NHATS Technical Paper #7

NATIONAL HEALTH AND AGING TRENDS STUDY (NHATS)

Hours of Care in Rounds 1 and 2 of the National Health and Aging Trends Study

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Hours of Care in Rounds 1 and 2 of the National Health and Aging Trends Study

Summary

This technical paper provides guidance to users on how to create comparable hours of care variables across rounds of the NHATS. Although questions were identical across waves, starting in Round 2, respondents were allowed to report zero days (per week or per month). To understand the implications of this change, we undertook several analyses. First, we compared the distribution of valid response and nonresponse categories across Rounds 1 and 2, for all helpers and within subsets helping in the last month and those helping only with activities with a year-long reference period. Next we explored mean hours and days by response categories by Round. Finally, we explored characteristics of helpers in each category by Round. Based on this analysis, we conclude that Round 1 helpers with 1 day per week or month and less than 1 hour per day are similar to cases in Round 2 with 0 days per week or month. To make Rounds 1 and 2 as comparable as possible we therefore recommend creating imputation categories that stratify helpers by whether they helped in the last month or only with activities with a year-long reference period and whether they helped exactly 1 day or more than 1 day. This strategy results in a similar distribution of valid and nonresponse categories across Rounds 1 and 2: In Round 1, 15% should be imputed, about 3% assigned zero hours, and 4% assigned a very small number of hours (e.g. 0.5) and in Round 2, the comparable figures are 16%, about 4%, and 5%. We also confirm that combining observations according to the recommended strategy creates subgroups that have similar composition in 2011 and 2012. Based on the recommended strategy we implemented an imputation algorithm for hours of care, which yielded on average 61.1 hours of care in Round 1 and 58.8 in Round 2. Summing hours across NHATS sampled persons receiving assistance and not living in nursing homes yielded a mean of 99 hours in Round 1 and in Round 2. Stata code to implement the proposed imputation strategy is provided in an Appendix.

Hours of Care in Rounds 1 and 2 of the National Health and Aging Trends Study

This technical paper provides guidance to users on how to create comparable hours of care variables across rounds of the NHATS.

Background

Hours of care are obtained in the Helpers (HL) section in NHATS. HL is designed to obtain information about individuals that the sampled person (SP) has identified in earlier sections as Helpers with activities. Questions are asked about each person identified as a helper, with the exception of helpers who are staff members in residential care places.

Activities. NHATS identifies as helpers people the sampled person identified as helping with mobility or self-care activities; carried out a household activity or medical care-related activity with or for a sample person; or gave rides to the SP. Specific activities for which helpers are identified include:

- Getting around outside, getting around inside, getting out of bed (MO Section)
- Eating, getting cleaned up, using the toilet, getting dressed (SC Section)
- Laundry, shopping for groceries or personal items, preparing hot meals, handling bills and banking, less common money matters (HA Section)
- Getting rides to places (DT Section; two persons can be identified[1])
- Keeping track of medications, sitting in on doctor visits, making decisions about insurance (MC Section)

Reference period. A reference period of the last month was used for all activities except: sat in on doctor visits, helped select insurance, or handled infrequent money-related matters. For those activities, the last year was the reference period.

Reason for assistance. Help with mobility and self care was assumed to be for health or functioning reasons. Respondents were asked whether help with household activities was received for health or functioning reasons. For driving help and help with the three activities with a year-long reference period, the reason for help was not ascertained.

Hours per month. Respondents are asked about days and hours in the last month for each helper, regardless of the reason for assistance or reference period. To collect hours of care, NHATS first asks whether in the last month the person helped on a regular schedule or whether it varied. For those who help on a regular schedule, days per week and hours per day (on days when help is provided) are collected; for those whose schedule varies, days in the last month and hours per day (on days when help is provided) are collected. In Rounds 1 and 2, a derived variable indicating hours of help in the last month is provided on the OP file for all nonstaff caregivers.[2]

[1] Types of transportation were captured in the Driving and Transportation section. If the person got rides from a family member, friend, or someone paid to help, flags were set in the OP file indicating who drove most and who else drove.

[2] In Round 2 this information was provided only for SPs who were alive at Round 2 (not for LML respondents).

Changes in Missing Values for Hours of Care

Although questions were identical across waves, allowable values for number of days and related skips changed between Rounds 1 and 2. In Round 1, if a respondent said that they did not receive assistance from a given helper in the last month or reported that they did not perceive the assistance they received as help, interviewers typically either entered missing values (dk, rf) for days or entered 1 day and less than 1 hour per day (a value of 0 for hours). In Round 2, a value of zero was introduced as an option for number of days (in the last month or per week). In Round 1, respondents who gave don't know/refused responses to days were asked about hours per day, but in Round 2, respondents who gave responses for days of 0, don't know, or refused were skipped around hours per day.

Missing data codes for the derived hours variable differ in Round 1 and 2. In Round 1, 3 missing value codes (-11, -10, and -9) are provided. A value of -11 indicates valid days but missing hours; -10 valid hours but missing days; and -9 missing both days and hours. A value of 9999 (not coded because < 1 hour/day), indicates that the value 0 hours per day was selected, which meant that the helper provided less than 1 hour of care on days when they provided assistance.

In Round 2, two new missing value codes were introduced: -13 is assigned when the SP was deceased and the Helper section was not administered, and -12 indicates that the respondent reported zero days (per week or per month) for the helper. Missing codes -9 (missing both days and hours) and -11 (valid days but missing hours) continue to be available, but -10 is no longer used because if days are missing, hours are not asked in Round 2.[3]

Analysis

To understand the implications of these changes, we undertook several analyses. First, we compared the distribution of valid response and nonresponse categories across Rounds 1 and 2. We examined these patterns for all helpers and within subsets helping in the last month and those helping only with activities with activities with a year-long reference period. Next we explored mean hours and days by response categories by Round. Finally, we explored characteristics of helpers in each category by Round.

Analysis of Changes in Response and Nonresponse Categories

Table 1 compares the weighted distribution of missing and valid values by round.[4] Overall the percentage with any missing or uncodeable information increased slightly from 21.7% in Round 1 to 24.9% in Round 2, or by about 3 percentage points. The percentage coded -11 (only hours missing) and the percentage with a valid calculated value remained relatively stable across rounds. However, after the introduction of 0 as a valid response for days, the percentage classified as -9 (missing both days and

[3] A small number of cases were assigned to the -9 or -12 categories, consistent with the Round 2 skip logic, even though hours values were collected contrary to the skip logic: Four cases with days missing were assigned -9, and 15 with 0 days reported were assigned -12.

