NATIONAL HEALTH AND AGING TRENDS STUDY (NHATS)
Development of Round 11 Survey Weights

November 2022

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 11, as for Rounds 5 through 10, 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 11 public use file account for differential probabilities of selection and adjust for potential bias related to unit nonresponse to the Round 1 through 11 interviews.

As in prior rounds, for Round 11 of NHATS, two types of sampling weights have been produced (for each cohort): a tracker weight (on the Tracker file with the variable names w11trfinwgt0 and w11tr2011wgt0) and an analytic weight (on the Sample Person file with the variable names w11anfinwgt0 and w11an2011wgt0). For variance estimation (see Section 7), NHATS has also included replicate versions of these weights (w11trfinwgt1-w11trfinwgt56 and w11anfinwgt1-w11anfinwgt56 for the 2015 Cohort; w11tr2011wgt1-w11tr2011wgt56 and w11an2011wgt1-w11an2011wgt56 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. For additional information on application of weights and variance estimation in NHATS analyses, see *Accounting for Sample Design in NHATS and NSOC Analyses: Frequently Asked Questions* (Freedman et al. 2020).

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 11 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 11 Tracker weight, only cases that were eligible as of September 30, 2014, and were classified in Round 11 as Respondents (including cases for whom a Round 11 Last Month of Life (LML) interview was completed) or Ineligible are assigned a positive weight (n=6,635). 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 11 interviews after they were selected, either due to death prior to their interview or due to moving outside the contiguous U.S., also have positive Round 11 Tracker weights

For the 2015 Cohort Round 11 Analytic weight, only Respondents (codes 60, 61, 62, 63; n=3,753) 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 11 Tracker weight, only original sample cases classified as Respondents and Ineligible are assigned a positive weight (N = 5,688). 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 11 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 11. Replenishment sample cases added in 2015 do not have positive 2011 Cohort Round 11 Tracker weights.

For the 2011 Cohort Round 11 Analytic weight, only original sample Respondents (codes 60, 61, 62, 63; n=1,909) 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 11 NHATS Sample for Weight Development Purposes

Disposition code	N	Classification for Tracker Weight	Classification for Analytic Weight	N	Classification for Tracker Weight	Classification for Analytic Weight
		Original Sample			**Replenishment Sample**	
60 Complete, community	1,517	Respondent	Respondent	1,568	Respondent	Respondent
60-Complete, NH or residential care	173	Respondent	Respondent	97	Respondent	Respondent
61 Complete, NH facility	8	Respondent	Respondent	6	Respondent	Respondent
62 Complete, SP deceased, proxy interview	191	Deceased respondent[+]	Respondent[+]	160	N/A	N/A
63 Complete SP, FQ not complete	20	Respondent	Respondent	13	Respondent	Respondent
64 Complete FQ, SP not complete	37	Respondent	Nonrespondent	27	Respondent	Nonrespondent
75 Physically/mentally unable to participate, no proxy	3	Nonrespondent	Nonrespondent	3	Nonrespondent	Nonrespondent
76 Too ill to participate, no proxy	15	Nonrespondent	Nonrespondent	12	Nonrespondent	Nonrespondent
77 Refusal, Sample Person	36	Nonrespondent	Nonrespondent	41	Nonrespondent	Nonrespondent
78 Language barrier	0	Nonrespondent	Nonrespondent	1	Nonrespondent	Nonrespondent
79 Unable to locate	1	Eligibility unknown[++]	Eligibility unknown[++]	1	Eligibility unknown[++]	Eligibility unknown[++]
80 Unavailable during field period	24	Nonrespondent	Nonrespondent	28	Nonrespondent	Nonrespondent
82 Outside of Primary Sampling Unit	2	Nonrespondent	Nonrespondent	5	Nonrespondent	Nonrespondent
83 Ineligible (moved out of contiguous US)	1	Ineligible	Ineligible	0	Ineligible	Ineligible
85 Refusal, facility	2	Nonrespondent	Nonrespondent	6	Nonrespondent	Nonrespondent
86 Deceased, no proxy	20	Deceased nonrespondent[+]	Nonrespondent[+]	16	N/A	N/A
87 Refusal, proxy	15	Nonrespondent	Nonrespondent	15	Nonrespondent	Nonrespondent
88 Work stopped	0	Nonrespondent	Nonrespondent	0	Nonrespondent	Nonrespondent
89 Final other/specify*	0	Nonrespondent*	Nonrespondent*	0	Nonrespondent*	Nonrespondent*
Not attempted in Round 11						
Deceased in Round 1, 2, 3, or 4	2,127	Ineligible[#]	Ineligible[#]	0	N/A	N/A
Deceased in Round 5, 6, 7, 8, 9, or 10	1,484	Ineligible	Ineligible	1,272	Ineligible	Ineligible
Other Round 1, 2, 3, or 4 ineligible	120	Ineligible[#]	Ineligible[#]	0	N/A	N/A
Other Round 5, 6, 7, 8, 9, or 10 ineligible	10	Ineligible	Ineligible	52	Ineligible	Ineligible
Rounds 1-10 nonrespondent	6,605	Nonrespondent**	Nonrespondent**	3,796	N/A	N/A
Total and number assigned weight	12,411	3,440 (5,688[##])	1,909	7,119	3,195	1,844

[+] 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, Round 6, Round 7, Round 8, Round 9, Round 10, and Round 11 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, Round 7, Round 8, Round 9, Round 10, and Round 11 weights.

**These cases were previously adjusted for in the Round 1, Round 2, Round 3, Round 4, Round 5, Round 6, Round 7, Round 8, Round 9, or Round 10 nonresponse adjustment to the tracker weight; the Round 10 nonresponse adjusted tracker weight was used as input to the Round 11 weighting process, so these cases are not included in the Round 11 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 11 Tracker Weights

2015 Cohort Tracker Weights

To produce the 2015 Cohort Round 11 Tracker weight, two adjustments were made to the Round 10 nonresponse adjusted tracker weight—an adjustment for Round 11 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. Although the response rates for the two samples are converging, there is still enough of a difference to warrant adjusting the two samples separately for Round 11 nonresponse.

Potential variables for creating nonresponse cells for the 2015 Cohort Round 11 Tracker weights came from 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 10 interviews (race/ethnicity, highest education, and residential settings); and
- For the replenishment sample, variables from the NHATS Rounds 5 through 10 interviews (race/ethnicity, highest education, and Rounds 5, 6, 7, 8, 9, and 10 residential settings).

Appendix Table 1 provides weighted response rates (using the 2015 cohort Round 10 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 SAS HPSPLIT 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.

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). The nursing home residents include both Round 1 or Round 5 residents who were not required to complete

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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.

an SP Interview during the recruitment round and new Rounds 2 through 10 nursing home cases who were eligible for the SP interview in Round 11. 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 11 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 10, final nonresponse cells included 12 indicators. For living SPs in the original sample who were living in nursing homes in Round 10, the sample size was too small to form more than just one nonresponse cell. For deceased SPs in the original sample, final nonresponse cells included 2 indicators. Combinations of these variables created 21 nonresponse cells among the original sample in the non-nursing home group, 1 nonresponse cell among the nursing home group, and 3 nonresponse cells for the deceased group (See Appendix Figures 1, 2, and 3, respectively). For living SPs in the replenishment sample who were residing in the community and other residential settings (not nursing homes) in Round 10, final nonresponse cells included 14 indicators. Combinations of these variables created 23 nonresponse cells (See Appendix Figure 4). For living SPs in the replenishment sample who were residing in nursing homes in Round 10, the sample size was small enough to warrant the use of just a single nonresponse cell (See Appendix Figure 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 11 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 11, 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 10, four dimensions were used in this Round 11 raking adjustment[2]:

(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.

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

In addition, as in Rounds 5 through 10, 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 11 Tracker weight applies only to the original sample, and followed the approach used to compute the Rounds 1 through 10 Tracker weights. This process began with the Round 10 nonresponse adjusted tracker weight (prior to raking). This Round 10 weight accounted for differential probabilities of selection and included adjustments for nonresponse to Rounds 1 through 10, but was not raked to the HISKEW[3]. 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. (2016b, 2017, 2018, 2019, 2020, 2021) for information about the specific adjustments applied in Rounds 2 through 10, respectively.

To produce the 2011 Cohort Round 11 Tracker weight, two adjustments were made to the Round 10 nonresponse adjusted tracker weight—an adjustment for Round 11 nonresponse and a raking adjustment to estimated population totals from the EDB. Potential variables for creating nonresponse cells for the 2011 Cohort Round 11 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 10 (race/ethnicity, highest education, and residential settings).

Appendix Table 2 provides weighted response rates (using the Round 10 nonresponse adjusted tracker weights that were the basis for the 2011 Cohort Round 11 Tracker 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 SAS HPSPLIT 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.

