

2017 Update: MSSP Savings Estimates

Program Financial Performance 2013-2017

Submitted to:

National Association of ACOs

Submitted by:

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November 20, 2019

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Results

This report presents Medicare Shared Savings Program (MSSP) Performance Year 2017 Accountable Care Organization (ACO) savings estimates. The report is an update to *Estimates of Savings by Medicare Shared Savings Program Accountable Care Organizations: Program Financial Performance 2013-2016*, released December 2018.

Building upon the methodology used in the performance year (PY) 2013-2016 savings estimates, we added PY2017 ACO beneficiary assignment, provider participation, and expenditure data for assigned and unassigned beneficiaries to estimate program savings from PY2013 to PY2017 (CMS Data Use Agreement number 28643). No substantial model or design changes were made from the analyses in prior years.

The addition of PY2017 data and the incorporation of a 100 percent sample of Medicare FFS beneficiaries' data affects our updated savings estimates by adding another post treatment comparison year, as well as enhancing our estimates' statistical confidence.

Exhibit 1 shows our per member per year (PMPY) savings estimates by ACO performance year.

Exhibit 1: Difference-in-Differences Regression Estimation of PMPY Spending Reduction (Savings) From ACOs vs. Comparison Group¹

Performance Year	Difference-in-Differences PMPY Estimate (\$)	95% Confidence Interval (\$)	P-Value
2013	-\$108.50	(-\$122.27 -\$94.73)	< 0.0001
2014	-\$121.64	(-\$134.07, -\$109.22)	< 0.0001
2015	-\$111.32	(-\$123.24, -\$99.39)	< 0.0001
2016	-\$107.47	(-\$119.96, -\$94.99)	< 0.0001
2017	-\$106.12	(-\$117.64, -\$94.60)	< 0.0001

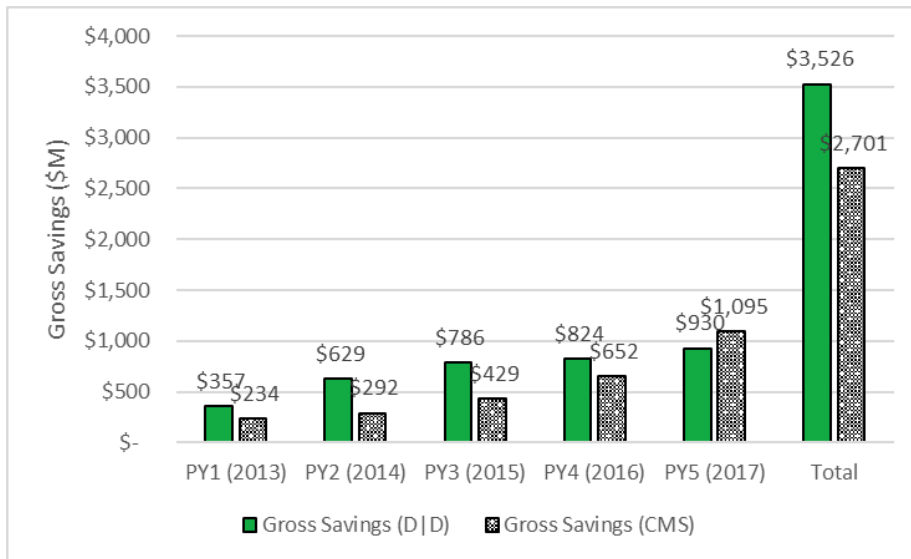
Source: Dobson | DaVanzo analysis of ACO RIF Data, CMS DUA 28643

In aggregate, with the addition of PY2017 data, we estimate MSSP ACOs saved CMS approximately \$3.526B from PY2013 to PY2017 with net savings of \$755M after accounting for shared savings payments made by CMS. Once again, these findings stand in contrast to the CMS savings calculations based on programmatic benchmarks, demonstrated in **Exhibits 2 and 3**.

