National Health and Aging Trends Study

Twenty Interval Regression Income Imputations:

Rounds 1 - 12

April 2024

Contents

Overview

The National Health and Aging Trends Study (NHATS) asks participants to report their total income for the prior calendar year in Rounds 1, 3, 5, 7, 9 and 11 forward. For those who do not report an exact value for total annual income, information is collected in broad categories. For single Sample Persons, individual income is reported; for those with a spouse or partner, couple income is reported.

In order to facilitate the use of these income data by the research community, we have developed multiple total income variables that include imputed values for those with missing income information. Through Round 11, NHATS included 5 income imputations on the Sample Person (SP) release files. These initial imputations were prepared using a hot deck approach. Beginning in Round 12, and for all prior rounds, NHATS expanded the number of imputations provided to 20 to improve standard error estimation. These expanded imputations are provided in a set of auxiliary files and were prepared using an interval regression methodology.

This technical paper describes the updated income imputation methodology using interval regression in NHATS. A separate technical paper describes the methodology for the initial income imputation methodology using a hot deck approach (Hu, Freedman & Rui 2024).

Although this technical paper demonstrates that percentile distributions for the two sets of estimates are close, means and standard deviations are lower for estimates based upon the updated methodology. We therefore recommend that researchers use the auxiliary set of 20 imputations.[1]

Auxiliary Imputed Income Files and Variables

The NHATS Imputed Income file includes one observation for each NHATS participant in the given round. Those who completed a living SP interview (r#dresid 1, 2, or 4) have reported or imputed values of total income. Following NHATS missing data conventions, remaining SPs (with r#dresid values of 3, 5, 6, 7 or 8) have variables on these files set to inapplicable (-1) or missing (-9).

The income imputation file for each round of NHATS includes 20 values of total income. In addition, a flag variable indicating which cases have imputed (vs. reported) values is included along with a derived variable indicating the reason for imputation.

Table 1. Total Income Imputation Variables Included in NHATS Auxiliary Files (All Rounds)

Variable name	Label	Description
ia#toincimif	R# F IMPUTED TOTAL INC FLG INTERVAL	Flag indicating imputation

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[1] The v. 1 Round 12 NHATS imputations were initially released before imputations for all rounds were completed (Hu & Freedman 2023). As we finalized earlier rounds, we made minor modifications to Round 12 to ensure consistency across rounds. We therefore recommend the research community use version 2 of the Round 12 imputations.

ia#dtoincimi1- ia#dtoincimi20	R# D IA50 IMPUTED TOTAL INC1-20 INTERVAL	Includes reported and imputed amounts
ia#dtoincimreas	R# D IMPUTED TOTAL INC REASON	Derived variable indicating reason for imputation: 1 Not imputed: exact value reported 2 Imputed: bracket response only 3 Imputed: missing exact value and bracket response 4 Imputed: other

Using Imputed Income in Analyses

We recommend that researchers use the auxiliary set of 20 imputations, since they yield more reliable estimates with narrower standard errors than the 5 hot deck imputations previously provided.

To adjust coefficients and standard errors for the variability between imputations following the combination rules by Rubin (1987), users can use the "mi estimate: svy" command in Stata to run estimations on the imputed dataset. To use this procedure, researchers must first generate an income variable that only includes non-imputed income values (that is, they must replace outliers that were imputed with a missing value. We have included code below for merging the auxiliary file, generating a non-imputed version of total income, and estimating weighted mean total income.

Below is an example of Stata code that may be used to estimate weighted mean income using NHATS Round 12. Other rounds are identical except for the round number in the variable names.

```
*merge income imputation file with SP file
use "[path\]NHATS_Round_12_Interval_Inc_Imp_File.dta", clear
merge 1:1 spid using "[path\]NHATS_Round_12_SP_File.dta"
drop _merge

*generate a total income variable that includes only non-imputed income values
gen ia12totinc2 = ia12dtoincimi1
replace ia12totinc2 = . if ia12dtoincimreas > 1

*save non imputed income variable to a new dataset
save newdataset, replace

*use this new dataset for analysis
use newdataset, clear

*use mi import to import data that include reported total income and additional imputed total
income variables
```

```
mi import wide, imputed (ia12totinc2 = ia12dtoincimi1 ia12dtoincimi2 ia12dtoincimi3
ia12dtoincimi4 ia12dtoincimi5 ia12dtoincimi6 ia12dtoincimi7 ia12dtoincimi8 ia12dtoincimi9
ia12dtoincimi10 ia12dtoincimi11 ia12dtoincimi12 ia12dtoincimi13 ia12dtoincimi14
ia12dtoincimi15 ia12dtoincimi16 ia12dtoincimi17 ia12dtoincimi18 ia12dtoincimi19
ia12dtoincimi20) drop
mi set wide

*NHATS Round 12 estimate weighted mean total income
mi svyset w12varunit [pweight=w12anfinwgt0], strata(w12varstrat) singleunit(centered)
mi estimate: svy, subpop(if r12dresid == 1 | r12dresid == 2 | r12dresid == 4 ): mean ia12totinc2
```

Extent of Missing Data for Total Income

Table 2 shows the percentage of participants that require imputation and the reason for NHATS through Round 12. The percentage of respondents who did not require imputation (i.e., provided an exact value of total income) increased across rounds from 54.3% in Round 1 to 72.0% in Round 12. A categorical response (requiring imputation within a bracket) was reported by 13.6%-21.7%, depending on the round and 13.1%-30.6% were missing both an exact valued and a categorical response (requiring a full imputation). In addition, about 1% of respondents provided values that were considered outliers (extremely low or high values that were inconsistent with other rounds) and hence imputed.

Table 2. Percentage of NHATS Participants Requiring Income Imputation and Reason

	n*	% Not imputed: exact value reported	% Imputed: bracket response only	% Imputed: missing exact value and bracket response	% Imputed: other
Round 12	5,900	72.0	14.5	12.6	1.0
Round 11	3,388	68.5	17.2	14.0	0.3
Round 9	4,460	68.2	17.9	13.1	0.9
Round 7	5,566	64.0	19.5	15.4	1.1
Round 5	7,576	55.4	19.4	24.7	0.6
Round 3	4,884	58.3	21.7	19.2	0.8
Round 1	7,609	54.3	13.6	30.6	1.6
*Includes those who completed a living SP interview.					

Imputation Approach

For purposes of imputation, we transformed income reports to log income (after adding $1). For respondents missing an exact value (or reporting an outlier value suspected to be misreporting[2]), we used multiple imputation by chained equations (MICE) to impute missing covariates and then missing total income. We used interval regression in Stata, which fills in the missing values of partially observed (censored) income (that is, within a range).

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[2]Cases with reported income <$200 and >$900,000 were confirmed to be substantially different from reports in prior rounds and therefore imputed.

To implement the interval regression approach, we specified a lower and upper limit for all cases. For cases with an exact value, we added $1 to the reported value, and specified the lower and upper limits to be the log-transform of that amount (essentially assigning the reported value to each imputation). For cases with only categorical information, we used the log-transformed upper and lower amounts of the bracket (plus $1) as limits. Cases with only an upper limit (e.g., income < $40,000 in Round 12) received $1 as their lower limit. Cases with only a lower limit (e.g., income > $145,000 in Round 12) received a missing value for their upper limit, which can take any positive value above the lower limit. For low-end outliers (<$200) inconsistent with prior rounds, we assumed that the exact value was in the lowest income category, e.g., <$40,000 for Round 12. For cases missing both sources of income (exact value and categorical information) and for high-end outliers (>$900,000) inconsistent with prior rounds, the lower limit was specified as $1 and upper limit set to missing. Before releasing the data, we transformed reported and imputed values back to the original (non-logged) dollar scale.

Imputation Groups

Imputation groups were formed based on available covariates. For Rounds 1, 3, 7, 9, and 11, three imputation groups were formed:

1. Sample persons (SPs) with a spouse/partner who completed the entire interview (non-breakoff);
2. SPs without a spouse/partner, non-breakoff;
3. SPs who did not complete the interview (breakoff);

For replenish rounds, i.e., Rounds 5 and 12, the three groups above were further divided into continuing and new SP groups (i.e., yielding six groups in Round 5 and five groups in Round 12. Sample sizes for each imputation group are presented by round in Appendix Table 1.

The breakoff group criteria changed starting in Round 11. Prior to Round 11, the Income & Assets (IA) section was administered near the end of the interview. For those rounds, most of the breakoffs occurred before the IA section. We therefore used the breakoff indicator (r#breakoffst) provided by NHATS to define the breakoff groups for imputation purposes. In 2011 the interview was reorganized and the IA section now occurs earlier in the interview. Starting in Round 11, we therefore classify interviews as breakoffs if they do not have most of the variables used in imputation – that is, if they occur before the end of the Economic Well-Being (EW) section.

Variables Used in Imputation

Here we provide an overview of covariates included in the imputation models. See Appendix Table 2 for details by imputation group and round. For all rounds, four classes of variables were used in the imputation.