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

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[3] 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.

required to complete an SP Interview and new Rounds 2 through 10 nursing home residents who were eligible for the SP interview in Round 11. 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 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 10, final nonresponse cells included 11 indicators; combinations of these variables created 22 nonresponse cells. Among living SPs who were nursing home residents in Round 10, the sample size was too small to form more than one nonresponse cell. For deceased SPs, final non-response cells included 2 indicators, resulting in 3 nonresponse cells (See Appendix Figures 7, 8, and 9).

The final step in creating the 2011 Cohort Round 11 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 11, 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 10, four dimensions were used in this Round 11 raking adjustment[4]:

(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
(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 11 Analytic Weights

As with the tracker weights, separate Round 11 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 11 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 11 who had completed a facility interview but not a Sample Person interview (n=64 for the 2015 Cohort and n=37 for the 2011 Cohort; designated as code 64). Round 11 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 11, thus are not part of the analytic weight nonresponse adjustment). The approach was designed to preserve the tracker weight distributions by Round 11 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=270 for the 2015

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[4] For purposes of raking, age categories refer to age at Round 1 sampling.

Cohort and n=173 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 ten rounds, whereas Round 11 was the seventh contact and attempt at gaining cooperation with the replenishment sample), the two samples were adjusted separately for Round 11 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 were considered for the analytic weight nonresponse adjustments; additionally, three variables that characterize the Round 11 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 11 residence type, the first split in each tree was forced to be Round 11 nursing home status. (All subsequent splitting was based on response propensities.) For the original sample, one variable other than Round 11 nursing home status (designated with "o" in Appendix Table 3) was retained in the final classification tree, resulting in 3 cells (see Appendix Figure 10); for the replenishment sample, no variables other than Round 11 nursing home status (designated with "r" in Appendix Table 3) were retained in the final classification tree, resulting in 2 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.

2011 Cohort Analytic Weights

As with the 2011 Cohort Round 11 Tracker weights, the 2011 Cohort Round 11 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 11 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 11 residence type, the first split was forced to be Round 11 nursing home status. (All subsequent splitting was based on response propensities.) Two variables (designated with "*" in Appendix Table 4) were retained in the final classification tree, forming 3 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.

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 Tracker weights for Rounds 6 through 10 had overall design effects of 1.62, 1.64, 1.65, 1.66, and 1.67, respectively. The nonresponse adjusted Round 11 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; no cases were identified as influential outliers. After the raking adjustment, the design effect for the final 2015 Cohort Round 11 Tracker weights was 1.66.

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 11 Analytic weights was 1.64 overall, and 1.63 for living SPs and 1.71 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, for Round 7 nonresponse, for Round 8 nonresponse, for Round 9 nonresponse, and for Round 10 nonresponse, the overall design effects were 1.32, 1.32, 1.31, 1.30, and 1.29, respectively. After adjusting for Round 11 nonresponse, the overall design effect was 1.26. In order to limit the variation in the weights, after the raking adjustment, the tracker weights were trimmed and then re-raked; six cases with extreme weights were trimmed at this point. After the raking adjustment and trimming, the design effect for the final 2011 Cohort Round 11 Tracker weights was 1.29.

After the adjustments applied in computing the analytic weight (nonresponse adjustment and raking), no cases were identified as influential outliers. After raking, the design effect for the final 2011 Cohort Round 11 Analytic weights was 1.28 overall; and 1.28 for living SPs and 1.24 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 11 Analytic weight reproduces those alive and eligible for NHATS during the Round 10 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 11, a positive Round 11 weight sits in the Tracker file and a zero Round 11 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 11, 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 Rounds 2 through 11 (measured in the SP interview) or who was in a particular type of residential care in Rounds 2 through 11 (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 11, or the characteristics of those living in residential care settings in Round 11 as measured in the Round 11 FQ interview, the Round 11 weight should be used. The former would use the Round 11 Analytic weight and the latter the Round 11 Tracker weight. To estimate characteristics (as of Round 11) of people 65 and older in Round 5, the 2015 Cohort Round 11 weight should be used. To examine associations between a characteristic in Round 11 and a characteristic in Round 1 (or any round prior to Round 5), the 2011 Cohort Round 11 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.

The replication approach that was used in NHATS (Montquila et al. 2012b) 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 11, the final tracker replicate weights are provided in the variables w11trfinwgt1-w11trfinwgt56 for the 2015 Cohort and w11tr2011wgt1- w11tr2011wgt56 for the 2011 Cohort, and the analytic replicate weights are provided in the variables w11anfinwgt1-w11anfinwgt56 for the 2015 Cohort and w11an2011wgt1-w11an2011wgt56 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 *Accounting for Sample Design in NHATS and NSOC Analyses: Frequently Asked Questions* (Freedman et al. 2020).

References

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Appendix: Variables Used in Nonresponse Adjustment for Round 11 NHATS Weights

Appendix Table 1. Response Rates by Various Indicators: NHATS Round 11 2015 Cohort

Variable & Values	Weighted Response Rate	Variable & Values	Weighted Response Rate
OVERALL	94.3%	**TRACT-LEVEL INDICATORS (Quartiles)**	
BENEFICIARY INDICATORS		**Household Income[3][a][d]** (C_AGG_HH_INC)	
Age[1][a][c][d] (H_AGECAT_R5)		1: 1st quartile	92.2%
1: 65-69	94.6%	2: 2nd quartile	94.6%
2: 70-74	96.0%	3: 3rd quartile	94.0%
3: 75-79	93.7%	4: 4th quartile	95.2%
4: 80-84	92.1%	9: Missing	0.0%
5: 85- 89	90.9%	**Median Household Income[3][a]** (C_MED_HH_INC)	
6: 90+	88.3%	1: 1st quartile	92.6%
Gender[1][a][d] (H_SEX)		2: 2nd quartile	93.7%
1: Male	94.7%	3: 3rd quartile	94.6%
2: Female	94.0%	4: 4th quartile	95.7%
Census Region[2][d] (S_REGION)		9: Missing	0.0%
1: Northeast	94.7%	**Median Household Income 65+[3][a]**	
2: Midwest	94.5%	(C_MED_HH_INC_65)	
3: South	94.8%	1: 1st quartile	93.5%
4: West	92.9%	2: 2nd quartile	94.7%
Census Division[2][a][c][d][f] (DIVISION)		3: 3rd quartile	92.9%
1: New England	94.7%	4: 4th quartile	96.0%
2: Middle Atlantic	94.7%	9: Missing	100%
3: East North Central	93.9%	**% Households with Adult 65+[3][d]** (C_PCT_HH_65)	
4: West North Central	95.4%	1: 1st quartile	93.8%
5: South Atlantic	95.3%	2: 2nd quartile	94.3%
6: East South Central	91.9%	3: 3rd quartile	94.4%
7: West South Central	95.4%	4: 4th quartile	94.5%
8: Mountain	93.6%	**% Households in Poverty[3]** (C_PCT_HH_POV)	
9: Pacific	92.8%	1: 1st quartile	96.5%
Census Metro/Micro Area Designation (2013)[2][a][d]		2: 2nd quartile	93.8%
(S_METMICRO)		3: 3rd quartile	93.4%
1: Metropolitan area	94.5%	4: 4th quartile	92.7%
2: Micropolitan area	92.9%	**% Households Reporting Public Assistance[3][d]**	
3: Non-metro	94.9%	(C_PCT_HH_PUBASST)	
Health Maintenance Organization Beneficiary[1]		1: 1st quartile	94.9%
(HMOTYPE)		2: 2nd quartile	95.1%
0: Yes	93.9%	3: 3rd quartile	93.8%
9: No	94.5%	4: 4th quartile	93.2%
Age First Enrolled in Medicare[1] (MEDIC_BEG)		**% Households Reporting Retirement Income[3]**	
1: Prior to age 65	91.4%	(C_PCT_HH_RETIREINC)	
2: At or after age 65	94.6%	1: 1st quartile	93.9%
R5 RACE ETHNICITY[4][d] (RL5DRACEHISP_R)		2: 2nd quartile	93.1%
1: White, non-Hispanic	95.0%	3: 3rd quartile	95.3%
2: Black, non-Hispanic	94.6%	4: 4th quartile	94.6%
3: Other, non-Hispanic	94.0%	**% Households Reporting Social Security[3]**	
4: Hispanic	86.7%	(C_PCT_HH_SOCSEC)	
5: DK/RF	92.8%	1: 1st quartile	94.2%
R5 HIGHEST EDUCATION [4][^] (EL5HIGSTSCHL_R)		2: 2nd quartile	94.2%
0: Not applicable	82.5%	3: 3rd quartile	94.5%
1: DK/RF	93.2%	4: 4th quartile	94.3%
2: Below high school	90.7%		
3: High school	94.9%		
4: Above High school	95.0%		