¹ Updated estimates for PY2013-2016 vary slightly from the previous report. These estimates have changed due to the addition of the 2017 post year treatment and comparison groups and the expansion of our data sample (from which comparison group beneficiaries are drawn) to 100 percent of Medicare FFS beneficiaries.

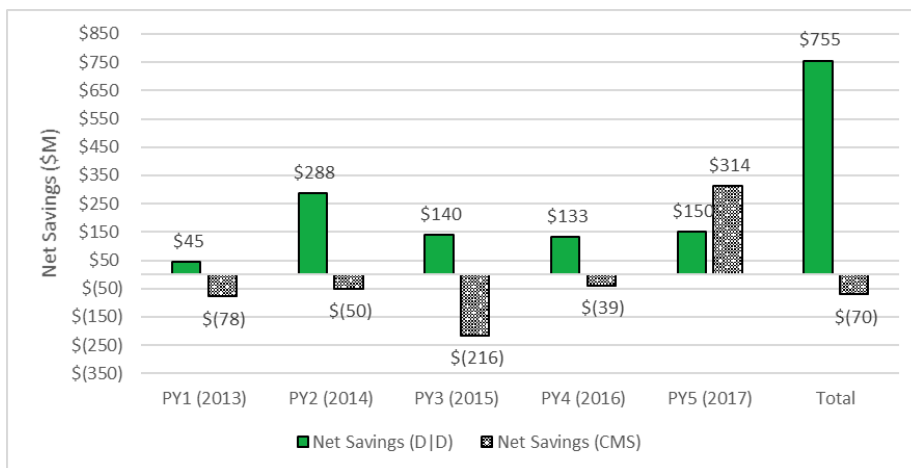
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Exhibit 2: Gross Federal Savings in the Medicare Shared Savings Program for PY2013-2017: Dobson | DaVanzo Analysis Compared to CMS Benchmark Approach²



Source: Dobson | DaVanzo analysis of ACO RIF Data, CMS DUA 28643 and CMS MSSP Public Use Files, 2013-2017

Exhibit 3: Net Federal Savings in the Medicare Shared Savings Program for PY2013-2017: Dobson | DaVanzo Analysis Compared to CMS Benchmark Approach³



Source: Dobson | DaVanzo analysis of ACO RIF Data, CMS DUA 28643 and CMS MSSP Public Use Files, 2013-2017

² Gross savings are total estimated savings by ACOs.

³ Net savings are gross savings minus MSSP shared savings and losses distributions.

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Discussion

The findings from our analysis are consistent with those reported in Chapter 6 of the June 2019 MedPAC report.⁴ MedPAC found MSSP ACOs tended to save around one percentage point PMPY relative to comparison groups, which is highly consistent with our current and previously reported findings. In general, we agree with MedPAC that analyses of ACO savings are highly sensitive to the selection of comparison group beneficiaries. We have also found that the method for controlling for geographic variation over time and other ACO beneficiary inclusion and exclusion criteria (such as the choice here to include beneficiaries who die during an attributed performance year) may substantially affect findings. We apply geographic selection, program eligibility checks and control variables to address selection bias robustly where feasible within the MSSP framework and to include as broadly representative and appropriate a comparison group as feasible.

Conclusion

This analysis extends our prior work on MSSP ACO cost savings which addressed performance from PY2013 to PY2016. Consistent with that work, we find the savings trend for MSSP continues into 2017. Using an as-treated difference-in-differences design, we estimate \$3.526 billion savings since the program started. This translates to about a 1-2% savings over time compared to spending in unattributed beneficiaries.

Difference-in-Differences Regression Estimation Methodology

Within the context of our study, the difference-in-differences estimator is defined as the difference in average expenditures in the treatment group (ACO assigned beneficiaries) before and after program intervention *minus* the difference in average expenditures in the comparison group (ACO unassigned beneficiaries) before and after program intervention. This approach yields the estimated per member per year (PMPY) spending reduction of the treatment group compared to the comparison group (or savings estimates) due to the ACO program intervention. To calculate the total savings estimates, we multiplied the difference-in-differences coefficients obtained from each performance year with the number of ACO assigned beneficiaries (adjusted person years) in each respective performance year. More detailed information on our updated regression specifications and methodology is included in the Appendix.