1. <u>Sources of income</u> indicate whether the respondent (and his/her spouse/partner, if applicable) has each source (yes/no). Sources include: Social Security and/or Railroad Retirement payments; Supplemental Security Income; Veteran's Administration payments; and whether they worked for pay last month.
2. <u>Sources of wealth</u> (some of which may generate income) indicate whether the respondent (and his/her spouse/partner, if applicable) has each source. Sources include: pension plans that were a job-related or union benefit; other retirement plans such as 401K plans, 403B plans or IRAs; mutual funds or stocks; any bonds; checking account; savings account; certificates of deposit (CDs); whether they own their home (and home value), rent their home or have some other arrangement; and whether they own a business, a farm, or any other real estate besides their home.
3. <u>Other income-related predictors</u> include: whether they usually pay off all credit card balances every month or don't have any credit cards and amount of balances owned; whether they have medical bills that are being paid over time; whether they receive or provide financial gifts to children or other relatives either regularly or just every so often as needed (and the amount of financial help provided to children or other relatives); whether they received food stamps, other food assistance such as Meals-on-Wheels, and / or gas, electricity, or other energy assistance; whether they have enough money for rent or mortgage, utilities and / or medical or prescription drug bills; and whether they live in Section 8 public housing or housing for low-income seniors.
4. <u>Other predictors</u> include: age, race/ethnicity, gender, educational attainment, current marital status, if there has been a change in marital status change from last round (continuing SPs only), total income from the last round (reported or average of 20 imputations for continuing SPs only), residential care status, whether the SP responded for themselves or had a proxy respondent, and interviewer observations about the home condition. Census division and metro/non-metro residence are also included as geographic indicators related to the complex sample design of NHATS. In Round 11 only, mode for Part 1 of the NHATS interview was also included as a predictor.

Income Imputation Procedure

For each imputation group, we estimated multiple imputations by chained equations (MICE) first to fill in missing values for covariates (starting with the least missing) and then for logged total income. Interval regression was used to impute 20 values of logged total income. We tested various numbers of imputations, ranging from 5 to 50. We found that 20 imputations consistently resulted in stable standard error estimation. The final number of imputations also aligns with recommendations from the literature when up to 30% of respondents have missing values (Graham et al., 2007; Bodener, 2008). For each imputation group, we specified 20 burn-in iterations (i.e., the number of iterations before the first set of imputed values is drawn). Final imputed variables were transformed back to a non-logged dollar scale.

We incorporated NHATS survey design variables into the imputation procedure by using NHATS weights in the imputation model (using a pweight statement).[3]

A summary of imputation model results can be found in the Appendix.

Descriptive Statistics for Total Income

Table 3 presents weighted descriptive statistics through Round 12 using 20 imputed values generated through the interval regression approach. The weighted means are based on averages over the 20 imputations and the standard error calculations take into account the extra variations introduced by the uncertainty of the imputation.

Table 3. Weighted Means and Percentiles for Total Income (in dollars), NHATS Rounds 1-12

	Reference Year	Ages	n	Mean	Standard error	25th percentile	Median	75th percentile
Round 12[a]	2021	65+	5,900	72,178	2,333	25,000	50,000	94,034
Round 11	2020	71+	3,388	64,321	2,656	24,637	47,000	80,000
Round 9	2018	69+	4,460	61,986	2,058	22,889	44,048	80,000
Round 7	2016	67+	5,566	60,411	2,135	22,000	41,741	76,602
Round 5	2014	65+	7,576	57,744	1,841	20,400	40,000	74,000
Round 3	2012	67+	4,884	52,774	1,711	18,980	35,270	68,985
Round 1	2010	65+	7,609	46,540	1,335	17,320	32,000	59,610

Note: Weighted means and standard errors were computed using "mi estimate: svy" command. Median and percentiles were computed using the "_pctile" command for the average of the 20 imputed variables. Final analytic weights were used in these analyses. Total income is for individuals and their spouse/partners (if applicable).
[a]Version 2. Values for Version 1 were 71,980 (Mean); 2,305 (SE), 25,000 (25th percentile), 50,000 (median), and 92,784 (75th percentile). See Hu & Freedman (2023).

Comparison with Previous Hot Deck Imputation Approach

Through Round 11, NHATS provided on each SP File 5 imputations prepared using a hot deck methodology (for details see Hu, Freedman & Jiao, 2024). Table 4 summarizes the main differences between the current interval regression and previous hot deck approach.

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[3]Although we did include publicly available geographic indicators (SP's census division and metro/non-metro residence) as controls, we could not directly account for strata and cluster variables in the imputation strategy. We considered other approaches–e.g., adding a variable for each strata by cluster combination or imputing separately by each unique cluster (Heeringa, West & Berglund, 2017; Kalpourtzi et al. 2024; Reiter 2006). However, the study has too many cluster/strata combinations to implement these approaches. We also explored controlling for the full set of replicate weights, which captures the survey's complex design, and found results were substantially similar to the final income imputations that we released. For example, for group 1 (i.e., continuing SP with spouse/partner) of Round 12, estimates for including replicate weights were 94,550 (mean), 4,134 (SE), 47,313 (25th percentile), 75,000 (median), and 117,162 (75th percentile), while for our current approach, the values were 93,854 (mean), 4,002 (SE), 47,254 (25th percentile), 75,000 (median), and 116,005 (75th percentile). However, the model did not consistently converge across imputation groups.

Table 4. Differences Between Hot Deck and Interval Regression Imputation Approaches

Hot Deck (5 imputations)	Interval Regression (20 imputations)
Imputation preparation: Editing before multiple imputation	
• Reports of zero income were accepted as valid and eligible to be used as donors for imputation	• Reports of less than $200 were treated as missing an exact value and imputed into the lowest income category
• Reports of very high incomes were accepted as valid and eligible to be used as donors for imputation	• Reports above $900,000 were treated as missing an exact value and imputed
Imputation	
• Cyclical n-partition hot deck procedure	• Interval regression
• Models do not distinguish different imputation groups; most but not all variables used in imputation are the same across rounds	• Models estimated for separately groups; most but not all variables used in imputation are the same across rounds
• Total Income Range variables for respondents who have spouse/partner and respondents who are single are imputed first; Total Income is then imputed within the income range.	• Total Income Range variables are not imputed as an interim step
Delivery	
• 5 imputed variables (ia#toincim1-5) and a flag variable (ia#toincimf) indicating which cases were imputed • Total income range for respondents who have spouse/partner (ia#eincimj1-5) and a flag variable (ia#eincimjf) • Total income range for respondents who are single (ia#eincims1-5) and a flag variable (ia#eincimsf)	• 20 imputed variables (ia#dtoincimi1-ia#dtoincimi20), a flag variable (ia#toincimif) indicating which cases were imputed, and a derived variable (ia#dtoincimreas) indicating reason for imputation
• Included in SP data file	• Included in an auxiliary file zipped with the NHATS data files

Table 5 compares descriptive statistics for the hot-deck and interval regression approaches through Round 11. The percentile distributions for the two sets of estimates are close, but means and standard errors are lower in the interval regression approach, likely because outliers were imputed rather than included as possible donors.

Table 5. NHATS imputed total income through Round 11: hot deck vs. interval regression approaches

	n	Mean	Standard error	25th percentile	Median	75th percentile
Round 11						
Hot deck	3,388	67,979	3,541	24,000	46,000	80,000
Interval regression	3,388	64,282	2,680	24,491	47,000	80,000

Round 9						
Hot deck	4,460	62,740	2,501	22,000	44,000	80,000
Interval regression	4,460	64,321	2,656	24,637	44,048	80,000
Round 7						
Hot deck	5,566	90,636 [a]	21,811[a]	21,272	41,800	76,600
Interval regression	5,566	60,411	2,135	22,000	41,741	76,602
Round 5						
Hot deck	7,576	66,548	4,493	20,000	40,000	75,000
Interval regression	7,576	57,744	1,841	20,400	40,000	74,000
Round 3						
Hot deck	4,884	69,428	7,447	18,600	35,600	70,000
Interval regression	4,884	52,774	1,711	18,980	35,270	68,985
Round 1						
Hot deck	7,609	58,050	3,222	16,668	32,200	60,000
Interval regression	7,609	46,540	1,335	17,320	32,000	59,610

Note: Weighted means and standard errors were computed using "mi estimate: svy" command. Median and percentiles were computed using the "_pctile" command for the average imputed variables. Final analytic weights were used in these analyses.

[a] In Round 7, there were several reported (n=12) and imputed (n=2-9, depending on the imputation) values above $900,000, including reported and imputed values of $99,999,999 and $9,999,999.