Variable & Values	Weighted Response Rate	Variable & Values	Weighted Response Rate
R1 HIGHEST EDUCATION[4][#][a] (EL1HIGSTSCHL_R)		**TRACT-LEVEL INDICATORS (Quartiles)**	
0: Not applicable	92.4%	**% Households Reporting SSI[3][a]** (C_PCT_HH_SSS)	
1: DK/RF	100.0%	1: 1st quartile	94.7%
2: Below high school	91.6%	2: 2nd quartile	95.0%
3: High school	93.9%	3: 3rd quartile	94.6%
4: Above High school	95.5%	4: 4th quartile	92.8%
		% Households Owning Their Home[3][d] (C_PCT_OWNHOME)	
COUNTY LEVEL INDICATORS		1: 1st quartile	93.1%
		2: 2nd quartile	91.5%
% Black 65+ (deciles)[2][a][d] (PCTBLK)		3: 3rd quartile	95.4%
0: 1st decile	93.7%	4: 4th quartile	96.2%
1: 2nd decile	94.6%	**% Households 65+ Owning Their Home[3][a][d]** (C_PCT_OWNHOME_65)	
2: 3rd decile	94.9%	1: 1st quartile	93.7%
3: 4th decile	96.2%	2: 2nd quartile	92.7%
4: 5th decile	90.3%	3: 3rd quartile	95.3%
5: 6th decile	95.6%	4: 4th quartile	95.1%
6: 7th decile	93.3%	**% Households 65+ Below Poverty[3]** (C_PCT_POV_65)	
7: 8th decile	95.7%	1: 1st quartile	96.3%
8: 9th decile	94.8%	2: 2nd quartile	93.6%
9: 10th decile	92.7%	3: 3rd quartile	94.8%
		4: 4th quartile	92.9%
% Hispanic 65+ (deciles)[2][d][f] (PCTHISP)		**Per Capita Income[3]** (C_PER_CAP_INC)	
0: 1st decile	93.2%	1: 1st quartile	93.2%
1: 2nd decile	92.3%	2: 2nd quartile	94.0%
2: 3rd decile	93.7%	3: 3rd quartile	93.7%
3: 4th decile	96.4%	4: 4th quartile	95.8%
4: 5th decile	94.9%		
5: 6th decile	95.3%		
6: 7th decile	97.2%	**OTHER INDICATORS**	
7: 8th decile	93.8%	**R10 RESIDENTIAL CARE STATUS[4]** (R10DRESID)	
8: 9th decile	94.7%	1: Community	94.4%
9: 10th decile	90.8%	2: Residential Care Resident not nursing home (SP interview complete)	96.8%
		3: Residential Care Resident not nursing home (FQ only)	67.8%
% Poverty (deciles)[2][a] (PCTPOV)		4: Nursing home (SP interview complete)	94.6%
0: 1st decile	97.2%	5: Nursing home (FQ only)	94.7%
1: 2nd decile	95.2%	7: Residential Care Resident not nursing home in R1 and R5 (FQ only)	80.6%
2: 3rd decile	93.4%	8: Nursing home in R1 and R5 (FQ only)	88.9%
3: 4th decile	93.7%		
4: 5th decile	95.4%		
5: 6th decile	96.7%		
6: 7th decile	92.8%		
7: 8th decile	92.6%		
8: 9th decile	94.7%		
9: 10th decile	89.3%		

[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 10 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=4,063 (3,817 respondents and 246 non-respondents)
Variable names used in classification trees shown parenthetically.

Appendix Table 2. Response Rates by Various Indicators: NHATS Round 11 2011 Cohort

Variable & Values		Weighted Response Rate	Variable & Values		Weighted Response Rate
OVERALL		94.4%	**TRACT-LEVEL INDICATORS (Quartiles)**		
BENEFICIARY INDICATORS			**Household Income**[3][a]	(C_AGG_HH_INC)	
Age[1][a]	(H_AGECAT)		1: 1st quartile		94.5%
1: 65-69		95.7%	2: 2nd quartile		92.5%
2: 70-74		93.6%	3: 3rd quartile		94.8%
3: 75-79		93.7%	4: 4th quartile		95.4%
4: 80-84		94.0%			
5: 85- 89		90.7%	**Median Household Income**[3][a]	(C_MED_HH_INC)	
6: 90+		90.4%	1: 1st quartile		91.7%
Gender[1]	(H_SEX)		2: 2nd quartile		94.1%
1: Male		93.9%	3: 3rd quartile		95.8%
2: Female		94.8%	4: 4th quartile		95.3%
Census Region[1]	(S_REGION)				
1: Northeast		92.1%	**Median Household Income 65+**[3][a]		
2: Midwest		95.0%		(C_MED_HH_INC_65)	
3: South		94.3%	1: 1st quartile		93.0%
4: West		95.9%	2: 2nd quartile		93.5%
Census Division[1][a][c]	(DIVISION)		3: 3rd quartile		94.1%
1: New England		91.2%	4: 4th quartile		96.6%
2: Middle Atlantic		92.6%	9: Missing		100.0%
3: East North Central		95.6%	**% Households with Adult 65+**[3]	(C_PCT_HH_65)	
4: West North Central		94.1%	1: 1st quartile		93.8%
5: South Atlantic		94.2%	2: 2nd quartile		94.9%
6: East South Central		94.0%	3: 3rd quartile		94.1%
7: West South Central		94.7%	4: 4th quartile		94.6%
8: Mountain		98.4%	**% Households in Poverty**[3]	(C_PCT_HH_POV)	
9: Pacific		95.5%	1: 1st quartile		96.2%
Census Metro/Micro Area Designation (2013)[2]			2: 2nd quartile		93.3%
	(S_METMICRO)		3: 3rd quartile		95.2%
1: Metropolitan area		94.8%	4: 4th quartile		92.4%
2: Micropolitan area		92.4%	**% Households Reporting Public Assistance**[3]		
3: Non-metro		93.8%		(C_PCT_HH_PUBASST)	
Health Maintenance Organization Beneficiary[1]			1: 1st quartile		95.2%
	(HMOTYPE)		2: 2nd quartile		95.4%
0: Yes		94.9%	3: 3rd quartile		92.7%
9: No		94.2%	4: 4th quartile		94.0%
Age First Enrolled in Medicare[1]	(MEDIC_BEG)		**% Households Reporting Retirement Income**[3][a]		
1: Prior to age 65		92.3%		(C_PCT_HH_RETIREINC)	
2: At or after age 65		94.6%	1: 1st quartile		93.5%
R1 RACE ETHNICITY[4]	(RL1DRACEHISP_R)		2: 2nd quartile		94.4%
1: White, non-Hispanic		94.8%	3: 3rd quartile		94.6%
2: Black, non-Hispanic		94.4%	4: 4th quartile		94.8%
3: Other, non-Hispanic		96.1%	**% Households Reporting Social Security**[3]		
4: Hispanic		88.8%		(C_PCT_HH_SOCSEC)	
5: DK/RF		93.5%	1: 1st quartile		94.7%
R1 HIGHEST EDUCATION[4][a]	(EL1HIGSTSCHL_R)		2: 2nd quartile		95.5%
0: Not applicable		92.9%	3: 3rd quartile		94.1%
1: DK/RF		100.0%	4: 4th quartile		93.8%
2: Below high school		91.0%			
3: High school		94.2%			
4: Above High school		95.5%			

Variable & Values		Weighted Response Rate
COUNTY LEVEL INDICATORS		
% Black 65+ (deciles)[2][a]	(PCTBLK)	
0: 1st decile		94.9%
1: 2nd decile		95.9%
2: 3rd decile		96.7%
3: 4th decile		92.1%
4: 5th decile		92.2%
5: 6th decile		95.0%
6: 7th decile		96.0%
7: 8th decile		92.6%
8: 9th decile		95.7%
9: 10th decile		93.1%
% Hispanic 65+ (deciles)[2][c]	(PCTHISP)	
0: 1st decile		94.8%
1: 2nd decile		93.7%
2: 3rd decile		94.7%
3: 4th decile		93.9%
4: 5th decile		96.0%
5: 6th decile		95.1%
6: 7th decile		92.6%
7: 8th decile		94.6%
8: 9th decile		93.4%
9: 10th decile		95.8%
% Poverty (deciles)[2][a]	(PCTPOV)	
0:1st decile		96.0%
1: 2nd decile		94.1%
2: 3rd decile		93.7%
3: 4th decile		95.6%
4: 5th decile		92.5%
5: 6th decile		95.7%
6: 7th decile		93.5%
7: 8th decile		95.2%
8: 9th decile		94.9%
9: 10th decile		92.9%

Variable & Values		Weighted Response Rate
TRACT-LEVEL INDICATORS (Quartiles)		
% Households Reporting SSI[3][a]	(C_PCT_HH_SSS)	
1: 1st quartile		94.4%
2: 2nd quartile		95.1%
3: 3rd quartile		95.0%
4: 4th quartile		93.1%
% Households Owning Their Home[3]	(C_PCT_OWNHOME)	
1: 1st quartile		93.2%
2: 2nd quartile		93.4%
3: 3rd quartile		93.7%
4: 4th quartile		96.5%
% Households 65+ Owning Their Home[3][a]	(C_PCT_OWNHOME_65)	
1: 1st quartile		92.7%
2: 2nd quartile		91.3%
3: 3rd quartile		96.5%
4: 4th quartile		96.0%
% Households 65+ Below Poverty[3]	(C_PCT_POV_65)	
1: 1st quartile		96.8%
2: 2nd quartile		94.5%
3: 3rd quartile		95.3%
4: 4th quartile		91.8%
Per Capita Income[3]	(C_PER_CAP_INC)	
1: 1st quartile		91.5%
2: 2nd quartile		94.3%
3: 3rd quartile		95.7%
4: 4th quartile		95.1%
OTHER INDICATORS		
R10 RESIDENTIAL CARE STATUS[4]	(R10DRESID)	
1: Community		94.3%
2: Residential Care Resident not nursing home (SP interview complete)		96.3%
3: Residential Care Resident not nursing home (FQ only)		68.7%
4: Nursing home (SP interview complete)		98.4%
5: Nursing home (FQ only)		100.0%
7: Residential Care Resident not nursing home in R1 and R5 (FQ only)		89.0%
8: Nursing home in R1 and R5 (FQ only)		100.0%

