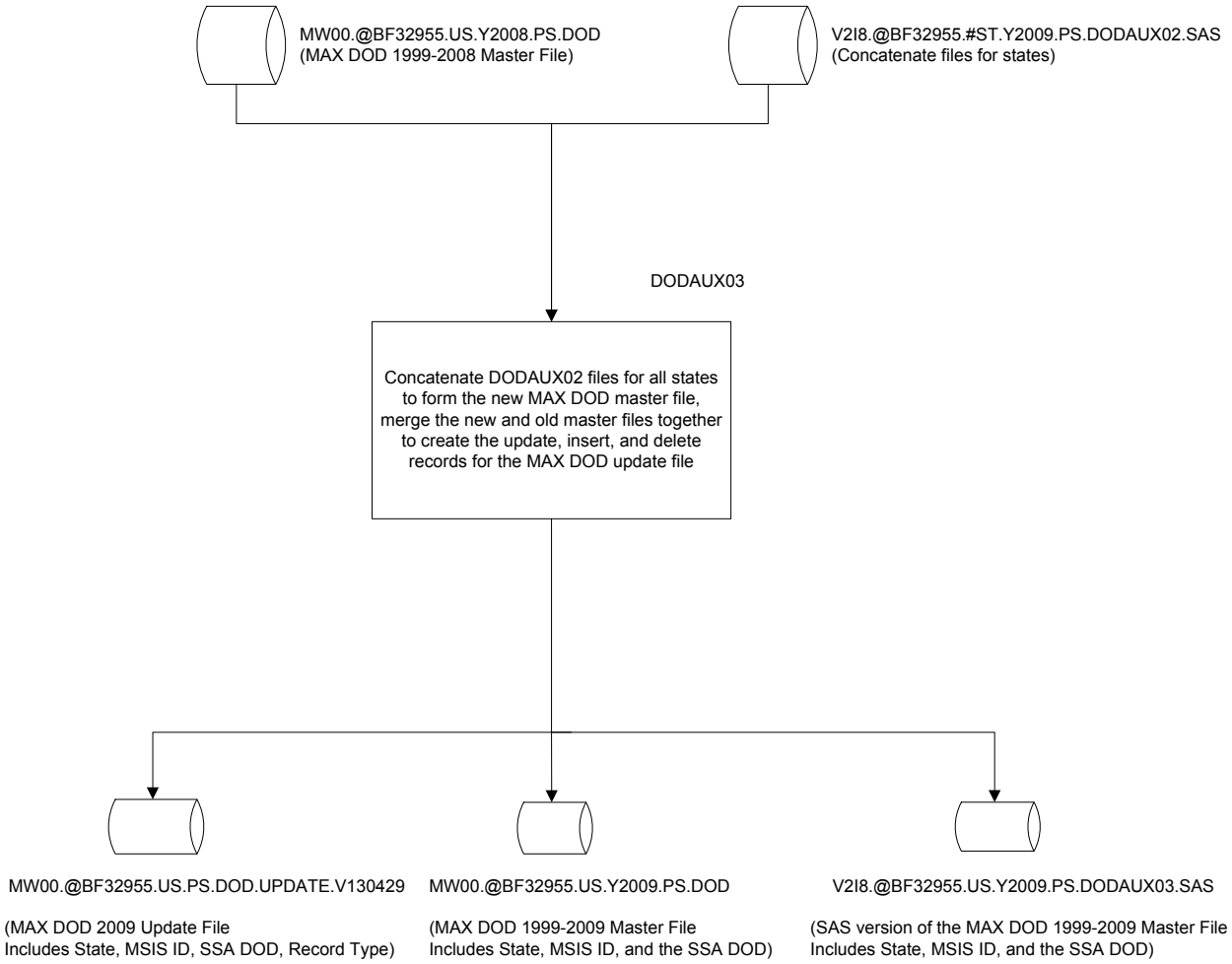
DODAUX01 command list (CLIST) submits this program for each year (#Y) for each state (#ST)

FIGURE A.2. DODAUX02



DODAUX02 command list (CLIST) submits this program for each state (#ST)

FIGURE A.3. DODAUX03



APPENDIX B

FILE LAYOUT AND DATA DICTIONARY FOR THE MAX DOD 2009 UPDATE FILE

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MAX DOD UPDATE FILE
FILE LAYOUT
1999-2009