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Appendix

Appendix Table 1. Sample Sizes for Income Imputation Groups: NHATS Rounds 1-12

	Continuing SP			New SP		
	1-Has spouse/ partner	2-No spouse/ partner	3-Breakoff*	4-Has spouse/ partner	5-No spouse/ partner	6-Breakoff*
Round 12						
Number with Reported Income	890	1,182	0	1,133	1,040	0
Number with Imputed Income	386	488	0	425	354	2
Total Model Sample Size	1,276	1,670	0	1,558	1,394	2,954
Round 11						
Number with Reported Income	1,052	1,270	0	-	-	-
Number with Imputed Income	442	623	1	-	-	-
Total Model Sample Size	1,494	1,893	3,388	-	-	-
Round 9						
Number with Reported Income	1,374	1,666	0	-	-	-
Number with Imputed Income	622	797	1	-	-	-
Total Model Sample Size	1,996	2,463	4,460	-	-	-
Round 7						
Number with Reported Income	1,682	1,878	1	-	-	-
Number with Imputed Income	892	1,077	36	-	-	-
Total Model Sample Size	2,574	2,955	5,566	-	-	-
Round 5						
Number with Reported Income	954	1,061	2	1,100	1,074	2
Number with Imputed Income	686	891	33	802	780	191
Total Model Sample Size	1,640	1,952	3,627	1,902	1,854	3,949
Round 3						
Number with Reported Income	1,392	1,455	1	-	-	-
Number with Imputed Income	869	1,082	85	-	-	-
Total Model Sample Size	2,261	2,537	4,884	-	-	-
Round 1						
Number with Reported Income	2,062	2,066	1	-	-	-
Number with Imputed Income	1,691	1,698	91	-	-	-
Total Model Sample Size	3,753	3,764	7,609	-	-	-

* Reported or average of 20 imputed values for the other two groups are also included in model estimation of the breakoff group.

Appendix Table 2. Variables used in Income Imputation Models by Imputation Group: NHATS Rounds 1-12

Variable name	Label	All rounds			Notes
		Continuing and New SP in Replenishment Years Unless Noted Otherwise			
		Has spouse/ partner	No spouse/ partner	Breakoff	
Sources of income					
ia#recsspa1	R# IA1 SP REC SOCIAL SECURITY	Yes	Yes	No	
ia#recsspa2	R# IA1 SPOUSE PART REC SOC SEC	Yes	No	No	
ia#recssils1	R# IA4 SP RECEIVD SSI LAST MONTH	Yes except for R11	Yes	No	
ia#recssils2	R# IA4 SPOUSE PRT REC SSI LST MO	Yes except for R11	No	No	
ia#recssils3	R# IA4 NO SSI RECEIVD LAST MONTH	No except for R11	No	No	
ia#rvapayls1	R# IA5 SP REC PAY FRM VA LAST MO	Yes	Yes	No	
ia#rvapayls2	R# IA5 SPOUS PA REC VA PAY LSTMO	Yes	No	No	
pa#workfrpay	R# PA17 EVER WORK FOR PAY	Yes	Yes	Yes	
lf#huswifwrk	R# LF13 HUSB WIFE PARTN PAY WORK	Yes	No	No	
Sources of wealth					
ia#penjobou1	R# IA6 SP HAS PENSION PLAN	Yes	Yes	No	
ia#penjobou2	R# IA6 SPOUSE HAS PENSION PLAN	Yes	No	No	
ia#iraothac1	R# IA7 SP HAS IRA OTH RETIRE ACC	Yes	Yes	No	
ia#iraothac2	R# IA7 SPOUSE HAS IRA OTHR ACC	Yes	No	No	
ia#mutfdstk1	R# IA8 SP OWNS MUTUAL FUND STOCK	Yes	Yes	No	Combined into a single variable: whether SP or spouse/partner of SP own any mutual fund stocks or bonds
ia#mutfdstk2	R# IA8 SPOUSE OWNS FUNDS STOCK				
ia#mutfdstk3	R# IA8 SP SPOUSE OWN FUNDS STOCK				
ia#mutfdstk4	R# IA8 NO FUNDS OR STOCK OWNED				
ia#ownbond1	R# IA12 SP OWNS BONDS				
ia#ownbond2	R# IA12 SPOUSE OWNS BONDS				
ia#ownbond3	R# IA12 SP SPOUSE OWN BONDS				
ia#ownbond4	R# IA12 NO BONDS OWNED				
ia#bnkacccd1	R# IA10 SP OWNS CHECK ACCT	No	Yes	No	
ia#bnkacccd4	R# IA10 NO CHECK ACCT OWNED	No[a]	No	No	
ia#bnkacccd5	R# IA10 SP OWNS SAVINGS ACCT	Yes	Yes	No	Combined into a single variable: whether SP or spouse/partner of SP own any savings account or CD
ia#bnkacccd6	R# IA10 SPOUSE OWNS SAVING ACCT				
ia#bnkacccd7	R# IA10 SP SPOUSE OWN SAVNG ACT				
ia#bnkacccd8	R# IA10 NO SAVINGS ACCT OWNED				
ia#bnkacccd9	R# IA10 SP OWNS CDS				
ia#bnkaccc10	R# IA10 SPOUSE OWNS CDS				
ia#bnkaccc11	R# IA10 SP SPOUSE OWN CDS				
ia#bnkaccc12	R# IA10 NO CDS OWNED				

hp#ownrentot	R# HP1 OWN RENT OR OTHER	Yes (binary in Round 1, excluded in Round 7, 3-category other years)[b]	Yes (binary in Round 5, 3-category other years)[c]	No	Three versions:
					A. binary (whether own or not) [Round 1]
					B. 3-category variable:
					   1. Own, home value < $200,000
					   2. Own, home value >= $200,000
					   3. Rent or other arrangement;
					C. 4-category variable:
					   1. Own, home value < $200,000
					   2. Own, home value >= $200,000
					   3. Rents
					   4. Other arrangement

hp#homevalue	R# HP4 PRESENT VALUE OF HOME				
hp#homvalamt	R# HP4A HOME VALUE AMOUNT				
ia#realestt1	R# IA13 SP OWNS REAL ESTATE	No	Yes	No	
ia#realestt4	R# IA13 NO REAL ESTATE OWNED	Yes	No	No	
Other income-related predictors					

ew#pycredbal	R# EW1 PAY OFF CREDIT CARD BALAN	Yes (4-category except Round 11 continuing)	Yes (4-category)	No	Two versions:
					A. Binary variable:
					   1. Has a credit card;
					   2. Doesn't have credit card
					B. 4-category variable:

ew#crecardeb	R# EW2 TOTAL CREDIT CARD DEBT				

					1. Pays off credit card each month 2. Pays minimum or more than minimum but not entire amount; has <$4,000 balance 3. Pays more than minimum but not entire amount; has >=$4,000 balance 4. Doesn't have credit card
ew#medpaovtm	R# EW5 MED BILLS PAID OVERTIME	Yes	Yes	No	
ew#finhlpfam	R# EW7 FINANCIAL HELP FRM FAMILY	Yes	Yes	No	

ew#fingftfam	R# EW12 FINANCIAL GIFTS TO FAMLY				Two versions:
					A. Binary variable
					  1. No gift to family
					  2. Gift to family
					B. 3-category:
					  1. No gift to family
					  2. < $4000 gift to family
					  3. >= $4000 gift to family

ew#amthlpgiv	R# EW14 AMOUNT OF HELP GIVEN	Yes (3-category)	Yes (3-category in Rounds 1, 7, and 9 continuing; binary otherwise)	No	
ew#progneed1	R# EW15 SP RECEIVD FOOD STAMPS				Combine into one binary variable
ew#progneed2	R# EW15 SP REC OTHR FOOD ASST	Yes	Yes	No	
ew#progneed3	R# EW15 SP REC GAS ENERGY ASST				
ew#nopayhous	R# EW18 NO MONEY FOR HOUSING				Combined into one binary variable
ew#nopayutil	R# EW18 NO MONEY FOR UTILITIES	Yes except Round 1	Yes except Round 1	No	
ew#nopaymed	R# EW18 NO MONEY FOR MEDICAL				
hp#sec8pubsn	R# HP7 HME SEC 8 PUBL SENOR HOUS	No	Yes	No	
Other predictors					
r#dintvwrage	R# D AGE OF SP AT INTERVIEW	Yes	Yes	Yes	

rl#dracehisp	R# D RACE AND HISPANIC ETHNICITY	Yes	Yes	Yes	4-category:
					  1. White, non-Hispanic
					  2. Black, non-Hispanic
					  3. Others/Missing
					  4. Hispanic

r#dgender	R# D GENDER OF SP	No	Yes	Yes	

el#higstschl	R# EL10 HGHST DGREE SCOOL COMPLD WHEN ADDED	Yes	Yes	Yes	4-category:
					  1. Less than high school
					  2. High school graduate
					  3. Some college
					  4. College graduate or more

hh#dmarstat	R# HH1 MARITAL STATUS	No	Yes	Yes	
Marital status change from last round		Yes except Round 1 and 12[d]	Yes except Round 1	Yes except Round 1	
Income from last round in which income collected		Yes except Round 1[d]	Yes except Round 1	Yes except Round 1	Reported or imputed income from last round in which income was collected. For a small number of cases that did not have an SP interview in the last round income was collected (r#status=64), last round income was treated as missing and imputed.
r#dresid	R# D RESIDENTIAL CARE STATUS	Yes	Yes	Yes	
is#resptype	R# IS2 TYPE OF RESPONDENT	Yes	Yes	Yes	
ir#areacond1	R# IR15 LITTER GLASS ON SDWLK ST				Combined into one binary variable
ir#areacond2	R# IR15 GRAFFITI ON BUILDG WALLS	Yes	Yes	Yes	
ir#areacond3	R# IR15 VACANT HOUSES OR STORES				
ir#condhome1	R# IR16 BROKEN WINDOWS IN HOME				Combined into one binary variable
ir#condhome2	R# IR16 CRUMBLNG FOUNDTN IN HOME				
ir#condhome3	R# IR16 MISSNG BRCKS SIDNG IN HM	Yes	Yes	Yes	
ir#condhome4	R# IR16 ROOF PROBLEM IN HOME				
ir#condhome5	R# IR16 BROKEN STEPS TO HOME	Yes	Yes	Yes	
ir#condhome6	R# IR16 CONTINUOUS SIDEWALKS	Yes	Yes	Yes	
re#dcensdiv	R# D SP CENSUS DIVISION	Yes	Yes	Yes	Recoded to four categories
r#dmetnonmet	R# D METRO / NON-METRO RESIDENCE	Yes	Yes	Yes	