[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 through 10 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=2,064 (1,946 respondents and 118 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 11 2015 Cohort

Variable & Values		Weighted Response Rate	Variable & Values		Weighted Response Rate
OVERALL		80.3%	**COUNTY LEVEL INDICATORS**		
BENEFICIARY INDICATORS			**% Black 65+ (deciles)[2]**	(PCTBLK)	
Age[1]	(H_AGECAT_R5)		0: 1st decile		90.2%
1: 65-69		75.1%	1: 2nd decile		75.5%
2: 70-74		87.0%	2: 3rd decile		85.4%
3: 75-79		86.0%	3: 4th decile		88.1%
4: 80-84		78.2%	4: 5th decile		91.0%
5: 85- 89		72.7%	5: 6th decile		64.9%
6: 90+		78.6%	6: 7th decile		79.5%
R5 Race Ethnicity[8]	(RL5DRACEHISP_R)		7: 8th decile		79.8%
1: White, non-Hispanic		83.1%	8: 9th decile		77.3%
2: Black, non-Hispanic		78.0%	9: 10th decile		68.1%
3: Other, non-Hispanic		71.5%			
4: Hispanic		60.1%			
5: DK/RF		47.0%	**% Hispanic 65+ (deciles)[2]**	(PCTHISP)	
			0: 1st decile		93.2%
Gender[1]	(H_SEX)		1: 2nd decile		93.2%
1: Male		83.3%	2: 3rd decile		67.7%
2: Female		78.7%	3: 4th decile		87.2%
			4: 5th decile		74.5%
Census Region[1]	(S_REGION)		5: 6th decile		82.3%
1: Northeast		75.9%	6: 7th decile		68.5%
2: Midwest		83.3%	7: 8th decile		87.2%
3: South		81.6%	8: 9th decile		74.5%
4: West		79.3%	9: 10th decile		70.1%
Census Division[1] °	(DIVISION)		**% Poverty (deciles)[2]**	(PCTPOV)	
1: New England		79.1%	0: 1st decile		75.9%
2: Middle Atlantic		74.4%	1: 2nd decile		85.2%
3: East North Central		74.3%	2: 3rd decile		76.6%
4: West North Central		93.7%	3: 4th decile		80.0%
5: South Atlantic		80.6%	4: 5th decile		92.5%
6: East South Central		97.3%	5: 6th decile		84.7%
7: West South Central		70.9%	6: 7th decile		88.6%
8: Mountain		74.2%	7: 8th decile		78.8%
9: Pacific		80.0%	8: 9th decile		68.3%
			9: 10th decile		73.1%
Census Metro/Micro Area Designation (2013)[1]	(S_METMICRO)		**OTHER INDICATORS**		
1: Metropolitan area		80.0%	**Facility Type Indicator[3]**	(FQ11DLOCSP)	
2: Micropolitan area		71.4%	1: Independent living/other		86.7%
3: Non-metro		100.0%	2: Assisted Living		86.7%
			3: Special care/memory care/Alzheimers unit		84.9%
Health Maintenance Organization Beneficiary[1]	(HMOTYPE)		4: Nursing home		59.8%
0: Yes		82.7%	8: Not reported		100.0%
9: No		79.6%			
			R1 RESIDENTIAL CARE STATUS[4] #	(R1DRESID_R)	
			1: Community		83.2%
Age First Enrolled in Medicare[1]	(MEDIC_BEG)		2: Residential Care Resident not nursing home		76.1%
1: Prior to age 65		65.9%	**R2 RESIDENTIAL CARE STATUS[4] #**	(R2DRESID_R)	
2: At or after age 65		82.1%	1: Community in R2		83.5%
			2: Residential care in R2		77.4%
			3: Nursing home in R2		57.6%

Variable & Values		Weighted Response Rate	Variable & Values		Weighted Response Rate
OTHER INDICATORS			**R3 RESIDENTIAL CARE STATUS[4] #**	(R3DRESID_R)	
R2 NURSING HOME STATUS[4] #	(R2NH)		1: Community in R3		84.1%
1: Yes		57.6%	2: Residential care in R3		77.4%
2: No		82.1%	3: Nursing home in R3		46.4%
R3 NURSING HOME STATUS[4] #	(R3NH)		**R4 RESIDENTIAL CARE STATUS[4] #**	(R4DRESID_R)	
1: Yes		46.4%	1: Community in R4		83.0%
2: No		82.5%	2: Residential care in R4		81.4%
R4 NURSING HOME STATUS[4] #	(R4NH)		3: Nursing home in R4		51.1%
1: Yes		51.1%	**R5 RESIDENTIAL CARE STATUS[4]**	(R5DRESID_R)	
2: No		82.6%	1: Community in R5		83.9%
R5 NURSING HOME STATUS[4]	(R5NH)		2: Residential care in R5		72.2%
1: Yes		60.3%	3: Nursing home in R5		60.3%
2: No		80.6%	**R6 RESIDENTIAL CARE STATUS[4]**	(R6DRESID_R)	
R6 NURSING HOME STATUS[4]	(R6NH)		1: Community in R6		83.4%
1: Yes		44.6%	2: Residential care in R6		76.7%
2: No		81.3%	3: Nursing home in R6		44.6%
R7 NURSING HOME STATUS[4]	(R7NH)		**R7 RESIDENTIAL CARE STATUS[4]**	(R7DRESID_R)	
1: Yes		58.5%	1: Community in R7		83.6%
2: No		81.6%	2: Residential care in R7		78.8%
R8: NURSING HOME STATUS[4]	(R8NH)		3: Nursing home in R7		58.5%
1: Yes		53.7%	**R8 RESIDENTIAL CARE STATUS[4]**	(R8DRESID_R)	
2: No		82.9%	1: Community in R8		83.5%
R9: NURSING HOME STATUS[4]	(R9NH)		2: Residential care in R8		82.3%
1: Yes		60.1%	3: Nursing home in R8		53.7%
2: No		83.7%	**R9 RESIDENTIAL CARE STATUS[4]**	(R9DRESID_R)	
R10: NURSING HOME STATUS[4]	(R10NH)		1: Community in R9		84.5%
1: Yes		58.9%	2: Residential care in R9		83.3%
2: No		85.7%	3: Nursing home in R9		60.1%
			R10 RESIDENTIAL CARE STATUS[4]	(R10DRESID_R)	
R11: NURSING HOME STATUS[4] o r	(R11NH)		1: Community in R10		92.5%
1: Yes		61.5%	2: Residential care in R10		83.8%
2: No		86.5%	3: Nursing home in R10		58.9%
			R11 RESIDENTIAL CARE STATUS[4]	(R11DRESID_R)	
			2: Residential care in R11		86.5%
			3: Nursing home in R11		61.5%

[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 Rounds 1 to 11 interviews or interview processes.

[#] 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=334 (270 respondents and 64 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 11 2011 Cohort

