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Supplement Article: The National Social Life, Health, and Aging Project Round 3 (2015–2016): Cohort 1 Wave 3 and Cohort 2 Wave 1

Ongoing Refinement and Innovation in the Data Collection Protocols of the Third Round of the National Social Life, Health, and Aging Project

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Abstract

Objectives: The third round (R3) of the National Social Life, Health, and Aging Project, a nationally representative, longitudinal survey of community-residing older adults, consisted of 4,777 in-person interviews and 6,100 completed visits to households to identify newly eligible respondents. It revisited respondents from the first rounds (Cohort 1), born in the years 1920 through 1947, and added new respondents (Cohort 2) born in the years 1948 through 1965. Coresidential romantic partners of both cohorts were also eligible. Data collection included in-person questionnaires, up to 11 biomeasures, and a self-administered, postinterview paper questionnaire.

Methods: Questionnaire domains included social network and social support, elder mistreatment, physical health, cognitive function, romantic partners and sexuality, fertility and menopause, mental health, and employment and finances. Biomeasure collection included height, weight, waist circumference, blood pressure and heart rate, timed walk, balance, chair stands, smell, saliva passive drool in a tube (cortisol, dehydroepiandrosterone, estradiol, progesterone, testosterone), dried blood spots (C-reactive protein, Epstein–Barr virus antibodies, high-density lipoprotein cholesterol, hemoglobin, glycosylated hemoglobin [HbA1c], total cholesterol), and accelerometry (sleep patterns and physical activity). A brief questionnaire also collected data on respondents who were deceased or in too poor health to participate.

Results: Measures such as response and cooperation rates are provided to evaluate the design and implementation.

Discussion: This article describes innovation in the development and implementation of R3, the recruitment of a new cohort of respondents, and fidelity to prior rounds' study design and data collection procedures.

Keywords: Aging, Biomeasures, Health, NSHAP, Survey

NORC at the University of Chicago and the National Social Life, Health, and Aging Project (NSHAP) investigator team completed the third round (see Author Note 1) of data collection by conducting 4,777 in-person interviews during 2015–2016. NSHAP is a longitudinal, population-based study of health and social factors that provides information about the well-being of older adults by examining interactions among physical health, illness and disease, cognitive function, emotional and mental health, and social connectedness. NSHAP is a national area probability

sample of community-residing older adults and consists of two cohorts: Cohort 1 (C1) includes adults born between 1920 and 1947 and their coresident romantic partners of any age, and Cohort 2 (C2) includes adults born between 1948 and 1965 and their coresident romantic partners of any age.

The NSHAP interview consists of three components: an in-person questionnaire (IPQ) focusing on physical, mental, and social health; the collection of minimally invasive biomeasures; and a leave-behind paper questionnaire (LBQ). Face-to-face interviews occur in the respondent's home via computer-assisted personal interview (CAPI). NSHAP also collects important biological measures, prioritizing noninvasive collection techniques and cutting-edge technology that minimize respondent burden (Jaszczak et al., 2009). These biomeasures vary across rounds and are highlighted in Table 1. The LBQ is left with the respondent as a supplement to be completed on their own time.

The first round (R1) of NSHAP was conducted in 2005–2006, recruiting C1 from a nationally representative sample of adults in the United States aged 57–85 at the time of recruitment. R1 was designed to describe the health of older Americans, evaluate the relationship between health and social connections, examine the impact of gender and socioeconomic context on health, identify biological pathways through which social connectedness affects aspects of health, and describe health behaviors and health care utilization. NORC field interviewers completed 3,005 interviews in R1, achieving a weighted response rate of 75.5% (Smith et al., 2009).

To allow for longitudinal analyses and to better characterize the impact of relationships on health, interviewers returned in 2010–2011 for Round 2 (R2), reinterviewing respondents from R1 (aged 62–90) and, for the first time, interviewing a sample of their cohabiting romantic partners (see Author Note 2). Along with the IPQ and LBQ,

Table 1. Summary of Biomeasure Collection in NSHAP Rounds 1, 2, and 3

Biomeasures	2005 Cohort 1 Wave 1	2010 Cohort 1 Wave 2	2015 Cohort 1 Wave 3	2015 Cohort 2 Wave 1
Anthropometrics				
Weight	●	●	●	●
Height	●	●	○	●
Waist circumference	●	●	○	●
Hip circumference	○	●	○	○
Cardiovascular function (blood pressure)				
Blood pressure and heart rate	●	●	●	●
Physical performance (chair stands, timed walk, balance)	●	▲	▲	▲
Sensory function				
Smell	●	▲	▲	○
Taste, touch, vision	●	○	○	○
Blood				
Dried blood spots: Epstein–Barr virus antibody titers, C-reactive protein, glycosylated hemoglobin (HbA1c), hemoglobin	●	●	●	●
Dried blood spots: total cholesterol, HDL cholesterol	○	●	●	●
Whole blood in a microtainer: cytokines	○	●	○	○
Saliva				
Cotinine	●	○	○	○
DHEA, estradiol, progesterone, testosterone	●	●	○	●
Oral mucosal transudate: OraSure for HIV testing	●	○	○	○
Cortisol	○	●	○	●
Urine				
Creatinine, vasopressin, oxytocin	○	●	○	○
Oragene for genotype	○	●	○	○
Vaginal swabs (BV, yeast, HPV)				
BV, yeast	●	●	○	○
HPV	●	○	○	○
Vaginal cell cytology	●	●	○	○
Accelerometry: sleep patterns and activity	○	●	▲	▲

