NHATS Technical Paper #20

NATIONAL HEALTH AND AGING TRENDS STUDY (NHATS)
Development of Round 7 Survey Weights

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1. Introduction

The NHATS public use data originally supported weighted analysis of Medicare beneficiaries ages 65 and older living in the contiguous United States on September 30, 2010. The original cohort has been interviewed annually. Replenishment took place in Round 5 so that the sample could be used to study disability trends as well as individual trajectories. The replenishment sample was drawn as of September 30, 2014. Details on sample design and selection are available elsewhere (Montaquila et al. 2012a and Dematteis et al. 2016a).

For Round 7, as for Rounds 5 and 6, separate sets of weights are provided for analyses pertaining to the original target population (the "2011 Cohort") and for analyses pertaining to the new target population (the "2015 Cohort"). The survey weights included with the Round 7 public use file account for differential probabilities of selection and adjust for potential bias related to unit nonresponse to the Round 1 through 7 interviews.

As in prior rounds, for Round 7 of NHATS, two types of sampling weights have been produced (for each cohort): a tracker weight (on the Tracker file with the variable names w7trfinwgt0 and w7tr2011wgt0) and an analytic weight (on the Sample Person file with the variable names w7anfinwgt0 and w7an2011wgt0). For variance estimation (see Section 7), NHATS has also included replicate versions of these weights (w7trfinwgt1-w7trfinwgt56 and w7anfinwgt1-w7anfinwgt56 for the 2015 Cohort; w7tr2011wgt1- w7tr2011wgt56 and w7an2011wgt1- w7an2011wgt56 for the 2011 Cohort).

The methodology that was used to develop these weights and appropriate uses of each of these weights are discussed in the following sections. The next section provides an overview of how cases were classified for purposes of weight development. Sections 3 and 4 detail the creation of the tracker and analytic weights, respectively. Section 5 reports on the effect of weighting adjustments on the precision of NHATS survey estimates. Section 6 provides guidance on the use of the tracker and analytic weights. A final section provides information on the proper calculation of variance estimates to account for the complex design and estimation procedures used in NHATS.

2. Definition of Respondent

In the development of survey weights, an important first step is the classification of cases into groups based on eligibility and response status. For Round 7 of NHATS, Table 1 shows how the disposition codes map into respondent, ineligible, and nonrespondent statuses.

In the computation of the 2015 Cohort weights, both original sample and replenishment sample cases were included. In the computation of the 2011 Cohort weights, only cases in the original sample were included.

2015 Cohort Weights

For the 2015 Cohort Round 7 Tracker weight, only cases that were eligible as of September 30, 2014, and were classified in Round 7 as Respondents (including cases for whom a Round 7 Last Month of Life (LML) interview was completed) or Ineligible are assigned a positive weight (n=7,568). Cases for which at least one survey component is available (codes 60, 61, 62, 63 and 64) are considered respondents for purposes of the tracker weight.

Cases who became ineligible for the Round 7 interviews after they were selected, either due to death prior to their first interview (Round 1 for original sample cases, Round 5 for replenishment sample cases) or due to moving outside the contiguous U.S., also have positive Round 7 Tracker weights

For the 2015 Cohort Round 7 Analytic weight, only Respondents (codes 60, 61, 62, 63; n=6,154) are assigned a positive weight. For the SP interview, cases were required to have completed the self-reported disability protocol (through the section on Participation; PA) to be considered complete.

2011 Cohort Weights

For the 2011 Cohort Round 7 Tracker weight, only original sample cases classified as Respondents and Ineligible are assigned a positive weight (N = 6,057). Original sample cases for which at least one survey component is available (codes 60, 61, 62, 63 and 64) are considered respondents for purposes of the tracker weight.

Original sample cases who became ineligible for the Round 1 interview after they were selected, either because they died or moved out of the contiguous U.S. by the time of the fieldwork, have positive Round 7 Tracker weights. Those who became ineligible in subsequent rounds for an interview because they moved out of the contiguous U.S. or completed a Last Month of Life (LML) interview because they died also have positive tracker weights in Round 7. Replenishment sample cases added in 2015 do not have positive 2011 Cohort Round 7 Tracker weights.

For the 2011 Cohort Round 7 Analytic weight, only original sample Respondents (codes 60, 61, 62, 63; n=3,139) are assigned a positive weight. For the SP interview, cases were required to have completed the self-reported disability protocol (through the section on Participation; PA) to be considered complete.

Table 1. Classification of Round 7 NHATS Sample for Weight Development Purposes

	Original Sample			Replenishment Sample		
Disposition code	**N**	**Classification for Tracker Weight**	**Classification for Analytic Weight**	**N**	**Classification for Tracker Weight**	**Classification for Analytic Weight**
60 Complete, community	2,537	Respondent	Respondent	2,580	Respondent	Respondent
60-Complete, NH or residential care	258	Respondent	Respondent	150	Respondent	Respondent
61 Complete, NH facility	41	Respondent	Respondent	88	Respondent	Respondent
62 Complete, SP deceased, proxy interview	276	Deceased respondent[+]	Respondent[+]	183	N/A	N/A
63 Complete SP, FQ not complete	27	Respondent	Respondent	14	Respondent	Respondent
64 Complete FQ, SP not complete	90	Respondent	Nonrespondent	68	Respondent	Nonrespondent
75 Physically/mentally unable to participate, no proxy	10	Nonrespondent	Nonrespondent	9	Nonrespondent	Nonrespondent
76 Too ill to participate, no proxy	15	Nonrespondent	Nonrespondent	27	Nonrespondent	Nonrespondent
77 Refusal, Sample Person	81	Nonrespondent	Nonrespondent	192	Nonrespondent	Nonrespondent
78 Language barrier	0	Nonrespondent	Nonrespondent	3	Nonrespondent	Nonrespondent
79 Unable to locate	10	Eligibility unknown[++]	Eligibility unknown[++]	22	Eligibility unknown[++]	Eligibility unknown[++]
80 Unavailable during field period	6	Nonrespondent	Nonrespondent	11	Nonrespondent	Nonrespondent
82 Outside of Primary Sampling Unit	11	Nonrespondent	Nonrespondent	3	Nonrespondent	Nonrespondent
83 Ineligible (moved out of contiguous US)	1	Ineligible	Ineligible	3	Ineligible	Ineligible
85 Refusal, facility	2	Nonrespondent	Nonrespondent	9	Nonrespondent	Nonrespondent
86 Deceased, no proxy	17	Deceased nonrespondent[+]	Nonrespondent[+]	17	N/A	N/A
87 Refusal, proxy	12	Nonrespondent	Nonrespondent	12	Nonrespondent	Nonrespondent
88 Work stopped	0	Nonrespondent	Nonrespondent	0	Nonrespondent	Nonrespondent
89 Final other/specify*	1	Nonrespondent*	Nonrespondent*	4	Nonrespondent*	Nonrespondent*
Not attempted in Round 7						
Deceased in Round 1, 2, 3, or 4	2,127	Ineligible[#]	Ineligible[#]	0	N/A	N/A
Deceased in Round 5 or 6	576	Ineligible	Ineligible	625	Ineligible	Ineligible
Other Round 1, 2, 3, or 4 ineligible	120	Ineligible[#]	Ineligible[#]	0	N/A	N/A
Other Round 5 or 6 ineligible	4	Ineligible	Ineligible	47	Ineligible	Ineligible
Round 1, 2, 3, 4, 5, or 6 nonrespondent	6,189	Nonrespondent**	Nonrespondent**	3,052	N/A	N/A
Total and number assigned weight	12,411	3,810 (6,057[##])	3,139	7,119	3,758	3,015

[+] For the original sample, the weights of deceased SPs were adjusted separately from those of living SPs.

[++] Due to the very low proportion of fielded cases in this category in Round 2 (0.46% of fielded cases), as well as the low proportion of Round 1 respondents that were ineligible for Round 2 (0.38%), these cases were treated as living nonrespondents in the computation of Round 2 weights. The same approach was used in the computation of Round 3 and Round 4.weights, and for original sample cases, in the computation of the Round 5 and Round 6 weights. For the replenishment sample, these cases were treated as cases with unknown eligibility in Round 5, and as living nonrespondents in the computation of Round 6 and Round 7 weights.

[**]These cases were previously adjusted for in the Round 1, Round 2, Round 3, Round 4, Round 5, or Round 6 nonresponse adjustment to the tracker weight; the Round 6 nonresponse adjusted tracker weight was used as input to the Round 7 weighting process, so these cases are not included in the Round 7 nonresponse adjustment.

SP=Sample Person interview; FQ=Facility Questionnaire

[#]These categories only apply to the 2011 Cohort.

[##]The number assigned tracker weights for the 2011 Cohort is given in parentheses.

3. Computation of Round 7 Tracker Weights

2015 Cohort Tracker Weights

To produce the 2015 Cohort Round 7 Tracker weight, two adjustments were made to the Round 6 nonresponse adjusted tracker weight—an adjustment for Round 7 nonresponse and a raking adjustment to estimated population totals from the Medicare Enrollment Database (EDB).

Response rates differed between the members of the original 2011 cohort and members of the 2015 cohort. Moreover, response mechanisms were different for the two samples since members of the original sample had been engaged in the study for several rounds, whereas Round 7 was only the third contact with the 2015 cohort. We therefore adjusted the two samples separately for Round 7 nonresponse.

Potential variables for creating nonresponse cells for the 2015 Cohort Round 7 Tracker weights came five sources:

- Beneficiary information from the sampling frame (the 20% HISKEW File for the original sample; the 20% extract of the EDB for the replenishment sample[1]), including demographic characteristics of the beneficiary (e.g., age as of September 30, 2014, gender) and geographic information (e.g., census division, metro and micropolitan status) based on the beneficiary's address on the frame;
- County-level demographic information based on the 5% HISKEW file or the 5% extract of the EDB (e.g., percent of beneficiaries in the county who are Black; percent of beneficiaries in the county who are Hispanic) for the county linked to the beneficiary's address from the EDB;
- Census tract-level information based on the 2009-2013 5-year American Community Survey (e.g. tract-level demographic information), based on linkages to the beneficiary's address from the EDB;
- For the original sample, variables from the NHATS Rounds 1 through 6 interviews (race/ethnicity, highest education, and residential settings); and
- For the replenishment sample, variables from the NHATS Rounds 5 and 6 interviews (race/ethnicity, highest education, and Rounds 5 and 6 residential settings).

Appendix Table 1 provides weighted response rates (using the 2015 cohort Round 6 Tracker nonresponse adjusted weights) by categories of the various indicators. We used these variables as input to a classification tree analysis to determine which of these variables were associated with nonresponse. This approach uses a search algorithm to identify variables associated with response propensities. At each step in the process, chi-square tests were performed to determine the most significant predictor of response, given the set of conditions already specified in the particular "branch." We also set a minimum cell size of 50.[2]

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[1] The HISKEW file was a 20% sample of the Medicare EDB (as of Sept. 30, 2010) that served as the sampling frame for the original selection. At the time of selection of the replenishment sample, CMS no longer created HISKEW files, but instead, a customized extract of the EDB was created.

[2] The classification tree analysis is designed to work with categorical predictor variables. Alternatives to this approach are propensity modeling based on logistic regression and Cartesian product cross-classification. The logistic regression approach uses a parametric model to identify predictors of response. When the pool of potential predictors includes continuous variables and categorizing the continuous variables would result in substantial losses of information, logistic regression modeling would be preferred over classification tree analysis.

We fit separate classification trees for the original sample and the replenishment sample. For the original sample, separate trees were fit for all living non-nursing home cases (Figure 1), nursing home residents (Figure 2), and deceased SPs (Figure 3) because underlying nonresponse processes differed for these three groups. Likewise, for the replenishment sample, separate trees were fit for living non-nursing home cases (Figure 4), nursing home residents (Figure 5), and deceased SPs (Figure 6). For the original sample, nursing home residents include both Round 1 residents who were not required to complete an SP Interview in Round 5 and new nursing home cases who were eligible for the SP interview in Round 5. Respondents to the LML interview conducted when the SP was deceased were proxy respondents. We included all variables as input for each of the trees.