[4] For the comparison, we excluded OP records that had constructed hours set to inapplicable (-1) in Round 1 (which indicated that the OP was not a helper), and in Round 2, we excluded OP records that had hours set to inapplicable (-1) or to -13 (indicating an OP who helped a deceased SP).

hours) declined from 6.2% to 3.6%, and the percentage classified as 9999 fell from 12.5% to 5.2%. In Round 2, 14.1% of OPs eligible for the helper section had 0 days reported.

Table 1. Frequency and Weighted % of Missing and Valid Hours of Care Codes by Round				
	Round 1		Round 2	
-12:zero days/wk or mo	--	--	1264	14.1%
-11:hours missing	253	2.1%	220	2.1%
-10:days missing	103	0.9%	--	--
-9:days+hrs missing	729	6.2%	372	3.6%
>0	9206	78.3%	7501	75.1%
9999:Not coded (<1 hour)	1306	12.5%	466	5.2%
N	11597	100.0%	9823	100.0%

Table 2 shows the distributions by Round, stratified by whether the helper helped with at least one activity with a reference period of last month or helped only with one or more activities with a year-long reference period. In both Rounds about 8% of helpers assisted only with activities with a one-year reference period.

Table 2. Frequency and Weighted % of Missing and Valid Hours of Care Codes by Round and Type of Help				
	Round 1		Round 2	
Helped last month				
-12:zero days/wk or mo	--	--	965	11.4%
-11:hours missing	241	2.2%	209	2.1%
-10:days missing	89	0.8%	--	--
-9:days+hrs missing	634	5.8%	334	3.4%
>0	8642	80.3%	7203	78.0%
9999:Not coded (<1 hour)	1069	11.0%	428	5.2%
N	10675	100.0%	9139	100.0%
Helped only with activities with year-long reference period				
-12:zero days/wk or mo	--	--	299	45.1%
-11:hours missing	12	1.2%	11	1.7%
-10:days missing	14	1.5%	--	--
-9:days+hrs missing	95	10.9%	38	5.7%
>0	564	57.4%	298	41.7%
9999:Not coded (<1 hour)	237	29.0%	38	5.8%
N	922	100.0%	684	100.0%

Among OP cases who helped in the last month, the percentage with an assigned value of -9 (missing both hours and days) decreased from 5.8% to 3.4% and the percentage with an assigned value of 9999

decreased from 11.0% to 5.2%. Altogether 11.4% of OP cases in Round 2 who helped in the last month were coded (inconsistently) as helping zero days.

Among OP cases who helped only with an activity with a year-long reference period (and therefore legitimately may have helped zero days in the last month), the percentage reporting a valid number of hours declined from 57.4% to 41.7% and the percentage with 9999 declined from 29.0% to 5.8%. Altogether 45.1% of OP cases who only helped with activities with a year-long reference period were assigned a value of -12 indicating zero days.[5]

Analysis of mean hours and components of hours

We investigated whether mean hours/month and components of hours/month were affected by the shift in the distribution of missing/incomplete cases (Table 3). Among those reporting one or more hours, patterns are very similar across rounds. For instance, mean hours among those reporting one or more hours was 74.3 in Round 1 and 73.7 in Round 2.

Table 3. Mean Hours and Days for Missing and Valid Hours of Care Codes by Round

	Round 1				Round 2			
	Hours/mo	Days/wk	Days/mo	Hours/day	Hours/mo	Days/wk	Days/mo	Hours/day
-12: days reported as 0	-	-	-	-	M	M	M	M
-11:hours missing (reg)	M	4.8	-	M	M	5.1	-	M
-11:hours missing (var)	M	-	14.9	M	M	-	17.2	M
-10:days missing (tot)	M	M	M	1.26	-	-	-	-
-9:days+hrs missing (tot)	M	M	M	M	M	M	M	M
1+ (regular)	144.5	4.5	-	5.9	129.6	4.5	-	5.5
1+ (varied)	44.4	-	10.3	3.1	48.0	-	11.4	3.3
1+ (total)	74.3	-	-	-	73.7	-	-	-
9999:Not coded (regular)	-	2.2	-	0	-	3.1	-	0
9999:Not coded (varied)	-	-	4.2	0	-	-	6.7	0

However, the percentage of 9999s with exactly one day reported (and <1 hour on that day) decreased from 68.6% among those with a regular schedule and 68.9% among those with a varied schedule in Round 1 to 48.1% and 31.5%, respectively, after the introduction of the 0 days response category in Round 2 (see Table 4).

[5] In tabulations not shown, we explored these distributions for the subset of OP records associated with SPs who received help in the last month with self care or mobility activities or at least one household activity for health or functioning reasons. Findings were similar to those for the full sample.

Table 4. Weighted % Reporting 1 day and Mean Days (Per week or Month) by Round and Schedule Type

	Round 1					Round 2				
	-11	-10	-9	9999	1+	-12	-11	-9	9999	1+
Regular schedule										
Percent reporting 1 day/wk	12.3	-	-	68.6	22.5	-	8.3	-	48.1	17.5
Mean days/wk	4.8	-	-	2.2	4.5	-	5.1	-	3.1	4.5
Varied schedule										
Percent reporting 1 day/mo	15.3	-	-	68.9	26.6	-	7.7	-	31.5	16.2
Mean days/mo	13.2	-	-	4.2	10.3	-	16.7	-	6.7	11.4

Analysis of other sample characteristics

Finally, we compared the weighted percentage helping with each type of activity within categories of missing and valid hours. As shown in Table 5, overall frequencies for Round 1 and Round 2 (Total columns) were nearly identical. In Round 1, OP helpers with valid hours and with -11 were consistently most engaged (helped with most activities, were least likely to help with just one activity and most likely to be a spouse) and those with 9999 least engaged (helped with fewest activities, were most likely to help with just one activity, and were likely to be unrelated to the SP). In Round 2, those with valid hours and with -11 also were most engaged and those with 9999 and -12 were least engaged. The 9999s in Round 1 fall between the groups assigned -12 and 9999 in Round 2 on many items. Of particular note 19.4% of 9999s in Round 1 helped only with an activity in the last year whereas 25.4% of the -12s and 8.8% of the 9999s in Round 2 did so. For the subset of OP records that belong to an SP who got help with self care, mobility or household activities (the latter for health and functioning reasons), patterns are consistent with the overall sample (not shown).