[a]Yes for new sample in replenishment year
[b]4-category for new sample in replenishment year
[c]3-category for new sample Round 5 and 4-category for new Sample Round 12

Appendix Table 3. Model results for NHATS Round 1 by imputation groups

	1-Has spouse/ partner		2-No spouse/ partner		3-Breakoff	
	Coef.	SE	Coef.	SE	Coef.	SE
SP's spouse/partner work for pay last month						
No						
Yes	0.12	0.04				
SP has pension plan						
No						
Yes	0.10	0.03	0.26	0.03		
SP's spouse/partner has pension plan						
No						
Yes	0.09	0.03				
SP receives social security						
No						
Yes	-0.08	0.03	0.04	0.06		
SP's spouse/partner receives social security						
No						
Yes	-0.03	0.04				
SP receives payment from VA						
No						
Yes	0.11	0.05	0.16	0.05		
SP's spouse/partner receives payment from VA						
No						
Yes	0.16	0.06				
SP receives SSI last month						
No						
Yes	-0.25	0.09	-0.26	0.05		
SP's spouse/partner receives SSI last month						
No						
Yes	-0.23	0.09				
SP has IRA or other retirement plans						
No						
Yes	0.11	0.03	0.15	0.04		
SP's spouse/partner has IRA or other retirement plans						
No						
Yes	0.11	0.03				
SP or spouse/partner of SP own any saving account or CD						
No						
Yes	0.13	0.04	0.16	0.03		
SP owns checking account						
No						
Yes			0.14	0.05		
No checking account owed						
No						
Yes	-0.17	0.09				
Receive help from food stamp, other food assistance or gas, electricity, or other energy assistance						
No						
Yes	-0.22	0.05	-0.16	0.04		
Financial help from family						
No						
Yes	-0.29	0.07	-0.16	0.05		
SP owns real estate						
No						
Yes			0.14	0.05		
No real estate owned by SP or spouse/partner of SP						
No						
Yes	-0.18	0.03				
Medical bills paid over time						
No						
Yes	-0.02	0.04	0.03	0.04		
Broken steps to home						
No						
Yes	-0.09	0.05	-0.05	0.04	-0.06	0.03

Whether any litter, graffiti on buildings and walls, or vacant or deserted houses						
No						
Yes	-0.10	0.05	0.02	0.04	-0.17	0.03
Whether broken windows, crumbling foundation, missing bricks, siding or roof problems						
No						
Yes	0.06	0.05	-0.11	0.05	-0.06	0.03
Whether SP or spouse/partner of SP own any mutual fund or bonds						
No						
Yes	0.23	0.03	0.17	0.05		
Credit card payment						
1 pay off						
2 pay minimum or more than minimum but not entire with less than 4,000 balances	0.03	0.05	-0.08	0.05		
3 pay more than minimum but not entire with 4,000 or more balances	0.15	0.04	0.00	0.05		
4 don't have credit card	-0.14	0.05	-0.17	0.04		
Home ownership (three-category)						
1 own, home value < 200,000						
2 own, home value >= 200,000			0.20	0.06		
3 rent or other arrangement			-0.02	0.03		
Home ownership (two-category)						
No						
Yes	0.14	0.05				
Gift to family						
1 No gift to family						
2 < 4000 gift	-0.01	0.03	0.02	0.04		
3 >= 4000 gift:	0.35	0.04	0.30	0.06		
Residential care status						
1 Community						
2 Residential care not nursing home (SP interview)	-0.01	0.13	-0.01	0.06	-0.15	0.04
Section 8 public housing or housing for low-income seniors						
No						
Yes			-0.10	0.05		
Ever work for pay						
No						
Yes	0.24	0.04	0.25	0.04	0.34	0.02
Marital status						
Married						
Living with a partner					-0.26	0.05
Separated					-0.88	0.07
Divorced			0.10	0.08	-0.73	0.03
Widowed			0.14	0.07	-0.53	0.02
Never married			0.09	0.09	-0.69	0.06
Education						
1 <HS						
2 HS	0.05	0.04	0.04	0.04	0.27	0.02
3 >HS, <College	0.16	0.04	0.16	0.05	0.48	0.02
4 College+	0.41	0.05	0.47	0.06	0.90	0.03
Gender						
1 Male						
2 Female			-0.11	0.03	-0.06	0.02
Race/ethnicity						
1 White, non-Hispanic						
2 Black, non-Hispanic	-0.04	0.05	-0.04	0.04	-0.23	0.02
3 Others/Missing	-0.19	0.09	-0.10	0.08	-0.47	0.06
4 Hispanics	-0.28	0.06	-0.02	0.05	-0.46	0.04
Age	-0.01	0.00	0.00	0.00	-0.01	0.00
Census division						
Northeast Region						
Midwest Region	0.00	0.05	0.03	0.04	0.01	0.03
South Region	0.03	0.04	0.02	0.04	-0.04	0.02
West Region	0.13	0.05	-0.02	0.05	0.08	0.03

Metro / Non-metro residence						
1 Metropolitan						
2 Non-metropolitan	-0.16	0.04	-0.07	0.04	-0.18	0.02
Response type						
1 Sample Person (SP)						
2 Proxy	-0.09	0.08	-0.01	0.06	-0.21	0.04
Constant	10.76	0.19	9.55	0.20	10.80	0.10
Log of sigma	-0.49	0.03	-0.51	0.03	-0.47	0.02
Sigma	0.61	0.02	0.60	0.02	0.63	0.01

Appendix Table 4. Model results for NHATS Round 3 by imputation groups

	1-Has spouse/ partner		2-No spouse/ partner		3-Breakoff	
	Coef.	SE	Coef.	Coef.	SE	Coef.
SP's spouse/partner work for pay last month						
No						
Yes	0.20	0.04				
SP has pension plan						
No						
Yes	0.11	0.03	0.14	0.03		
SP's spouse/partner has pension plan						
No						
Yes	0.08	0.03				
SP receives social security						
No						
Yes	-0.01	0.04	-0.16	0.08		
SP's spouse/partner receives social security						
No						
Yes	-0.01	0.04				
SP receives payment from VA						
No						
Yes	0.06	0.05	0.11	0.05		
SP's spouse/partner receives payment from VA						
No						
Yes	0.06	0.07				
SP receives SSI last month						
No						
Yes	-0.09	0.10	-0.10	0.05		
SP's spouse/partner receives SSI last month						
No						
Yes	0.00	0.10				
SP has IRA or other retirement plans						
No						
Yes	0.00	0.03	0.08	0.03		
SP's spouse/partner has IRA or other retirement plans						
No						
Yes	0.07	0.03				
SP or spouse/partner of SP own any saving account or CD			0.07	0.03		
No						
Yes	-0.01	0.04				
SP owns checking account						
No						
Yes			0.00	0.06		
Financial help from family						
No						
Yes	0.01	0.06	-0.09	0.04		
Financial gifts to family						
No						
Yes			0.15	0.03		
Financial gifts to family						
1 No gift to family						
2 < 4000 gift	0.05	0.03				
3 >= 4000 gift:	0.28	0.04				
SP owns real estate						
No						
Yes			-0.02	0.04		
No real estate owned by SP or spouse/partner of SP						
No						
Yes	-0.07	0.03				
Medical bills paid over time						
No						
Yes	-0.04	0.04	0.04	0.04		
Broken steps to home						
No						
Yes	-0.04	0.06	0.02	0.03	-0.03	0.03
Continuous sidewalks						
No						