ELEMENT NUMBER:	ELEMENT NAME:	TYPE:	LENGTH:	BEG:	END:
****	MAX DOD Update File	REC	31	1	31
1	State	CHAR	2	1	2
2	MSIS ID	CHAR	20	3	22
3	Date of Death	NUM	8	23	30
4	Record Type	CHAR	1	31	31

MAX DOD UPDATE FILE
DATA ELEMENT DICTIONARY
1999-2009

ELEMENT NUMBER: ****

ELEMENT NAME: **MAX DOD Update File**

SAS VARIABLE: NONE

TYPE: REC LENGTH: 31 BEG: 1 END: 31

DESCRIPTION: The MAX DOD Update File contains records to be used to revise the previous MAX DOD master file. There are three types of records:

(1) Insert Records - enrollees not in the previous MAX DOD master file but included in the new MAX DOD master file

(2) Update Records - enrollees in both the previous and new MAX DOD master files but with a different date of death

(3) Delete Records - enrollees in the previous MAX DOD master file who should be removed

Source: MAX PS and SSA DMF

MAX DOD UPDATE FILE
DATA ELEMENT DICTIONARY
1999-2009

ELEMENT NUMBER: 1

ELEMENT NAME: **State**

SAS VARIABLE: STATE

TYPE: CHAR LENGTH: 2 BEG: 1 END: 2

DESCRIPTION: State code

Codes:
AL = Alabama
AK = Alaska
AZ = Arizona
AR = Arkansas
CA = California
CO = Colorado
CT = Connecticut
DE = Delaware
DC = District of Columbia
FL = Florida
GA = Georgia
HI = Hawaii
ID = Idaho
IL = Illinois
IN = Indiana
IA = Iowa
KS = Kansas
KY = Kentucky
LA = Louisiana
ME = Maine
MD = Maryland
MA = Massachusetts
MI = Michigan
MN = Minnesota
MS = Mississippi
MO = Missouri
MT = Montana
NE = Nebraska
NV = Nevada
NH = New Hampshire
NJ = New Jersey
NM = New Mexico
NY = New York
NC = North Carolina
ND = North Dakota
OH = Ohio
OK = Oklahoma
OR = Oregon
PA = Pennsylvania
RI = Rhode Island
SC = South Carolina
SD = South Dakota
TN = Tennessee
TX = Texas
UT = Utah
VT = Vermont
VI = Virgin Islands
VA = Virginia
WA = Washington
WV = West Virginia
WI = Wisconsin
WY = Wyoming

Source: MAX PS: STATE_CD

MAX DOD UPDATE FILE
DATA ELEMENT DICTIONARY
1999-2009

ELEMENT NUMBER: 2

ELEMENT NAME: **MSIS ID**

SAS VARIABLE: MSIS_ID

TYPE:	CHAR	LENGTH: 20	BEG: 3	END: 22

DESCRIPTION: Medicaid Statistical Information System (MSIS) identification number

Source: MAX PS: MSIS_ID

MAX DOD UPDATE FILE
DATA ELEMENT DICTIONARY
1999-2009

ELEMENT NUMBER: 3

ELEMENT NAME: **Date of Death**

SAS VARIABLE: SSA_DOD

TYPE:	NUM	LENGTH:	8	BEG:	23	END:	30

DESCRIPTION: Date of Death from SSA Death Master File (DMF)

MAX DOD UPDATE FILE
DATA ELEMENT DICTIONARY
1999-2009

ELEMENT NUMBER: 4

ELEMENT NAME: **Record Type**

SAS VARIABLE: RECORD_TYPE

TYPE: CHAR LENGTH: 1 BEG: 31 END: 31

DESCRIPTION: Record Type

Codes:

I = Insert Record
U= Update Record
D= Delete Record

APPENDIX C

FILE LAYOUT AND DATA DICTIONARY FOR THE MAX DOD 2009 MASTER FILE

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MAX DOD MASTER FILE
FILE LAYOUT
1999-2009

ELEMENT NUMBER:	ELEMENT NAME:	TYPE:	LENGTH:	BEG:	END:
****	MAX DOD Master File	REC	30	1	30
1	State	CHAR	2	1	2
2	MSIS ID	CHAR	20	3	22
3	Date of Death	NUM	8	23	30

MAX DOD MASTER FILE
DATA ELEMENT DICTIONARY
1999-2009

ELEMENT NUMBER: ****

ELEMENT NAME: **MAX DOD Master File**

SAS VARIABLE: NONE

TYPE: REC LENGTH: 30 BEG: 1 END: 30

DESCRIPTION: The MAX DOD Master File contains Medicaid enrollees (from the MAX PS file for 1999 through 2009) that linked to the SSA DMF and have a non-missing date of death.