Table 5. Percentage of Each Hours Category Providing Help with Given Activity By Round

	Round 1 (%)						Round 2 (%)					
	-11	-10	-9	9999	1	Total	-12	-11	-9	9999	1	Total
Spouse	44.9	39.4	29.0	29.7	37.4	36.1	22.2	44.7	27.6	29.9	35.0	32.9
Other relative	39.7	46.8	46.4	47.7	46.6	46.6	47.9	43.5	50.9	45.9	46.3	49.3
Non relative	15.4	13.8	24.6	22.6	16.0	17.4	29.8	11.9	21.5	24.1	18.7	21.2
Regular schedule	23.3	26.1	6.9	18.9	29.9	26.9	22.2	21.4	10.3	19.3	31.5	24.8
Last year activity only	4.5	14.2	14.3	19.4	6.1	8.3	25.4	6.6	12.8	8.8	4.4	7.9
Only 1 activity	32.3	44.6	51.0	61.8	35.9	40.1	71.6	28.2	45.8	56.5	36.2	42.4
Mean no. of activities	3.4	2.4	2.3	1.9	3.1	2.9	1.6	3.3	2.4	2.0	3.1	2.9
SP gets help from anyone for h/f reasons	43.9	31.2	37.8	29.9	43.2	41.1	28.3	49.7	45.5	33.2	43.3	43.1
Activities last month												
Go out help	12.2	12.5	8.8	5.9	12.2	11.2	5.3	10.1	9.6	6.6	12.5	11.1
Inside help	7.0	2.5	3.6	2.1	8.5	7.3	1.6	4.4	2.9	2.4	8.4	6.9
Out of bed help	5.4	1.1	2.2	1.1	5.3	4.5	0.6	2.9	1.8	1.4	4.9	4.0
Transport – most	35.8	19.9	26.8	25.4	33.6	32.1	21.1	33.1	30.2	34.7	30.2	32.4
Transport – other	7.0	14.5	13.0	15.8	13.0	13.9	15.9	8.5	13.4	19.0	14.1	14.5
Laundry	46.6	26.3	23.3	17.3	35.1	32.3	12.9	40.9	26.4	17.1	35.1	30.9
Shopping	56.3	45.9	36.0	30.0	50.0	46.7	20.5	62.6	35.8	31.9	49.3	44.1
Meals	51.7	31.2	30.7	25.9	44.1	41.1	22.8	51.9	32.0	27.8	44.7	40.4
Banking	36.6	28.5	23.9	19.9	33.2	31.0	16.8	37.2	32.7	21.5	31.9	29.3
Eating	3.0	0.0	1.4	0.5	4.4	3.7	0.7	5.0	2.1	0.8	4.5	3.7
Bathing	5.8	0.5	3.9	1.0	6.1	5.3	0.1	4.2	3.6	1.8	6.9	5.6
Toileting	2.3	0.0	1.5	0.2	3.4	2.8	0.6	1.2	1.3	0.3	3.1	2.5
Dressing	10.1	3.1	4.3	3.0	8.6	7.6	1.3	9.1	4.6	4.2	8.7	7.3
Meds	14.0	4.5	6.6	3.3	11.5	10.1	2.1	12.6	7.2	6.3	11.3	9.6
Activities last year												
Money	12.8	10.2	11.4	14.2	12.1	12.3	14.5	16.2	11.9	11.7	10.1	11.0
Dr. Visits	33.2	31.2	23.2	18.6	29.3	27.7	19.2	29.0	20.2	18.0	27.8	25.9
Insurance	4.6	4.8	4.5	7.8	3.4	4.1	6.7	2.2	3.1	2.7	2.5	3.1
N	253	103	729	1306	9206	11597	1264	220	372	466	7501	9823

Recommendations for Treatment of Incomplete Hours

Based on this analysis, we conclude that Round 1 cases with 1 day per week or month and less than 1 hour per day are similar to cases in Round 2 with 0 days per week or month. To make Rounds 1 and 2 as comparable as possible we therefore recommend creating imputation categories that stratify helpers by whether they helped in the last month or only with activities with a year-long reference period and considers whether those not coded in Round 1 (0 hours reported indicating less than 1 hour per day) reported exactly 1 day or more than 1 day (see Table 6).

Table 6. Recommendation Imputation Categories for Incomplete Hours of Care: Rounds 1 & 2

	Round 1		Round 2	
Helped last month				
-12:zero days/wk or mo	--	--	965	Impute hours/mo
-11:hours missing	242	Impute hours/day	209	Impute hours/day
-10:days missing	91	Impute days/ mo	--	--
-9:days+hrs missing	638	Impute hours/mo	334	Impute hours/mo
>0	8697	Valid	7203	Valid
9999: Not coded (reported 1 day)	676	Impute hours/mo		
9999: Not coded (reported >1 day)	396	Assign a value between 0 and 1 for hours/day and multiply by days	428	Assign a value between 0 and 1 for hours/day and multiply by days
Only helped with activities with year-long reference period				
-12:zero days/wk or mo	--	--	299	Assume 0
-11:hours missing	11	Impute hours /day	11	Impute hours/day
-10:days missing	12	Impute days/ mo	--	--
-9:days+hrs missing	91	Assume 0	38	Impute hours/mo
>0	509	Valid	298	Valid
9999:Not coded (reported 1 day)	212	Assume 0		
9999: Not coded (reported >1 day)	22	Assign a value between 0 and 1 for hours/day and multiply by days	38	Assign a value between 0 and 1 for hours/day and multiply by days

This strategy results in a similar distribution of valid and non-response values across Rounds 1 and 2 (Table 7). In Round 1, 15% should be imputed, about 3% assigned zero hours, and 4% a very small number of hours (e.g. 0.5). In Round 2, the comparable figures are 16%, about 4%, and 5%.

Table 7. Frequency and Weighted % of Missing and Valid Hours of Care Codes by Proposed Imputation Categories and Round				
	Round 1		Round 2	
Impute[1]	1670	14.7%	1557	16.1%
-12 (zero days)	0	0.0%	965	10.5%
-11 (missing hours)	253	2.1%	220	2.1%
-10 (missing days)	103	0.9%	0	0.0%
-9 (missing hours and days)	638	5.3%	334	3.5%
9999 (uncodeable)	676	6.4%	0	0.0%
Zero[2]	303	3.1%	299	3.6%
>0 and < 1 hours/day[3]	418	3.9%	466	5.2%
Valid value[4]	9206	78.3%	7501	75.1%
Total	11597	100.0%	9823	100.0%

[1]In Round 2, -12 and helped with activity in last month; in Round 1 or 2, missing values of -11 or -10; in Round 1, -9 and helped last month; in Round 2 -9; in Round 1, 9999 and exactly 1 day reported and helped with activity in last month.