	(1)		(2)		(3)	
Yes	0.06	0.03	0.03	0.03	0.03	0.02
Whether SP or spouse/partner of SP own any mutual fund or bonds						
No						
Yes	0.12	0.03	0.12	0.03		
Home ownership (four-category)						
1 own, home value < 200,000						
2 own, home value >= 200,000	0.21	0.03				
3 rent	0.02	0.06	0.19	0.04		
4 other arrangement	0.05	0.07	-0.06	0.03		
Home ownership (three-category)						
1 own, home value < 200,000						
2 own, home value >= 200,000						
3 rent or other arrangement						
Residential care status						
1 Community						
2 Residential care not nursing home (SP interview)	0.11	0.18	-0.05	0.07	-0.04	0.05
4 Nursing home (SP interview)	-0.06	0.18	0.13	0.12	0.08	0.06
Section 8 public housing or housing for low-income seniors						
No						
Yes			-0.09	0.06		
Ever work for pay						
No						
Yes	0.10	0.03	0.15	0.04	0.14	0.02
Marital status						
Married						
Living with a partner					-0.06	0.07
Separated					-0.48	0.10
Divorced			0.05	0.09	-0.42	0.03
Widowed			0.09	0.09	-0.31	0.02
Never married			0.13	0.10	-0.32	0.05
Marital status change from Round 1 to Round 3						
No						
Yes	0.07	0.10	0.01	0.05	0.00	0.04
Education						
1 <HS						
2 HS	0.06	0.05	0.01	0.04	0.12	0.03
3 >HS, <College	0.08	0.05	0.09	0.04	0.20	0.03
4 College+	0.19	0.05	0.19	0.05	0.35	0.03
Gender						
1 MALE						
2 FEMALE			-0.18	0.03	-0.04	0.02
Race/ethnicity						
1 White, non-Hispanic						
2 Black, non-Hispanic	0.06	0.04	0.01	0.03	-0.02	0.02
3 Others/Missing	-0.04	0.10	-0.03	0.06	-0.10	0.06
4 Hispanics	-0.15	0.09	-0.14	0.05	-0.20	0.04
Age	-0.01	0.00	0.00	0.00	-0.01	0.00
Round 1 income	0.39	0.03	0.35	0.03	0.56	0.02
Metro / Non-metro residence						
1 Metropolitan						
2 Non-metropolitan	-0.02	0.03	0.01	0.04	-0.03	0.02
Response type						
1 Sample Person (SP)						
2 Proxy	0.04	0.08	0.04	0.05	-0.07	0.03
Receive help from food stamp, other food assistance or gas, electricity, or other energy assistance						
No						
Yes	-0.14	0.07	-0.18	0.04		
No money for housing, utilities or medical bills						
No						
Yes	-0.16	0.07	-0.08	0.05		
No checking account owed						
No						
Yes	-0.15	0.11				

Whether any litter, graffiti on buildings and walls, or vacant or deserted houses						
No						
Yes	-0.03	0.06	-0.09	0.04	-0.13	0.03
Credit card payment						
1 pay off						
2 pay minimum or more than minimum but not entire with less than 4,000 balances	-0.05	0.05	-0.02	0.04		
3 pay more than minimum but not entire with 4,000 or more balances	0.06	0.05	0.11	0.05		
4 don't have credit card	-0.17	0.05	-0.12	0.03		
Whether broken windows, crumbling foundation, missing bricks, siding or roof problems						
No						
Yes	0.00	0.08	0.00	0.05	-0.05	0.04
Census division						
Northeast Region						
Midwest Region	0.02	0.04	-0.05	0.04	-0.03	0.03
South Region	0.05	0.04	-0.04	0.03	-0.03	0.03
West Region	0.00	0.05	0.00	0.04	0.03	0.03
Constant	6.83	0.42	6.73	0.45	5.06	0.28
Log of sigma	-0.71	0.05	-0.76	0.04	-0.71	0.03
Sigma	0.49	0.02	0.47	0.02	0.49	0.01

Appendix Table 5. Model results for NHATS Round 5 by imputation groups

| | Continuing SP | | | | | | New SP | | | | | |
| | 1-Has spouse/partner | | 2-No spouse/partner | | 3-Breakoff | | 4-Has spouse/partner | | 5-No spouse/partner | | 6-Breakoff | |
	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
SP's spouse/partner work for pay last month												
No												
Yes	0.04	0.05					0.11	0.04				
SP has pension plan												
No												
Yes	0.01	0.03	0.16	0.03			0.11	0.03	0.18	0.04		
SP's spouse/partner has pension plan												
No												
Yes	0.06	0.03					0.10	0.03				
SP receives social security												
No												
Yes	0.05	0.05	0.04	0.08			-0.06	0.04	-0.26	0.09		
SP's spouse/partner receives social security												
No												
Yes	-0.10	0.05					-0.09	0.04				
SP receives payment from VA												
No												
Yes	0.08	0.06	0.09	0.05			0.16	0.06	0.16	0.08		
SP's spouse/partner receives payment from VA												
No												
Yes	0.02	0.08					0.09	0.06				
SP receives SSI last month												
No												
Yes	-0.53	0.20	-0.04	0.08			-0.22	0.12	-0.14	0.07		
SP's spouse/partner receives SSI last month												
No												
Yes	0.23	0.12					-0.09	0.10				
SP has IRA or other retirement plans												
No												
Yes	0.06	0.04	0.13	0.03			0.02	0.04	0.13	0.05		
SP's spouse/partner has IRA or other retirement plans												
No												
Yes	-0.03	0.04					0.15	0.04				
SP or spouse/partner of SP own any saving account or CD												
No												
Yes	0.03	0.04	0.10	0.03			0.09	0.04	0.19	0.04		
SP owns checking account												
No												
Yes			0.12	0.08					0.31	0.08		
No money for housing, utilities or medical bills												
No												
Yes	-0.22	0.11	0.03	0.05			-0.01	0.08	-0.08	0.07		
Receive help from food stamp, other food assistance or gas, electricity, or other energy assistance												
No												
Yes	-0.11	0.08	-0.12	0.04			-0.22	0.07	-0.14	0.06		
Financial help from family												
No												
Yes	-0.10	0.08	-0.05	0.05			-0.14	0.07	-0.14	0.05		
Financial gifts to family												
No												
Yes			0.12	0.03					0.21	0.04		
Financial gifts to family												
1 No gift to family												
2 < 4000 gift	0.08	0.03					0.10	0.04				
3 >= 4000 gift	0.25	0.05					0.34	0.05				
SP owns real estate												

	Est	SE	Est	SE	Est	SE	Est	SE	Est	SE	Est	SE
No												
Yes			0.09	0.05					0.14	0.06		
No real estate owned by SP or spouse/partner of SP												
No												
Yes	-0.18	0.04					-0.16	0.04				
Medical bills paid over time												
No												
Yes	-0.05	0.08	-0.05	0.04			-0.08	0.05	-0.06	0.07		
Broken steps to home												
No												
Yes	-0.01	0.05	0.04	0.04	-0.02	0.03	0.07	0.06	-0.03	0.06	0.02	0.04
Continuous sidewalks												
No												
Yes	0.03	0.03	0.02	0.03	0.01	0.02	0.05	0.04	0.02	0.04	0.03	0.02
Whether any litter, graffiti on buildings and walls, or vacant or deserted houses												
No												
Yes	-0.04	0.06	0.06	0.04	-0.04	0.03	-0.01	0.05	-0.19	0.06	-0.23	0.04
Whether broken windows, crumbling foundation, missing bricks, siding or roof problems												
No												
Yes	-0.11	0.07			-0.05	0.03	-0.09	0.08	-0.12	0.06	-0.16	0.05
Whether SP or spouse/partner of SP own any mutual fund or bonds												
No												
Yes	0.16	0.04	0.11	0.03			0.14	0.04	0.17	0.05		
Credit card payment												
1 pay off												
2 pay minimum or more than minimum but not entire with less than 4,000 balances	-0.01	0.06	-0.06	0.05			-0.08	0.05	-0.06	0.06		
3 pay more than minimum but not entire with 4,000 or more balances	0.07	0.06	0.06	0.04			-0.03	0.05	0.07	0.07		
4 don't have credit card	0.02	0.06	-0.10	0.05			-0.18	0.06	-0.19	0.05		
Home ownership (four-category)												
1 own, home value < 200,000												
2 own, home value >= 200,000							0.36	0.04				
3 rent							0.04	0.08				
4 other arrangement							-0.07	0.08				
Home ownership (three-category)												
1 own, home value < 200,000												
2 own, home value >= 200,000	0.13	0.04							0.17	0.05		
3 rent or other arrangement	0.05	0.06							-0.04	0.04		
Home ownership (two-category)												
No												
Yes			-0.04	0.04								
Residential care status												
1 Community												
2 Residential care not nursing home (SP interview)	0.14	0.14			0.02	0.05	0.08	0.12	0.08	0.08		
4 Nursing home (SP interview)	0.08	0.13			-0.04	0.05					-0.01	0.05
Section 8 public housing or housing for low-income seniors												
No												
Yes			-0.06	0.07					-0.12	0.07		
Ever work for pay												
No												
Yes	0.05	0.04	0.13	0.05	0.10	0.03	0.19	0.04	0.33	0.05	0.30	0.03
Marital status												
Married												
Living with a partner					-0.12	0.06					-0.20	0.09
Separated					-0.11	0.09					-0.97	0.07
Divorced			-0.01	0.09	-0.21	0.03			0.14	0.07	-0.79	0.04
Widowed			0.04	0.09	-0.13	0.02			0.21	0.07	-0.55	0.03