Appendix Table 1 indicates the variables used in the final non-response cells for the 2015 Cohort Round 7 Tracker weights; an "a" indicates variables retained in the non-nursing home tree for the original sample, a "b" indicates those retained in the nursing home tree for the original sample, a "c" indicates those retained in the deceased original sample tree, a "d" indicates those retained in the non-nursing home tree for the replenishment sample, an "e" indicates those retained in the nursing home tree for the replenishment sample, and an "f" indicates those retained in the deceased replenishment sample tree.

For living SPs in the original sample who were living in the community and other residential settings (not nursing homes) in Round 6, final nonresponse cells included 19 indicators. Among living nursing home residents in Round 5, there was no nonresponse in Round 7, thus, no classification tree was fit for this group. Combinations of these variables created 26 nonresponse cells among the original sample in the non-nursing home group and 1 nonresponse cell among the nursing home group (See Appendix Figures 1 and 2). For deceased SPs in the original sample, the total of 4 final nonresponse cells included 3 indicators (See Appendix Figure 3). For living SPs in the replenishment sample who were residing in the community and other residential settings (not nursing homes) and those in nursing homes in Round 5, final nonresponse cells included 18 indicators and 1 indicator, respectively. Combinations of these variables created 26 nonresponse cells among the replenishment sample non-nursing home residents and 2 nonresponse cells among the nursing home group (See Appendix Figures 4 and 5). For deceased SPs in the replenishment sample, the total of 3 final nonresponse cells included 2 indicators (See Appendix Figure 6).

The final step in creating the 2015 Cohort Round 7 Tracker weight involved raking the nonresponse adjusted weights to control totals developed from the 5% EDB extract (of Medicare beneficiaries as of September 30, 2014) that was used for sampling. For consistency, the raking adjustment also included the ineligibles (primarily deaths), since the frame that served as the source of the control totals also includes beneficiaries who were ineligible for NHATS. In Round 7, weight trimming was done in conjunction with this raking adjustment, due to a few outlier weights; this is discussed further in section 5.

As in Rounds 1 through 6, four dimensions were used in this Round 7 raking adjustment[3]:

The Cartesian product cross-classification approach involves specifying a set of adjustment cell variables based on prior experience (generally, (1) prior analyses that identified predictors associated with response propensities; and/or (2) predictors associated with response and/or subject matter expertise that informs the choice of variables).

[3] For purposes of raking, age categories refer to age at Round 5 sampling.

(1) Age category (65-69, 70-74, 75-79, 80-84, 85-89, 90+) by sex by race from the EDB (Black; non-Black);
(2) Age category (65-69, 70-74, 75-79, 80-84, 85-89, 90+) by Census region;
(3) Age category (65-69, 70-74, 75-79, 80-84, 85-89, 90+) by MSA status (from the EDB); and
(4) Age category (65-69, 70-74, 75-79, 80-84, 85-89, 90+) by a binary indicator of whether the SP was enrolled in Medicare prior to age 65.

In addition, as in Rounds 5 and 6, a fifth dimension—whether or not the beneficiary was eligible for selection into the original sample (i.e., age 65 or older and enrolled in Medicare as of September 30, 2010)—was used.

2011 Cohort Weights

The 2011 Cohort Round 7 Tracker weight applies only to the original sample, and followed the approach used to compute the Rounds 1 through 6 Tracker weights. This process began with the Round 6 nonresponse adjusted tracker weight (prior to raking). This Round 6 weight accounted for differential probabilities of selection and included adjustments for nonresponse to Rounds 1 through 6, but was not raked to the HISKEW[4]. See Montaquila et al. (2012b) for details on the specific methodology used in computing and adjusting the Round 1 weights; also, refer to Montaquila et al. (2014, 2015a, 2015b) and DeMatteis et al. (2016, 2017) for information about the specific adjustments applied in Rounds 2 through 6, respectively.

To produce the 2011 Cohort Round 7 Tracker weight, two adjustments were made to the Round 6 nonresponse adjusted tracker weight—an adjustment for Round 7 nonresponse and a raking adjustment to estimated population totals from the EDB. Potential variables for creating nonresponse cells for the 2011 Cohort Round 7 Tracker weights came from four sources:

- Beneficiary information from the sampling frame (the 20% HISKEW File for the original sample), including demographic characteristics of the beneficiary (e.g., age computed as of September 30, 2014 based on birthdate, gender) and geographic information (e.g., census division, metro and micropolitan status) based on the beneficiary's address in the EDB;
- County-level demographic information based on the 5% HISKEW file (e.g., percent of beneficiaries in the county who are Black; percent of beneficiaries in the county who are Hispanic) for the county linked to the beneficiary's address from the EDB;
- Census tract-level information based on the 2009-2013 5-year American Community Survey (e.g. tract-level demographic information), based on linkages to the beneficiary's address from the EDB; and
- Variables from NHATS Rounds 1 through 6 (race/ethnicity, highest education, and residential settings).

Appendix Table 2 provides weighted response rates (using the Round 6 nonresponse adjusted tracker weights that were the basis for the 2011 Cohort Round 7 Tracker weights) by categories of the various

[4] The HISKEW file was a 20% sample of the Medicare enrollment database (as of Sept. 30, 2010) that served as the sampling frame for the original selection.

indicators. We used these variables as input to a classification tree analysis to determine which of these variables were associated with nonresponse. This approach uses a search algorithm to identify variables associated with response propensities. At each step in the process, chi-square tests were performed to determine the most significant predictor of response, given the set of conditions already specified in the particular "branch." We also set a minimum cell size of 50.[5]

Separate trees were fit for all living non-nursing home cases (Figure 7), nursing home residents (Figure 8), and deceased SPs (Figure 9) because underlying nonresponse processes differed for these three groups. For the original sample, nursing home residents include both Round 1 residents who were not required to complete an SP Interview and new Rounds 2 through 6 nursing home residents who were eligible for the SP interview in Round 7. Respondents to the LML interview conducted when the SP was deceased were proxy respondents. We included all variables as input for each of the trees.

Appendix Table 2 indicates the variables used in the final nonresponse cells for the 2011 Cohort Tracker weights, with an "a" for the non-nursing home tree, a "b" for the Round 5 nursing home residents tree, and a "c" for the deceased SP tree. For living SPs who were living in the community and other residential settings (not nursing homes) in Round 6, final nonresponse cells included 15 indicators; combinations of these variables created 26 nonresponse cells. Among living nursing home residents in Round 6, there was no nonresponse in Round 7, thus, no classification tree was fit for this group, resulting in 1 nonresponse cell. For deceased SPs, final non-response cells included 3 indicators, resulting in 4 nonresponse cells (See Appendix Figures 7, 8, and 9).

The final step in creating the 2011 Cohort Round 7 Tracker weight involved raking the nonresponse adjusted weights to control totals developed from the 5% HISKEW as of September 30, 2010 that was used for sampling of the original sample. For consistency, the raking adjustment also included the ineligibles (primarily deaths), since the frame that served as the source of the control totals also includes beneficiaries who were ineligible for NHATS. In Round 7, weight trimming was done in conjunction with this raking adjustment, due to a few outlier weights; this is discussed further in section 5.

As in Rounds 1 through 5, four dimensions were used in this Round 7 raking adjustment[6]:

(1) Age category (65-69, 70-74, 75-79, 80-84, 85-89, 90+) by sex by race from the EDB (Black; non-Black);
(2) Age category (65-69, 70-74, 75-79, 80-84, 85-89, 90+) by Census region;
(3) Age category (65-69, 70-74, 75-79, 80-84, 85-89, 90+) by MSA status (from the HISKEW); and

[5] The classification tree analysis is designed to work with categorical predictor variables. Alternatives to this approach are propensity modeling based on logistic regression and Cartesian product cross-classification. The logistic regression approach uses a parametric model to identify predictors of response. When the pool of potential predictors includes continuous variables and categorizing the continuous variables would result in substantial losses of information, logistic regression modeling would be preferred over classification tree analysis. The Cartesian product cross-classification approach involves specifying a set of adjustment cell variables based on prior experience (generally, (1) prior analyses that identified predictors associated with response propensities; and/or (2) predictors associated with response and/or subject matter expertise that informs the choice of variables).

[6] For purposes of raking, age categories refer to age at sampling.

(4) Age category (65-69, 70-74, 75-79, 80-84, 85-89, 90+) by a binary indicator of whether the SP was enrolled in Medicare prior to age 65.

4. Computation of Round 7 Analytic Weights

As with the tracker weights, separate Round 7 Analytic weights were computed for the 2015 Cohort (designed for analysis of the original and replenishment samples combined) and for the 2011 Cohort (designed for analysis of the original sample alone).

The computation of the analytic weights begins with the final Round 7 Tracker weight for the respective cohort. A weighting class adjustment was developed for the class of nonrespondents who were eligible for but did not complete the SP interview: those living in nursing homes or non-nursing home residential care in Round 7 who had completed a facility interview but not a Sample Person interview (n=158 for the 2015 Cohort and n=90 for the 2011 Cohort; designated as code 64). (Round 7 nursing home residents who were nursing home residents at the time of their baseline interview (code 61) were not eligible for an SP interview in Round 7, thus are not part of the analytic weight nonresponse adjustment). The approach was designed to preserve the tracker weight distributions by Round 7 residence type (nursing home, non-nursing home). That is, we allowed the weights of residential care cases with both a completed FQ and a completed SP interview (n=408 for the 2015 Cohort and n=258 for the 2011 Cohort) to be adjusted to account for similar cases missing the SP Interview.

2015 Cohort Analytic Weights

Because it was believed that response mechanisms may be different for the two samples (since members of the original sample had been engaged in the study for several rounds, whereas Round 7 was the third contact and attempt at gaining cooperation with the replenishment sample), the two samples were adjusted separately for Round 7 analytic nonresponse. Since the sample size is much smaller for this nonresponse adjustment, only a subset of variables used in tracker weight classification tree analysis was considered for the analytic weight nonresponse adjustments; additionally, three variables that characterize the Round 7 nursing home status, non-nursing home residential care status, and area of the facility where the SP lives were included (see Appendix Table 3). In order to preserve the tracker weight distribution, for each sample separately by Round 7 residence type, the first split in each tree was forced to be Round 7 nursing home status. (All subsequent splitting was based on response propensities.) For the original sample, 4 variables (designated with “o” in Appendix Table 3) were retained in the final classification tree, forming 5 cells (see Appendix Figure 10); for the replenishment sample, 2 variables designated with ”r” in Appendix Table 3) were retained in the final classification tree, forming 3 cells (see Appendix Figure 11).

As a final step, we applied a raking procedure so that marginal totals based on the analytic weights would match the totals at replenishment sampling by: 5-year age groups, sex, race, region, micro/metropolitan status, and whether Medicare was received before age 65 (see footnote 2).

2011 Cohort Analytic Weights

As with the 2011 Cohort Round 7 Tracker weights, the 2011 Cohort Round 7 Analytic weight applies only to the original sample. Since the sample size is much smaller for this nonresponse adjustment, only a subset of variables used in tracker weight classification tree analysis was considered for the analytic

weight nonresponse adjustments; additionally, three variables that characterize the Round 7 nursing home status, non-nursing home residential care status, and area of the facility where the SP lives were included (see Appendix Table 4). In order to preserve the tracker weight distribution by Round 7 residence type, the first split was forced to be Round 7 nursing home status. (All subsequent splitting was based on response propensities.) Four variables (designated with "*" in Appendix Table 4) were retained in the final classification tree, forming 5 cells (see Appendix Figure 12).