[2]In Round 1, -9 and helped only with activities with a year-long reference period; In Round 1, 9999 and exactly 1 day reported and helped only with activity with year-long reference period; in Round 2, -12 and helped only with activity with year-long reference period.

[3]In Round 1, 9999 and helped more than one day; in Round 2, 9999.

[4]All components reported so that value of hours last month could be calculated

Combining observations according to the recommended strategy creates subgroups that, with one exception, have similar composition in 2011 and 2012 (Table 8). The group to have hours imputed, for instance, helps with a similar number of activities in both years (2.3 in 2011 and 2.1 in 2012). The group recommended to be imputed to 0 also has similar profiles in 2011 and 2012; the vast majority helped with one activity over the last year and more than 40% were non-relatives. For the groups recommended to be assigned a small amount of hours/day, there were a larger share of spouses, a smaller percentage performing only 1 activity, and a greater share performing household activities in 2011 than in 2012. When comparisons are limited to those helping more than one day (not shown), the two groups are much more similar.

Table 8. Percentage Providing Help with Given Activity By Round and Proposed Imputation Categories

	Round 1 (%)					Round 2 (%)				
	Impute[1]	Zero[2]	>0 and <1 hours per day[3]	Valid value[4]	Total	Impute[1]	Zero[2]	>0 and <1 hours per day[3]	Valid value[4]	Total
Spouse	33.5	8.7	41.4	37.4	36.1	29.7	6.8	29.9	35.0	32.9
Other relative	50.1	35.2	42.0	46.6	46.6	50.8	35.2	45.9	46.3	46.6
Nonrelative	16.4	56.1	16.6	16.0	17.4	19.4	58.0	24.1	18.7	20.5
Regular schedule	15.7	14.8	19.1	29.9	26.9	19.2	23.7	19.3	31.5	28.6
Last year activity only	1.5	100.0	5.3	6.1	8.3	3.7	100.0	8.8	4.4	7.9
Only 1 activity	49.2	97.9	43.5	35.9	40.1	54.7	97.1	56.5	36.2	42.4
Mean no. of activities	2.3	1.0	2.5	3.1	2.9	2.1	1.0	2.0	3.1	2.8
SP gets help from anyone for h/f reasons	36.5	18.9	34.6	43.2	41.1	36.9	19.3	33.2	46.3	43.1
Activities last month										
Go out help	9.2	0.0	7.3	12.2	11.2	8.1	0.0	6.6	12.5	11.1
Inside help	3.6	0.0	3.2	8.5	7.3	2.6	0.0	2.4	8.4	6.9
Out of bed help	2.3	0.0	1.7	5.3	4.5	1.3	0.0	1.4	4.9	4.0
Transport - most	30.2	0.0	34.1	33.6	32.1	29.3	0.0	30.2	34.7	32.4
Transport - other	17.3	0.0	13.0	13.9	13.9	17.9	0.0	19.0	14.1	14.5
Laundry	25.9	0.0	26.5	35.1	32.3	22.4	0.0	17.1	35.1	30.9
Shopping	39.9	0.0	44.1	50.0	46.7	33.9	0.0	31.9	49.3	44.1
Meals	33.6	0.0	40.3	44.1	41.1	33.7	0.0	27.8	44.7	40.4
Banking	26.7	0.0	27.2	33.2	31.0	26.4	0.0	21.5	31.9	29.3
Eating	1.2	0.0	0.8	4.4	3.7	1.7	0.0	0.8	4.5	3.7
Bathing	2.8	0.0	1.9	6.1	5.3	2.1	0.0	1.8	6.9	5.6
Toileting	1.1	0.0	0.3	3.4	2.8	0.9	0.0	0.3	3.1	2.5
Dressing	4.3	0.0	6.7	8.6	7.6	3.3	0.0	4.2	8.7	7.3
Meds	6.4	0.0	5.6	11.5	10.1	5.0	0.0	6.3	11.3	9.6
Activities Last Year										
Money (last year)	7.7	39.0	12.9	12.1	12.3	8.5	40.0	11.7	10.1	11.0
Dr. Visits (last year)	20.7	31.4	18.5	29.3	27.7	16.5	38.2	18.1	27.8	25.9
Insurance (last year)	1.8	31.7	3.5	3.4	4.1	1.4	24.7	2.7	2.5	3.1
N	1670	303	418	9206	11597	1557	299	466	7501	9823

[1]In Round 2, -12 and helped with activity in last month; in Round 1 or 2, missing values of -11 or -10; in Round 1, -9 and helped last month; in Round 2 -9; in Round 1, 9999 and exactly 1 day reported and helped with activity in last month.
[2]In Round 1, -9 and helped only with activity with year-long reference period; In Round 1, 9999 and exactly 1 day reported and helped only with activity with year-long reference period; in Round 2, -12 and helped only with activity with year-long reference period.
[3]In Round 1, 9999 and helped more than one day; in Round 2, 9999.
[4]All components reported so that value of hours last month could be calculated

Imputation Strategy

Finally, we developed an imputation algorithm, based on categories recommended in Table 6. We estimated separate imputation models for hours/day, days, and hours/month for each Round, using all cases with valid amounts, including those with less than one hour on days when they helped (see Table 9).

We included the following predictors: helper's relationship to the sample person, whether help was provided on a regular schedule (vs. varied), whether the person helped only with an activity in the last year, whether help was provided for only one activity, specific activities with which the person provided help, and an indicator of whether the sample person was high need (received help with self-care, mobility activity or a household activity related to health and functioning). We logged the outcomes so that predictions would be limited to positive values.

This approach resulted in an average number of hours 61.1 in Round 1 and 58.8 in Round 2 (see Table 10). Stata code to implement this imputation strategy is provided in Appendix A.

Finally, we summed over helpers for a given Sample Person and calculated mean total hours of care in 2011 and 2012 (the latter restricted to non-nursing home cases to enhance comparability). We found mean total hours were 99 in both 2011 and 2012 (not shown).

Users may wish to investigate alternative models or more complex imputation strategies that allow uncertainty due to the imputation to be taken into account in estimates.