	M1 coef	M1 se	M2 coef	M2 se	M3 coef	M3 se	M4 coef	M4 se	M5 coef	M5 se	M6 coef	M6 se
Never married			-0.09	0.11	-0.31	0.07			0.11	0.09	-0.88	0.06
Marital status change from Round 3 to Round 5												
No												
Yes	0.28	0.34	-0.13	0.07	-0.14	0.05						
Education												
1 <HS												
2 HS	-0.02	0.06	0.00	0.04	0.05	0.03	0.12	0.05	0.04	0.05	0.32	0.03
3 >HS, <College	0.00	0.06	0.00	0.04	0.07	0.03	0.18	0.06	0.14	0.05	0.52	0.04
4 College+	0.05	0.07	0.15	0.07	0.21	0.04	0.44	0.06	0.40	0.07	0.98	0.04
Gender												
1 Male												
2 Female			-0.04	0.04	-0.01	0.02			-0.19	0.04	-0.11	0.02
Race/ethnicity												
1 White, non-Hispanic												
2 Black, non-Hispanic	-0.05	0.07	-0.03	0.04	-0.10	0.03	-0.13	0.06	0.02	0.05	-0.28	0.03
3 Others/Missing	-0.22	0.12	-0.13	0.09	-0.30	0.06	-0.16	0.09	-0.19	0.11	-0.45	0.07
4 Hispanics	-0.27	0.11	0.02	0.06	-0.19	0.05	-0.25	0.07	-0.12	0.08	-0.48	0.05
Age	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	-0.01	0.00
Round 3 income	0.62	0.05	0.57	0.05	0.78	0.02						
Census division												
Northeast Region												
Midwest Region	0.02	0.05	0.04	0.05	0.02	0.03	0.02	0.05	0.08	0.05	0.03	0.03
South Region	0.06	0.05	0.07	0.05	0.07	0.03	-0.01	0.04	-0.01	0.05	-0.03	0.03
West Region	0.05	0.05	0.07	0.06	0.08	0.03	0.04	0.05	0.03	0.06	0.09	0.04
Metro / Non-metro residence												
1 Metropolitan												
2 Non-metropolitan	-0.06	0.04	-0.08	0.04	-0.09	0.02	-0.12	0.04	-0.02	0.04	-0.17	0.03
Response type												
1 Sample Person (SP)												
2 Proxy	0.04	0.08	-0.01	0.08	-0.05	0.05	-0.07	0.08	0.13	0.06	-0.10	0.05
SP receives social security												
No												
Yes	0.05	0.05	0.04	0.08			-0.06	0.04	-0.26	0.09		
No checking account owed												
No												
Yes	-0.01	0.14					-0.27	0.14				
Constant	4.03	0.66	4.05	0.48	2.35	0.31	11.05	0.22	9.87	0.24	11.09	0.14
Log of sigma	-0.74	0.04	-0.75	0.06	-0.78	0.04	-0.65	0.03	-0.60	0.04	-0.51	0.02
Sigma	0.48	0.02	0.47	0.03	0.46	0.02	0.52	0.02	0.55	0.02	0.60	0.01

Appendix Table 6. Model results for NHATS Round 7 by imputation groups

	1-Has spouse/ partner		2-No spouse/ partner		3-Breakoff	
	Coef.	SE	Coef.	Coef.	SE	Coef.
SP's spouse/partner work for pay last month						
No						
Yes	0.10	0.03				
SP has pension plan						
No						
Yes	0.05	0.02	0.11	0.03		
SP's spouse/partner has pension plan						
No						
Yes	0.05	0.02				
SP receives social security						
No						
Yes	-0.04	0.03	0.01	0.06		
SP's spouse/partner receives social security						
No						
Yes	-0.05	0.03				
SP receives payment from VA						
No						
Yes	0.08	0.04	0.16	0.04		
SP's spouse/partner receives payment from VA						
No						
Yes	0.01	0.05				
SP receives SSI last month						
No						
Yes	0.01	0.11	-0.10	0.06		
SP's spouse/partner receives SSI last month						
No						
Yes	-0.05	0.09				
SP has IRA or other retirement plans						
No						
Yes	0.02	0.03	0.08	0.03		
SP's spouse/partner has IRA or other retirement plans						
No						
Yes	0.05	0.03				
SP or spouse/partner of SP own any saving account or CD						
No						
Yes	0.03	0.04	0.04	0.03		
SP owns checking account						
No						
Yes			0.10	0.07		
No checking account owed						
No						
Yes	-0.13	0.15				
No money for housing, utilities or medical bills						
No						
Yes	-0.17	0.07	0.10	0.04		
Receive help from food stamp, other food assistance or gas, electricity, or other energy assistance						
No						
Yes	-0.14	0.05	-0.10	0.04		
Financial help from family						
No						
Yes	-0.20	0.07	-0.02	0.04		
Gift to family						
1 No gift to family						
2 < 4000 gift	0.06	0.03	0.03	0.03		
3 >= 4000 gift:	0.18	0.04	0.22	0.05		
SP owns real estate						
No						
Yes			0.07	0.04		

No real estate owned by SP or spouse/partner of SP						
No						
Yes	-0.08	0.03				
Medical bills paid over time						
No						
Yes	-0.01	0.04	0.01	0.04		
Broken steps to home						
No						
Yes	0.03	0.04	-0.02	0.05	0.00	0.03
Continuous sidewalks						
No						
Yes	0.03	0.03	0.04	0.03	0.02	0.02
Whether any litter, graffiti on buildings and walls, or vacant or deserted houses						
No						
Yes	-0.06	0.05	0.03	0.05	-0.06	0.03
Whether broken windows, crumbling foundation, missing bricks, siding or roof problems						
No						
Yes	0.12	0.06	-0.17	0.06	-0.08	0.04
Whether SP or spouse/partner of SP own any mutual fund or bonds						
No						
Yes	0.09	0.03	0.06	0.03		
Credit card payment						
1 pay off						
2 pay minimum or more than minimum but not entire with less than 4,000 balances	-0.03	0.05	-0.20	0.04		
3 pay more than minimum but not entire with 4,000 or more balances	0.10	0.04	-0.02	0.04		
4 don't have credit card	-0.06	0.05	-0.16	0.03		
Home ownership (four-category)						
1 own, home value < 200,000						
2 own, home value >= 200,000			0.11	0.04		
3 rent			-0.05	0.04		
4 other arrangement			-0.08	0.04		
Residential care status						
1 Community						
2 Residential care not nursing home (SP interview)	-0.08	0.08	0.07	0.06	-0.01	0.04
4 Nursing home (SP interview)	0.17	0.12	-0.26	0.17	-0.29	0.09
Section 8 public housing or housing for low-income seniors						
No						
Yes			-0.14	0.06		
Ever work for pay						
No						
Yes	0.11	0.03	0.16	0.04	0.14	0.02
Marital status						
Married						
Living with a partner					0.01	0.05
Separated					-0.42	0.12
Divorced			0.18	0.12	-0.27	0.03
Widowed			0.25	0.12	-0.16	0.02
Never married			0.20	0.13	-0.26	0.05
Marital status change from Round 5 to Round 7						
No						
Yes	0.11	0.07	-0.11	0.06	-0.13	0.05
Education						
1 <HS						
2 HS	0.01	0.04	0.08	0.04	0.11	0.03
3 >HS, <College	0.08	0.04	0.10	0.04	0.18	0.03
4 College+	0.18	0.04	0.24	0.05	0.33	0.03
Gender						

1 MALE						
2 FEMALE			-0.08	0.03	-0.03	0.02
Race/ethnicity						
1 White, non-Hispanic						
2 Black, non-Hispanic	0.03	0.04	0.01	0.04	-0.05	0.02
3 Others/Missing	-0.02	0.09	0.04	0.06	-0.04	0.05
4 Hispanics	-0.07	0.06	-0.05	0.05	-0.14	0.04
Age	0.00	0.00	0.00	0.00	0.00	0.00
Round 5 income	0.59	0.03	0.43	0.04	0.67	0.02
Census division						
Northeast Region						
Midwest Region	-0.05	0.04	-0.08	0.04	-0.07	0.03
South Region	-0.02	0.04	-0.04	0.04	-0.04	0.03
West Region	0.00	0.04	-0.01	0.04	-0.02	0.03
Metro / Non-metro residence						
1 Metropolitan						
2 Non-metropolitan	-0.02	0.03	0.04	0.03	0.00	0.02
Response type						
1 Sample Person (SP)						
2 Proxy	-0.04	0.07	0.07	0.08	0.01	0.04
Constant	4.24	0.42	5.60	0.45	3.56	0.23
Log of sigma	-0.82	0.04	-0.73	0.04	-0.79	0.03
Sigma	0.44	0.02	0.48	0.02	0.45	0.01

Appendix Table 7. Model results for NHATS Round 9 by imputation groups

	1-Has spouse/ partner		2-No spouse/ partner		3-Breakoff	
	Coef.	SE	Coef.	Coef.	SE	Coef.
SP has pension plan						
No						
Yes	0.03	0.02	0.12	0.03		
SP's spouse/partner has pension plan						
No						
Yes	0.07	0.02				
SP receives social security						
No						
Yes	0.04	0.03	0.04	0.07		
SP's spouse/partner receives social security						
No						
Yes	-0.02	0.03				
SP receives payment from VA						
No						
Yes	0.03	0.04	0.11	0.06		
SP's spouse/partner receives payment from VA						
No						
Yes	0.09	0.04				
Whether SP or spouse/partner of SP own any mutual fund or bonds						
No						
Yes			0.11	0.04		
SP receives SSI last month						
No						
Yes	-0.07	0.10	-0.04	0.05		
SP's spouse/partner receives SSI last month						
No						
Yes	0.03	0.10				
SP owns checking account						
No						
Yes			0.08	0.07		
SP or spouse/partner of SP own any saving account or CD						
No						
Yes	0.00	0.03	0.06	0.04		
SP has IRA or other retirement plans						
No						
Yes	-0.02	0.03	0.07	0.04		
SP's spouse/partner has IRA or other retirement plans						
No						
Yes	0.04	0.03				
Credit card payment						
1 pay off						
2 pay minimum or more than minimum but not entire with less than 4,000 balances	-0.16	0.04	-0.03	0.04		
3 pay more than minimum but not entire with 4,000 or more balances	0.00	0.04	-0.06	0.05		
4 don't have credit card	-0.15	0.05	-0.15	0.05		
Whether SP or spouse/partner of SP own any mutual fund or bonds						
No						
Yes	0.06	0.03				
Ever work for pay						
No						
Yes	0.03	0.03	0.05	0.04	0.04	0.02
SP's spouse/partner work for pay last month						
No						
Yes	0.08	0.03				
No money for housing, utilities or medical bills						
No						