As a final step, we applied a raking procedure so that marginal totals based on the analytic weights would match the totals at sampling by: 5-year age groups, sex, race, region, micro/metropolitan status, and whether Medicare was received before age 65 (see footnote 2).

5. Design Effects Related to Weighting

Although weighting adjustments are aimed at reducing bias, increased variation in weights generally increases the variances of survey estimates (Kish, 1965). Thus, in the development and implementation of the weighting methodology for NHATS, care was taken to balance the bias reductions against the potential increases in variance.

The estimated overall design effect due to variation in the Round 1 nonresponse adjusted tracker weights was 1.28. After applying Round 2 nonresponse adjustments within cells determined by the classification tree results, the estimated overall design effect due to unequal weighting increased to 1.33. Incorporating the Round 3 nonresponse adjustments, the estimated overall design effect due to unequal weighting was 1.35, and after Round 4 nonresponse adjustment this overall design effect was 1.34.

2015 Cohort Weights

The composited weights used in computing the 2015 Cohort Round 5 Tracker weights had an overall design effect (due to variation in the weights) of 1.34. After Round 5 nonresponse adjustment, the overall design effect was 1.55, with the increase being due to the extent of variation in response propensities between and within the two samples (the original sample and Round 5 replenishment sample). The nonresponse adjusted Round 6 Tracker weights had an overall design effect of 1.62. The nonresponse adjusted Round 7 Tracker weights had an overall design effect of 1.64. In order to limit the variation in the weights, after the raking adjustment, trimming of the tracker weights was considered; however, no influential outlier weights were identified, so no weights were trimmed at this stage. After the raking adjustment, the design effect for the final 2015 Cohort Round 7 Tracker weights was 1.64.

After the adjustments applied in computing the analytic weight (nonresponse adjustment and raking), two cases were identified as influential outliers, and their analytic weights were trimmed; following trimming, the weights were re-raked. After the re-raking, the design effect for the final 2015 Cohort Round 7 Analytic weights was 1.62 overall, and 1.61 for living SPs and 1.53 for deceased SPs.

2011 Cohort Weights

For the 2011 Cohort weights, after Round 5 nonresponse adjustment, the overall design effect was 1.33. After adjusting for Round 6 nonresponse, the overall design effect was 1.32. After adjusting for Round 7 nonresponse, the overall design effect was 1.32. In order to limit the variation in the weights, after the

raking adjustment, the tracker weights were trimmed and then re-raked; four cases with extreme weights were trimmed at this point. After the raking adjustment and trimming, the design effect for the final 2011 Cohort Round 7 Tracker weights was 1.34.

After the adjustments applied in computing the analytic weight (nonresponse adjustment and raking), one case was identified as an influential outlier, and its analytic weight was trimmed; following trimming, the weights were re-raked. After the re-raking, the design effect for the final 2011 Cohort Round 7 Analytic weights was 1.33 overall; and 1.32 for living SPs and 1.36 for deceased SPs.

6. Use of the Tracker vs. Analytic Weight

When using the tracker weight from any round, respondents are weighted up to represent all Medicare beneficiaries ages 65 and older who were alive on or as of the target date for the cohort (September 30, 2014 for the 2015 Cohort; September 30, 2010 for the 2011 Cohort) and residing in the contiguous United States. In contrast, the analytic weight at a given round reproduces only those alive and eligible for NHATS during the prior round fieldwork period (with the exception of a small number of persons from the prior round who are deemed ineligible in the current round because they relocated outside the contiguous U.S.). Thus, the Round 7 Analytic weight reproduces those alive and eligible for NHATS during the Round 6 fieldwork period.

The only other difference between the two sets of weights is the treatment of respondents who live in residential care settings other than nursing homes. In cases where an FQ interview was completed but an (eligible) SP interview was not completed in Round 7, a positive Round 7 weight sits in the Tracker file and a zero Round 7 weight in the Analytic file. The analytic weights of individuals with both an SP and FQ interview have been adjusted to represent these cases (persons assigned both an SP and FQ interview but with only an FQ). For all other respondents (including cases with proxy responses to the LML interview) the analytic and tracker weights are equal.

Most often analyses will use the analytic weight. The tracker weight is appropriate for making national estimates using the FQ information (e.g. for services available to older adults living in residential care settings) and for investigating the role of mortality on Round 1 disability estimates and successive cross-sections.

Another important consideration is whether to use a round-specific weight and, for Rounds 5 through 7, whether to use the 2015 Cohort weight or the 2011 Cohort weight. A useful rule of thumb is to always consider the population to which an estimate is being generalized. To estimate, for example, the proportion of the population in Round 1 who has a particular characteristic in Round 2, 3, 4, 5, 6, or 7 (measured in the SP interview) or who was in a particular type of residential care in Round 2, 3, 4, 5, 6, or 7 (measured in the FQ interview), a Round 1 weight should be used. The former would use the Round 1 Analytic weight and the latter the Round 1 Tracker weight. To estimate characteristics of people ages 75 and older in Round 7, or the characteristics of those living in residential care settings in Round 7 as measured in the Round 7 FQ interview, the Round 7 weight should be used. The former would use the Round 7 Analytic weight and the latter the Round 7 Tracker weight. To estimate characteristics (as of Round 7) of people 65 and older in Round 5, the 2015 Cohort Round 7 weight should be used. To examine associations between a characteristic in Round 7 and a characteristic in Round 1 (or any round prior to Round 5), the 2011 Cohort Round 7 weight should be used.

7. Variance Estimation

Two broad classes of methods have been developed for computation of standard errors of estimates from complex sample surveys: (1) Taylor series linearization and (2) replication methods. The NHATS data files contain the information necessary for analysts to use either of these approaches to compute standard errors. The "stratum" and "cluster" variables that allow users to compute variance estimates using Taylor series linearization are provided on the NHATS Tracker and SP files as the variables w5varstrat and w5varunit, respectively.

As discussed in Montaquila, Freedman, Spillman, and Kasper (2012a), for NHATS, the replication approach that was used is the modified balanced repeated replication (BRR) method suggested by Fay (Judkins 1990). When estimating the variance of ratios of rare subsets, one problem that occasionally arises from standard BRR is that one or more replicate estimates will be undefined due to zero denominators. Instead of increasing the weights of one half-sample by 100 percent and decreasing the weights of the other half-sample to zero as in standard BRR, Fay's method perturbs the weights by ±100(1-K) percent where K is referred to as "Fay's factor." The perturbation factor for standard BRR is 100 percent, or K=0. For NHATS, K = 0.3 was used.

Nonresponse adjustment and raking were repeated for each of the replicates. For Round 7, the final tracker replicate weights are provided in the variables w7trfinwgt1-w7trfinwgt56 for the 2015 Cohort and w7tr2011wgt1- w7tr2011wgt56 for the 2011 Cohort, and the analytic replicate weights are provided in the variables w7anfinwgt1-w7anfinwgt56 for the 2015 Cohort and w7an2011wgt1-w7an2011wgt56 for the 2011 Cohort. Through the creation of person-level replicate weights, Fay's method approximately reflects the contribution of variance due to nonresponse adjustments, calibration adjustments (e.g., poststratification or raking), and other weight adjustment factors that are dependent on the observed sample.

For additional information on application of weights and variance estimation in NHATS analyses, see the National Health and Aging Trends Study (NHATS) User Guide at www.nhats.org

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Appendix: Variables Used in Nonresponse Adjustment for Round 7 NHATS Weights

Appendix Table 1. Response Rates by Various Indicators: NHATS Round 7 2015 Cohort

Variable & Values	Weighted Response Rate
OVERALL	91.9%
BENEFICIARY INDICATORS	
Age[1 d] (H_AGECAT_R5)	
1: 65-69	90.9%
2: 70-74	92.1%
3: 75-79	92.8%
4: 80-84	92.8%
5: 85- 89	92.5%
6: 90+	91.7%
Gender[1 a d] (H_SEX)	
1: Male	91.8%
2: Female	92.0%
Census Region[2 a] (S_REGION)	
1: Northeast	91.6%
2: Midwest	94.0%
3: South	91.3%
4: West	90.8%
Census Division[2 a c d] (DIVISION)	
1: New England	90.2%
2: Middle Atlantic	92.2%
3: East North Central	94.2%
4: West North Central	93.7%
5: South Atlantic	89.8%
6: East South Central	94.0%
7: West South Central	92.6%
8: Mountain	91.7%
9: Pacific	90.7%
Census Metro/Micro Area Designation (2013)[2] (S_METMICRO)	
1: Metropolitan area	91.7%
2: Micropolitan area	92.1%
3: Non-metro	93.4%
Health Maintenance Organization Beneficiary[1 d] (HMOTYPE)	
0: Yes	92.4%
9: No	91.7%
Age First Enrolled in Medicare[1 a] (MEDIC_BEG)	
1: Prior to age 65	89.6%
2: At or after age 65	92.1%
R5 RACE ETHNICITY[4 a d] (RL5DRACEHISP_R)	
1: White, non-Hispanic	92.6%
2: Black, non-Hispanic	93.2%
3: Other, non-Hispanic	86.9%
4: Hispanic	90.5%
5: DK/RF	78.7%
R5 HIGHEST EDUCATIONY[4 ^ d f] (EL5HIGSTSCHL_R)	
0: Not applicable	86.6%
1: DK/RF	76.7%
2: Below high school	88.6%
3: High school	90.1%
4: Above High school	92.3%
TRACT-LEVEL INDICATORS (Quartiles)	
Household Income[3 a d] (C_AGG_HH_INC)	
1: 1st quartile	92.6%
2: 2nd quartile	91.8%
3: 3rd quartile	92.2%
4: 4th quartile	91.4%
9: Missing	100.0%
Median Household Income[3 a] (C_MED_HH_INC)	
1: 1st quartile	92.2%
2: 2nd quartile	92.3%
3: 3rd quartile	91.6%
4: 4th quartile	91.5%
9: Missing	100.0%
Median Household Income 65+[3 a d] (C_MED_HH_INC_65)	
1: 1st quartile	92.2%
2: 2nd quartile	91.9%
3: 3rd quartile	91.8%
4: 4th quartile	91.6%
9: Missing	100.0%
% Households with Adult 65+[3 a d] (C_PCT_HH_65)	
1: 1st quartile	91.9%
2: 2nd quartile	92.4%
3: 3rd quartile	91.8%
4: 4th quartile	91.5%
% Households in Poverty[3] (C_PCT_HH_POV)	
1: 1st quartile	93.0%
2: 2nd quartile	90.6%
3: 3rd quartile	91.2%
4: 4th quartile	92.9%
% Households Reporting Public Assistance[3 d] (C_PCT_HH_PUBASST)	
1: 1st quartile	91.6%
2: 2nd quartile	92.3%
3: 3rd quartile	90.9%
4: 4th quartile	92.8%
% Households Reporting Retirement Income[3 a] (C_PCT_HH_RETIREINC)	
1: 1st quartile	91.0%
2: 2nd quartile	91.8%
3: 3rd quartile	92.8%
4: 4th quartile	91.5%
% Households Reporting Social Security[3] (C_PCT_HH_SOCSEC)	
1: 1st quartile	91.9%
2: 2nd quartile	92.1%
3: 3rd quartile	91.4%
4: 4th quartile	92.2%