Variable & Values		Weighted Response Rate	Variable & Values		Weighted Response Rate
OVERALL		81.9%	**COUNTY LEVEL INDICATORS**		
BENEFICIARY INDICATORS			**% Black 65+ (deciles)[2]**	(PCTBLK)	
Age[1]	(H_AGECAT)		0: 1st decile		83.4%
1: 65-69		74.3%	1: 2nd decile		87.6%
2: 70-74		89.4%	2: 3rd decile		88.9%
3: 75-79		90.5%	3: 4th decile		86.5%
4: 80-84		77.7%	4: 5th decile		97.0%
5: 85- 89		65.3%	5: 6th decile		57.2%
6: 90+		85.5%	6: 7th decile		71.2%
			7: 8th decile		100.0%
R1 Race Ethnicity[4]	(RL1DRACEHISP_R)		8: 9th decile		92.8%
1: White, non-Hispanic		87.0%	9: 10th decile		67.8%
2: Black, non-Hispanic		81.4%			
3: Other, non-Hispanic		53.5%			
4: Hispanic		37.7%	**% Hispanic 65+ (deciles)[2]**	(PCTHISP)	
5: DK/RF		0%	0: 1st decile		89.2%
			1: 2nd decile		95.4%
Gender[1]	(H_SEX)		2: 3rd decile		74.2%
1: Male		88.1%	3: 4th decile		98.9%
2: Female		79.7%	4: 5th decile		79.8%
			5: 6th decile		90.6%
Census Region[1]	(S_REGION)		6: 7th decile		68.1%
1: Northeast		73.4%	7: 8th decile		87.6%
2: Midwest		93.7%	8: 9th decile		90.3%
3: South		80.3%	9: 10th decile		60.9%
4: West		79.0%			
Census Division[1] *	(DIVISION)		**% Poverty (deciles)[2]**	(POVERTY_PCT)	
1: New England		90.4%	0: 1st decile		65.1%
2: Middle Atlantic		70.6%	1: 2nd decile		89.4%
3: East North Central		90.2%	2: 3rd decile		83.5%
4: West North Central		97.6%	3: 4th decile		91.4%
5: South Atlantic		79.7%	4: 5th decile		91.1%
6: East South Central		100.0%	5: 6th decile		97.9%
7: West South Central		69.3%	6: 7th decile		100.0%
8: Mountain		77.5%	7: 8th decile		57.5%
9: Pacific		79.3%	8: 9th decile		80.2%
			9: 10th decile		78.6%
Census Metro/Micro Area Designation (2013)[2]	(S_METMICRO)		**OTHER INDICATORS**		
1: Metropolitan area		81.4	**Facility Type Indicator[3]**	(FQ10DLOCSP)	
2: Micropolitan area		81.1%	1: Independent living/other		85.4%
3: Non-metro		100.0%	2: Assisted Living		88.5%
			3: Special care/memory care/Alzheimer's unit		75.6%
Health Maintenance Organization Beneficiary[1]	(HMOTYPE)		4: Nursing home		67.0%
0: Yes		84.0%	8: Not reported		100.0%
9: No		81.2%			
			R1 RESIDENTIAL CARE STATUS[4]	(R1DRESID_R)	
Age First Enrolled in Medicare[1]	ENROLL_AGE)		1: Community		83.4%
1: Prior to age 65		96.0%	2: Residential Care Resident not nursing home		76.0%
2: At or after age 65		80.5%			

Variable & Values		Weighted Response Rate	Variable & Values		Weighted Response Rate
OTHER INDICATORS			**OTHER INDICATORS**		
R2 NURSING HOME STATUS[4]	(R2NH)		**R2 RESIDENTIAL CARE STATUS[4]**	(R2DRESID_R)	
1: Yes		58.4%	1: Community in R2		83.8%
2: No		82.3%	2: Residential care in R2		77.5%
R3 NURSING HOME STATUS[4]	(R3NH)		3: Nursing home in R2		58.4%
1: Yes		55.3%	**R3 RESIDENTIAL CARE STATUS[4]**	(R3DRESID_R)	
2: No		82.5%	1: Community in R3		84.3%
R4 NURSING HOME STATUS[4]	(R4NH)		2: Residential care in R3		76.7%
1: Yes		57.0%	3: Nursing home in R3		55.3%
2: No		82.5%	**R4 RESIDENTIAL CARE STATUS[4]**	(R4DRESID_R)	
R5 NURSING HOME STATUS[4]	(R5NH)		1: Community in R4		83.2%
1: Yes		66.2%	2: Residential care in R4		81.0%
2: No		82.4%	3: Nursing home in R4		57.0%
R6 NURSING HOME STATUS[4]	(R6NH)		**R5 RESIDENTIAL CARE STATUS[4]**	(R5DRESID_R)	
1: Yes		73.6%	1: Community in R5		84.2%
2: No		82.3%	2: Residential care in R5		78.7%
R7 NURSING HOME STATUS[4]	(R7NH)		3: Nursing home in R5		66.2%
1: Yes		83.5%	**R6 RESIDENTIAL CARE STATUS[4]**	(R6DRESID_R)	
2: No		81.8%	1: Community in R6		82.8%
R8 NURSING HOME STATUS[4]	(R8NH)		2: Residential care in R6		81.3%
1: Yes		82.9%	3: Nursing home in R6		73.6%
2: No		81.8%	**R7 RESIDENTIAL CARE STATUS[4]**	(R7DRESID_R)	
R9 NURSING HOME STATUS[4]	(R9NH)		1: Community in R7		82.0%
1: Yes		68.7%	2: Residential care in R7		81.6%
2: No		84.2%	3: Nursing home in R7		84.0%
R10 NURSING HOME STATUS[4]	(R10NH)		**R8 RESIDENTIAL CARE STATUS[4]**	(R8DRESID_R)	
1: Yes		63.3%	1: Community in R8		77.5%
2: No		86.2%	2: Residential care in R8		85.0%
R11 NURSING HOME STATUS[4] *	(R11NH)		3: Nursing home in R8		83.0%
1: Yes		67.7%	**R9 RESIDENTIAL CARE STATUS[4]**	(R9DRESID_R)	
2: No		86.0%	1: Community in R9		81.4%
			2: Residential care in R9		85.4%
			3: Nursing home in R9		%
			R10 RESIDENTIAL CARE STATUS[4]	(R10DRESID_R)	
			2: Residential care in R10		63.3%
			3: Nursing home in R10		86.2%
			R11 RESIDENTIAL CARE STATUS[4]	(R11DRESID_R)	
			2: Residential care in R11		67.7%
			3: Nursing home in R11		86.0%

[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 Rounds 1 to 11 interviews or interview processes.
*=retained in classification tree analysis for adjustment of missing SP interview.
N=210 (173 respondents and 37 nonrespondents); Variable names used in classification trees shown parenthetically.

Figure 1. Round 11 2015 Cohort Tracker weight nonresponse adjustment cells – non nursing home cases in original sample
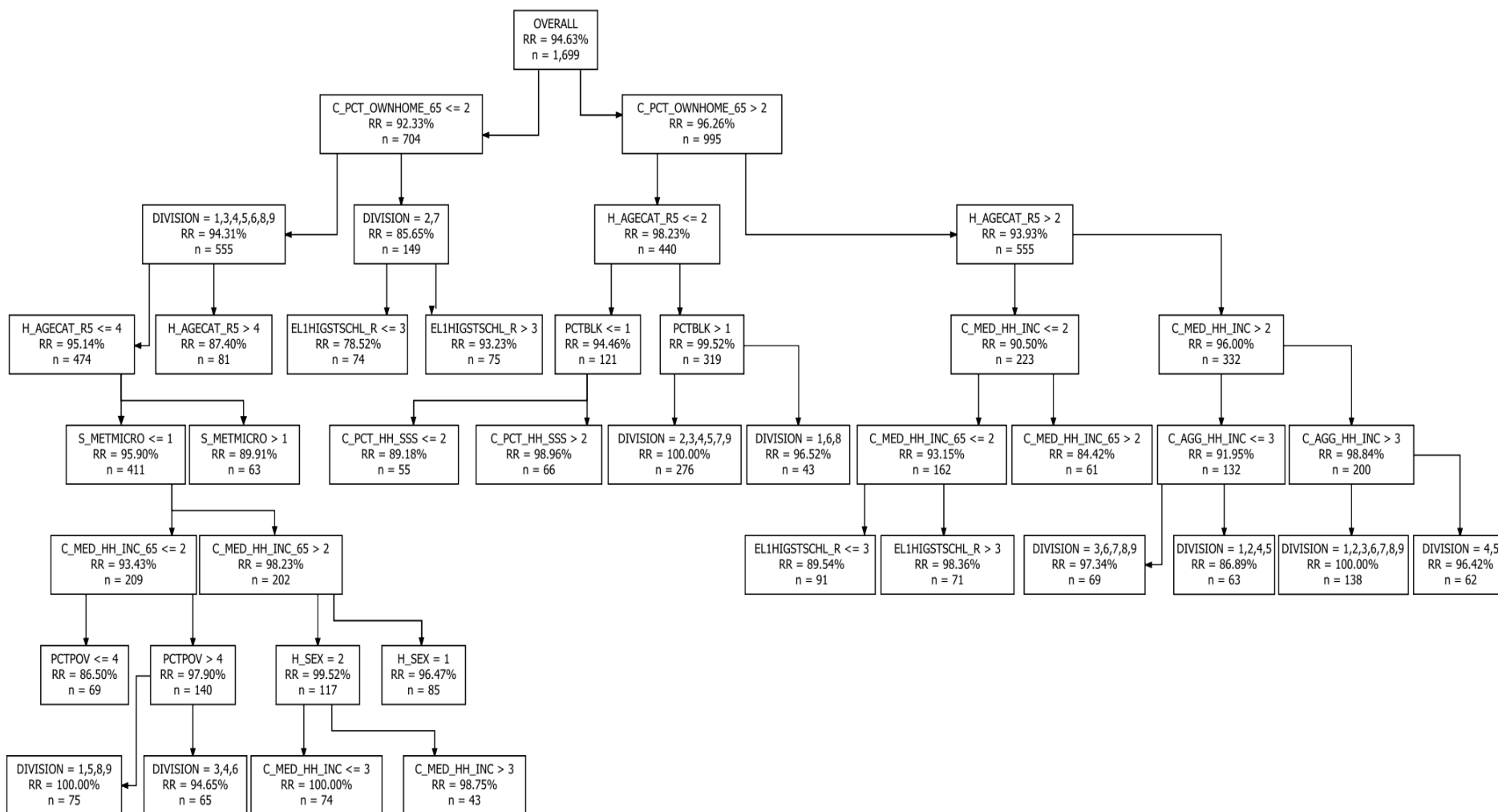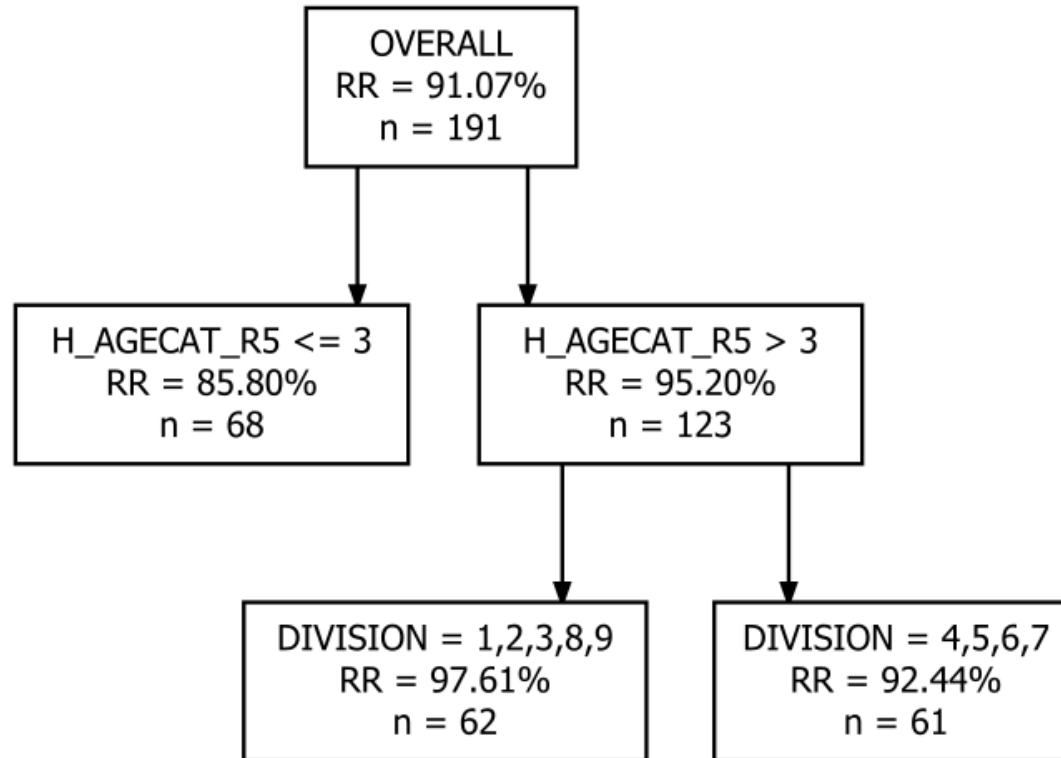

Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

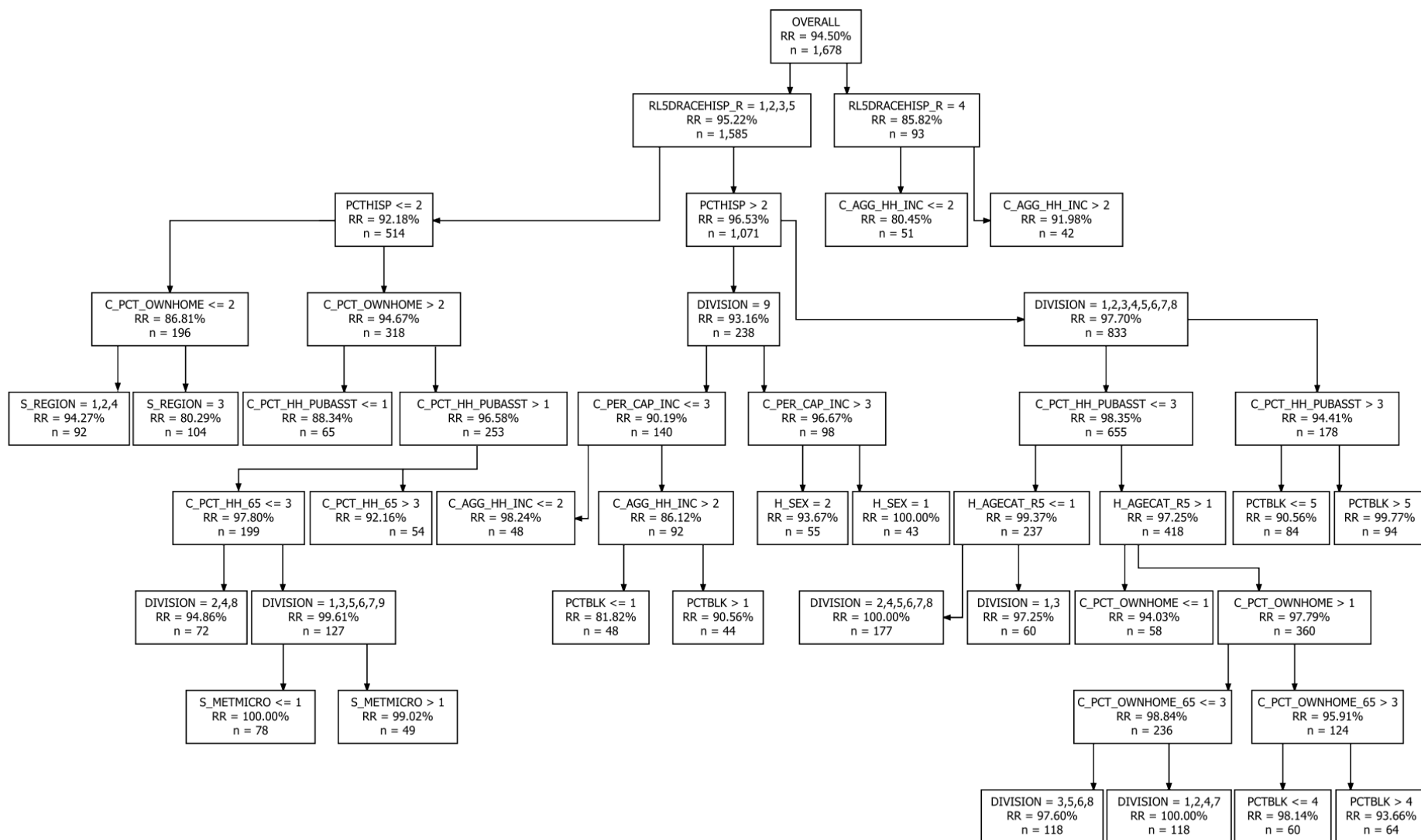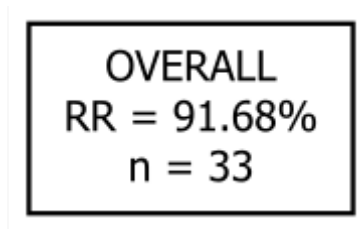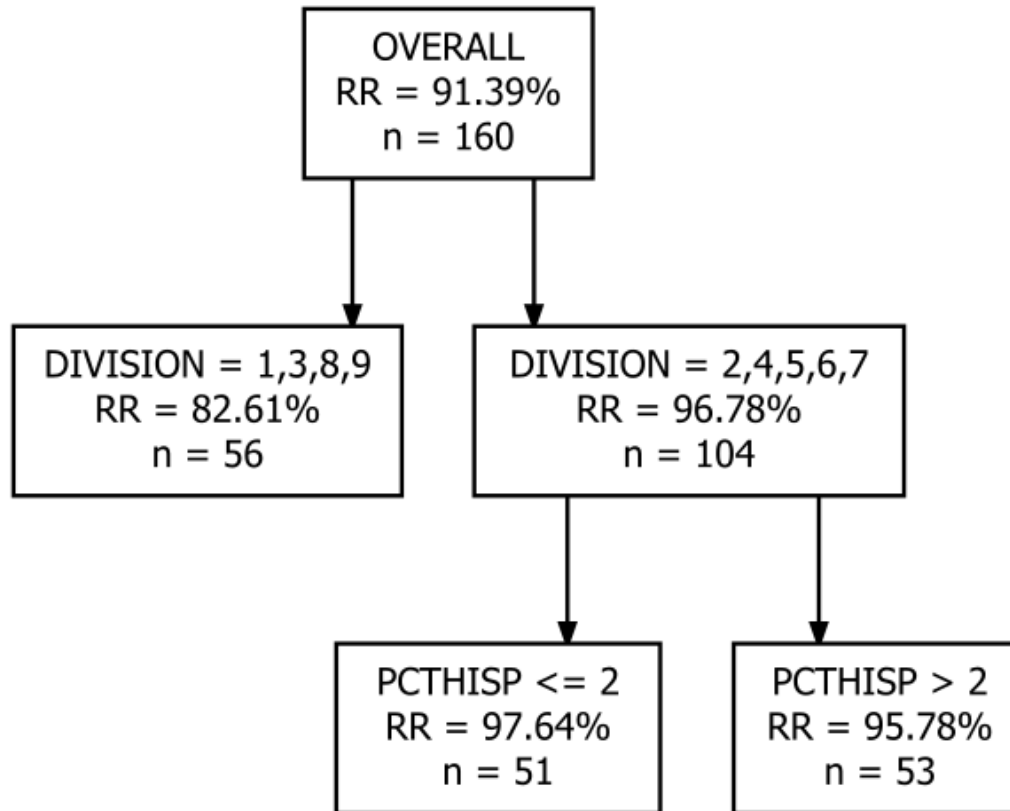**Figure 2. Round 11 2015 Cohort Tracker weight nonresponse adjustment cells – nursing home cases in original sample**