Future Rounds

We recommend the same approach to handling missing hours in Rounds 3 and forward, which use the same design as Round 2

Table 9. Imputation models by Round and Type of Imputation

	Round 1 (%)						Round 2 (%)			
	Ln (Days)[1]		Ln(Hours/Day)[2]		Ln (Hours/month)[3]		Ln(Hours/Day)[2]		Ln (Hours/month)[3]	
	Beta	p	Beta	p	Beta	p	Beta	p	Beta	p
Spouse (vs. nonrelative)	0.5	0.00	0.1	0.22	0.6	0.00	0.0	0.59	0.6	0.00
Other relative (vs. nonrelative)	0.1	0.00	0.1	0.02	0.2	0.00	0.0	0.19	0.2	0.00
Regular (vs. varied)	0.8	0.00	0.3	0.00	1.1	0.00	0.3	0.00	1.0	0.00
Last year activity only	-0.4	0.00	0.0	0.66	-0.4	0.00	-0.1	0.09	-0.4	0.00
Only 1 activity	-0.3	0.00	0.0	0.70	-0.3	0.00	0.0	0.55	-0.4	0.00
SP high need	0.1	0.00	0.1	0.00	0.3	0.00	0.1	0.01	0.2	0.00
Activities last month										
Going outside	0.0	0.50	0.0	0.18	0.1	0.20	0.1	0.03	0.1	0.01
Getting around inside	0.1	0.09	0.2	0.00	0.2	0.00	0.1	0.05	0.3	0.00
Getting out of bed help	0.0	1.00	0.2	0.00	0.2	0.01	0.3	0.00	0.3	0.00
Eating	0.1	0.14	0.1	0.22	0.2	0.06	0.0	0.43	0.1	0.07
Bathing	0.1	0.01	0.2	0.00	0.3	0.00	0.0	0.85	0.0	0.72
Toileting	-0.1	0.11	0.2	0.01	0.1	0.51	0.4	0.00	0.3	0.01
Dressing	0.1	0.01	0.0	0.37	0.2	0.01	0.1	0.11	0.2	0.07
Laundry	0.3	0.00	0.3	0.00	0.6	0.00	0.3	0.00	0.6	0.00
Shopping	0.2	0.00	0.1	0.00	0.3	0.00	0.1	0.02	0.3	0.00
Meals	0.3	0.00	0.1	0.00	0.3	0.00	0.1	0.00	0.4	0.00
Banking	0.0	0.23	0.0	0.24	0.1	0.15	0.0	0.25	0.1	0.01
Meds	0.2	0.00	0.2	0.00	0.4	0.00	0.2	0.00	0.3	0.00
Transport - most	0.1	0.02	0.0	0.07	0.1	0.01	0.1	0.05	0.0	0.98
Transport - other	-0.2	0.00	0.1	0.00	-0.1	0.29	0.1	0.10	-0.2	0.00
Activities Last Year										
Money matters	0.0	0.45	-0.1	0.03	0.0	0.48	-0.1	0.01	-0.2	0.01
Doctor Visits	0.0	0.35	0.1	0.00	0.1	0.01	0.1	0.00	0.2	0.00
Health Insurance	0.0	0.79	-0.2	0.02	-0.1	0.23	-0.1	0.33	-0.1	0.47
Constant	1.1	0.00	0.3	0.00	1.4	0.00	0.4	0.00	1.7	0.00
N	9624		9624		9624		7966		7966	

[1]To be applied to -10 in Round 1

[2]To be applied to -11 in Round 1 and Round 2

[3]To be applied to -9 and 9999 in Round 1 and -12 and -9 in Round 2

Table 10. Weighted Mean Hours Per Month by Imputation Categories and Round				
	Round 1		Round 2	
	N	Mean Hrs/Mo	N	Mean Hrs/Mo
Impute[1]				
-12 (zero days)	0	-	965	15.7
-11 (missing hours)	253	45.9	220	49.9
-10 (missing days)	103	8.6	0	-
-9 (missing days and hours)	638	15.0	334	17.5
9999 (uncodeable)	676	13.8	0	-
Zero[2]	303	0.0	299	0.0
Small amt[3]	418	6.6	466	4.0
Valid value[4]	9206	74.3	7501	73.6
Total	11597	61.2	9823	58.8

[1]In Round 2, -12 and helped with activity in last month; in Round 1 or 2, missing values of -11 or -10; in Round 1, -9 and helped last month; in Round 2 -9; in Round 1, 9999 and exactly 1 day reported and helped with activity in last month. -10s with less than one hour/day were assigned .5 hours/day and multiplied by the imputed number of days.

[2]In Round 1, -9 and helped only with activity with year-long reference period; In Round 1, 9999 and exactly 1 day reported and helped only with activity with year-long reference period; in Round 2, -12 and helped only with activity with year-long reference period.

[3]In Round 1, 9999 and helped more than one day; in Round 2, 9999.