Variable & Values	Weighted Response Rate
R1 HIGHEST EDUCATIONY[4 # a] (EL1HIGSTSCHL_R)	
0: Not applicable	95.1%
1: DK/RF	77.2%
2: Below high school	95.0%
3: High school	94.3%
4: Above High school	95.8%
COUNTY LEVEL INDICATORS	
% Black 65+ (deciles)[2 a d] (PCTBLK)	
0: 1st decile	93.0%
1: 2nd decile	94.7%
2: 3rd decile	91.9%
3: 4th decile	91.8%
4: 5th decile	90.9%
5: 6th decile	91.5%
6: 7th decile	88.6%
7: 8th decile	91.8%
8: 9th decile	92.9%
9: 10th decile	91.3%
% Hispanic 65+ (deciles)[2 c d f] (PCTHISP)	
0: 1st decile	92.0%
1: 2nd decile	92.9%
2: 3rd decile	95.3%
3: 4th decile	92.6%
4: 5th decile	92.1%
5: 6th decile	91.9%
6: 7th decile	92.5%
7: 8th decile	91.2%
8: 9th decile	89.9%
9: 10th decile	88.6%
% Poverty (deciles)[2 a d e] (PCTPOV)	
0:1st decile	92.7%
1: 2nd decile	93.1%
2: 3rd decile	91.8%
3: 4th decile	91.5%
4: 5th decile	91.0%
5: 6th decile	93.1%
6: 7th decile	92.0%
7: 8th decile	89.3%
8:9th decile	91.9%
9: 10th decile	92.1%

Variable & Values	Weighted Response Rate
TRACT-LEVEL INDICATORS (Quartiles)	
% Households Reporting SSI[3 a d] (C_PCT_HH_SSS)	
1: 1st quartile	92.1%
2: 2nd quartile	91.8%
3: 3rd quartile	91.2%
4: 4th quartile	92.4%
% Households Owning Their Home[3 a d] (C_PCT_OWNHOME)	
1: 1st quartile	92.2%
2: 2nd quartile	92.1%
3: 3rd quartile	90.4%
4: 4th quartile	93.0%
% Households 65+ Owning Their Home[3 a d] (C_PCT_OWNHOME_65)	
1: 1st quartile	91.5%
2: 2nd quartile	91.0%
3: 3rd quartile	92.1%
4: 4th quartile	92.6%
% Households 65+ Below Poverty[3 a d] (C_PCT_POV_65)	
1: 1st quartile	92.7%
2: 2nd quartile	91.8%
3: 3rd quartile	91.1%
4: 4th quartile	92.0%
Per Capita Income[3 a d] (C_PER_CAP_INC)	
1: 1st quartile	92.5%
2: 2nd quartile	90.6%
3: 3rd quartile	92.2%
4: 4th quartile	92.3%
OTHER INDICATORS	
R6 RESIDENTIAL CARE STATUS[4 a c] (R6DRESID)	
1: R6 Community	91.8%
2: R6 Residential Care Resident not nursing home (SP interview complete)	95.6%
3: R6 Residential Care Resident not nursing home (FQ only)	91.1%
4: R6 nursing home (SP interview complete)	99.2%
5: R6 nursing home (FQ only)	90.3%
7: R1 to R5 Residential Care Resident not nursing home (FQ only)	83.8%
8: R1 to R5 nursing home	90.9%

[1]Based on Information either on the September 30, 2010 CMS 20% Health Insurance Skeleton Eligibility Write-Off (HISKEW) file if the case is in the original sample, or on the September 30, 2014 CMS 20% Enrollment Database (EDB) extract if the case is in the replenishment sample .

[2]Based on county-level information from the September 30, 2014 CMS 5% EDB extract linked to the beneficiary's EDB address.

[3]Based on tract-level information from the 2009-2013 5-year American Community Survey file linked to the beneficiary's EDB address.
[4]Based on responses to items in the Rounds 1 to 5 interviews.
[#]Response rates were computed only for the original sample.
[^] Response rates were computed only for the replenishment sample.
a=retained in classification tree analysis for living SP non-nursing home branch of the original sample
b=retained in classification tree analysis for living SP nursing home branch of the original sample
c=retained in classification tree analysis for deceased SP branch of the original sample
d= retained in classification tree analysis for living SP non-nursing home branch of the replenishment sample
e= retained in classification tree analysis for living SP nursing home branch of the replenishment sample
f= retained in classification tree analysis for deceased SP branch of the replenishment sample
N=6,786 (6,312 respondents and 474 non-respondents)
Variable names used in classification trees shown parenthetically.

Appendix Table 2. Response Rates by Various Indicators: NHATS Round 7 Cohort 2011

Variable & Values		Weighted Response Rate
OVERALL		95.2%
BENEFICIARY INDICATORS		
Age[1] [a]	(H_AGECAT)	
1: 65-69		94.8%
2: 70-74		96.5%
3: 75-79		95.7%
4: 80-84		93.3%
5: 85- 89		93.5%
6: 90+		96.4%
Gender[1]	(H_SEX)	
1: Male		95.2%
2: Female		95.2%
Census Region[1] [a] (S_REGION)		
1: Northeast		93.7%
2: Midwest		96.3%
3: South		95.6%
4: West		94.6%
Census Division[1] [a] [c]	(DIVISION)	
1: New England		93.0%
2: Middle Atlantic		94.0%
3: East North Central		96.7%
4: West North Central		95.8%
5: South Atlantic		94.9%
6: East South Central		96.5%
7: West South Central		96.4%
8: Mountain		95.8%
9: Pacific		94.4%
Census Metro/Micro Area Designation (2013)[2] (S_METMICRO)		
1: Metropolitan area		95.2%
2: Micropolitan area		94.5%
3: Non-metro		96.5%
Health Maintenance Organization Beneficiary[1] (HMOTYPE)		
0: Yes		95.4%
9: No		95.1%
Age First Enrolled in Medicare[1]	(MEDIC_BEG)	
1: Prior to age 65		94.1%
2: At or after age 65		95.3%
R1 RACE ETHNICITY[4] [a]	(RL1DRACEHISP_R)	
1: White, non-Hispanic		95.6%
2: Black, non-Hispanic		94.7%
3: Other, non-Hispanic		95.7%
4: Hispanic		93.2%
5: DK/RF		71.8%
R1 HIGHEST EDUCATIONY[4] [a]	(EL1HIGSTSCHL_R)	
0: Not applicable		95.3%
1: DK/RF		77.5%
2: Below high school		95.2%
3: High school		94.3%
4: Above High school		95.9%

Variable & Values		Weighted Response Rate
TRACT-LEVEL INDICATORS (Quartiles)		
Household Income[3]	(C_AGG_HH_INC)	
1: 1st quartile		95.9%
2: 2nd quartile		95.6%
3: 3rd quartile		95.4%
4: 4th quartile		94.5%
Median Household Income[3]	(C_MED_HH_INC)	
1: 1st quartile		95.8%
2: 2nd quartile		95.2%
3: 3rd quartile		95.9%
4: 4th quartile		93.9%
Median Household Income 65+[3] (C_MED_HH_INC_65)		
1: 1st quartile		94.8%
2: 2nd quartile		95.2%
3: 3rd quartile		95.5%
4: 4th quartile		95.2%
9: Missing		100%
% Households with Adult 65+[3] [a]	(C_PCT_HH_65)	
1: 1st quartile		94.7%
2: 2nd quartile		95.5%
3: 3rd quartile		95.6%
4: 4th quartile		94.8%
% Households in Poverty[3] [a]	(C_PCT_HH_POV)	
1: 1st quartile		95.5%
2: 2nd quartile		95.0%
3: 3rd quartile		94.7%
4: 4th quartile		95.7%
% Households Reporting Public Assistance[3] [a] (C_PCT_HH_PUBASST)		
1: 1st quartile		95.2%
2: 2nd quartile		95.2%
3: 3rd quartile		95.6%
4: 4th quartile		94.7%
% Households Reporting Retirement Income[3] (C_PCT_HH_RETIREINC)		
1: 1st quartile		94.7%
2: 2nd quartile		96.8%
3: 3rd quartile		95.5%
4: 4th quartile		93.8%
% Households Reporting Social Security[3] (C_PCT_HH_SOCSEC)		
1: 1st quartile		95.5%
2: 2nd quartile		94.7%
3: 3rd quartile		94.8%
4: 4th quartile		95.7%

Variable & Values	Weighted Response Rate
COUNTY LEVEL INDICATORS	
% Black 65+ (deciles)[2 a] (PCTBLK)	
0: 1st decile	95.1%
1: 2nd decile	96.3%
2: 3rd decile	94.2%
3: 4th decile	96.6%
4: 5th decile	93.2%
5: 6th decile	95.0%
6: 7th decile	95.0%
7: 8th decile	96.2%
8: 9th decile	96.3%
9: 10th decile	93.5%
% Hispanic 65+ (deciles)[2 a c] (PCTHISP)	
0: 1st decile	96.8%
1: 2nd decile	96.2%
2: 3rd decile	95.2%
3: 4th decile	94.7%
4: 5th decile	94.2%
5: 6th decile	94.1%
6: 7th decile	98.2%
7: 8th decile	92.6%
8: 9th decile	95.0%
9: 10th decile	94.8%
% Poverty (deciles)[2 a] (PCTPOV)	
0:1st decile	95.6%
1: 2nd decile	96.1%
2: 3rd decile	93.4%
3: 4th decile	94.6%
4: 5th decile	96.1%
5: 6th decile	94.4%
6: 7th decile	95.0%
7: 8th decile	96.8%
8:9th decile	95.6%
9: 10th decile	94.0%

Variable & Values	Weighted Response Rate
TRACT-LEVEL INDICATORS (Quartiles)	
% Households Reporting SSI[3 a] (C_PCT_HH_SSS)	
1: 1st quartile	95.6%
2: 2nd quartile	94.4%
3: 3rd quartile	95.2%
4: 4th quartile	95.7%
% Households Owning Their Home[3] (C_PCT_OWNHOME)	
1: 1st quartile	96.6%
2: 2nd quartile	95.1%
3: 3rd quartile	94.1%
4: 4th quartile	95.5%
% Households 65+ Owning Their Home[3] (C_PCT_OWNHOME_65)	
1: 1st quartile	95.2%
2: 2nd quartile	94.6%
3: 3rd quartile	94.9%
4: 4th quartile	96.0%
% Households 65+ Below Poverty[3 a] (C_PCT_POV_65)	
1: 1st quartile	95.1%
2: 2nd quartile	95.6%
3: 3rd quartile	95.0%
4: 4th quartile	95.0%
Per Capita Income[3 a] (C_PER_CAP_INC)	
1: 1st quartile	95.8%
2: 2nd quartile	95.3%
3: 3rd quartile	95.7%
4: 4th quartile	94.3%
OTHER INDICATORS	
R6 RESIDENTIAL CARE STATUS[4 c] (R6DRESID)	
1: R6 Community	95.1%
2: R6 Residential Care Resident not nursing home (SP interview complete)	96.2%
3: R6 Residential Care Resident not nursing home (FQ only)	93.7%
4: R6 nursing home (SP interview complete)	98.9%
5: R6 nursing home (FQ only)	98.4%
7: R1-R5 Residential Care Resident not nursing home (FQ only)	94.9%
8: R1- R5 nursing home	95.8%

[1]Based on Information on the September 30, 2010 CMS 20% Health Insurance Skeleton Eligibility Write-Off (HISKEW) file.
[2]Based on county-level information from the September 30, 2014 CMS 5% EDB extract linked to the beneficiary's EDB address.
[3]Based on tract-level information from the 2009-2013 5-year American Community Survey file linked to the beneficiary's EDB address.
[4]Based on responses to items in the Rounds 1 and 6 interviews.
a=retained in classification tree analysis for living SP non-nursing home branch
b=retained in classification tree analysis for living SP nursing home branch
c=retained in classification tree analysis for deceased SP branch
N=3,394 (3,229 respondents and 165 non-respondents)
Variable names used in classification trees shown parenthetically.