Note: (○) = not included in data collection; (●) = included in data collection; (▲) = enhanced, comparable versions included in data collection; NSHAP = National Social Life, Health, and Aging Project; BV = bacterial vaginosis; DHEA = dehydroepiandrosterone; EBV = Epstein–Barr virus; HDL = high-density lipoprotein; HPV = human papillomavirus; HIV = human immunodeficiency virus.

the R2 interview added, removed, and enhanced certain biomeasures (Table 1), details of which are described in the work of O'Doherty et al. (2014). In addition to these data collection components, a short proxy questionnaire was developed to collect final health data for R1 respondents who were deceased or in too poor health to participate in R2. Interviewers completed 3,377 interviews in R2, achieving a weighted response rate of 79% (Jaszczak et al., 2014).

NSHAP R3 enables analyses of long-term health trajectories and outcomes for C1 (aged 67–95) and adds C2 respondents (aged 50–67) for their first interview. R3 was conducted in 2015–2016 and included 2,409 C1 respondents and their coresident romantic partners, and 2,368 C2 respondents. NORC developed a short screening questionnaire to determine the eligibility of one or more members of the sampled household. NSHAP R3 included the screener, the IPQ, the LBQ, the proxy, and the collection of up to 11 physical measures and biospecimens: height, weight, waist circumference, blood pressure and heart rate, timed walk, balance, chair stands, smell, saliva passive drool in a tube (cortisol, dehydroepiandrosterone, estradiol, progesterone, testosterone), dried blood spots (C-reactive protein, Epstein–Barr virus antibodies, high-density lipoprotein cholesterol, hemoglobin, glycosylated hemoglobin [HbA1c], total cholesterol), and accelerometry (sleep and physical activity). R3 consists of 4,777 completed interviews.

Round 3 Sample

C1 Respondents

To enable continuing longitudinal analysis, reinterviewing C1 respondents was a key goal. At the time of R3, C1 included respondents: interviewed in both R1 and R2, not interviewed in R1 but interviewed in R2, interviewed in R1 but not interviewed in R2, and coresident spouses or romantic partners (see Author Note 3) of respondents from R1 who were recruited and interviewed in R2.

New for R3: C2 Respondents

To add the second panel of respondents, a nationwide sample of 7,667 households was randomly selected and screened to identify adults born between 1948 and 1965. From this, 3,112 eligible respondents from 2,051 households were identified. All age-eligible members of a sampled household were selected to participate in R3; of these, 2,129 respondents (68.4%, see Author Note 4) agreed to participate. Of an additional 304 Cohort 2 partner respondents (see Author Note 5), 239 (78.6%) completed the interview.

Round 3 Methods

To support analyses of change over time, the core areas of the R3 IPQ and biomeasure protocols remained unchanged from R1 and R2. Following extensive review and analysis by the investigator team, some modifications to the questionnaire, biomeasures, and biomeasure protocols were implemented. The NSHAP Advisory Board was consulted to hone data collection and analysis plans for R3.

New for R3: Household Screening to Identify C2 Respondents

During the screening, NORC field interviewers confirmed the address, asked if there were any household members older than the age of 40, and collected names and ages of any such adults. The screener was conducted on a tablet that created eligible respondent cases for immediate interviewing if the respondent was available.

Additionally, cohabiting partners of new respondents (identified in the social network roster section of the questionnaire) were eligible to participate regardless of their age. During the interview, age-eligible respondents were asked if they had a cohabiting partner. If so, they confirmed whether that partner had been identified in the household screener. If the partner had not been identified, a new case was created and they were invited to participate. The C2 age-eligible respondent was informed during their interview that their partner would be interviewed and that all answers would be confidential. We had conducted an experiment in R2 to test the impact of informing the respondent that we would seek an interview with their partner (Czaplewski et al., 2012).