[4]All components reported so that value of hours last month could be calculated

Appendix A. Stata code to impute incomplete hours of care in Rounds 1 and 2

```
/***************This code imputes hours of care for OP helpers in Rounds 1 and 2 of NHATS****************/
/***************Missing values are imputed in a way that maintains consistency across rounds*************/
/***************Created February 2014*****************************************************************/

/***********This section sorts and merges Round 1 SP and OP files by spid*****************************/

use "[add location]NHATS_Round_1_SP_File.dta", clear
sort spid
save "[add location]R1spsort.dta", replace

use  "[add location]NHATS_Round_1_OP_File_v2.dta", clear
sort spid opid
save "[add location]R1opsort.dta", replace

merge spid using "…R1spsort.dta"
keep if _merge==3 /*keep cases with Round 1 OP records*/

/******************set weighting******************/

svyset w1varunit [pweight=w1anfinwgt0], strata(w1varstrat)

/********************create recoded values for imputation*************************************/

/*recode Round 1 staff days/hours variables to -1 if not helper*/
recode op1helpsched op1numdayswk op1numdaysmn op1numhrsday (-9/-7=-1) (1/999=-1) if op1ishelper==-1

/*generate indicator of help with any task that has monthly reference period*/
gen month=0
replace month=1 if (op1outhlp==1 | op1insdhlp==1 | op1bedhlp==1 | op1tkplhlp1==1 | op1tkplhlp2==1 |
op1launhlp==1 | op1shophlp==1 | op1mealhlp==1 | op1bankhlp==1 | op1eathlp==1 | op1bathhlp==1 |
op1toilhlp==1 | op1dreshlp==1 | op1medshlp==1)

/*generate indicator of help with any task that has yearly reference period*/
gen year=0
replace year=1 if (op1moneyhlp==1 | op1dochlp==1 | op1insurhlp==1)

/*generate indicator of help in last year but not last month*/
gen yearnotmonth=0
replace yearnotmonth=1 if year==1 & month==0

/*generate SP received help with self care or mobility activity or household activity for health and functioning
reasons*/

gen disab=0
/*self care or mobility*/
replace disab=1 if  mo1douthelp==2 | mo1dinsdhelp==2 | mo1dbedhelp==2|sc1deathelp==2 | sc1dbathhelp==2 |
sc1dtoilhelp==2 | sc1ddreshelp==2
/*household activity for health or functioning reasons or in residential care*/
recode ha1dlaunreas ha1dshopreas ha1dmealreas ha1dbankreas  mc1dmedsreas (4=3)
```

```
replace disab=1 if ha1dlaunreas==3 | ha1dshopreas==3 | ha1dmealreas==3 | ha1dbankreas==3 |
mc1dmedsreas==3

/*generate reported hours flag collapsing valid (1+) hours are collapsed into value of 1*/
gen op1dhrsmth2=op1dhrsmth
recode op1dhrsmth2 (1/750=1)
tab op1dhrsmth2 op1ishelper

/*generate variable indicating one day per month or one day per week*/
gen justone=0
replace justone=1 if  op1numdayswk==1 |  op1numdaysmn==1

/*recode help flags so all are 1 or 0*/
recode op1outhlp op1insdhlp op1bedhlp  op1tkplhlp1  op1tkplhlp2  op1launhlp  op1shophlp  op1mealhlp
op1bankhlp  op1eathlp  op1bathhlp  op1toilhlp  op1dreshlp  op1medshlp  op1moneyhlp  op1dochlp  op1insurhlp
(-999/-1=0) (2=0)

/*generate variable indicating help with only one activity*/
gen numact=op1outhlp + op1insdhlp + op1bedhlp + op1tkplhlp1 + op1tkplhlp2 + op1launhlp + op1shophlp +
op1mealhlp + op1bankhlp + op1eathlp + op1bathhlp + op1toilhlp + op1dreshlp + op1medshlp + op1moneyhlp +
op1dochlp + op1insurhlp
gen oneact=0
replace oneact=1 if numact==1

/*generate variable indicating relationship is spouse, other rel, other nonrel*/
gen spouse=0
replace spouse=1 if op1relat==2
gen otherrel=0
replace otherrel=1 if (op1relat>2 & op1relat<=29) | op1relat==91
gen nonrel=0
replace nonrel=1 if op1relat>=30 & op1relat~=91

/*generate variable indicating whether help was on regular schedule*/
gen regular=0
replace regular=1 if op1helpsched==1

/*generate indicator of imputation category */
/*********values**********************/
/*1=impute*/
/*2=recode to zero*/
/*3=recode to small number of hours per day*/
/*4=no imputation needed*/

gen op1dhrsmth3=-1
replace op1dhrsmth3=1 if (op1dhrsmth2==-11 | op1dhrsmth2==-10) | (op1dhrsmth2==-9 & yearnotmonth==0) &
op1ishelper==1 /*impute*/
replace op1dhrsmth3=1 if  op1dhrsmth2==9999 & (op1numdayswk==1 | op1numdaysmn==1) & yearnotmonth==0
& op1ishelper==1/*impute 1,0s that helped last month*/
replace op1dhrsmth3=2 if  op1dhrsmth2==-9 & yearnotmonth==1 & op1ishelper==1/*recode to zero*/
replace op1dhrsmth3=2 if  op1dhrsmth2==9999 & (op1numdayswk==1 | op1numdaysmn==1) & yearnotmonth==1
& op1ishelper==1/*recode to zero if 1 day <1 hours*/
```

```
replace op1dhrsmth3=3 if op1dhrsmth2==9999 & (op1numdayswk~=1 & op1numdaysmn~=1) & op1ishelper==1
/*recode to small number if more than one day*/
replace op1dhrsmth3=4 if op1dhrsmth2==1 & op1ishelper==1 /*information not missing or incomplete*/

/***************reduce data set – keep only needed variables***********************************/

keep op* numact yearnotmonth disab w1anfinwgt0 w1varstrat w1varunit r1dresid spid justone spouse otherrel
nonrel regular oneact


/********************implement imputation strategy*********************************************/

/*fill in missing data as recommended for groups 2 (recode to zero), 3 (small hours per day) and 4 (valid value)*/
gen op1dhrsmth_i=0
replace op1dhrsmth_i=op1dhrsmth if op1dhrsmth3==4 /*valid*/