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┌─────────────────────┐
│       OVERALL       │
│   RR = 98.29%       │
│      n = 56         │
└─────────────────────┘
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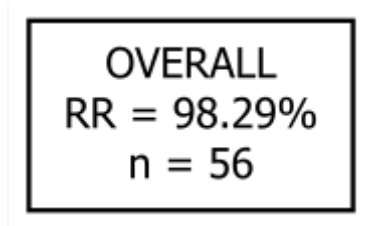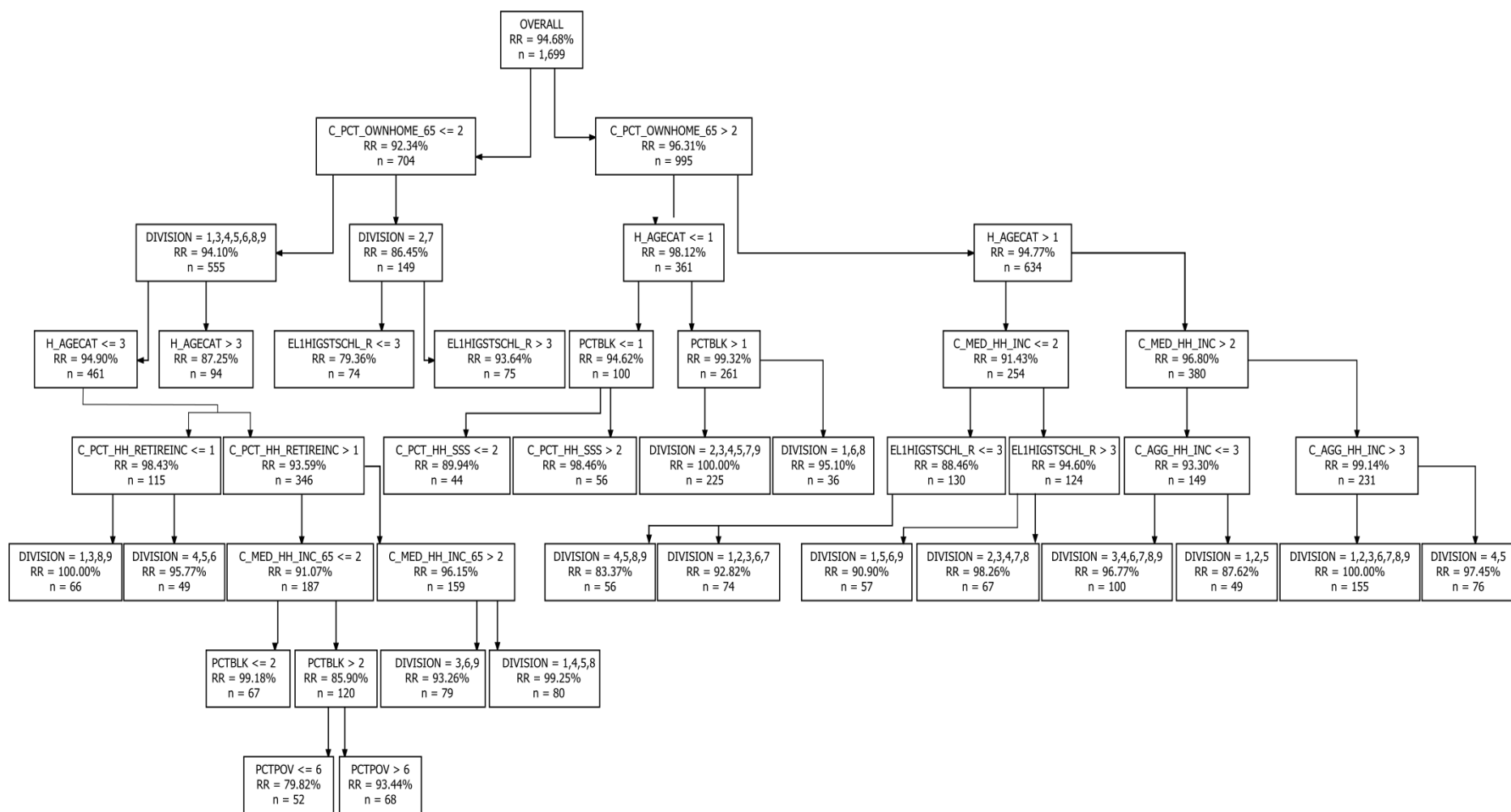
Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 3. Round 11 2015 Cohort Tracker weight nonresponse adjustment cells – deceased cases in original sample

OVERALL
RR = 91.07%
n = 191

H_AGECAT_R5 <= 3
RR = 85.80%
n = 68

H_AGECAT_R5 > 3
RR = 95.20%
n = 123

DIVISION = 1,2,3,8,9
RR = 97.61%
n = 62
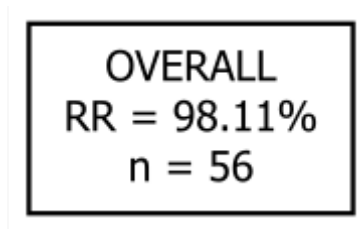
DIVISION = 4,5,6,7
RR = 92.44%
n = 61

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

Figure 4. Round 11 2015 Cohort Tracker weight nonresponse adjustment cells – non nursing home cases in replenishment sample
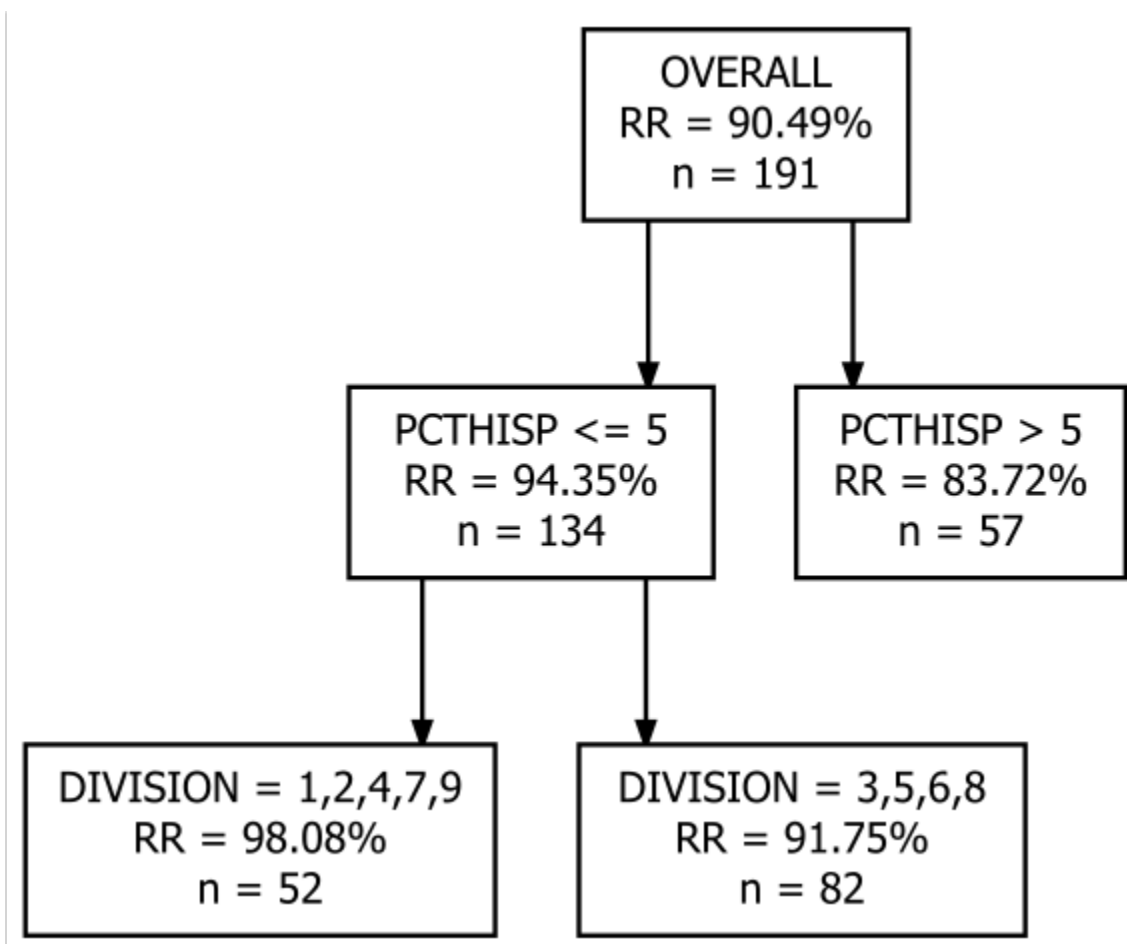

Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 5. Round 11 2015 Cohort Tracker weight nonresponse adjustment cells – nursing home cases in replenishment sample

OVERALL
RR = 91.68%
n = 33

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

Figure 6. Round 11 2015 Cohort Tracker weight nonresponse adjustment cells – deceased cases in replenishment sample
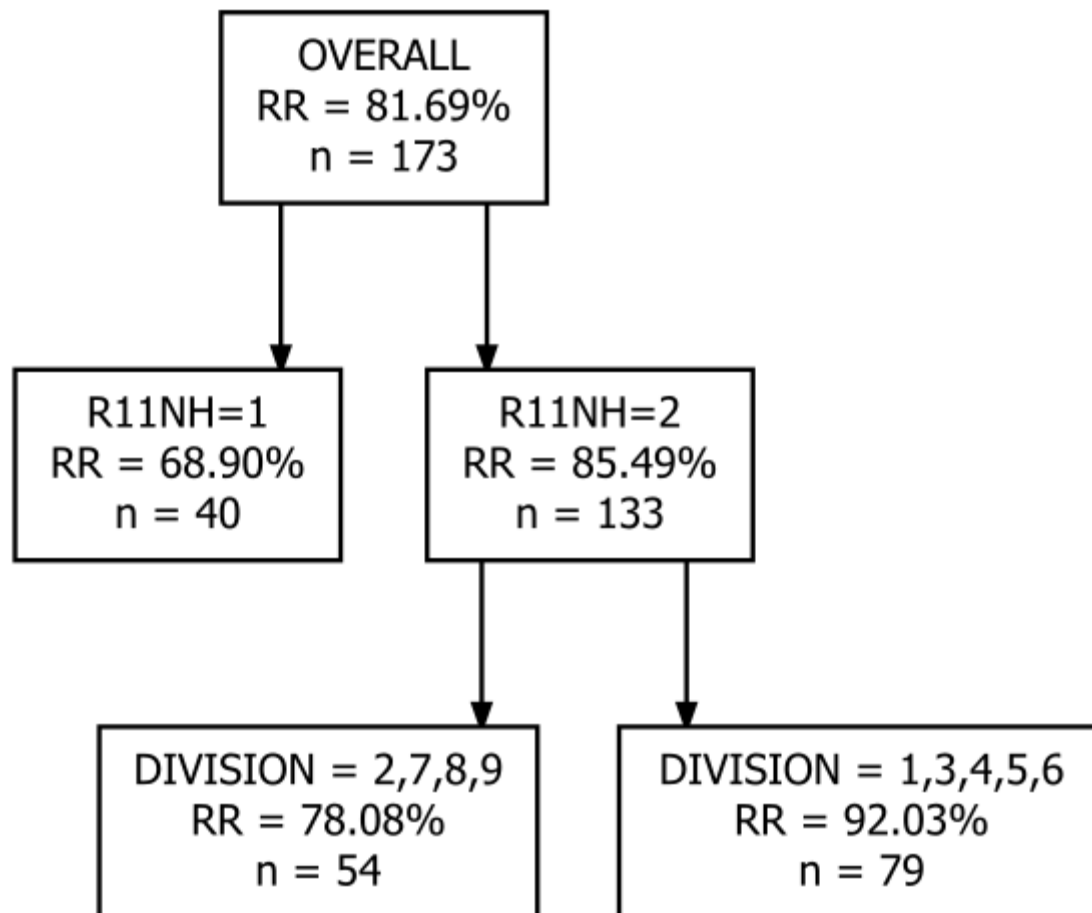

Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 7. Round 11 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 11 2011 Cohort Tracker weight nonresponse adjustment cells – nursing home cases in original sample

OVERALL
RR = 98.11%
n = 56

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

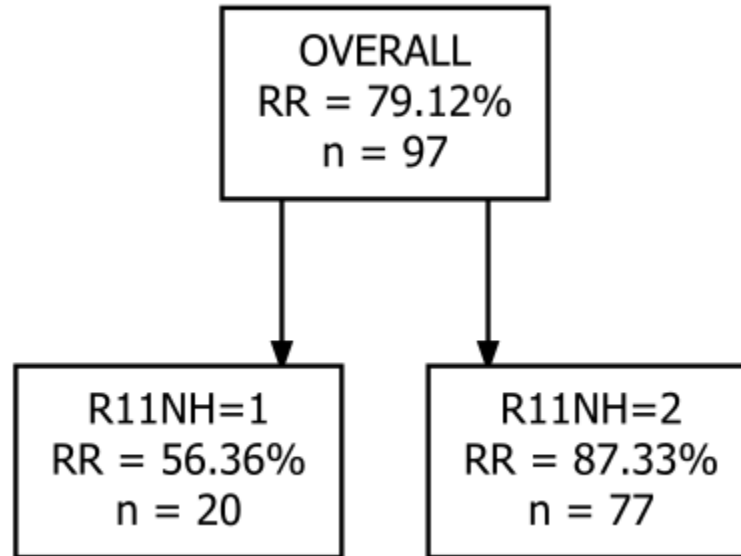**Figure 9. Round 11 2011 Cohort Tracker weight nonresponse adjustment cells – deceased cases in original sample**

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

Figure 10. Round 11 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
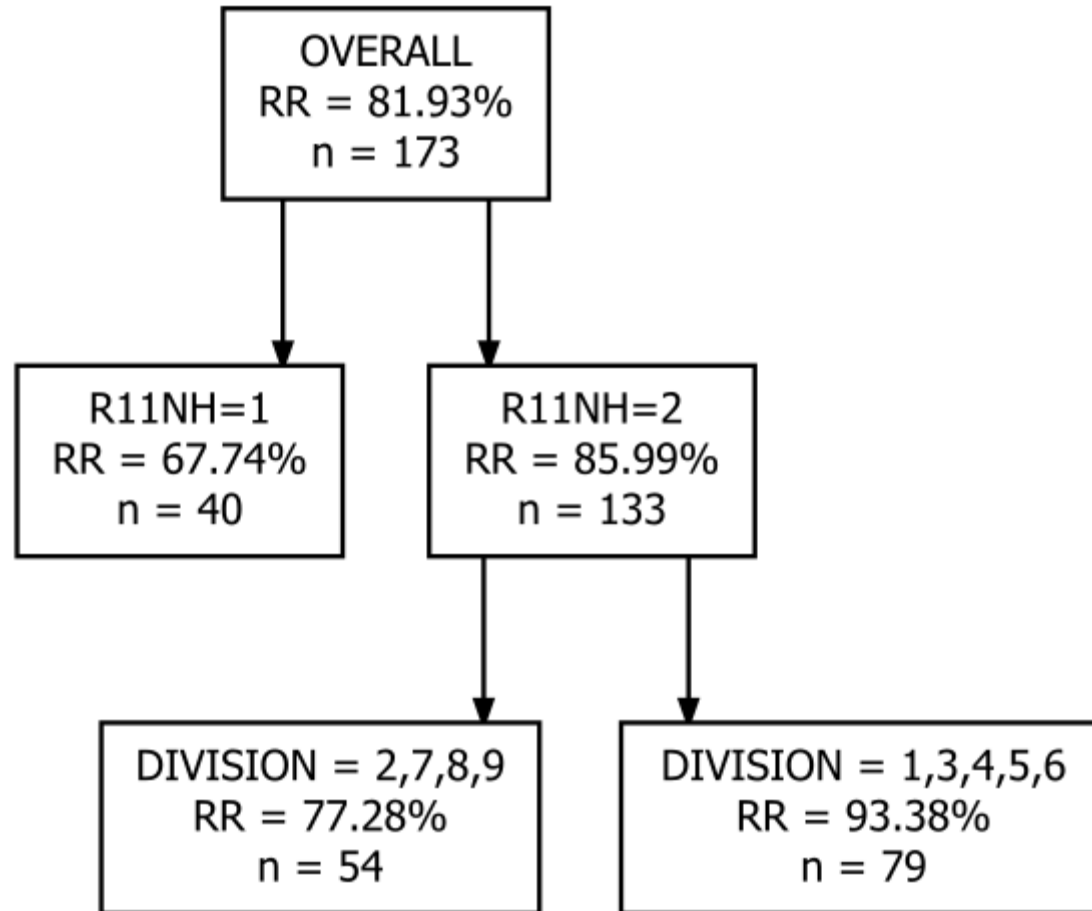

Note: "RR" is the weighted response rate for the particular cell, and "n" is the number of respondents in the cell

Figure 11. Round 11 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 11 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