Questionnaire Development

As in R1 and R2, the questionnaire for R3 included the following domains: social network and social support, elder mistreatment, physical health, cognitive function, romantic partners and sexuality, fertility and menopause, mental health, and employment and finances. Within each domain, some sections remained identical to R1 and R2, whereas others were enhanced slightly. Consent for Medicare linkage was added to the R3 questionnaire. Furthermore, with the addition of C2 to the sample, the administration of some sections varied by cohort. The most notable differences included social network change and consent for Medicare and Census linkage were asked of C1 only; basic background questions were asked of C2 only; and sections about partner history and morbidity were asked with different timeframes (since last interview for C1, lifetime for C2). Table 2 summarizes the domains across all three rounds.

Biomeasure Development

In R3, NSHAP continued collecting biomeasures to objectively assess health status and disease. Since R1, NSHAP has collected biomeasures across six general domains: anthropometrics, cardiovascular function, physical

Table 2. Summary of NSHAP In-Person Questionnaire Domains Over Three Rounds

Domains	Round 1	Round 2	Round 3
Social context			
Social network roster	●	●	●
Social network change	○	●	●
Social support	●	▲	●
Elder abuse	●	○	▲
Care receiving	●	▲	▲
Sex and partnership			
Marital, cohabit, and sexual history	●	●	●
Current partnership	●	●	●
Sexual motivation, behavior, and function	●	▲	●
Environmental context			
Household composition	●	●	●
Link to 1940 U.S. Census files	○	○	●
Physical health			
Self-reported health	●	▲	●
Surgeries, procedures, and health behavior	●	▲	●
Morbidity	●	●	●
Functional health			
Self-rated and interviewer	●	▲	●
Medication log			
Rx, alternative, over the counter	●	●	●
Link to Medicare files	○	○	●
Mental health and personality			
Depressive and anxiety symptoms	●	●	●
Perceived stress and loneliness	●	●	●
Happiness–unhappiness	●	●	●
The big five personality test	○	●	●
Cognitive function	●	▲	●

Notes: (●) = included in data collection; (▲) = enhanced, comparable versions included in data collection; (○) = not included in data collection; NSHAP = National Social Life, Health, and Aging Project. A circle in R3 following a triangle in R2 indicates that the R3 interview retained the same enhanced section from R2.

performance, sensory function, biomarkers from specimen collection, and activity and sleep.

As in R1 and R2, an interdisciplinary biomeasure working group collaborated on the order of measure administration as well as the development and enhancement of protocols for collection and shipping. To accommodate the addition of C2, the group identified measures to temporarily drop from R3. While not every measure from R2 was collected in R3, every domain was represented in the final selection. Table 1 summarizes the measures, organized by domain, collected from C1 in R1, R2, and R3, as well as the measures collected from C2 in R3.

Biomeasure protocols remained consistent with prior rounds, except for the physical performance battery, accelerometry, and blood spot shipping protocols. These were improved by adding a balance measure to the physical performance battery, selecting a new accelerometry device, and incorporating a WarmMark temperature monitor into the blood spot shipping protocol. As in prior rounds, not every measure could be collected from every respondent due to time and budget considerations. A core set of measures was assigned to all respondents, including anthropometrics, cardiovascular function, physical performance, and dried blood spot collection. Additional measures were collected from subsets of respondents, which were assigned based on cohort and prior-round experience.

Biomeasure Subsets

All C1 respondents who had been assigned olfaction in R2 (roughly two thirds) again received olfaction in R3. Because height and waist had already been collected from C1, these were only collected from C2. Similarly, saliva was collected from C2 but not from C1 in R3. All C1 respondents who agreed to accelerometry in R2 plus a random one-third sample of C2 respondents were eligible for accelerometry in R3. In R2, Oragene was assigned to two thirds of the C1 sample after discovering that it was possible to perform targeted genotyping in the other third of respondents using their blood sample. The remaining one third of C1 respondents from whom we had not collected Oragene in R2 were asked to consent to the use of their blood sample for genetic analysis in R3. The questionnaire skipped or displayed olfaction, accelerometry, and genetic analysis

consent based on respondent eligibility. For cohort-specific measures, such as height, weight, and saliva, the questionnaire followed the corresponding path.

New for R3: New Device and Protocol for Sleep/Activity Measurement

Although accelerometry was introduced as a biomeasure substudy in R2, in R3, sleep and activity were measured using a different device and using a different distribution protocol. In R2, the device (Respironics Actiwatch Spectrum) was mailed to respondents after completing the IPQ; in R3, the device (a custom-built accelerometer from Gulf Coast Data Concepts) was activated and given directly to respondents at the conclusion of the IPQ. The change enabled interviewers to provide consenting respondents with the accelerometer immediately, thus avoiding potential nonresponse from having to arrange a later time to receive it (Lawrence et al., 2017).