Yes	-0.11	0.05	-0.08	0.09		
Receive help from food stamp, other food assistance or gas, electricity, or other energy assistance						
No						
Yes	-0.11	0.04	-0.10	0.04		
Section 8 public housing or housing for low-income seniors						
No						
Yes			-0.01	0.05		
Medical bills paid overtime						
No						
Yes	0.04	0.04	0.01	0.05		
SP owns real estate						
No						
Yes			0.14	0.03		
No real estate owned by SP or spouse/partner of SP						
No						
Yes	-0.07	0.03				
Financial help from family						
No						
Yes	-0.05	0.04	-0.07	0.04		
Gift to family						
1 No gift to family						
2 < 4000 gift	0.00	0.03	0.00	0.03		
3 >= 4000 gift:	0.09	0.03	0.20	0.05		
Education						
1 <HS						
2 HS	0.08	0.05	0.11	0.05	0.15	0.03
3 >HS, <College	0.14	0.04	0.14	0.05	0.21	0.03
4 College+	0.20	0.05	0.29	0.05	0.33	0.03
Marital status						
1 Married						
2 Living with a partner					-0.05	0.06
3 Separated					-0.04	0.09
4 Divorced			-0.20	0.08	-0.24	0.03
5 Widowed			-0.15	0.08	-0.17	0.02
6 Never married			-0.25	0.10	-0.30	0.05
Marital status change from Round 7 to Round 9						
No						
Yes	0.12	0.06	-0.11	0.06	-0.13	0.05
R7 income	0.64	0.03	0.53	0.04	0.74	0.02
No checking account owed						
No						
Yes	-0.09	0.12				
Broken steps to home						
No						
Yes	-0.01	0.04	-0.12	0.05	-0.08	0.03
Whether any litter, graffiti on buildings and walls, or vacant or deserted houses						
No						
Yes	-0.05	0.04	0.11	0.05	0.04	0.03
Continuous sidewalks						
No						
Yes	0.07	0.03	0.05	0.03	0.05	0.02
Home ownership (three-category)						
1 own, home value < 200,000						
2 own, home value >= 200,000	0.08	0.03	0.03	0.04		
3 rent	-0.08	0.05	0.04	0.04		
4 other arrangement			-0.07	0.04		
Whether broken windows, crumbling foundation, missing bricks, siding or roof problems						
No						
Yes	-0.07	0.05	0.12	0.05	0.01	0.03

Residential care status						
1 Community						
2 Residential care not nursing (SP interview)	0.23	0.09	0.01	0.06	0.04	0.04
4 Nursing home (SP interview)	-0.27	0.14	-0.08	0.07	-0.15	0.05
Census division						
Northeast Region						
Midwest Region	0.03	0.03	-0.02	0.04	0.02	0.02
South Region	-0.02	0.03	-0.02	0.04	-0.03	0.02
West Region	0.00	0.03	0.00	0.04	0.00	0.02
Metro / Non-metro residence						
1 Metropolitan						
2 Non-metropolitan	-0.04	0.03	0.00	0.03	-0.03	0.02
Race/ethnicity						
1 White, non-Hispanic						
2 Black, non-Hispanic	0.04	0.04	-0.01	0.04	-0.07	0.02
3 Others/Missing	-0.04	0.05			-0.15	0.04
4 Hispanics	0.02	0.07			-0.08	0.04
Age	0.00	0.00	0.00	0.00	0.00	0.00
Gender						
1 Male						
2 Female			-0.08	0.03	-0.02	0.02
Response type						
1 Sample person						
2 Proxy	-0.08	0.05	-0.02	0.06	-0.12	0.04
Constant	3.83	0.38	4.51	0.52	2.69	0.26
Log of sigma	-1.01	0.04	-0.76	0.05	-0.87	0.03
Sigma	0.37	0.01	0.47	0.02	0.42	0.01

Appendix Table 8. Model results for NHATS Round 11 by imputation groups

	1-Has spouse/ partner		2-No spouse/ partner		3-Breakoff	
	Coef.	SE	Coef.	SE	Coef.	SE
SP's spouse/partner work for pay last month						
No						
Yes	0.07	0.04				
SP has pension plan						
No						
Yes	0.07	0.03	0.15	0.03		
SP's spouse/partner has pension plan						
No						
Yes	0.06	0.03				
SP receives social security						
No						
Yes	-0.08	0.04	0.09	0.10		
SP's spouse/partner receives social security						
No						
Yes	-0.05	0.04				
SP receives payment from VA						
No						
Yes	0.07	0.04				
SP's spouse/partner receives payment from VA						
No						
Yes	0.04	0.05				
SP receives SSI last month						
No						
Yes			-0.11	0.05		
No SSI received last month						
No						
Yes	0.12	0.11				
SP has IRA or other retirement plans						
No						
Yes	0.00	0.03	0.12	0.04		
SP's spouse/partner has IRA or other retirement plans						
No						
Yes	0.05	0.03				
SP or spouse/partner of SP own any saving account or CD						
No						
Yes	-0.05	0.03	0.02	0.03		
No money for housing, utilities or medical bills						
No						
Yes	0.08	0.08	0.10	0.06		
Receive help from food stamp, other food assistance or gas, electricity, or other energy assistance						
No						
Yes	0.04	0.07	-0.06	0.04		
Financial help from family						
No						
Yes	-0.12	0.06	-0.02	0.04		
SP owns real estate						
No						
Yes			0.16	0.05		
No real estate owned by SP or spouse/partner of SP						
No						
Yes	-0.07	0.03				
Medical bills paid over time						
No						
Yes	-0.01	0.05	0.07	0.06		
Broken steps to home						
No						
Yes	0.03	0.05	0.03	0.04	0.03	0.03
Continuous sidewalks						

No						
Yes	0.06	0.03	0.05	0.03	0.02	0.02
Whether any litter, graffiti on buildings and walls, or vacant or deserted houses						
No						
Yes	-0.01	0.06	-0.09	0.05	-0.07	0.03
Whether broken windows, crumbling foundation, missing bricks, siding or roof problems						
No						
Yes	-0.07	0.09	-0.10	0.05	-0.11	0.04
Whether SP or spouse/partner of SP own any mutual fund or bonds						
No						
Yes	0.07	0.03	0.01	0.04		
Credit card payment						
1 pay off						
2 pay minimum or more than minimum but not entire with less than 4,000 balances			0.01	0.04		
3 pay more than minimum but not entire with 4,000 or more balances			0.01	0.06		
4 don't have credit card			-0.04	0.06		
Don't have any credit card						
No						
Yes	-0.04	0.06				
Home ownership (four-category)						
1 own, home value < 200,000						
2 own, home value >= 200,000	0.14	0.03	0.00	0.04		
3 rent	0.04	0.05	-0.13	0.04		
4 other arrangement						
Residential care status						
1 Community						
2 Residential care not nursing home (SP interview)	0.01	0.07	0.06	0.06	-0.03	0.04
4 Nursing home (SP interview)	0.05	0.14	-0.31	0.22	-0.35	0.11
Section 8 public housing or housing for low-income seniors						
No						
Yes			-0.10	0.06		
Ever work for pay						
No						
Yes	0.01	0.04	0.04	0.06	0.02	0.03
Financial Gifts to family						
1 No gift to family						
2 < 4000 gift	0.01	0.03				
3 >= 4000 gift:	0.02	0.04				
Financial gifts to family						
No						
Yes			0.05	0.03		
Marital status						
1 Married						
2 Living with a partner					0.03	0.06
3 Separated					-0.37	0.12
4 Divorced			0.20	0.14	-0.20	0.03
5 Widowed			0.25	0.14	-0.15	0.02
6 Never married			0.04	0.16	-0.39	0.09
Marital status change from Round 9 to Round 11						
No						
Yes	0.03	0.08	-0.11	0.06	-0.13	0.04
Education						
1 <HS						
2 HS	0.13	0.07	0.01	0.05	0.08	0.03
3 >HS, <College	0.14	0.07	0.06	0.05	0.12	0.04
4 College+	0.19	0.07	0.12	0.06	0.20	0.04
Gender						
1 Male						