Appendix Table 3. Sampled Person Interview Response Rates Among Cases with Completed Facility Questionnaires, by Various Indicators: NHATS Round 7 2015 Cohort

Variable & Values		Weighted Response Rate
OVERALL		69.2%
BENEFICIARY INDICATORS		
Age[1]	(H_AGECAT_R5)	
1: 65-69		61.1%
2: 70-74		62.1%
3: 75-79		70.7%
4: 80-84		72.0%
5: 85- 89		70.4%
6: 90+		69.3%
R5 Race Ethnicity[8]	(RL5DRACEHISP_R)	
1: White, non-Hispanic		74.2%
2: Black, non-Hispanic		73.2%
3: Other, non-Hispanic		40.3%
4: Hispanic		59.1%
5: DK/RF		15.5%
Gender[1]	(H_SEX)	
1: Male		68.9%
2: Female		69.3%
Census Region[1]	(S_REGION)	
1: Northeast		62.4%
2: Midwest		69.1%
3: South		75.3%
4: West		66.5%
Census Division[1 r]	(DIVISION)	
1: New England		61.8%
2: Middle Atlantic		62.8%
3: East North Central		66.9%
4: West North Central		71.1%
5: South Atlantic		72.3%
6: East South Central		87.8%
7: West South Central		73.6%
8: Mountain		84.5%
9: Pacific		63.0%
Census Metro/Micro Area Designation (2013)[1]	(S_METMICRO)	
1: Metropolitan area		69.4%
2: Micropolitan area		60.8%
3: Non-metro		80.5%
Health Maintenance Organization Beneficiary[1]	(HMOTYPE)	
0: Yes		63.9%
9: No		71.3%
Age First Enrolled in Medicare[1]	(MEDIC_BEG)	
1: Prior to age 65		60.2%
2: At or after age 65		70.3%

Variable & Values		Weighted Response Rate
COUNTY LEVEL INDICATORS		
% Black 65+ (deciles)[2]	(PCTBLK)	
0: 1st decile		70.9%
1: 2nd decile		69.1%
2: 3rd decile		63.1%
3: 4th decile		66.8%
4: 5th decile		72.1%
5: 6th decile		62.4%
6: 7th decile		72.3%
7: 8th decile		74.2%
8: 9th decile		76.0%
9: 10th decile		71.8%
% Hispanic 65+ (deciles)[2]	(PCTHISP)	
0: 1st decile		79.6%
1: 2nd decile		72.0%
2: 3rd decile		72.3%
3: 4th decile		77.1%
4: 5th decile		80.0%
5: 6th decile		59.5%
6: 7th decile		63.6%
7: 8th decile		74.3%
8: 9th decile		51.5%
9: 10th decile		67.2%
% Poverty (deciles)[2 o]	(PCTPOV)	
0: 1st decile		62.5%
1: 2nd decile		63.6%
2: 3rd decile		67.4%
3: 4th decile		73.2%
4: 5th decile		71.9%
5: 6th decile		83.6%
6: 7th decile		67.3%
7: 8th decile		66.5%
8: 9th decile		71.7%
9: 10th decile		79.2%
OTHER INDICATORS		
Facility Type Indicator[3]	(FQ7DLOCSP)	
1: Independent living/other		73.5%
2: Assisted Living		70.7%
3: Special care/memory care/Alzheimers unit		53.2%
4: Nursing home		61.5%
8:		100.0%
R1 RESIDENTIAL CARE STATUS[4 # o]	(R1DRESID_R)	
1: Community		84.2%
2: Residential Care Resident not nursing home		56.0%

Variable & Values		Weighted Response Rate
OTHER INDICATORS		
R2 NURSING HOME STATUS[5] #	(R2NH)	
1: Yes		71.6%
2: No		75.0%
R3 NURSING HOME STATUS[6] #	(R3NH)	
1: Yes		42.3%
2: No		76.8%
R4 NURSING HOME STATUS[7] #	(R4NH)	
1: Yes		49.4%
2: No		77.6%
R5 NURSING HOME STATUS[8]	(R5NH)	
1: Yes		47.7%
2: No		70.4%
R6 NURSING HOME STATUS[9]	(R6NH)	
1: Yes		58.4%
2: No		70.7%
R7 NURSING HOME STATUS[10] o r	(R7NH)	
1: Yes		61.2%
2: No		71.6%

Variable & Values		Weighted Response Rate
R2 RESIDENTIAL CARE STATUS[5] #	(R2DRESID_R)	
1: Community in R2		84.2%
2: Residential care in R2		61.1%
3: Nursing home in R2		71.6%
R3 RESIDENTIAL CARE STATUS[6] #	(R3DRESID_R)	
1: Community in R3		87.2%
2: Residential care in R3		63.0%
3: Nursing home in R3		42.3%
R4 RESIDENTIAL CARE STATUS[7] #	(R4DRESID_R)	
1: Community in R4		87.9%
2: Residential care in R4		67.5%
3: Nursing home in R4		49.4%
R5 RESIDENTIAL CARE STATUS[8] o	(R5DRESID_R)	
1: Community in R5		84.9%
2: Residential care in R5		60.9%
3: Nursing home in R5		47.7%
R6 RESIDENTIAL CARE STATUS[9]	(R6DRESID_R)	
1: Community in R6		83.9%
2: Residential care in R6		65.3%
3: Nursing home in R6		58.4%
R7 RESIDENTIAL CARE STATUS[10]	(R7DRESID_R)	
2: Residential care in R7		71.6%
3: Nursing home in R7		61.2%

[1]Based on Information either on the September 30, 2010 CMS 20% Health Insurance Skeleton Eligibility Write-Off (HISKEW) file if the case is in the original sample, or on the September 30, 2014 CMS 20% Enrollment Database (EDB) extract if the case is in the replenishment sample .

[2]Based on county-level information from the September 30, 2014 CMS 5% EDB extract linked to the beneficiary's EDB address.

[3]Based on the responses to two items on the type of facility from the FQ, FQ6 (fq6facdescri; including answers from FQ6A) and FQ10 (fq6faaretype).

[4]Based on responses to items in the Round 1 interview or interview process.

[5]Based on responses to items in the Round 2 interview or interview process.

[6]Based on responses to items in the Round 3 interview or interview process.

[7]Based on responses to items in the Round 4 interview or interview process.

[8]Based on responses to items in the Round 5 interview or interview process.

[9]Based on responses to items in the Round 6 interview or interview process.

[10]Based on responses to items in the Round 7 interview or interview process.

[#]Response rates were computed only for the available original sample.

[^] Response rates were computed only for the available replenishment sample.

o=retained in classification tree analysis for adjustment of missing SP interview of the original sample.

r=retained in classification tree analysis for adjustment of missing SP interview of the replenishment sample.

N=566 (408 respondents and 158 nonrespondents); Variable names used in classification trees shown parenthetically.

Appendix Table 4. Sampled Person Interview Response Rates Among Cases with Completed Facility Questionnaires, by Various Indicators: NHATS Round 7 2011 Cohort

Variable & Values		Weighted Response Rate
OVERALL		75.3%
BENEFICIARY INDICATORS		
Age[1]	(H_AGECAT)	
1: 65-69		71.2%
2: 70-74		80.2%
3: 75-79		77.5%
4: 80-84		77.4%
5: 85- 89		67.9%
6: 90+		75.4%
R1 Race Ethnicity[4]	(RL1DRACEHISP_R)	
1: White, non-Hispanic		77.6%
2: Black, non-Hispanic		77.2%
3: Other, non-Hispanic		46.1%
4: Hispanic		60.4%
5: DK/RF		0.0%
Gender[1]	(H_SEX)	
1: Male		74.9%
2: Female		75.5%
Census Region[1]	(S_REGION)	
1: Northeast		59.5%
2: Midwest		76.5%
3: South		84.0%
4: West		77.3%
Census Division[1]	(DIVISION)	
1: New England		66.9%
2: Middle Atlantic		56.9%
3: East North Central		72.6%
4: West North Central		80.1%
5: South Atlantic		80.1%
6: East South Central		91.0%
7: West South Central		86.9%
8: Mountain		74.6%
9: Pacific		77.9%
Census Metro/Micro Area Designation (2013)[2]	(S_METMICRO)	
1: Metropolitan area		76.0%
2: Micropolitan area		64.9%
3: Non-metro		79.7%
Health Maintenance Organization Beneficiary[1]	(HMOTYPE)	
0: Yes		69.8%
9: No		77.0%
Age First Enrolled in Medicare[1]	(MEDIC_BEG)	
1: Prior to age 65		71.9%
2: At or after age 65		75.8%

Variable & Values		Weighted Response Rate
COUNTY LEVEL INDICATORS		
% Black 65+ (deciles)[2]	(PCTBLK)	
0: 1st decile		68.9%
1: 2nd decile		82.9%
2: 3rd decile		75.8%
3: 4th decile		71.6%
4: 5th decile		84.2%
5: 6th decile		52.7%
6: 7th decile		81.7%
7: 8th decile		78.6%
8: 9th decile		75.4%
9: 10th decile		87.5%
% Hispanic 65+ (deciles)[2]	(PCTHISP)	
0: 1st decile		78.4%
1: 2nd decile		83.8%
2: 3rd decile		84.0%
3: 4th decile		82.7%
4: 5th decile		81.1%
5: 6th decile		60.6%
6: 7th decile		56.7%
7: 8th decile		77.3%
8: 9th decile		73.6%
9: 10th decile		78.4%
% Poverty (deciles)[2]*	(POVERTY_PCT)	
0: 1st decile		62.1%
1: 2nd decile		66.8%
2: 3rd decile		80.6%
3: 4th decile		76.3%
4: 5th decile		73.5%
5: 6th decile		87.1%
6: 7th decile		78.2%
7: 8th decile		74.5%
8: 9th decile		88.5%
9: 10th decile		88.3%
OTHER INDICATORS		
Facility Type Indicator[3]	(FQ7DLOCSP)	
1: Independent living/other		78.2%
2: Assisted Living		79.7%
3: Special care/memory care/Alzheimers unit		58.0%
4: Nursing home		70.3%
R1 RESIDENTIAL CARE STATUS[4]*	(R1DRESID_R)	
1: Community		84.8%
2: Residential Care Resident not nursing home		56.3%