New for R3: LBQ Retrieval Experiment

As in R1 and R2, interviewers gave respondents a supplemental self-administered paper questionnaire (the LBQ) at the end of the IPQ to complete and return by mail. C1 and C2 respondents received slightly different versions of the LBQ. Approximately 9 months into data collection, LBQ response rates were lower than previous rounds, especially for C2. An experiment was conducted to test various methods of prompting respondents to return their LBQ, by sending a new copy via different carriers (USPS and FedEx) and, for cases receiving multiple follow-up mailings, in different sequences (e.g., USPS then FedEx, FedEx then USPS). The main finding of the experiment was that sending a new copy to the respondent via FedEx in relative proximity to their IPQ produced the biggest improvement in LBQ return rates (for information about the experimental protocol and complete findings, see Lawrence et al., 2018). Employing these findings in future data collection could help reduce respondent burden and costs by limiting or eliminating phone prompting efforts.

New for R3: Data Linkage

In R3, NSHAP added questions to facilitate linkage to three sources of administrative data: Medicare Claims records, the 1940 U.S. Census, and the National Death Index (NDI).

C1 respondents older than the age of 65 at the time of R3 were asked to consent to linking their survey data to Medicare data by providing their Medicare number. This linkage was done for respondents who consented to such linkage during the R3 interview as well as those who completed R1 and/or R2 but died prior to R3 data collection.

C1 respondents were also asked to provide their parents' names and last name at birth. They were informed that this information would be used to link study results to data publicly available in the 1940 U.S. Census. This linkage, done in coordination with an investigator at the University of Minnesota, constituted part of a project to link Census records to several other studies, including the Health and Retirement Study, the Panel Study of Income Dynamics, the Wisconsin Longitudinal Study, and the National Health and Aging Trends Study (see Author Note 6).

Although NSHAP attempts to administer a proxy questionnaire when we learn a respondent has died (see Author Note 7), unit- and item-level nonresponse results in considerable missing data on mortality. Linking NDI records (to confirm death and ascertain month, year, and cause of death) with NSHAP respondents increases the quality of the data set by obtaining a medically certified cause of death, thus enabling more targeted analyses.

Questionnaire Administration and Management

The NSHAP R3 IPQ was conducted in English or Spanish using a CAPI questionnaire. The CAPI instrument controlled which biomeasures were administered and which version of the LBQ was given to the respondent. The instrument also used information from previous interviews to enable relevant skip patterns and comparisons of the social network rosters between rounds.

To minimize data entry errors, range checks were programmed into the CAPI instrument. Interviewer instructions and data fields for collecting biomeasure responses were also incorporated into the instrument. Interviewers also used hard-copy respondent materials (e.g., a spiral-bound book with selected question text and response options) to facilitate questionnaire administration.

Data Collection

Like questionnaire modifications, R3 data collection protocols were largely adapted from those successfully employed in R1 and R2. Procedures were carefully designed for all aspects of R3 data collection, including field staff preparation, informed consent, processes to conduct in-home interviews and biomeasure collection, and the LBQ. The complexity of the interview required comprehensive and efficient protocols for all data collection tasks.

Interviewer Recruitment

Interviewers are often the "face" of a project to respondents and are therefore critical to its success. NORC-experienced (and NSHAP-experienced) interviewers were staffed wherever possible. It was necessary to hire some new-to-NORC interviewers in geographic areas where NORC had no existing field staff. Because of the biomeasures included, recruitment also focused on the ability and willingness of interviewers to learn new skills. To reduce potential attrition due to the challenging nature of certain tasks, the

NSHAP project team made sure interviewers were comfortable with all elements of the role prior to being staffed. Potential interviewers were given fact sheets about the biomeasures they would be collecting, as well as information about storing and shipping biological samples. They were shown pictures of the biomeasure collection techniques and equipment.

Interviewer Training

Field interviewers participated in training prior to data collection, including a home-study packet, an in-person training in Chicago, and additional booster trainings throughout data collection. In total, 106 field interviewers and 12 field managers completed NSHAP training in August and September of 2015. First, interviewers completed a home-study packet that included reviewing the training manuals and watching a video demonstrating biomeasure collection and shipping procedures. Interviewers then attended a 6-day, in-person training that consisted of four project training days, a self-study day, and a certification day. The four project training days were taught through brief lectures, hands-on practice drills and mocks, and individual instruction. One of the project training days was devoted to biomeasure training, which used a standardized technique for each measure. The trainer would first explain the procedure, then demonstrate it with a "respondent," and finally, the interviewer would practice the procedure on a training partner. Interviewers used the self-study day to review materials and practice their interviewing skills and biomeasure collection techniques. The final day of training required interviewers to pass a certification interview, which included gaining cooperation, administering the complete interview, and collecting and packing all biomeasures. Interviewers also had to complete at least one practice interview after returning home. Booster trainings conducted throughout data collection were implemented via webinar to all interviewers and consisted of topics such as best practices in the field and biomeasure collection tips.