Source: MAX PS and SSA DMF

MAX DOD MASTER FILE
DATA ELEMENT DICTIONARY
1999-2009

ELEMENT NUMBER: 1

ELEMENT NAME: **State**

SAS VARIABLE: STATE

TYPE: CHAR LENGTH: 2 BEG: 1 END: 2

DESCRIPTION: State code

Codes:
AL = Alabama
AK = Alaska
AZ = Arizona
AR = Arkansas
CA = California
CO = Colorado
CT = Connecticut
DE = Delaware
DC = District of Columbia
FL = Florida
GA = Georgia
HI = Hawaii
ID = Idaho
IL = Illinois
IN = Indiana
IA = Iowa
KS = Kansas
KY = Kentucky
LA = Louisiana
ME = Maine
MD = Maryland
MA = Massachusetts
MI = Michigan
MN = Minnesota
MS = Mississippi
MO = Missouri
MT = Montana
NE = Nebraska
NV = Nevada
NH = New Hampshire
NJ = New Jersey
NM = New Mexico
NY = New York
NC = North Carolina
ND = North Dakota
OH = Ohio
OK = Oklahoma
OR = Oregon
PA = Pennsylvania
RI = Rhode Island
SC = South Carolina
SD = South Dakota
TN = Tennessee
TX = Texas
UT = Utah
VT = Vermont
VI = Virgin Islands
VA = Virginia
WA = Washington
WV = West Virginia
WI = Wisconsin
WY = Wyoming

Source: MAX PS: STATE_CD

MAX DOD MASTER FILE
DATA ELEMENT DICTIONARY
1999-2009

ELEMENT NUMBER: 2

ELEMENT NAME: **MSIS ID**

SAS VARIABLE: MSIS_ID

TYPE:	CHAR	LENGTH: 20	BEG: 3	END: 22

DESCRIPTION: Medicaid Statistical Information System (MSIS) identification number

Source: MAX PS: MSIS_ID

MAX DOD MASTER FILE
DATA ELEMENT DICTIONARY
1999-2009

ELEMENT NUMBER: 3

ELEMENT NAME: **Date of Death**

SAS VARIABLE: SSA_DOD

TYPE:	NUM	LENGTH:	8	BEG:	23	END:	30

DESCRIPTION: Date of Death from SSA Death Master File (DMF)

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APPENDIX D

FREQUENTLY ASKED QUESTIONS ABOUT DATES OF DEATH

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New Medicaid researchers are often puzzled by the importance of the three dates of death in the MAX PS file and the MAX DOD file. In this section we describe two frequently asked questions (FAQs) about the DOD information and reiterate how best to use this information.

1. **FAQ #1: The MAX PS files contain three DOD data elements. How accurate are they, and which one should researchers use?**

   The MAX PS files contain three DOD data elements:

   - Medicaid date of death as reported by the Medicaid state agency
   - Medicare date of death date as obtained from the link between MAX PS records and the Medicare EDB
   - Date of death from the SSA DMF as obtained from the link between MAX PS records and the DMF

   It is well known that DODs are underreported by Medicaid state agencies in MSIS, the source for MAX. We linked MAX data to the Medicare EDB and captured the Medicare DOD, as we believe the reporting of DODs in the Medicare data system for dual enrollees is more complete than in MSIS. However, the MAX PS-to-EDB link only improved DOD reporting in MAX reporting for people dually enrolled in Medicare and Medicaid. There was still concern about DOD underreporting for nondual Medicaid enrollees. This concern led to linking records in the MAX PS and the SSA DMF.

   We recommend the following hierarchy of use among the three DOD data elements in the MAX PS file:

   - If present, use the DOD from the SSA DMF.
   - If the DMF DOD is missing, use the Medicare DOD.
   - If both the DMF and Medicare DODs are missing, use the Medicaid DOD.

2. **FAQ #2: What is the MAX DOD file, and when should I use it?**

   Researchers often use death as an outcome measure, typically measuring duration until death or including an indicator of death within a certain time period. The regular MAX PS files have been linked to the SSA DMF and include deaths that occur *during* (or prior to) the MAX CY.

However, to support CER and other outcomes research, it is beneficial to have the most up-to-date DOD information, including deaths that occurred *after* the MAX file year. The MAX DOD file was created to meet this need.

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