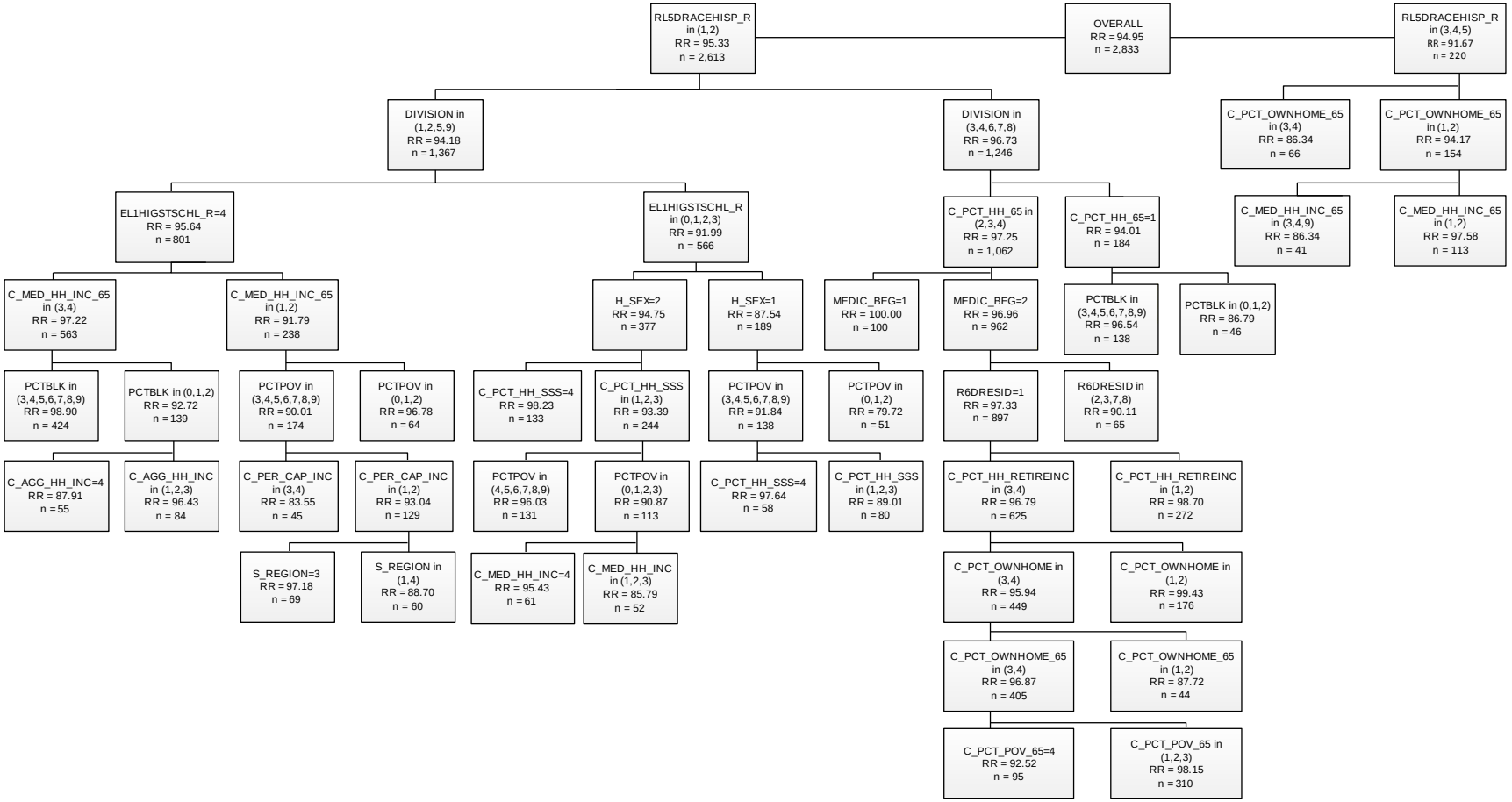
Variable & Values		Weighted Response Rate
OTHER INDICATORS		
R2 NURSING HOME STATUS[5]	(R2NH)	
1: Yes		71.4%
2: No		75.4%
R3 NURSING HOME STATUS[6]	(R3NH)	
1: Yes		40.9%
2: No		77.3%
R4 NURSING HOME STATUS[7]	(R4NH)	
1: Yes		49.4%
2: No		78.2%
R5 NURSING HOME STATUS[8]	(R5NH)	
1: Yes		47.4%
2: No		79.3%
R6 NURSING HOME STATUS[9]	(R6NH)	
1: Yes		62.3%
2: No		78.4%
R7 NURSING HOME STATUS[9] *	(R7NH)	
1: Yes		70.2%
2: No		77.6%

Variable & Values		Weighted Response Rate
OTHER INDICATORS		
R2 RESIDENTIAL CARE STATUS[5]	(R2DRESID_R)	
1: Community in R2		85.0%
2: Residential care in R2		61.1%
3: Nursing home in R2		71.4%
R3 RESIDENTIAL CARE STATUS[6]	(R3DRESID_R)	
1: Community in R3		87.9%
2: Residential care in R3		63.3%
3: Nursing home in R3		40.9%
R4 RESIDENTIAL CARE STATUS[7]	(R4DRESID_R)	
1: Community in R4		88.7%
2: Residential care in R4		67.8%
3: Nursing home in R4		49.4%
R5 RESIDENTIAL CARE STATUS[8] *	(R5DRESID_R)	
1: Community in R5		92.1%
2: Residential care in R5		70.3%
3: Nursing home in R5		47.4%
R6 RESIDENTIAL CARE STATUS[9]	(R6DRESID_R)	
1: Community in R6		92.1%
2: Residential care in R6		72.7%
3: Nursing home in R6		62.3%
R7 RESIDENTIAL CARE STATUS[9]	(R7DRESID_R)	
2: Residential care in R6		77.6%
3: Nursing home in R6		70.2%

[1]Based on Information on the September 30, 2010 CMS 20% Health Insurance Skeleton Eligibility Write-Off (HISKEW) file.
[2]Based on county-level information from the September 30, 2014 CMS 5% EDB extract linked to the beneficiary's EDB address.
[3]Based on the responses to two items on the type of facility from the FQ, FQ6 (fq6facdescri; including answers from FQ6A) and FQ10 (fq6faaretype).
[4]Based on responses to items in the Round 1 interview or interview process.
[5]Based on responses to items in the Round 2 interview or interview process.
[6]Based on responses to items in the Round 3 interview or interview process.
[7]Based on responses to items in the Round 4 interview or interview process.
[8]Based on responses to items in the Round 5 interview or interview process.
[9]Based on responses to items in the Round 6 interview or interview process.
[10]Based on responses to items in the Round 7 interview or interview process.

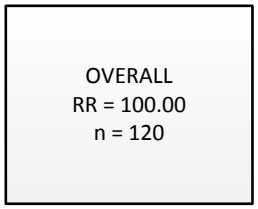
*=retained in classification tree analysis for adjustment of missing SP interview.
N=348 (258 respondents and 90 nonrespondents); Variable names used in classification trees shown parenthetically.

Figure 1. Round 7 2015 Cohort Tracker weight nonresponse adjustment cells – non nursing home cases in original sample



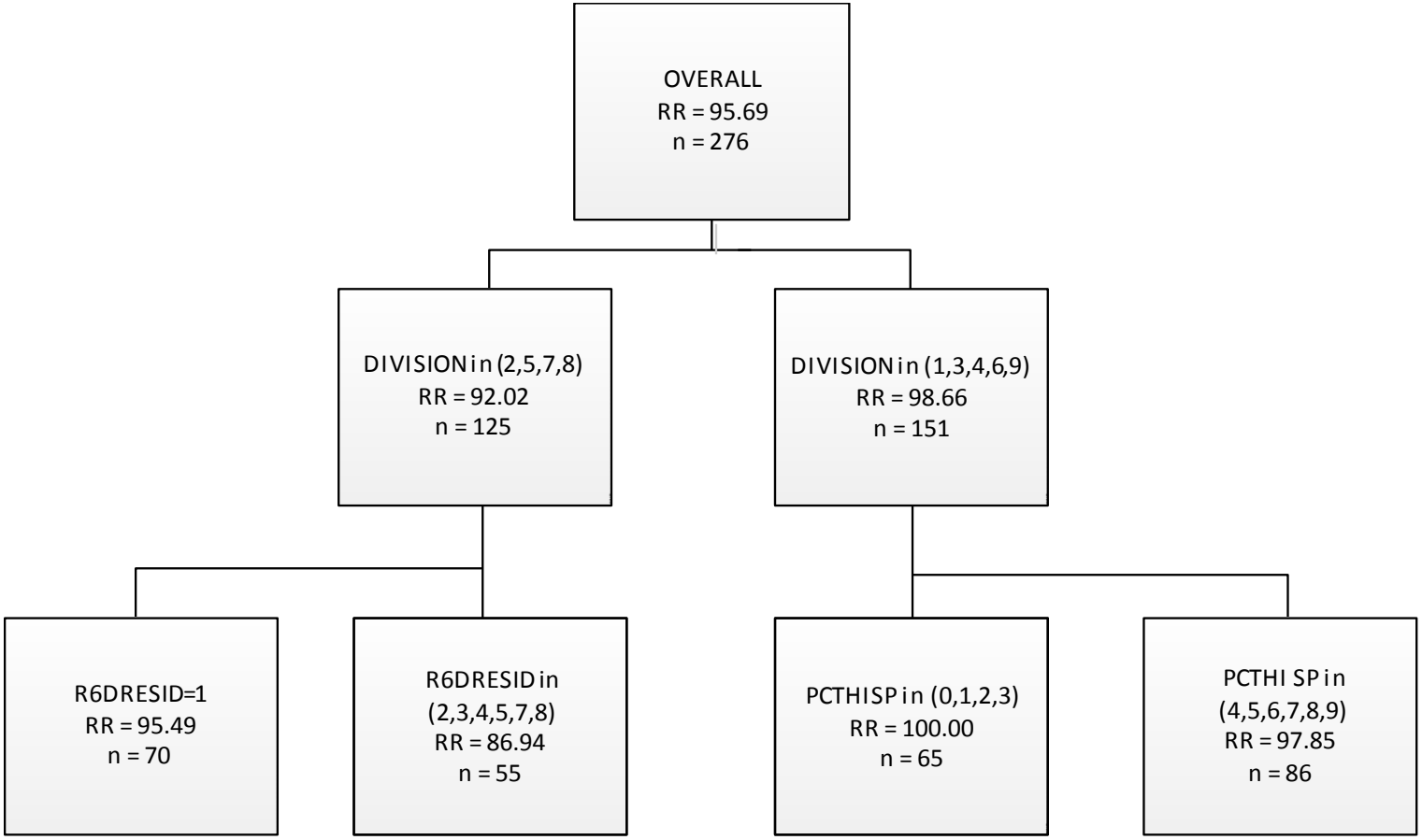
Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 2. Round 7 2015 Cohort Tracker weight nonresponse adjustment cells – nursing home cases in original sample



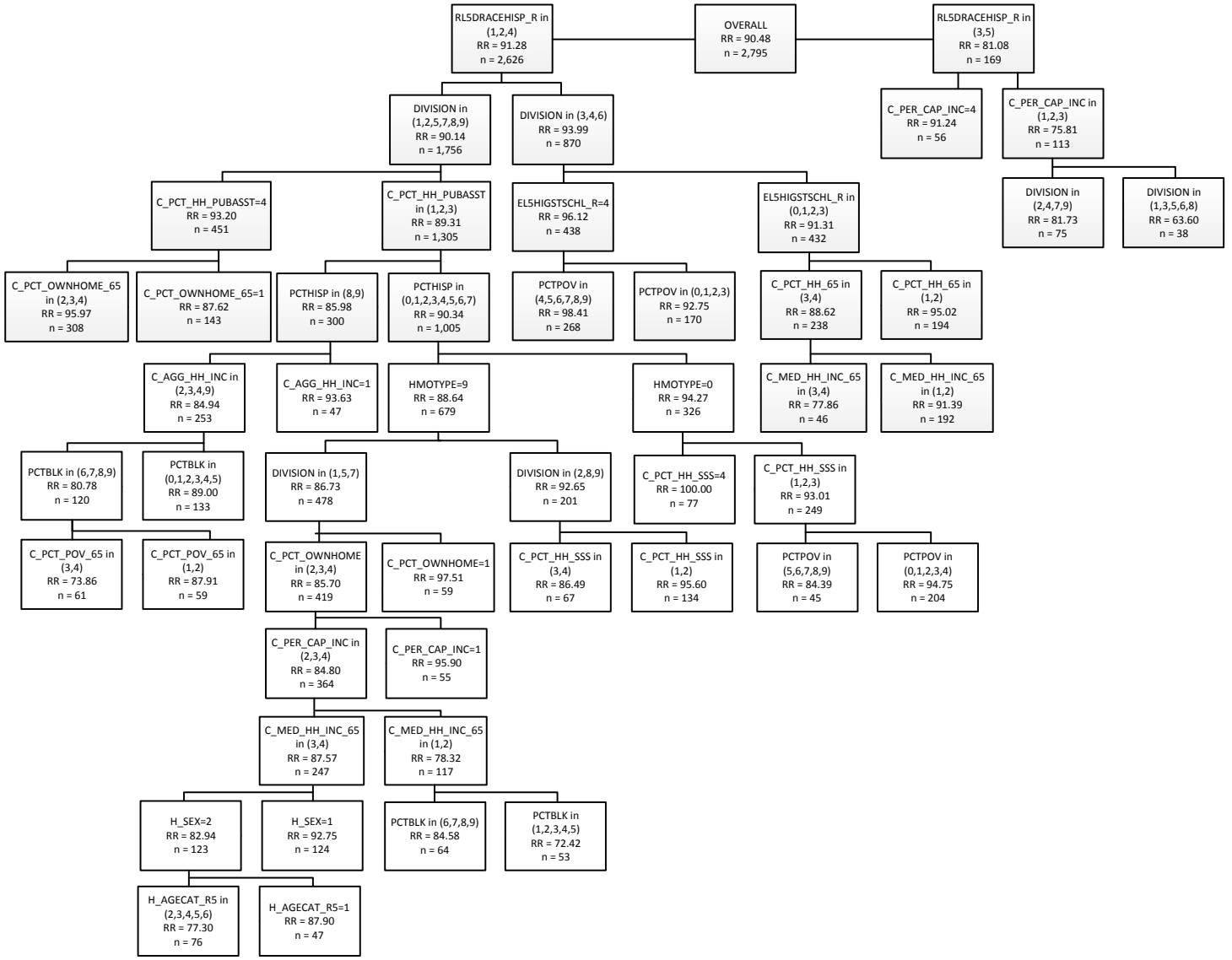
Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 3. Round 7 2015 Cohort Tracker weight nonresponse adjustment cells – deceased cases in original sample