Gaining Cooperation

Gaining respondent cooperation is essential to any survey, and retaining that cooperation is especially important in longitudinal studies. In the spring of 2015, almost 6 months before R3 data collection, C1 respondents received a letter informing them of our intent to return for an interview in 2015 and requesting they confirm or update their contact information. Updates were returned by 1,176 C1 respondents (33.6% of the full cohort sample). Two weeks before data collection began, advance letters notified them that they would soon be visited by an interviewer. A letter was also sent to households selected for screening to identify and recruit C2 respondents. Data collection began in September 2015 and lasted 61 weeks.

For households selected for screening, interviewers avoided mentioning NSHAP to avoid biasing responses to the screener questionnaire. Interviewers emphasized the brevity of screening questions and the importance of participation in the random sample survey because respondents could not be replaced by anyone else. They could also provide materials showing their legitimacy, including a NORC brochure, identification badge, and business cards.

Once a respondent was identified as eligible, interviewers would begin gaining cooperation for the NSHAP interview. For previously interviewed respondents, NORC's case management system provided interviewers with a respondent's participation and detailed contact history from prior rounds. Interviewers could use a variety of materials, including brochures, examples of questions asked, a letter to community authorities, an example health information booklet showing the results respondents would receive, and research findings from NSHAP. NSHAP also offered an initial monetary incentive of $100.

If households or respondents initially refused to participate, NSHAP mailed customized letters addressing the specific reasons for refusing. As the field period progressed, NSHAP also sent reluctant respondents a refusal conversion packet in December 2015 containing a small in-kind gift (pen with project logo). In May 2016, NSHAP began sending reluctant households a prepaid incentive to complete the screener questionnaire. These mailings included a $10 bill and a handwritten note with an interviewer's name and phone number. At this point, households could complete the screener over the phone if desired. Interviewers were also allowed to start offering small in-kind gift cards for the completion of household screeners in-person. The final refusal conversion effort for R3 was an increase of the monetary incentive offered to respondents, up to a potential total of $500. A summary of incentives dispensed appears in Table 3.

Institutional Review Board Approval and Informed Consent

Consent was obtained at several points through R3. Prior to household screening, interviewers obtained the respondent's verbal consent. Prior to the NSHAP interview, interviewers obtained respondents' written informed consent. This written consent occurs at the beginning of the IPQ. The respondent is asked to read (or request that the interviewer read) and sign the consent form. A copy of the form is given to the respondent. In addition to written consent, verbal consent is sought throughout the interview in order to reinforce that respondents may withdraw consent, refuse to answer any question, or choose not to provide a biomeasure or specimen at any time, regardless of written consent provided at the start. At the close of the interview, respondents were asked to document their preferences regarding the use of any specimens they provided for future analysis (and genetic analysis, for a small subset of C1 respondents). Full approval was granted for R3 from the NORC Institutional Review Board.

Table 3. Cases Completed by Incentives Received

Incentive	$100	$200	$400	$500	$100 + retroactive[a]	Total
Number of respondents	3,643	210	722	58	144	4,777
Percentage of completed cases	76.3%	4.4%	15.1%	1.2%	3.0%	100.0%

[a]A "retroactive" increased incentive was provided to respondents who received a $100 incentive but had a partner or other household member who later completed the interview for a higher incentive amount.

Postinterview Questionnaire

At the end of the IPQ, respondents were given the LBQ to complete and return in a postage-paid envelope. For R3, there were two versions of the LBQ: one for C1 and one for C2. The two questionnaires were largely identical except for 27 additional background questions for C2 respondents and one 21-item grid about personality characteristics for C1 respondents. Both versions took approximately 25–35 min to complete.

Accelerometry

Near the end of the IPQ, interviewers explained the accelerometry leave-behind measure to the respondents and gained their cooperation. Respondents who agreed wore a small, watch-like device on their nondominant wrist for 4 days. In the R2 interview, interviewers only gained respondent consent to be contacted by phone later to schedule a mailing of the accelerometer. For R3, the accelerometer could be configured on the spot so that interviewers could help the respondent put the device on their wrist and answer questions. After wearing the device for 4 days, the respondent mailed it back to NORC in a prepaid return envelope.

Biomeasure Results Notification

As in R1 and R2, interviewers provided respondents with some of their biomeasure results at the end of the interview. These included average pulse rate and blood pressure, height, weight, and body mass index (BMI; for C2 respondents), waist circumference, the number of correct smells identified (for eligible C1 respondents), and results from the three mobility measures. The booklet provided health information for the respondent to view whether their BMI and waist circumference were above average, below average, or average. It also provided information on normal, prehypertension, and high blood pressure ranges so that the respondent could compare their own readings. Results from accelerometry and biospecimens collected were either experimental or not clinically validated and therefore were not reported to respondents. A list of resources that contained information about health and social service organizations (e.g., Feeding America, National Center on Elder Abuse, National Health Information Center) was also provided to respondents.