To increase the precision of the standard error estimate, we used robust estimation to account for the data's clustered nature. **Exhibits 4 and 5** compare the results of difference-in-differences ordinary least squares estimation versus when robust estimation is applied.

⁴ "Assessing the Medicare Shared Savings Program's effect on Medicare spending," MedPAC, June 2019 Report to the Congress (Chapter 6), http://www.medpac.gov/docs/default-source/reports/jun19_ch6_medpac_reporttocongress_sec.pdf?sfvrsn=0.

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Since the PMPY savings estimate coefficients do not change, the focus in these table is the standard error.

Exhibit 4: Differential Change From Difference-in-Differences Ordinary Least Squares Estimation of PMPY Spending for ACOs vs Comparison Group

Performance Year	Difference-in-Differences Estimate (\$)	Standard Error (\$)	P-Value	95% Confidence Interval (\$)
PY-2013	-108.498	7.024	<0.0001	(-122.265,-94.730)
PY-2014	-121.642	6.340	<0.0001	(-134.069,-109.215)
PY-2015	-111.318	6.085	<0.0001	(-123.244, -99.939)
PY-2016	-107.472	6.369	<0.0001	(-119.955, -94.989)
PY-2017	-106.120	5.879	<0.0001	(-117.643, -94.597)

Source: Dobson | DaVanzo analysis of ACO RIF Data, CMS DUA 28643

Exhibit 5: Differential Change From Difference-in-Differences Robust Estimation of PMPY Spending for ACOs vs Comparison Group

Performance Year	Difference-in-Differences Estimate (\$)	Standard Error (\$)	P-Value	95% Confidence Interval (\$)
PY-2013	-108.498	7.596	<0.0001	(-123.386, -93.610)
PY-2014	-121.642	7.011	<0.0001	(-135.384, -107.900)
PY-2015	-111.318	7.090	<0.0001	(-125.214, -97.422)
PY-2016	-107.472	7.353	<0.0001	(-121.884, -99.060)
PY-2017	-106.120	6.887	<0.0001	(-119.619, -92.621)

Source: Dobson | DaVanzo analysis of ACO RIF Data, CMS DUA 28643

Sensitivity Analysis

As a sensitivity analysis, we also estimated the following difference-in-differences regression model, in which we did not break up the main coefficient of interest into five performance years. Instead, we estimated PMPY savings on average over the five performance years as a single unified post-period. We applied this simpler model as an alternative to see whether results were consistent with primary findings in terms of direction and magnitude.

$$Y_{itc} = \beta_0 + \beta_1 * Treat_{it} + \beta_2 * After_t + \beta_3 * After_t * Treat_{it} + \beta_4 * X_{itc} + \beta_5 * HRR * Year_t + \varepsilon_{it}$$

Here, the main coefficient of interest is β_3 (difference-in-differences estimator) derived from the interaction between the dummy variables “*Treat*” (ACO assigned beneficiaries) and “*After*” (post ACO contract period). β_3 measures the changes in PMPY spending among the treatment group beneficiaries (relative to the comparison group) due to ACO

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intervention. Specifically, in the above model used for sensitivity analysis, coefficient β_3 is the average PMPY savings throughout the period from PY2013-2017.

To get the total savings, we multiplied this coefficient by the number of ACO assigned beneficiaries adjusted person years over the five performance years.

In modeling this sensitivity analysis specification, we find that overall total savings are approximately \$3.22 billion, which is consistent with our primary findings in terms of direction and magnitude. With a simpler model as used in the sensitivity analyses, we would expect a generally similar but not as precise estimate of total savings which results here in a lower savings estimate than the more robust full model. We find a corresponding PMPY savings estimate of \$100.55 (Confidence Interval ranges between -110.732 and -90.368). This result is also statistically significant at 1% (p-value < 0.0001).