replace op1dhrsmth_i=0  if op1dhrsmth3==2                /*assign zero*/
replace op1dhrsmth_i=(.5*op1numdayswk*4.3) if op1dhrsmth3==3 & op1helpsched==1  /*assign small hours*/
replace op1dhrsmth_i=(.5*op1numdaysmn) if op1dhrsmth3==3 & (op1helpsched==2 | op1helpsched==-7 |
op1helpsched==-8)  /*assign small hours*/

/*to impute values for op1dhrsmth3==1 (impute) run imputation model ******/
/*use small amount cases and valid cases to estimate models*/

/*impute -10 missing days per month and then fill in op1dhrsmth_i*/
gen op1numdays_i=0
replace op1numdays_i=op1numdayswk*4.3 if (op1dhrsmth3==4 | op1dhrsmth3==3) & op1helpsched==1
replace op1numdays_i=op1numdaysmn if (op1dhrsmth3==4 | op1dhrsmth3==3) & (op1helpsched==2 |
op1helpsched==-7 | op1helpsched==-8)
gen ln_op1numdays_i=ln(op1numdays_i) if (op1dhrsmth3==4 | op1dhrsmth3==3)
svy: reg ln_op1numdays_i spouse otherrel regular yearnotmonth oneact disab op1outhlp op1insdhlp op1bedhlp
op1tkplhlp1 op1tkplhlp2 op1launhlp op1shophlp op1mealhlp op1bankhlp op1eathlp op1bathhlp op1toilhlp
op1dreshlp op1medshlp op1moneyhlp op1dochlp op1insurhlp if (op1dhrsmth3==4 | op1dhrsmth3==3)
predict ln_op1numdays_i2 if op1dhrsmth3==1 & op1dhrsmth2==-10
gen op1numdays_i2=exp(ln_op1numdays_i2) if op1dhrsmth3==1 & op1dhrsmth2==-10
replace op1dhrsmth_i=op1numdays_i2*op1numhrsday if op1dhrsmth3==1 & op1dhrsmth2==-10 &
op1numhrsday>=1
replace op1dhrsmth_i=op1numdays_i2*.5 if op1dhrsmth3==1 & op1dhrsmth2==-10 & op1numhrsday==0

/*impute -11 missing hours per day and then fill in op1dhrsmth_i*/
gen op1numhrsday_i=0
replace op1numhrsday_i=.5 if op1dhrsmth3==3
replace op1numhrsday_i=op1numhrsday if op1dhrsmth3==4
gen ln_op1numhrsday_i=ln(op1numhrsday_i) if (op1dhrsmth3==4 | op1dhrsmth3==3)
svy: reg ln_op1numhrsday_i spouse otherrel regular yearnotmonth oneact disab op1outhlp op1insdhlp op1bedhlp
op1tkplhlp1 op1tkplhlp2 op1launhlp op1shophlp op1mealhlp op1bankhlp op1eathlp op1bathhlp op1toilhlp
op1dreshlp op1medshlp op1moneyhlp op1dochlp op1insurhlp if (op1dhrsmth3==4 | op1dhrsmth3==3)
predict ln_op1numhrsday_i2 if op1dhrsmth3==1 & op1dhrsmth2==-11
gen op1numhrsday_i2=exp(ln_op1numhrsday_i2) if op1dhrsmth3==1 & op1dhrsmth2==-11
replace op1dhrsmth_i=op1numdayswk*4.3*op1numhrsday_i2 if op1dhrsmth3==1 & op1dhrsmth2==-11 &
op1helpsched==1
replace op1dhrsmth_i=op1numdaysmn*op1numhrsday_i2 if op1dhrsmth3==1 & op1dhrsmth2==-11 &
(op1helpsched==2 | op1helpsched==-7 | op1helpsched==-8) & op1numdaysmn>=1
```

```
replace op1dhrsmth_i=op1numdayswk*4.3*op1numhrsday_i2 if op1dhrsmth3==1 & op1dhrsmth2==-11 &
(op1helpsched==2 | op1helpsched==-7 | op1helpsched==-8) & op1numdaysmn<1 & op1numdayswk>=1

/*impute -9 and 9999 missing hours per month op1dhrsmth_i*/
gen ln_op1dhrsmth_i=ln(op1dhrsmth_i) if (op1dhrsmth3==4 | op1dhrsmth3==3)
svy: reg ln_op1dhrsmth_i spouse otherrel regular yearnotmonth oneact disab op1outhlp op1insdhlp op1bedhlp
op1tkplhlp1 op1tkplhlp2 op1launhlp op1shophlp op1mealhlp op1bankhlp op1eathlp op1bathhlp op1toilhlp
op1dreshlp op1medshlp op1moneyhlp op1dochlp op1insurhlp if (op1dhrsmth3==4 | op1dhrsmth3==3)
predict ln_op1dhrsmth_i2 if op1dhrsmth3==1 & (op1dhrsmth2==-9 | op1dhrsmth2==9999)
gen op1dhrsmth_i2=exp(ln_op1dhrsmth_i2) if op1dhrsmth3==1 & (op1dhrsmth2==-9 | op1dhrsmth2==9999)
replace op1dhrsmth_i=op1dhrsmth_i2 if op1dhrsmth3==1 & (op1dhrsmth2==-9 | op1dhrsmth2==9999)
replace op1dhrsmth_i=-1 if op1ishelper~=1

/*****************************keep imputed hours Round 1*****************************/

keep spid opid op1dhrsmth_i
label var op1dhrsmth_i “R1 hours helped last month with imputed values”
save “[add location]Round 1 hours.dta”, replace

clear
clear matrix

/***********This section sorts and merges Round 2 SP and OP files by spid*****************************/

use "[add location]NHATS_Round_2_SP_File.dta", clear
sort spid
save "[add location]NHATS_Round_2_SP_FileSORT.dta", replace

use "[add location]NHATS_Round_2_OP_File.dta", clear
sort spid opid
save "[add location]NHATS_Round_2_OP_FileSORT.dta", replace

merge spid using "[add location]NHATS_Round_2_SP_FileSORT.dta"
keep if _merge==3 /*keep cases with sp interview in round 2*/
sort spid opid
save "[add location]R2_OPSPlinked.dta", replace

/*****************set weighing******************/
svyset w2varunit [pweight=w2anfinwgt0], strata(w2varstrat)


/*******************created recoded values for imputation***************************************/

/*recode Round 2 staff days/hours variables to -1 if not helper*/
recode op2helpsched op2numdayswk op2numdaysmn op2numhrsday (-9/-7=-1) (1/999=-1) if op2ishelper==-1

/*generate indicator of help with any task that has monthly reference period*/
gen month=0
replace month=1 if (op2outhlp==1 | op2insdhlp==1 | op2bedhlp==1 | op2tkplhlp1==1 | op2tkplhlp2==1 |
op2launhlp==1 | op2shophlp==1 | op2mealhlp==1 | op2bankhlp==1 | op2eathlp==1 | op2bathhlp==1 |
op2toilhlp==1 | op2dreshlp==1 | op2medshlp==1)
```

```
/*generate indicator of help with any task that has yearly reference period*/
gen year=0
replace year=1 if (op2moneyhlp==1 | op2dochlp==1 | op2insurhlp==1)

/*generate indicator of help in last year but not last month*/
gen yearnotmonth=0
replace yearnotmonth=1 if year==1 & month==0

/*generate SP received help with self care or mobility activity or household activity for health and functioning