Biospecimen Shipping

After collecting specimens, interviewers stored them in their house and then shipped them to the laboratory for storage until analysis (see Author Note 8). Blood samples were stored at ambient temperature in a designated ventilated container until the weekly shipping date; saliva samples were stored in an insulated container in the freezer until the monthly shipping date. Interviewers received step-by-step written and video instructions and hands-on instruction during training on how to store, pack, and ship specimens. This ensured the integrity of specimens and that federal shipping regulations were followed while maintaining interviewer safety.

The WarmMark temperature monitor was added to the blood spot shipping protocol for R3. Upon activation, the WarmMark monitor indicates whether a sample has been exposed to a temperature exceeding 86°F and for how long: brief (30 min), moderate (2 h), or prolonged (8 h). Interviewers activated the WarmMark monitor upon storing the specimen and, at the time of shipment, indicated whether the WarmMark had triggered during storage. Upon receipt of the specimens, the laboratory would also note whether the WarmMark had triggered and the duration. This process allowed the laboratory to distinguish between WarmMarks that triggered during storage or only once they had shipped. Of the 4,131 blood spot samples received at the laboratory with a WarmMark monitor, 4,018 (97.3%) indicated the WarmMark had not been triggered (meaning that only 113—or 2.7%—of those samples had been exposed to excessive heat). Table 4 contains additional information on tracking, shipping, and cataloging of the biospecimens.

Biospecimen Quality Control

NORC implements rigorous quality control standards and performed continuous monitoring of the biospecimens to ensure data quality. This monitoring included:

Reconciliation—Throughout data collection, NORC performed weekly reconciliation between laboratory data and questionnaire data to confirm whether a biospecimen was collected and arrived at the appropriate destination. Tracking was performed with an electronic reconciliation system that allowed for remote specimen tracking from in-home collection through the delivery in the final data set. Anomalies were investigated and resolved by research,

Table 4. NSHAP Round 3 Biospecimen Storage and Shipping Protocols

Biospecimen	Storage requirements	Shipping requirements
Ship weekly		
Blood spot cards	Day of interview: Place blood spot cards with the cover open in a storage container with a desiccant pack and activated temperature indicator and store overnight at room temperature. Day after the interview: Close the blood spot card covers and store in a resealable plastic bag with desiccant pack and activated temperature indicator until shipment.	Ship blood spot cards in a small Styrofoam container with a frozen ice pack for express shipment.
Ship monthly		
Saliva tubes	Place saliva tubes in a storage container and immediately place in the freezer. Keep saliva tubes in the freezer until shipment.	Ship saliva tubes in Styrofoam container with dry ice for express shipment.

Note: NSHAP = National Social Life, Health, and Aging Project.

field, and laboratory staff using field notes, laboratory sample requisition forms, and FedEx tracking numbers.

Laboratory sample quality—The quality of the samples collected and delivered to the laboratory was monitored throughout data collection. NSHAP's laboratory partner provided ongoing feedback on the biospecimen quality, including how they were collected, stored, shipped, and received. Sample quality feedback, such as shipment temperature or sample condition, was communicated to field staff. If common issues arose, such as overlapping or small blood spots or issues with shipping protocols, booster training calls were organized for field interviewers to review the protocols and share tips.

Proxy Interview

Because incapacitation and mortality are important health outcomes, NSHAP used a brief questionnaire to collect health data about C1 respondents through a proxy respondent. When NSHAP learned that a C1 respondent had passed away or was in health too poor to participate (see Author Note 9), the project attempted to identify and locate an appropriate proxy respondent (e.g., a spouse, partner, child, or other close friend or relative). The proxy questionnaire collected final data on the respondent, including the date and cause of death (if applicable). In R3 data collection, we identified 628 deceased C1 respondents and 163 in health too poor to participate.

Results

R3 data collection began in September 2015 and ended in November 2016. Table 5 presents the 3,497 returning C1 cases and 3,416 new C2 cases fielded. Of those 6,913 fielded cases, 1,083 (15.7%) were out of scope (i.e., they did not meet eligibility requirements). Most of these were deceased (628). Other out-of-scope respondents included those who did not speak English or Spanish, those living in a nursing home, those born in a year outside the scope of the study, and those who had moved outside the United States since R2. Of 5,830 eligible fielded cases, 4,777 were successfully interviewed for a weighted response rate of 78.6% (81.9% unweighted), while 1,053 cases were nonrespondents. Table 5 also provides an overview of dispositions for all fielded cases.

Biomeasure Cooperation Rates

Biomeasure cooperation rates were monitored continuously throughout the field period. As given in Table 6, the cooperation rates for Round 3 (using the formula for COOP3 as given in AAPOR, 2016) were quite high, with 10 of the 11 measures achieving cooperation rates above 90% (see Author Note 10). In addition, future analysis had a 99% consent rate (of 4,413 eligible respondents) and genetic analysis had a 92% consent rate (of 999 eligible respondents).