2 Female			-0.08	0.03	-0.03	0.02
Race/ethnicity						
1 White, non-Hispanic						
2 Black, non-Hispanic	-0.02	0.04	-0.03	0.04	-0.06	0.03
3 Others/Missing	-0.05	0.04	0.00	0.08	-0.07	0.03
4 Hispanics	-0.06	0.08	-0.06	0.05	-0.13	0.04
Age	0.00	0.00	0.00	0.00	0.00	0.00
Round 9 income	0.70	0.03	0.59	0.04	0.77	0.02
Census division						
Northeast Region						
Midwest Region	-0.02	0.04	-0.10	0.05	-0.05	0.03
South Region	-0.04	0.04	-0.05	0.04	-0.04	0.03
West Region	-0.08	0.04	0.01	0.04	-0.03	0.03
Metro / Non-metro residence						
1 Metropolitan						
2 Non-metropolitan	0.04	0.03	-0.09	0.04	-0.03	0.02
Response type						
1 Sample Person (SP)						
2 Proxy	-0.11	0.08	-0.06	0.07	-0.09	0.04
SP owns checking account						
No						
Yes			0.01	0.08		
Survey mode						
Part 1 conducted in person						
Part 1 conducted on phone	0.03	0.02	-0.05	0.03	-0.01	0.02
Constant	2.97	0.52	3.82	0.47	2.57	0.25
Log of sigma	-1.03	0.05	-0.73	0.06	-0.88	0.04
Sigma	0.36	0.02	0.48	0.03	0.41	0.02

Appendix Table 9. Model results for NHATS Round 12 by imputation groups

| | Continuing SP | | | | New SP | | | | | |
| | 1-Has spouse/ partner | | 2-No spouse/ partner | | 4-Has spouse/ partner | | 5-No spouse/ partner | | 6-Breakoff | |
Variable Labels	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
SP's spouse/partner work for pay last month										
No										
Yes	0.01	0.05			0.21	0.05				
SP has pension plan										
No										
Yes	0.03	0.03	0.09	0.03	0.15	0.04	0.20	0.05		
SP's spouse/partner has pension plan										
No										
Yes	0.02	0.03			0.20	0.05				
SP receives social security										
No										
Yes	-0.01	0.04	0.13	0.08	-0.11	0.06	0.12	0.09		
SP's spouse/partner receives social security										
No										
Yes	0.02	0.04			-0.07	0.05				
SP receives payment from VA										
No										
Yes	-0.05	0.04	0.08	0.06	0.01	0.08	0.32	0.08		
SP's spouse/partner receives payment from VA										
No										
Yes	0.02	0.05			0.01	0.09	-0.15	0.04		
SP receives SSI last month										
No										
Yes	0.02	0.11	0.00	0.07	-0.41	0.17	-0.10	0.06		
SP's spouse/partner receives SSI last month										
No										
Yes	-0.05	0.12			-0.02	0.13				
SP has IRA or other retirement plans										
No										
Yes	0.00	0.03	0.08	0.04	0.08	0.05	0.30	0.05		
SP's spouse/partner has IRA or other retirement plans										
No										
Yes	-0.02	0.03			0.19	0.05				
SP or spouse/partner of SP own any saving account or CD										
No										
Yes	0.05	0.04	0.04	0.04	0.15	0.06	-0.02	0.05		
SP owns checking account										
No			0.37	0.13						
Yes							0.19	0.07		
No money for housing, utilities or medical bills										
No										
Yes	0.05	0.07	0.12	0.06	-0.22	0.09	-0.03	0.05		
Receive help from food stamp, other food assistance or gas, electricity, or other energy assistance										
No										
Yes	-0.06	0.07	-0.21	0.06	-0.14	0.10	-0.32	0.05		
Financial help from family										
No										
Yes	-0.12	0.08	-0.08	0.04	-0.20	0.11				
Financial Gifts to family										
1 No gift to family										
2 < 4000 gift	0.04	0.03			0.13	0.05				
3 >= 4000 gift:	0.12	0.03			0.35	0.06				
Financial gifts to family										
No										
Yes			0.08	0.03			0.16	0.05		
SP owns real estate										
No										
Yes			0.08	0.04			0.22	0.07		
No real estate owned by SP or spouse/partner of SP										

No										
Yes	-0.07	0.03			-0.14	0.05				
Medical bills paid over time										
No										
Yes	-0.02	0.06	-0.10	0.09	-0.01	0.08	-0.13	0.07		
Broken steps to home										
No										
Yes	0.06	0.05	-0.09	0.05	-0.10	0.06	-0.12	0.06	-0.13	0.05
Continuous sidewalks										
No										
Yes	0.02	0.03	0.05	0.03	-0.05	0.05	0.01	0.04	-0.02	0.04
Whether any litter, graffiti on buildings and walls, or vacant or deserted houses										
No										
Yes	0.04	0.05	-0.10	0.05	0.06	0.08	0.07	0.05	-0.17	0.05
Whether broken windows, crumbling foundation, missing bricks, siding or roof problems										
No										
Yes	-0.18	0.07	0.00	0.07	-0.10	0.10	-0.09	0.06	-0.15	0.07
Whether SP or spouse/partner of SP own any mutual fund or bonds										
No										
Yes	0.10	0.03	0.10	0.04	0.16	0.05	0.10	0.06		
Credit card payment										
1 pay off										
2 pay minimum or more than minimum but not entire with less than 4,000 balances	0.08	0.05	-0.03	0.05	-0.03	0.08	-0.12	0.06		
3 pay more than minimum but not entire with 4,000 or more balances	0.06	0.05	0.08	0.05	0.03	0.08	0.08	0.07		
4 don't have credit card	-0.12	0.07	0.06	0.05	-0.09	0.08	-0.24	0.06		
Home ownership (four-category)										
1 own, home value < 200,000										
2 own, home value >= 200,000					0.33	0.06	0.30	0.07		
3 rent					-0.21	0.15	0.03	0.06		
4 other arrangement					0.00	0.10	-0.15	0.07		
Home ownership (three-category)										
1 own, home value < 200,000										
2 own, home value >= 200,000	0.06	0.03	0.10	0.04						
3 rent or other arrangement	-0.05	0.07	-0.01	0.04						
Residential care status										
1 Community										
2 Residential care not nursing home (SP interview)	0.14	0.10	-0.02	0.07	0.02	0.22	0.02	0.07	-0.11	0.07
4 Nursing home (SP interview)	-0.20	0.23	-0.36	0.16						
Section 8 public housing or housing for low-income seniors										
No										
Yes			-0.07	0.06			-0.24	0.07		
Ever work for pay										
No										
Yes	0.05	0.04	0.03	0.04	0.26	0.06	0.20	0.06	0.38	0.04
Marital status										
Married or living with a partner										
Separated									-0.89	0.09
Divorced			0.07	0.08			-0.13	0.09	-0.80	0.05
Widowed			0.11	0.08			-0.03	0.09	-0.56	0.05
Never married			0.19	0.11			-0.12	0.10	-0.82	0.07
Marital status change from Round 11 to Round 12										
No										
Yes			0.10	0.07						
No checking account owed										
No										
Yes					-0.28	0.22				
Education										
1 <HS										
2 HS	0.01	0.07	0.03	0.05	0.12	0.08	0.04	0.06	0.31	0.05

	Coef	SE	Coef	SE	Coef	SE	Coef	SE	Coef	SE
3 >HS, <College	0.03	0.07	0.00	0.06	0.18	0.07	0.08	0.06	0.53	0.05
4 College+	0.06	0.07	0.16	0.06	0.38	0.08	0.37	0.07	1.01	0.05
Gender										
1 MALE										
2 FEMALE			-0.08	0.03			-0.09	0.05	-0.08	0.04
Race/ethnicity										
1 White, non-Hispanic										
2 Black, non-Hispanic	-0.03	0.07	0.05	0.04	0.02	0.08	0.01	0.05	-0.26	0.05
3 Others/Missing	0.03	0.06	-0.04	0.06	-0.34	0.21	0.20	0.12	-0.51	0.16
4 Hispanics	-0.12	0.09	0.01	0.08	-0.21	0.07	-0.05	0.05	-0.44	0.05
Age	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Round 11 income	0.75	0.04	0.54	0.04						
Census division										
Northeast Region										
Midwest Region	0.08	0.04	0.01	0.05	-0.10	0.07	0.10	0.08	-0.12	0.05
South Region	0.02	0.04	-0.09	0.05	-0.05	0.05	0.07	0.06	-0.05	0.04
West Region	0.06	0.04	-0.02	0.05	-0.10	0.07	0.05	0.07	-0.08	0.05
Metro / Non-metro residence										
1 Metropolitan										
2 Non-metropolitan	-0.02	0.03	0.04	0.04	-0.03	0.05	0.02	0.05	-0.14	0.04
Response type										
1 Sample person (SP)										
2 Proxy	0.01	0.12	0.04	0.09	-0.19	0.11	-0.06	0.11	-0.30	0.08
Constant	2.94	0.45	4.22	0.49	10.40	0.34	9.95	0.29	10.78	0.20
Log of sigma	-1.00	0.06	-0.74	0.05	-0.48	0.05	-0.65	0.04	-0.35	0.03
Sigma	0.37	0.02	0.48	0.02	0.62	0.03	0.52	0.02	0.70	0.02