reasons*/
gen disab=0
replace disab=1 if mo2douthelp==2 | mo2dinsdhelp==2 | mo2dbedhelp==2
replace disab=1 if sc2deathelp==2 | sc2dbathhelp==2 | sc2dtoilhelp==2 | sc2ddreshelp==2
recode ha2dlaunreas ha2dshopreas ha2dmealreas ha2dbankreas  mc2dmedsreas (3=1) (4=1)
replace disab=1 if ha2dlaunreas==1 | ha2dshopreas==1 | ha2dmealreas==1 | ha2dbankreas==1 |
mc2dmedsreas==1

/*generate hours variable so valid (1+) hours are collapsed into value of 1*/
gen op2dhrsmth2=op2dhrsmth
recode op2dhrsmth2 (1/750=1)

/*generate variable indicating one day per month or one day per week*/
gen justone=0
replace justone=1 if  op2numdayswk==1 |  op2numdaysmn==1

/*recode help flags so all are 1 or 0*/
recode op2outhlp op2insdhlp op2bedhlp  op2tkplhlp1  op2tkplhlp2  op2launhlp  op2shophlp  op2mealhlp
op2bankhlp  op2eathlp  op2bathhlp  op2toilhlp  op2dreshlp  op2medshlp  op2moneyhlp  op2dochlp  op2insurhlp
(-999/-1=0) (2=0)

/*generate variable indicating help with only one activity*/
gen numact=op2outhlp + op2insdhlp + op2bedhlp + op2tkplhlp1 + op2tkplhlp2 + op2launhlp + op2shophlp +
op2mealhlp + op2bankhlp + op2eathlp + op2bathhlp + op2toilhlp + op2dreshlp + op2medshlp + op2moneyhlp +
op2dochlp + op2insurhlp
gen oneact=0
replace oneact=1 if numact==1

/*generate variable indicating relationship is spouse, other rel, other nonrel*/
gen spouse=0
replace spouse=1 if op2relat==2
gen otherrel=0
replace otherrel=1 if (op2relat>2 & op2relat<=29) | op2relat==91
gen nonrel=0
replace nonrel=1 if op2relat>=30 & op2relat~=91

/*generate variable indicating whether help was on regular schedule*/
gen regular=0
replace regular=1 if op2helpsched==1

/*generate indicator of imputation category */
/*********values**********************/
/*1=impute*/
```

```
/*2=recode to zero*/
/*3=recode to small number of hours per day*/
/*4=no imputation needed*/

gen op2dhrsmth3=-1
replace op2dhrsmth3=1 if (op2dhrsmth2==-11 | op2dhrsmth2==-9) & op2ishelper==1 /*impute*/
replace op2dhrsmth3=1 if op2dhrsmth2==-12 & yearnotmonth==0 & op2ishelper==1 /*impute*/
replace op2dhrsmth3=2 if  op2dhrsmth2==-12 & yearnotmonth==1 & op2ishelper==1/*recode to zero*/
replace op2dhrsmth3=3 if op2dhrsmth2==9999 & op2ishelper==1 /*recode to small number if more than one
day*/
replace op2dhrsmth3=4 if op2dhrsmth2==1 & op2ishelper==1 /*information not missing or incomplete*/

/***************reduce data set – keep only needed variables***********************************/
keep op* numact yearnotmonth disab w2anfinwgt0 w2varstrat w2varunit r2dresid spid justone oneact regular
spouse otherrel nonrel


/********************implement imputation strategy*********************************************/
/*fill in missing data as recommended for groups 2 (recode to zero), 3 (small hours per day) and 4 (valid value)*/
gen op2dhrsmth_i=0
replace op2dhrsmth_i=op2dhrsmth if op2dhrsmth3==4 /*valid*/
replace op2dhrsmth_i=0  if op2dhrsmth3==2 /*assign zero*/
replace op2dhrsmth_i=(.5*op2numdayswk*4.3) if op2dhrsmth3==3 & op2helpsched==1
replace op2dhrsmth_i=(.5*op2numdaysmn) if op2dhrsmth3==3 & (op2helpsched==2 | op2helpsched==-7 |
op2helpsched==-8)
/*try changing imputation amount to mean of small amt group*/
mean op2dhrsmth_i, over(op2dhrsmth3)

/*to impute values for op2dhrsmth3==1 (impute) run imputation model ******/
/*use small amount cases and valid cases to estimate models*/

/*impute -11 missing hours per day and then fill in op2dhrsmth_i*/
gen op2numhrsday_i=0
replace op2numhrsday_i=.5 if op2dhrsmth3==3
replace op2numhrsday_i=op2numhrsday if op2dhrsmth3==4
gen ln_op2numhrsday_i=ln(op2numhrsday_i) if op2dhrsmth3==3 | op2dhrsmth3==4
svy: reg ln_op2numhrsday_i spouse otherrel regular yearnotmonth oneact disab op2outhlp op2insdhlp op2bedhlp
op2tkplhlp1 op2tkplhlp2 op2launhlp op2shophlp op2mealhlp op2bankhlp op2eathlp op2bathhlp op2toilhlp
op2dreshlp op2medshlp op2moneyhlp op2dochlp op2insurhlp if (op2dhrsmth3==4 | op2dhrsmth3==3)
predict ln_op2numhrsday_i2 if op2dhrsmth3==1 & op2dhrsmth2==-11
gen op2numhrsday_i2=exp(ln_op2numhrsday_i2) if op2dhrsmth3==1 & op2dhrsmth2==-11
replace op2dhrsmth_i=op2numdayswk*4.3*op2numhrsday_i2 if op2dhrsmth3==1 & op2dhrsmth2==-11 &
op2helpsched==1
replace op2dhrsmth_i=op2numdaysmn*op2numhrsday_i2 if op2dhrsmth3==1 & op2dhrsmth2==-11 &
(op2helpsched==2 | op2helpsched==-7 | op2helpsched==-8)

/*impute -9 and -12 missing hours per month op2dhrsmth_i*/
gen ln_op2dhrsmth_i=ln(op2dhrsmth_i)
svy: reg ln_op2dhrsmth_i spouse otherrel regular yearnotmonth oneact disab op2outhlp op2insdhlp op2bedhlp
op2tkplhlp1 op2tkplhlp2 op2launhlp op2shophlp op2mealhlp op2bankhlp op2eathlp op2bathhlp op2toilhlp
op2dreshlp op2medshlp op2moneyhlp op2dochlp op2insurhlp if (op2dhrsmth3==4 | op2dhrsmth3==3)
predict ln_op2dhrsmth_i2 if op2dhrsmth3==1 & (op2dhrsmth2==-9 | op2dhrsmth2==-12)
```

```
gen op2dhrsmth_i2=exp(ln_op2dhrsmth_i2) if op2dhrsmth3==1 & (op2dhrsmth2==-9 | op2dhrsmth2==-12)
replace op2dhrsmth_i=op2dhrsmth_i2 if op2dhrsmth3==1 & (op2dhrsmth2==-9 | op2dhrsmth2==-12)
replace op2dhrsmth_i=-1 if op2ishelper~=1

/*****************************keep imputed hours Round 2*****************************/
keep spid opid op2dhrsmth_i
label var op2dhrsmth_i “R2 hours helped last month with imputed values”
save “[add location]Round 2 hours.dta”, replace
```