LBQ Return Rate

Respondents who had not returned their LBQ within 3 weeks of completing the IPQ were prompted by telephone. Additional follow-up efforts were completed as part of the LBQ retrieval experiment (see above). The final return rate for the LBQ was 85% overall, with 91% for C1 and 80% for C2 respondents.

Accelerometry Return Rate

Of respondents eligible for accelerometry and asked to consent during the IPQ, 84% agreed. For in-person distribution at the end of the interview, 1,062 devices were given to respondents during R3. Of those 1,062 distributed devices, 1,023 (or 96.3%) were returned to NORC. NSHAP field managers attempted phone prompting for the 39 respondents who never ultimately returned the device.

Data Linkage

Following R3 data collection, we pursued linkages between NSHAP respondents born by 1940 and data from

Table 5. NSHAP Final Sample Dispositions for Cases Fielded in Round 3

		Sample type		
		All	Cohort 1	Cohort 2
	No. of cases fielded	6,913	3,497	3,416
Disposition				
Out of scope	No. of cases	1,083	806	277
	% all fielded			
	Unweighted		23.0%	8.1%
	Weighted		20.8%	8.0%
	No. of eligible cases fielded	5,830	2,691	3,139
Interview	No. of cases	4,777	2,409	2,368
	% eligible fielded			
	Unweighted		89.5%	75.4%
	Weighted		89.2%	74.1%
Noninterviewed respondent	No. of cases	1,053	282	771
	% eligible fielded			
	Unweighted		10.5%	24.6%
	Weighted		10.8%	25.9%

Note: NSHAP = National Social Life, Health, and Aging Project.

Table 6. NSHAP Round 3 Biomeasure Cooperation Rates

Measure	Cooperation rate	No. of eligible respondents
Weight	98%	4,740
Waist	97%	2,371
Height	99%	2,358
Blood pressure and heart rate	98%	4,777
Balance	99%	4,599
Timed walk	98%	4,614
Chair stands	98%	4,455
Passive drool	91%	2,371
Smell	96%	1,639
Blood spots	92%	4,773
Accelerometry	84%	1,280

Note: NSHAP = National Social Life, Health, and Aging Project.

the 1940 U.S. Census. This effort resulted in linkages for 935 respondents out of 2,877 (32.5%). We also linked consenting NSHAP respondents to their Medicare data. Of the 2,409 eligible respondents, 1,689 (68.5%) provided their Medicare number. Of those 1,689 respondents, 1,659 (98.2%) were successfully linked to their Medicare files.

Discussion

The main objectives of NSHAP R3 were to enrich the analytical possibilities of the data set by adding a third time point to the C1 sample and to ensure the ongoing viability of NSHAP as a longitudinal data source by identifying and recruiting a new, younger sample. Following both cohorts in subsequent rounds will allow for unique comparisons of longitudinal change and outcomes across different birth cohorts. As with previous rounds, an important methodological and operational challenge was to find the appropriate balance between continuity with previous protocols and designing innovations and enhancements. All refinements to questionnaire items and biomeasure collection protocols were designed to enhance and expand upon previous practice while remaining compatible with the data collected in R1 and R2. Furthermore, the similarity of the data collection components (IPQ, biomeasure collection, LBQ) provided continuity for returning C1 respondents while establishing the same baseline for C2 respondents.

Although continuity remains a crucial element of NSHAP's longitudinal design, R3 also afforded opportunities for broadening the scope of the study and innovating in its content and execution. While the addition of a younger cohort strengthens NSHAP's ability to examine the importance of social and health factors in aging adults, the implementation of a nationwide household screening and

new respondent recruitment component presented new operational challenges beyond the existing complexity of the NSHAP interview. Introducing new data linkages will allow researchers to explore data points and analyses not previously available. Looking ahead at the next round of data collection with these two cohorts, who have had different combinations of experience with the NSHAP interview, we will focus on the challenges and methods of approach for each cohort. In addition, advances in the science underlying the biomeasures or in data collection techniques will continue to necessitate innovation that prioritizes current best practices while ensuring consistency and comparability.

NSHAP is an established longitudinal survey that has successfully integrated a face-to-face interview in the respondent's home with extensive biomeasure collection across multiple rounds, even in the face of general declines in response rate across the field of survey research. NSHAP has demonstrated the extent to which biomeasures can be successfully collected by nonmedically trained interviewers in a nonclinical setting, while several other metrics—including the conversion of C1W1 respondents who were C1W2 nonresponders back into C1W3 participants, and the finding that many respondents who completed a prior NSHAP interview at a higher incentive amount were willing to complete the R3 interview for the standard incentive—may prove useful to other longitudinal studies. Additionally, the findings of the LBQ retrieval experiment indicate ways that NSHAP can potentially increase its response rate for future leave-behind measures; remailing via FedEx was shown to be a better alternative to phone prompting.