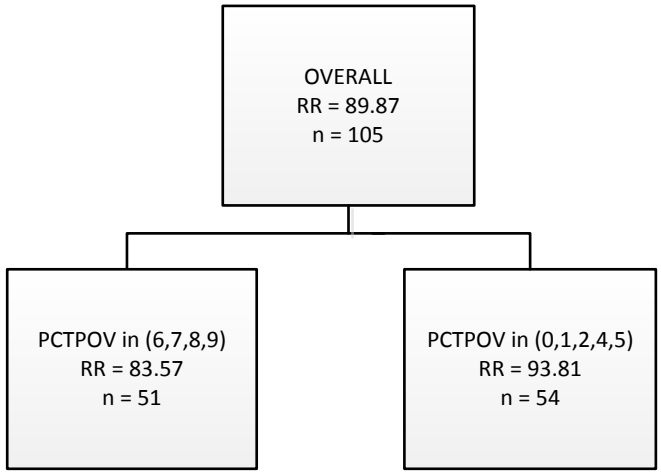
Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 4. Round 7 2015 Cohort Tracker weight nonresponse adjustment cells – non nursing home cases in replenishment sample



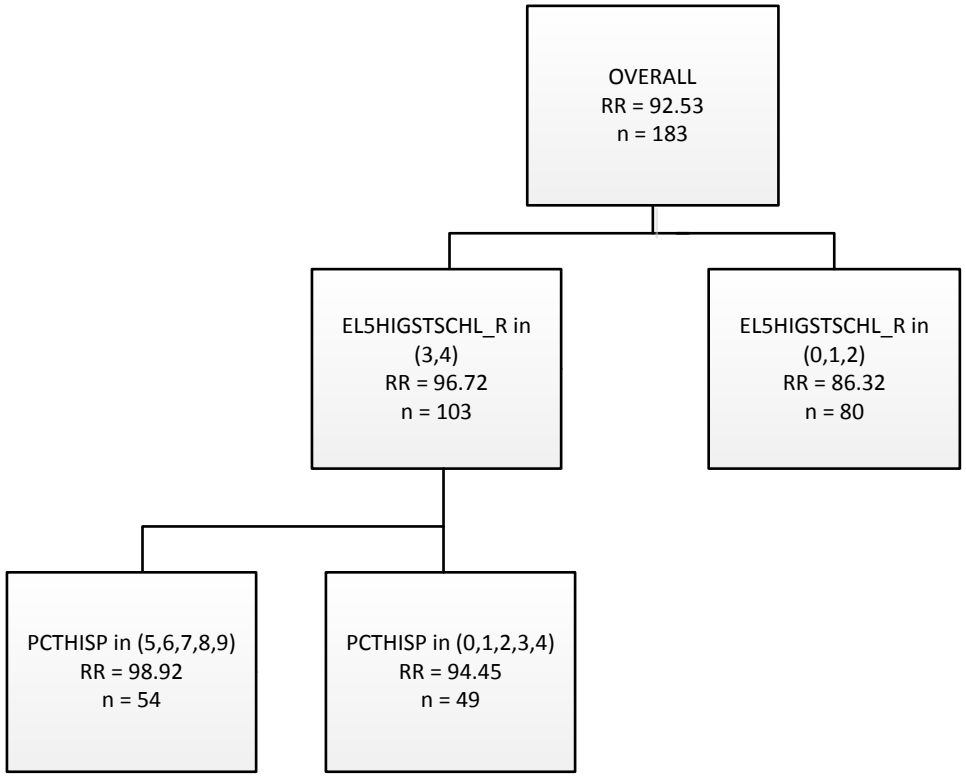
Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 5. Round 7 2015 Cohort Tracker weight nonresponse adjustment cells – nursing home cases in replenishment sample



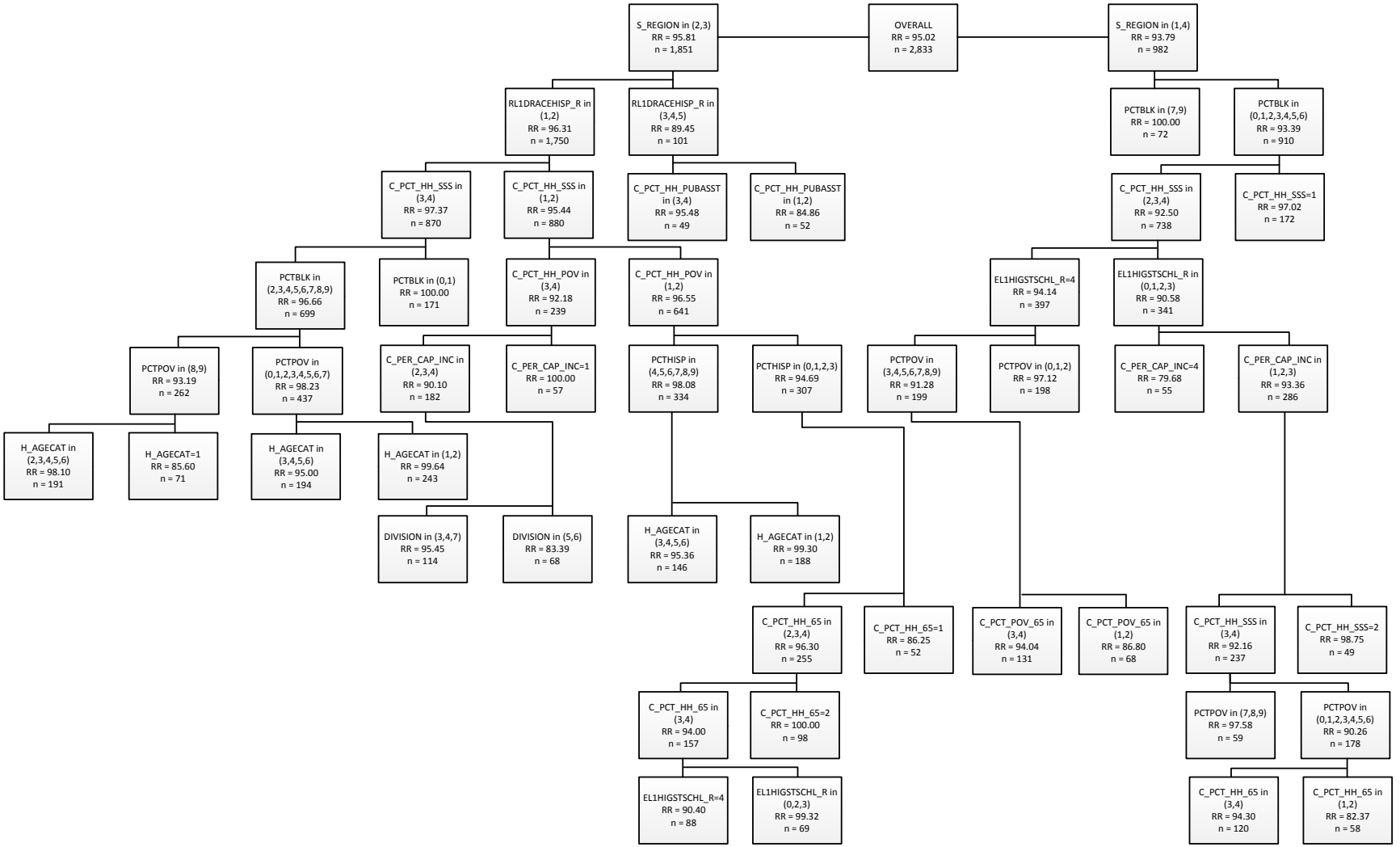
Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 6. Round 7 2015 Cohort Tracker weight nonresponse adjustment cells – deceased cases in replenishment sample



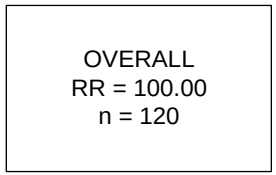
Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 7. Round 7 2011 Cohort Tracker weight nonresponse adjustment cells – non nursing home cases in original sample



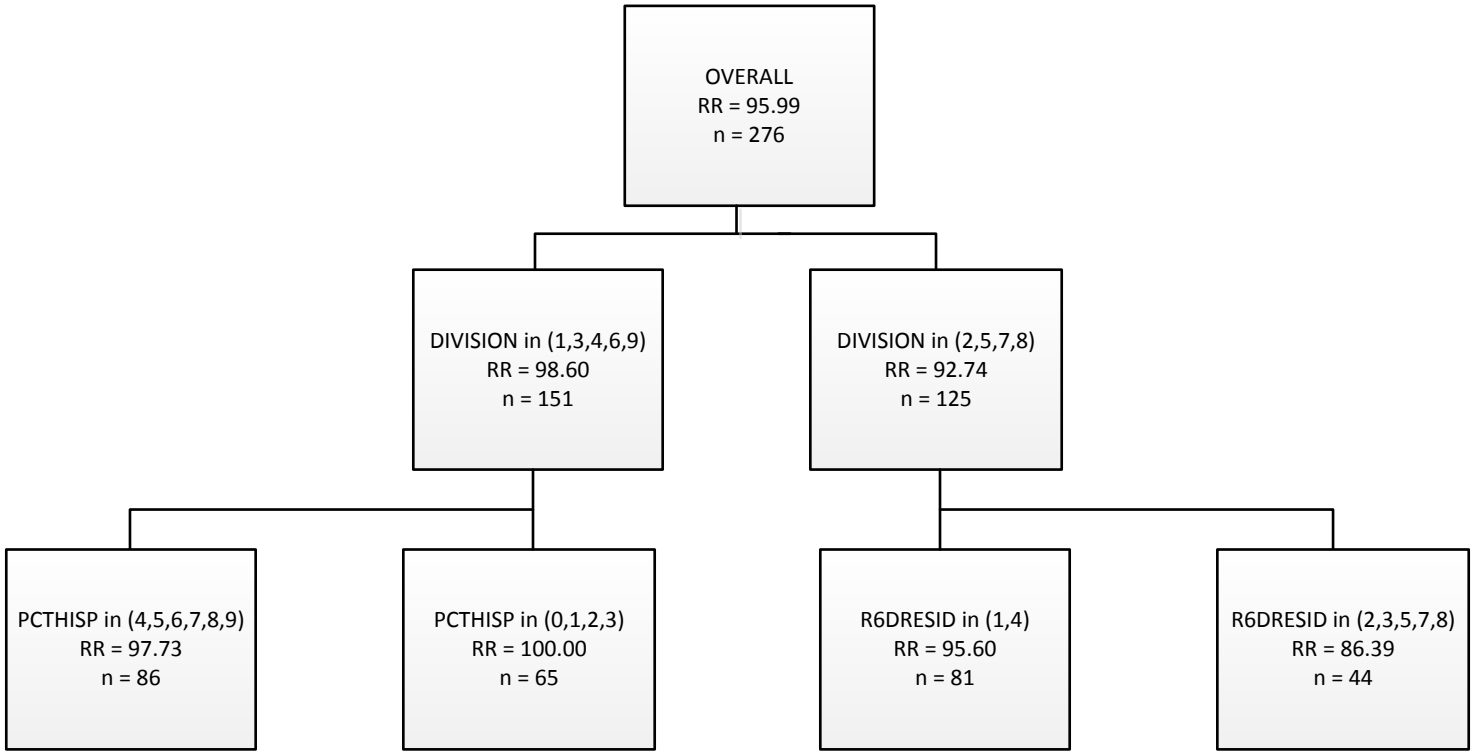
Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 8. Round 7 2011 Cohort Tracker weight nonresponse adjustment cells – nursing home cases in original sample