Appendix: Regression Model Specification and File Construction

The regression model is estimated using ordinary least squares with robust variance estimation and takes the following basic specification:

$$Y_{itc} = \beta_0 + \beta_1 * Treat_{it} + \beta_2 * After_t + \beta_3 * After_t * Treat_{it} + \beta_4 * X_{itc} + \beta_5 * HRR * Year_t + \varepsilon_{it}$$

Here, Y_{itc} is per member per year total Parts A and B expenditures for beneficiary “i” in year “t” and residing in county “c”.

$Treat_{it}$ indicates whether individual “i” is assigned to an ACO in time period “t” or not; and $After_t$ is a dummy variable indicating the post contract period of the ACO. This ‘post contract’ period depends on when beneficiaries were assigned to that ACO.

Specifically, the $After_t$ variables indicate the following: $After_{2013}$ is a dummy variable and equals 1 if performance year is 2013 (zero otherwise), i.e. the ACO must have started in 2013 or in prior years, hence we are able to measure spending effects in PY2013. Similarly, $After_{2014}$ is a dummy variable and equals 1 if performance year is 2014 (zero otherwise), $After_{2015}$ is a dummy variable and equals 1 if performance year is 2015 (zero otherwise), $After_{2016}$ is a dummy variable and equals 1 if performance year is 2016 (zero otherwise), and $After_{2017}$ is a dummy variable and equals 1 if performance year is 2017 (zero otherwise).

The main coefficient of interest in the model is parameter estimate, β_3 , corresponding to the interaction of the ACO treatment dummy and the post-intervention (post contract period) dummy variable. To get the PMPY savings estimate for each of the performance years separately, we have included five such dummy variable interaction terms in the model. More specifically, the model includes $Treat_{it} * After_{2013}$, $Treat_{it} * After_{2014}$, $Treat_{it} * After_{2015}$, $Treat_{it} * After_{2016}$ $Treat_{it} * After_{2017}$ to obtain the PMPY savings estimates for each of the five performance years (2013, 2014, 2015, 2016 and 2017) separately. Here, each of the $Treat$ dummy variables correspond to the five performance years and include almost exactly the same number of ACO assigned beneficiaries participating in the program as compared to the total number of ACO beneficiary years in the ACO public use file. ACO assigned beneficiaries included in the ACO beneficiary file, but whose information is not included in the Master Beneficiary Summary File and/or the claims files are not used in our analysis. Overall, nearly less than 0.01% of ACO assigned beneficiaries are not used in our regression analysis in any given performance year.

If the MSSP program generates any savings, we would expect a negative sign corresponding to the difference-in-differences main coefficients of interest, denoted by β_3 , (i.e., the interaction between the “*Treat*” dummy and “*After*” dummy variables).

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Finally, the vector X_{itc} includes all beneficiary level demographic information (age, gender, race, and Medicare dual eligibility), health status or severity of individuals (HCC scores), as well as the original reason for beneficiary Medicare eligibility, i.e. End Stage Renal Disease (ESRD), disability. The coefficients corresponding to each hospital referral region (HRR) with year interaction determine the difference in average PMPY spending for an HRR from the omitted HRR. This entails fixed effects for each HRR in each year to compare each beneficiary attributed to an ACO with beneficiaries in the comparison group (not assigned) living in the same area (HRR). This effectively adjusts for HRR and time-specific changes in healthcare spending or quality between treatment and comparison groups.

Data and File Construction

The data for this analysis was derived from the National Association of ACOs data warehouse, a comprehensive repository of all MSSP ACO claims and a 100 percent sample of those eligible for MSSP assignment and not assigned for years 2011-2017. Specific data sets include the following:

- Master Beneficiary File
- ACO Beneficiary level Research Identifiable File
- ACO Provider Research Identifiable File
- Outpatient
- Inpatient
- Carrier (Physician/Supplier Part B)
- Skilled Nursing Facility (SNF)
- Home Health Agency (HHA)
- Durable Medical Equipment (DME)
- Hospice
- The Dartmouth Atlas of Healthcare website (for geographic location indicator Hospital Referral Region (HRR))

DATABASE CONSTRUCTION:

Sample: The unit of observation in the database is the beneficiary. The database includes information on both ACO assigned beneficiaries (treatment group) and unattributed, assignable beneficiaries (comparison group). For this analysis, individuals were included if they were enrolled in Medicare Parts A and B and not Part C during the study period. The treatment group includes all beneficiaries who were in the ACO program at any particular time period in our study regardless of their switching into the program or into another ACO. As long as the beneficiary was participating in the ACO program, we included her/him in the treatment group. The comparison group includes beneficiaries who are eligible but not attributed to an ACO and who reside in an ACO service area (defined by the counties of

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ACO assigned beneficiaries' residence). We restricted our comparison group to only those beneficiaries who had never been finally assigned to an ACO in any particular time period. If the beneficiary switched out of the treatment group, we excluded that beneficiary from the comparison group.

Because beneficiaries who switched into or out of an ACO tend to have higher healthcare spending⁵, excluding beneficiaries from the comparison group who switched out of an ACO at once protects the comparison group from contamination, but may yield overestimates of savings where a previously ACO attributed beneficiary becomes unattributed and has a substantial spending increase. Conversely, including beneficiaries in the treatment group who switched into an ACO may have the effect of underestimating savings (e.g. a beneficiary whose spending changes when entering the ACO program will be included in the treatment group).

Lastly, we excluded beneficiaries from the treatment and comparison group who resided in counties with 5 or fewer ACO assigned beneficiaries.

Dependent Variable (Cost): For the analysis, we calculated per member per year (PMPY) expenditures defined as total Part A and Part B allowed amounts. As a quality check, we compared ACO level PMPY expenditures from our Research Identifiable Files (RIF) database with ACO level PMPY expenditures from the CMS Public Use File (PUF). Our results closely matched the PMPY in the PUF, as shown in **Exhibit 6** below.

Exhibit 6: Benchmarking PMPY Spending Between Research Identifiable Files (RIF) and ACO Public Use File (PUF)

	PY-2013	PY-2014	PY-2015	PY-2016	PY-2017
ACO-PUF	\$9,991	\$10,173	\$10,326	\$10,525	\$10,704
RIF	\$9,977	\$10,167	\$10,318	\$10,521	\$10,703

Source: Dobson | DaVanzo analysis of ACO RIF Data, CMS DUA 28643 and CMS MSSP Public Use Files, 2013-2017

Model Covariates: We included beneficiary-level demographic information (age, gender, and race, Medicare dual eligibility) and a health status severity measure (Hierarchical Condition Category scores), as well as whether the beneficiary has ESRD and whether disability is the original reason for Medicare eligibility. We have also included HRRs corresponding to each beneficiary to control for market effects.

We used the CMS-HCC Risk adjustment model, version 22, to calculate HCC scores at the beneficiary level for each year. We used the 2014 model software to calculate HCC scores

⁵ "Assessing the Medicare Shared Savings Program's effect on Medicare spending," MedPAC, June 2019 Report to the Congress (Chapter 6), http://www.medpac.gov/docs/default-source/reports/jun19_ch6_medpac_reporttocongress_sec.pdf?sfvrsn=0.

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2011-2014, the 2016 model for 2015-2016 (as was required to handle the ICD-9/10 transition in 2015), and for 2017 we have used version 21 (the first model to feature 100% ICD-10 programming). Finally, using the Dartmouth Atlas of Healthcare website, we used the zip code and HRR cross walk information in each year and incorporated it in our database to calculate HRR dummy variables. The HRR dummy variables were interacted with year dummy variables to control for geographic and time dependent fixed effects. A more detailed description of the demographic variables' construction is given in the "Demographic Variables" section.

Time Variables: To design the pre- and post- period database for our regression analysis we have pulled data from 2011 to 2017. The post-contract period depends on when beneficiaries were assigned to that ACO. For example, for an individual who is assigned to an ACO in 2013, the post periods are 2013-2017, which represent the years the beneficiary was assigned to an ACO. Similarly, for a new individual who is assigned to an ACO in 2015, the post periods are 2015-2017. A special case is applied to individuals assigned to an ACO in 2012, the first year of the ACO program, in this instance the post periods are 2013-2017; 2012 is not included in the post years as it was not a full performance year for MSSP ACOs. This is because ACOs started in two different periods during 2012 (April 1st and July 1st), therefore we consider 2012 to be a neutral period.

Given this logic, we constructed the dummy variable "*After*" to indicate the pre- and post-period for a beneficiary ACO participation. We also constructed a dummy variable called "*Treat*" to indicate treatment versus comparison group beneficiaries. As aforementioned, *After* and *Treat* dummies are interacted to derive the difference-in-differences estimators.

The following sections describe the specifications for constructing the demography and expenditure variables.

DEMOGRAPHIC VARIABLES

1. **ACO Assigned Beneficiary Identification:** Using ACO Beneficiary level RIF File, we identify the beneficiaries who are assigned to an ACO using "FINAL_ASSIGN" variable. This variable is an indicator variable and its value is "1" if a beneficiary is assigned in the final reconciliation period. We use this variable to identify ACO assigned beneficiaries in 2013, 2014, 2015, 2016, and 2017. For 2012, the ACO assigned criteria will be different since there is no 2012 ACO beneficiary level RIF file (rather the combined 2012-2013 performance year assignment is included in the 2013 ACO beneficiary RIF). We use the following proxy methods to identify 2012 ACO assigned beneficiaries.
 - (i) Use the variable "Final_ASSIGN" from ACO beneficiary level RIF file and ACO start date information in 2013 to identify 2012 ACO starter beneficiaries for sensitivity analysis.

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- Number of assigned beneficiaries in performance year is identified from this step and the variable “N_AB” (as appeared in ACO PUF file) is constructed from this step.
- 2. **Identify Month of Eligibility:** We need to identify month of eligibility for annualizing PMPY expenditures. We compute the fraction of months each beneficiary is enrolled in Medicare Parts A and B using the variable “FINAL_AB_ELIG_MONTHS” from ACO beneficiary level RIF file for ACO assigned beneficiaries. This variable represents the number of months of Parts A and B eligibility for the 12 month period used for the final reconciliation period. We generate a variable called “adjmo”.

$$\text{adjmo} = \text{FINAL_AB_ELIG_MONTHS} / 12$$

- Number of assigned beneficiaries in performance year adjusted downwards for beneficiaries with less than a full 12 months of eligibility (the number of person months divided by 12) is identified in this step. Using the second step of the methodology we calculate the variable “N_AB_YEAR_PY” as appeared in the ACO PUF.
- For unattributed beneficiaries starting from 2011 to 2017, we construct the fraction of months of eligibility variable from their respective Master Beneficiary Files.

Generate a variable called, “adjmo” to define the fraction of months of eligibility for a beneficiary then use the following logic to construct adjmo:

If BENE_SMI_CVRAGE_TOT_MONS > BENE_HI_CVRAGE_TOT_MONS
then adjmo = BENE_SMI_CVRAGE_TOT_MONS

If BENE_SMI_CVRAGE_TOT_MONS < BENE_HI_CVRAGE_TOT_MONS
then adjmo = BENE_HI_CVRAGE_TOT_MONS

If BENE_SMI_CVRAGE_TOT_MONS = BENE_HI_CVRAGE_TOT_MONS
then adjmo = BENE_HI_CVRAGE_TOT_MONS

- 3. **Construct Age Categories:** Calculate age of each ACO assigned beneficiary using the date of birth variable called, “BIRTH_DT” from the ACO beneficiary level research identifiable files. (For example, Age is calculated as of January 1, 2014 for each beneficiary for 2014 data file). For unattributed beneficiaries we

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use the variable “BENE_BIRTH_DT” from Master Beneficiary Files (e.g., MBSF_AB_11_R5668 file in 2011) to construct the age variable.

- Construct four age dummy variables after constructing “AGE” variable.
 - AGE_GR1=1 if $0 < \text{AGE} \leq 64$
=0 otherwise
 - AGE_GR2=1 if $64 < \text{AGE} \leq 74$
=0 otherwise
 - AGE_GR3=1 if $74 < \text{AGE} \leq 84$
=0 otherwise
 - AGE_GR4=1 if $\text{AGE} > 84$
=0 otherwise

4. **Construct Gender Dummy Variable:** Use “GNDR_CD” variable from ACO beneficiary level RIF dataset to construct gender dummy variable for ACO assigned beneficiaries. [Note: GNDR_CD=1 for male, GNDR_CD=2 for female and GNDR_CD=0 for unknown]

Use “BENE_SEX_IDENT_CD” variable Master Beneficiary Files (e.g., MBSF_AB_11_R5668 file in 2011) to construct gender dummy variable for un-attributed beneficiaries.

- SEX=1 if male
=0 otherwise

5. **Construct Race Dummy Variable :** Use “RACE_CD” variable from ACO beneficiary level RIF file to construct race dummy variables for ACO assigned beneficiaries.

Use “BENE_RACE_CD” variable from Master Beneficiary Files (e.g., MBSF_AB_11_R5668 file in 2011) to construct race dummy variable.

- WHITE=1 if Race variable =1
=0 otherwise
- BLACK=1 if Race variable =2
=0 otherwise
- ASIAN=1 if Race variable =3
=0 otherwise
- HISPAN=1 if Race variable =4
=0 otherwise
- NATIVE=1 if Race variable =6
=0 otherwise
- OTHERS=1 [For all other cases than above]

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=0 otherwise

6. **Construction of Beneficiary Categories:** Use Master Beneficiary Files (e.g., MBSF_AB_11_R5668 file in 2011) to construct dummy variables for the following beneficiary categories:
- **Identify ESRD Beneficiaries:** ESRD beneficiaries are identified from the Master Beneficiary File using the variable "BENE_MDCR_STATUS_CD". ESRD individuals are identified if the beneficiary Medicare status code variable is 11 (Aged with ESRD) or 21 (Disabled with ESRD) or 31 (ESRD only).
 - **Identify DISABLED Beneficiaries:** DISABLED beneficiaries are identified from the Master Beneficiary File using the variable "BENE_MDCR_STATUS_CD". DISABLED individuals are identified if the beneficiary Medicare status code variable is 20 (Disabled without ESRD).
 - **Identify DUAL Beneficiaries:** Individual with DUAL status is identified from "FINAL_DUAL_ELIG_MONTHS" variable from SSP ACO beneficiary RIF file for ACO assigned beneficiaries. For unattributed beneficiaries use the variable called "DUAL_ELGBL_MOS_NUM" to define dual status of a beneficiary from Master Beneficiary File (e.g., MBSF_D11_R5668 file in 2011). CMS generally considers beneficiaries to be full duals if they have values of 02, 04, or 08, and to be partial duals if they have values of 01, 03, 05, or 06. Generate dual indicator variable and its value 1 if a beneficiary is either partially or fully dually eligible

Note: For the 2012 database use the Master Beneficiary File "MBSF_D12_R5668" to construct dual eligibility status for unattributed beneficiaries. For ACO assigned beneficiaries use the following method:

- o From 2013 ACO beneficiary level RIF file identify those beneficiaries corresponding to whom the variable
Q1_DUAL_ELIG_MONTHS \neq 0 Q2_DUAL_ELIG_MONTHS \neq 0 or Q3_DUAL_ELIG_MONTHS \neq 0.

Construct dummy variable for each of these categories (ESRD, Disabled and Dual).

7. Use HCC calculation from each year and assign it to the database corresponding to each beneficiary.

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8. Include patient level locations [e.g., State ID, County ID, Zipcode] in the database.
9. Include HRR and Zipcode crosswalk from Dartmouth Atlas website and assign HRR information corresponding to each beneficiary in each year.
10. Include ACO ID and ACO start date in the database.
11. Create year dummy variables.
12. Create HRR dummy variables.
13. Create HRR and Year dummy interaction variables.
14. Create all the treatment dummy and post dummy variables.

PER MEMBER PER YEAR (PMPY) EXPENDITURE CALCULATION:

- For each beneficiary calculate total Medicare Parts A and B FFS expenditures (payments) from the Inpatient, SNF, Outpatient, Carrier (Physician/Supplier Part B), DME, HHA, and Hospice claims.
- Exclude denied payments and line items from the calculation following Table-1.
- Remove capital and operating IME and DSH amounts from inpatient expenditures. We do not apply this exclusion criterion for Maryland because Maryland is outside the inpatient prospective payment system.
- Split the inpatient expenditures into five parts STAC (Short Term Acute Care), LTCH (Long Term Acute Care), IRF (Inpatient Rehab Facilities), IP-Psychiatric and other inpatients.
- Calculate total inpatient expenditures using MSSP methodology as described in Table-1.
- Expenditures at each care setting are annualized and truncated.

Annualization: After summing a beneficiary's expenditures for all care settings (Physicians, SNF, Inpatient, Outpatient, HHA, DME and Hospice), we annualize the expenditures by dividing them (claim payment amounts) by the fraction of months in the year each beneficiary was enrolled in each Medicare enrollment type. In other words, to annualize a beneficiary's expenditures, we divide the total expenditures in the applicable months by the fraction of the year the beneficiary is enrolled ("adjmo" variable).

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Truncation: In order to prevent a small number of extremely costly beneficiaries from significantly affecting the ACO's per capita expenditures we have truncated the annualized expenditures at the beneficiary level for each care-setting. We have truncated the expenditures at 1st and 99th percentiles after annualization.

Exhibit 7 contains the exclusion and inclusion criterion following MSSP methodology⁶.

Exhibit 7: Variables Used in Total Beneficiary Expenditure Calculation

Expenditure Component	Payment is equal to	Claim denied if left justified value is	Line Item denied if	Through Date
SNF (Claim type=20, 30)	Claim payment amount	Any non-blank value for 'Claim Medicare Non-Payment reason code'	Not applicable	Claim through date
Inpatient (Claim type = 60)	Claim payment amount (excluding capital and operating IME and DSH amounts)	Any non-blank value for 'Claim Medicare Non-Payment reason code'	Not applicable	Claim through date
Outpatient (Claim type = 40)	Claim payment amount	Any non-blank value for 'Claim Medicare Non-Payment reason code' Claim Billing Facility Type Code in (4,5)	Not applicable	Claim through date
Home Health (Claim type = 10)	Claim payment amount	Any non-blank value for 'Claim Medicare Non-Payment reason code' Claim Billing Facility Type Code in (4,5)	Not applicable	Claim through date
Carrier (physician/supplier Part B) (Claim type=71, 72)	Line NCH payment amount	'Carrier Claim Payment Denial Code' = 'O' or 'D' through 'Y'	Line processing indicator code ≠ A,R, or S	Line latest expense date
DME (Claim type = 81, 82)	Line NCH payment amount	Claim payment Denial Code = 'O' or 'D' through 'Y'	Line processing indicator code ≠ A, R, or S	Line latest expense date
Hospice (Claim type=50)	Claim payment amount	Any non-blank value for 'Claim Medicare Non-Payment reason Code'	Not Applicable	Claim through date

Note: Since this data comes from our RIF dataset, we do not have month of eligibility information by four types of beneficiary categories (Aged-dual, Aged-non-dual, disabled and ESRD), we do not calculate the PMPY spending for these four categories and adjust the PMPY spending calculation by the weights of these beneficiaries. We used all the above care setting files to calculate PMPY spending (after annualization and truncation).

⁶ Shared Savings and Losses Assignment Methodology Specifications, Version 3, CMS (December 2014), <https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharedsavingsprogram/Downloads/Shared-Savings-Losses-Assignment-Spec-v2.pdf>.