NSHAP data and documentation are available to registered users through the National Archive of Computerized Data on Aging, within the Interuniversity Consortium for Political and Social Research. More details on how to gain access to NSHAP data can be found at http://www.icpsr.umich.edu/icpsrweb/NACDA/. The NSHAP questionnaires and other data collection documentation are publicly available at https://www.norc.org/NSHAP.

Author Notes

1. A note on terminology: the word "round" refers to each discrete period of NSHAP data collection, regardless of which respondents participated. The word "wave" refers to sequential instances of participation in NSHAP within-sampled respondent types. Therefore, the third round of NSHAP data collection spanned 2015–2016, but included Cohort 1 Wave 3 (C1W3) and Cohort 2 Wave 1 (C2W1).
2. See the work of O'Muircheartaigh et al. (2014) for details on sampling for R1 and R2.
3. The NSHAP definition of an interview-eligible partner is twofold: (a) the current romantic, sexual, or intimate partner of a respondent who (b) lives with the respondent. The terms spouse and romantic partner may be used interchangeably in this article.
4. Unless specifically stated otherwise, all percentages reported in this article are unweighted.
5. See in the Method section for additional detail on the protocol for identifying age-eligible and partner respondents in Cohort 2.
6. The 1940 U.S. Census data linkage work was supported by a separate grant, NIA R01AG050300.
7. See the "Proxy Interview" subsection in Data Collection for more detail.
8. Specimens were shipped to the Institute for Mind and Biology laboratory at the University of Chicago.
9. The most common ways of learning that a proxy interview was likely needed were from field interviewers making in-person contact attempts at the respondent's home and speaking with family or neighbors or from proactive outreach to the project by a family member in response to receiving advance mailings addressed to the respondent.
10. Unlike the overall response rate, which includes nonrespondents in the denominator, biomeasure cooperation rates are calculated as the number of respondents agreeing to each measure out of all respondents who completed the R3 interview.

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Conflict of Interest

None declared.

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Author Contributions

K. O'Doherty led the data collection operations team (with oversight from S. Smith), of which D. Lawrence, A. Wiencrot, S. Walsh, J. Satorius, E. Burgess, L. Sedlak, and K. Koepp were a part. All authors contributed to the writing and review of the manuscript.

References

The American Association for Public Opinion Research. (2016). Standard definitions: final dispositions of case codes and outcome rates for surveys. (9th ed.). AAPOR.

Czaplewski, M., Satorius, J., & Colicchia, M. (2012). *Investigating spouse/partner response in a longitudinal study of older adults*. Paper presented at the 2012 annual conference of American Association for Public Opinion Research, Orlando, FL.

Jaszczak, A., Lundeen, K., & Smith, S. (2009). Using nonmedically trained interviewers to collect biomeasures in a national in-home survey. *Field Methods*, **21**(1), 26–48. doi:10.1177/1525822X08323988

Jaszczak, A., O'Doherty, K., Colicchia, M., Satorius, J., McPhillips, J., Czaplewski, M., Imhof, L., & Smith, S. (2014). Continuity and innovation in the data collection protocols of the second wave of the National Social Life, Health, and Aging Project. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **69**(Suppl. 2), 4–14. doi:10.1093/geronb/gbu031

Lawrence, D., Bishop, L., Koepp, K., & O'Doherty, K. (2017). *Examining the effects of accelerometry device type and distribution method in two consecutive waves of a longitudinal study*. Poster presented at the 72nd annual conference of the American Association of Public Opinion Research, New Orleans, LA.

Lawrence, D., Burgess, E., English, E. M., Archambeau, K., & O'Muircheartaigh, C. A. (2018). *Testing the impact of the type of mail used on augmenting response rates for a Leave-Behind Questionnaire in a face-to-face study*. NORC Working Paper Series, WP-2018-003. NORC. https://www.norc.org/PDFs/Working%20Paper%20Series/WP-2018-003.pdf

O'Doherty, K., Jaszczak, A., Hoffmann, J.N., You, H.M.,Kern, D.W., Pagel, K., McPhillips, J., Schumm, L.P., Dale, W., Huang, E., & McClintock, M.K. (2014). Survey field methods for expanded biospecimen and biomeasure collection in NSHAP wave 2. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **69**(8), S27–S37. doi:10.1093/geronb/gbu045

O'Muircheartaigh, C., English, N., Pedlow, S., & Kwok, P. K. (2014). Sample design, sample augmentation, and estimation for Wave 2 of the NSHAP. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **69**(Suppl. 2), S15–S26. doi:10.1093/geronb/gbu053

Smith, S., Jaszczak, A., Graber, J., Lundeen, K., Leitsch, S., Wargo, E., & O'Muircheartaigh, C. (2009). Instrument development and implementation of the study design for the National Social Life, Health, and Aging Project (NSHAP). *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **64B**(Suppl. 1), 20–29. doi:10.1093/geronb/gbn013