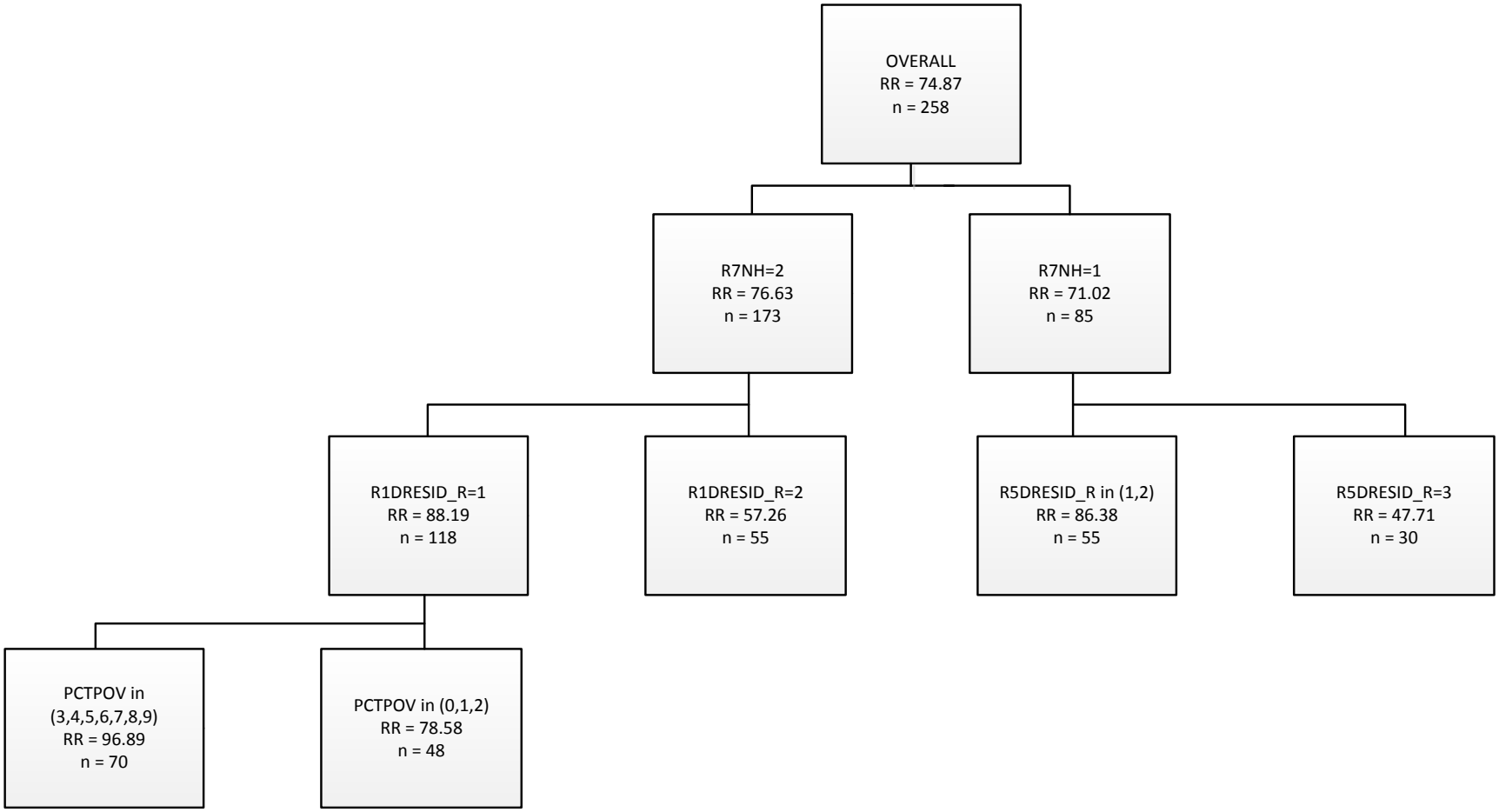
Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 9. Round 7 2011 Cohort Tracker weight nonresponse adjustment cells – deceased cases in original sample



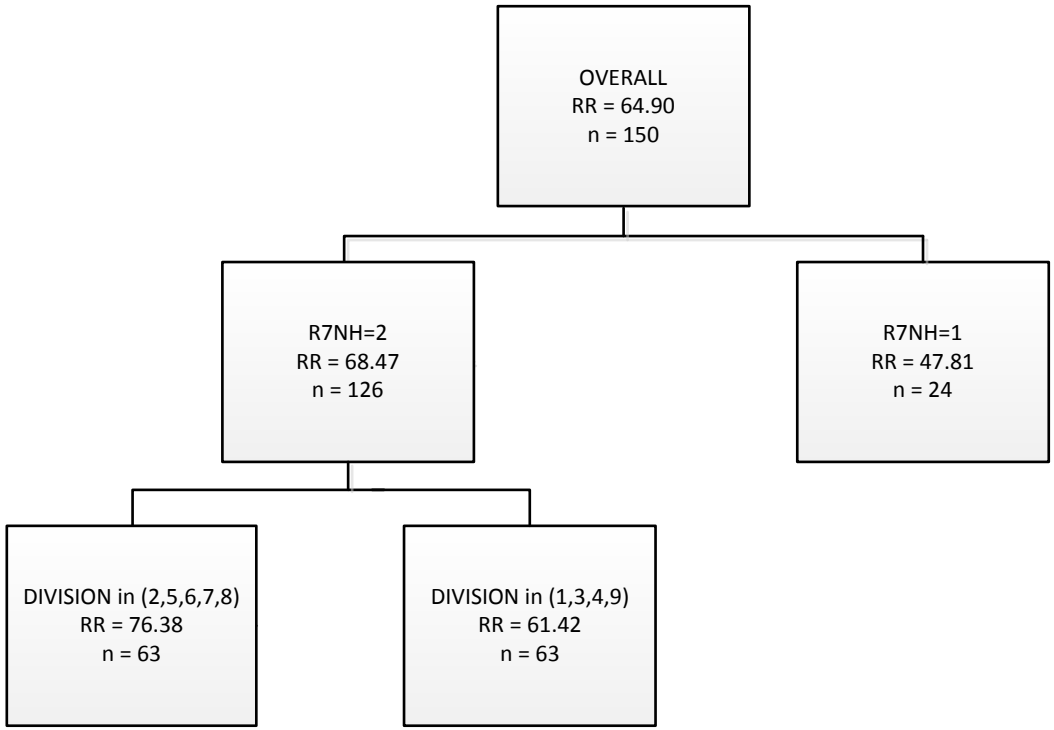
Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 10. Round 7 2015 Cohort Analytic weight nonresponse adjustment cells – original sample residential care (not nursing home) and nursing home cases with both an SP and FQ interview



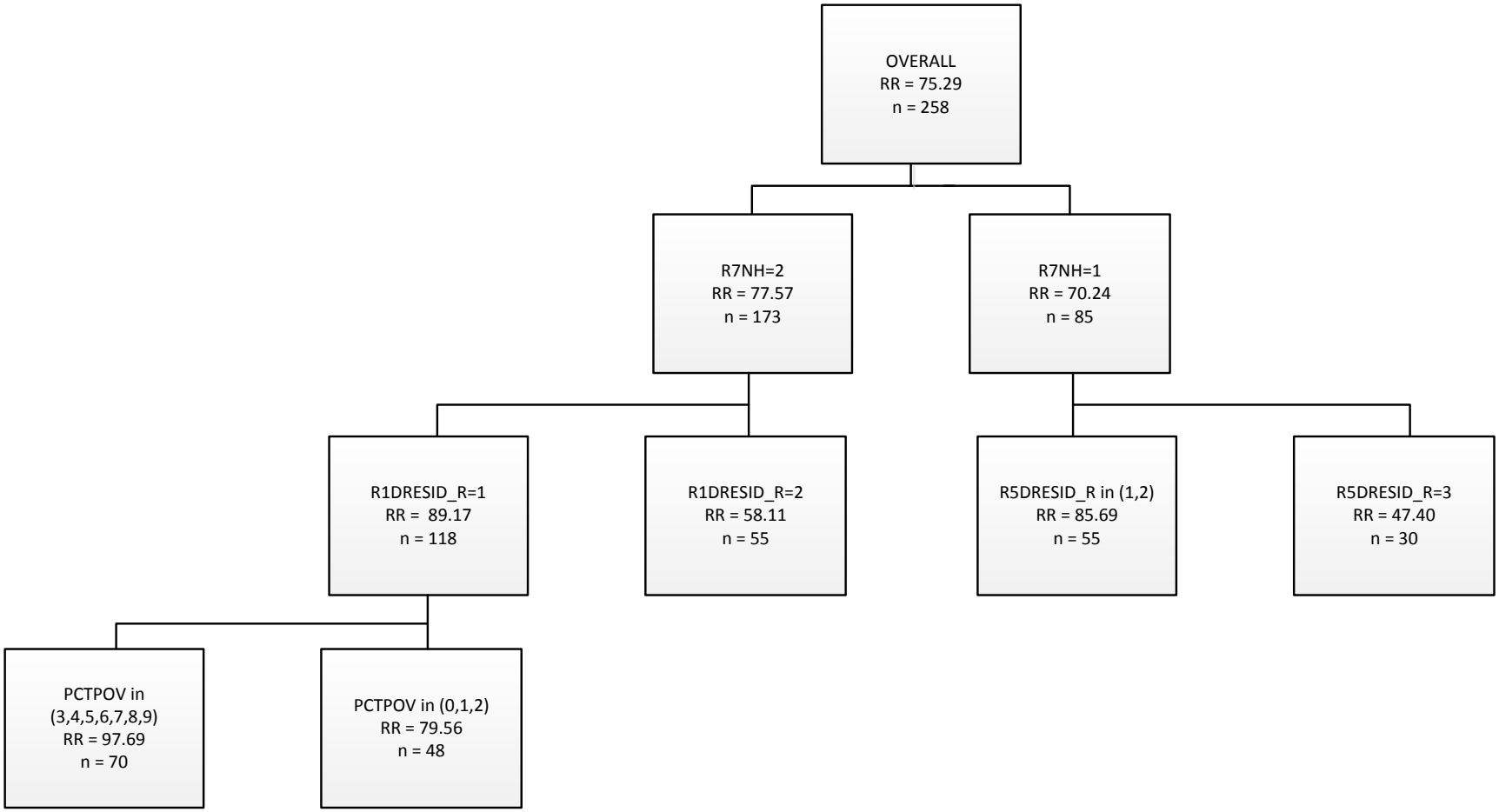
Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 11. Round 7 2015 Cohort Analytic weight nonresponse adjustment cells – replenishment sample residential care (not nursing home) and nursing home cases with both an SP and FQ interview



Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 12. Round 7 2011 Cohort Analytic weight nonresponse adjustment cells –original sample residential care (not nursing home) and nursing home cases with both an SP and FQ interview



Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell