Summary of analyses for reporting, MA & PDP CAHPS

1. Data are cleaned. (See specifications in vendor training slides, specifically the section on Data Analysis and Reporting.)

2. Data are stratified by contract (and by survey type in contracts with both MA-PD and MA-only coverage types, consistent with whether the original sample design for the contract was stratified by contract × Part D coverage or only by contract). (For information on sampling methodology, see the Quality Assurance Protocols & Technical Specifications Version 16.0, Sampling section.)

   Weights are defined as:

   $$(number\ of\ eligible\ enrollees) \div (number\ of\ respondents)$$

   and are uniform within each stratum.

3. Recode survey variables following measure and case-mix model definitions.

4. Create dichotomous variables for each level of any categorical case-mix adjustor variable with 3 or more levels (excluding one level as the reference level). (See Appendix A in this document.)

5. Data are analyzed using CAHPS Macro, Version 5.0. The general documentation for the CAHPS Macro, Version 5.0 is currently available as "Instructions for Analyzing Data from CAHPS® Surveys", which includes both a description of options and explanatory narrative about the calculations. The specific instructions below assume that the software used is CAHPS Macro, Version 5.0, available on the AHRQ CAHPS website; all needed syntax to run Version 5.0 with MA & PDP CAHPS data appears in this document in Appendix B.

   The Macro performs a standard analysis as follows:

   a. Replace missing case-mix adjustor values with unweighted contract mean values for each dichotomously coded variable. For each respondent, this imputes missing covariate values to the contract mean of non-missing values between zero and one.
   b. Mean-center the data by subtracting the weighted contract mean for each variable (outcome and dichotomously coded case-mix variables) from each value of the corresponding variable observed in that contract.
   c. Estimate case-mix adjustment model coefficients by weighted least squares (WLS) linear regression using weights calculated in step 2 above.
   d. Calculate uncentered adjusted mean scores for each measure and contract by subtracting regression predictions for each respondent and measure from the

corresponding observed response and then calculating the mean of these differences within each contract.

e. Re-center scores for each measure and contract (by adding the same amount to each contract's scores on the measure) so that the contract-enrollment-weighted mean of adjusted contract scores equals the corresponding weighted mean of unadjusted contract mean scores; the amount added is the difference between the overall weighted unadjusted mean score and the overall weighted adjusted mean score (uncentered adjusted mean score from (5c) minus unadjusted mean score).
f. For each composite measure and contract, calculate the equally-weighted mean across the included items of scores and of residuals.
g. Estimate sampling variances (squared standard errors) for each measure and contract.
h. Calculate the national mean (the weighted mean of all contract scores) for each measure, weight by the survey-eligible contract enrollment assessed at the time of sample design.
i. Calculate the standard error of the estimated difference between the contract score and the weighted national mean for each measure.
j. Calculate t-statistics using parameters from (5d), (5g), and (5h), t = (estimated difference between contract and national mean) / (standard error of estimated difference)
k. Compare t-statistics to cutoffs −1.96 and +1.96 to assign
    i. "meaning" = 1 (t < −1.96, significantly below average);
    ii. "meaning" = 2 (−1.96 <= t <= +1.96, not significantly different from average);
    iii. "meaning" = 3 (t > +1.96, significantly above average).

6. "Stars" estimation post-processes output from the Macro and applies criteria published in the Medicare 2026 Part C & D Star Ratings Technical Notes, Attachment K.
    a. Convert the score to a 0-100 scale as used in consumer reports, by the following formula:

$$Snew = 100\ (Sold - Smin) \div (Smax - Smin)$$

    where s_{max} and s_{min} are respectively the highest and lowest allowed scores on the item and composite. Standard errors are likewise converted by multiplication by $100 \div (Smax - Smin)$.
    b. For each scaled measure, calculate quantile cutoffs (15, 30, 60, 80th percentile) across contracts, round both these cutoff values and the measure scores for

contracts to the nearest integer, and assign each contract to a base group according to the following categorization, where *s* is the rounded score on a 0-100 scale and q_c is the rounded *c*-percentile cutoff[1]:

Group 1: $s < q_{15}$

Group 2: $q_{15} \leq s < q_{30}$

Group 3: $q_{30} \leq s < q_{60}$

Group 4: $q_{60} \leq s < q_{80}$

Group 5: $q_{80} \leq s$

c. Please see the maximum likelihood estimates of between-contract variance τ2.

Calculate reliability (Interunit reliability or IUR) by contract for each measure. IUR represents the fraction of observed variation in scores attributable to true variation in contract performance rather than measurement variation, and is calculated by the formula $IUR_p = \frac{\tau 2}{\tau 2 + \mathrm{Vp}}$ where V_p is the sampling variance of the measure for contract *p*.

d. Combine results from 6b and 6c, and significance test results from the Macro output (5j,"meaning"), and apply criteria to determine final stars. (See vendor training slides, specifically the section on Data Analysis and Reporting, and the Medicare 2026 Part C & D Star Ratings Technical Notes).

[1] Note: quantiles are not uniquely defined in discontinuous distributions, such as these sample distributions. We use the interpolated Type 7 method of Hyndman, R. J. and Fan, Y. (1996). Sample quantiles in statistical packages, *American Statistician* 50(4), 361–365. doi: 10.2307/2684934 which is the default in R.

Appendix A: Indicator-coded Case-mix Adjustment Variables

Table 1 shows a list of case-mix adjustment variables used in analysis and reporting; each row of this table corresponds to a dichotomously coded variable (with value 0 or 1) in the model. Sample code for creating dichotomously coded variables for age for use in case-mix models is shown after the table.

Table 1 – Case-mix adjustment variables used in analysis

Predictor	Value	Original Field from CAHPS data
Age	64 or under	SA_AGE
Age	65 – 69	SA_AGE
Age	75 – 79	SA_AGE
Age	80 – 84	SA_AGE
Age	85 and older	SA_AGE
Education	Less than an 8th grade education	EDUC
Education	Some high school	EDUC
Education	Some college	EDUC
Education	College graduate	EDUC
Education	More than a bachelor's degree	EDUC
General Health Status	Excellent	R_GHS (reverse coded)
General Health Status	Very good	R_GHS (reverse coded)
General Health Status	Fair	R_GHS (reverse coded)
General Health Status	Poor	R_GHS (reverse coded)
Mental Health Status	Excellent	R_MHS (reverse coded)
Mental Health Status	Very good	R_MHS (reverse coded)
Mental Health Status	Fair	R_MHS (reverse coded)
Mental Health Status	Poor	R_MHS (reverse coded)
Proxy	Proxy helped	PROXY_READ, PROXY_WRIT, PROXY_TRAN, PROXY_OTHR
Proxy	Proxy answered	PROXY_ANSW
Medicaid Dual	Medicaid dual eligible	SA_MDCD_STUS
Low Income Subsidy	Low-income subsidy (LIS) without Medicaid dual eligibility	SA_LIS

Predictor	Value	Original Field from CAHPS data
Asian Language Survey	Asian Language Survey (Chinese, Korean, Tagalog, and Vietnamese)	SU_DISPO_LANG

Here is an example of sample code for the age category.

```
/*Sample code - age category*/
    length agec $10.;
     if sa_age>0 then do; age64=0;
           age6569=0; age7074=0;
           age7579=0; age8084=0;
           age85=0; end;

    if sa_age> . and sa_age<=64 then do; age64=1;   end;
    if sa_age>64 and sa_age<70  then do; age6569=1; end;
    if sa_age>69 and sa_age<75  then do; age7074=1; end;
    if sa_age>74 and sa_age<80  then do; age7579=1; end;
    if sa_age>79 and sa_age<85  then do; age8084=1; end;
    if sa_age>=85               then do; age85=1;   end;
```

Appendix B: Using the CAHPS Analysis Program ("CAHPS Macro"), Version 5.0
Below is a typical Macro call statement for a measure that is a single item. Values of parameters that are **boldfaced** below must be replaced (in second column) by values specific to the run.

Parameters in *italics* may optionally be replaced to modify the output. Set *outregre=0* to suppress saving of regression coefficients. Set *proc_type=1* to report standard errors from PROC SURVEYREG (treating contracts as clusters) or *proc_type*=0 to ignore clustering. (This option has no effect on point estimates.) Other parameters should be specified exactly as shown. Below, the programming code for the Macro call statement is described.

Macro call statement

```
%cahps(

var          = rate_plan,

vartype      = 2,                  /* 1 = Dichotomous Scale (yes/no 0-1)
                                      2 = Global Rating Scale (0-10)
                                      3 = How Often Scale ("never" to "always" scale 1-4)
                                      4 = Any type of three-point response scale (1-3)
                                      5 = Other Scale (Must assign a value to min_resp and
                                        max_resp arguments) */
name         = test rate plan,    /*Label the outcome variable*/
adjuster     = case mix list,     /*List case-mix variables*/
adj_bars     = 1,                 /*Flag if frequency bars to be case-mix adjusted*/
bar_stat     = 1,                 /*Flag if case-mix adjusted bars to be saved*/
impute       = 1,                 /*Flag if missing case-mix adjusters to be imputed*/
adultkid     = 3,                 /*Specify how to analyze child and adult surveys:
                                      0 = combine adult and child - no interaction
                                      1 = combine adult and child - yes interaction
                                      2 = analyze child data only
                                      3 = analyze adult data only*/
wgtresp      = weight_variable,   /*Blank or the name of a variable for individual respondents*/
wgtmean      = weight_variable,   /*Blank or the name of a variable for the plan means*/
wgtplan      = 1,                 /*Flag if plan weights for the plan level used*/
overall_wt   = 2,                 /*weight options for calculating the overall mean:
                                      0 = Number of respondents
                                      1 = Equal weighting of contracts
                                      2 = population: sum of case weights*/
outregre     = 1,                 /*Flag if regression output text to be saved*/
proc_type    = 1,                 /*Assign the procedure type for the case-mix regression:
                                      0 = PROC REG
                                      1 = PROC SURVEYREG*/
wt_type      = 2,                 /*Weight options for calculating of the case-mix regression
                                                coefficients:
                                      0 = number of respondents
                                      1 = equal weighting of contracts
                                      2 = population: sum of case weights*/
dataset      = in_dataset,        /*Name of input data*/
outname      = output_name        /*Name used for output dataset*/ ) ;
```

For a composite measure, specify parameters as shown above, but include all items of the composite in the VAR call statement. For instance, the doctor communication composite combines four items, and the code to combine these variables is:

```
var = md_explain md_listen md_respect md_sptime,
```

The following describes three points in the computations performed by the CAHPS analysis program at which weighting is relevant, and the options in the analysis program that determine the calculation of weights for the MA & PDP CAHPS analysis.

a. **Estimation of case-mix regression coefficients**: First, set the within-contract weight by setting the weight variable name in WGTRESP. Next, set WT_TYPE = 2 to direct the program to estimate population-weighted regression coefficients by weighting each contract by the sum of weights of individuals responding in that contract.

b. **Calculation of adjusted contract means**: Contract-level weights are calculated as the sum of individual-level weights for item respondents in each contract. Set WGTPLAN = 1 and place the weight variable name in WGTMEAN, which creates the contract weight by summing the weight variable.

c. **Calculation of overall mean, re-centering of adjusted means to match overall adjusted mean to overall unadjusted mean, and significance tests of difference from the overall mean**: To use population weights to calculate the overall mean, set OVERALL_WT = 2.