Aging in Puerto Rico: Longitudinal Follow-Up of the PREHCO Study (Third wave)

Methodological Report

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and

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at Birmingham

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The Aging in Puerto Rico project: Longitudinal Follow-up of the PREHCO Project is a collaboration between the University of Alabama at Birmingham and the Graduate School of Public Health of the Medical Sciences Campus of the University of Puerto Rico.

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1. Introduction: the PREHCO Project

The Puerto Rican Elderly Health Conditions (PREHCO) project was initially developed with federal funds from the National Institute on Aging / NIA (Grant number RO1 AG1622090-01) through a subcontract between the University of Wisconsin-Madison and the University of Puerto Rico between 2000 and 2009.

The project began as a cross-sectional study of the non-institutionalized population aged 60 years or older in Puerto Rico that served as a base for the study of this age group.

A multistage stratified cluster sampling design was utilized, using the 2000 Population and Housing Census of the United States Census Bureau as a sampling frame. The sample included five strata and was representative of the population aged 60 years or older in Puerto Rico within each of those strata.

PREHCO was designed as a study comparable to the Multicenter Project on Health and Well-being of Older Adults in Latin America and the Caribbean (SABE) developed by the Pan American Health Organization (PAHO) in several cities in Latin America and the Health and Retirement Study (HRS).

The questionnaire included sections on health conditions, physical and mental disability, functionality, use of medicines, health needs and social services, access to and use of health services, abuse, migration, housing conditions, patterns of help from family, community, and public and government agencies.

The data for this first wave of the project was collected between 2002 and 2003.

In the first wave of the PREHCO project, 4,291 target participants aged 60 or older, and 1,442 spouses, regardless of their age, agreed to be interviewed. For people who were determined unable to answer the questionnaire by themselves (primarily based on cognitive screening), we conducted an interview with a proxy informant (13.5% of participants), usually a family member of the participant.

PREHCO became a longitudinal study with the second wave, which ran from 2006 to 2007.

Table 1 shows the distribution of the interviews in PREHCO 1 according to the result obtained in PREHCO 2. Participants who died or were institutionalized between the two interviews were interviewed through a proxy.

Table 1. Distribution of participant outcomes for PREHCO 2.

Result in PREHCO 2	PREHCO 1 (n=4,291)
Target interview	2,726
Proxy interview	439
Proxy interview for a deceased participant	678
Proxy interview for a institutionalized participant	48
No response	400

2. Aging in Puerto Rico: Longitudinal Follow-up of the PREHCO Project 2021-2022

This new wave of the project constitutes the third wave and has been developed between 2021 and 2022, as a collaboration between the University of Alabama at Birmingham and the University of Puerto Rico. The project follows the original participants and incorporates new tests of cognitive function, and measures of stress and mental health.

In the last decade, Puerto Rico experienced a rapidly aging population, a financial collapse, a mass outward migration of youth, Hurricane Maria, and the earthquakes in the south. For these reasons we set out to collect two new waves of data related to aging, stress, and health in the sample of PREHCO survivors. Thus, this project extends the follow-up of PREHCO to between 21 and 23 years after the initial data collection and aims to examine the predictors of cognitive decline, disability, and mortality. We also collected data on hurricane-related stressors and mental health, and measured hair cortisol.

Our project has been guided by the following objectives:

1. Examine biopsychosocial predictors of cognitive health, cortisol levels, mental health, disability, and mortality 21-23 years after baseline data.

2. Examine cross-sectional associations between stressors, resilience-enhancing factors, perceived stress, cortisol, and health, as well as changes in health two years later.

3. Facilitate cross-cultural comparisons in new areas of study with the HRS.

The interviewees in this wave of the project are the survivors of the original participants who met three conditions: (1) having participated in the two previous waves of the project, (2) being alive[1] at the beginning of the field work and (3) residing in Puerto Rico.

1,299 participants were determined eligible to participate in follow-up. Their age at the beginning of the field work was at least 78 years.

Of the 1,299 participants expected to still be living, 958 were interviewed, either directly or through a proxy (due to performance on cognitive screening, or because at the time of the interview they had died or were institutionalized).

The distribution of the 958 cases, according to the type of interview, is as follows:

- Interviewees who completed self-report: 617
- Interviewed proxy: 194
- Deceased participants[2] interviewed proxy: 113
- Institutionalized participants[3] interviewed proxy: 34

[1] According to the information gathered from the National Death Index (NDI) and the Demographic Registry of the Department of Health of Puerto Rico.
[2] Participants who were found dead at the time of locating them to conduct the interview.
[3] Participants who were found institutionalized at the time of locating them to conduct the interview.

3. Questionnaire

The questionnaire is the main instrument to collect information. Three sources of information were used to design the questionnaire: (1) the previous PREHCO questionnaires, (2) measures from the HRS including objective/subjective cognitive function and proxy report of dementia symptoms, and (3) questions developed by experts to determine the influence of certain events: hurricane, earthquakes, and pandemic, on the participants.

3.1. Questionnaire sections and calculated variables

Section A: Demographic Data and Minimental

This section establishes the type of interview (see the "Questionnaire Versions" section below) that was conducted depending on the current status of the main interviewee. As in previous PREHCO waves, the Minimental Cabán was used to determine whether a proxy report was needed due to cognitive impairment (Sánchez-Ayéndez et al., 2003[4]). If the score obtained was eleven or higher, the interview was carried out with the participant. If the score was 9 or 10 the interviewer decided whether he considers the participant was qualified to complete self-reports.

Section A calculated variables	
MINIMEN_F_w3	Final minimental score
The final score in the Minimental Cabán was calculated by adding the individual points obtained in each of the questions that compose it, up to a maximum of 20 points. For those participants who have a physical problem that prevents them from drawing (a4_w3=1), this score is calculated by weighting the score obtained in the questions that do not require drawing or using their hands.	

Section B: Living arrangements

This section collects information about the people who live in the household with the interviewee: number, sex, age, and relationship with the interviewee.

Section C: Cognitive Proxy

Section C contains information on cognitive functioning, collected from the proxies[5]. All questions come from the Health and Retirement Study (HRS) and are described in Ofstedal et al. (2005)[6].

[4] Sánchez-Ayéndez M, Cabán C, Fernández L, Rosich W, Dávila A, Larriuz M, Hernández J, García A, Palloni A. A short psychometric scale to evaluate the cognitive status of aged Spanish speakers. P R Health Sci J. 2003 Dec;22(4):377-83.

[5] The target answers questions C3 and C4 in this section.

[6] Ofstedal, M.B., Fisher, G.G., & Herzog, A. R. (2005). Documentation of cognitive functioning measures in the health and retirement study. HRS/AHEAD Documentation Report DR-006. Available through the Survey Research Center at the Institute for Social Research, University of Michigan. http://hrsonline.isr.umich.edu/sitedocs/userg/dr-006.pdf

Global Ratings: Memory, Judgment, and Organization

Two questions were asked about participants' overall memory (item C1) and change in memory compared to two years ago (item C2). In addition to rating respondents' memory, proxy respondents rated participants' overall judgment (item C3) and organization of daily life (C4).

Jorm IQCODE (16-item version)

This measure is widely used as a screening test for dementia, particularly in those who do poorly on brief cognitive testing (e.g., combined with low Minimental Cabán). Proxy respondents were asked 16 questions (items C5-C52) about the participant's change in memory for several types of information in the last two years. These questions were adapted by the HRS from the short form of the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE; Jorm, 1994[7]), and described in Ofstedal et al. (2005). These questions were worded as:

"Compared with two years ago, how is (participant name) at …?", with (a) options for improved, not much changed, or gotten worse, and (b) how much improvement or decline was observed. Therefore, each of the 16 individual IQCODE items was comprised of 3 questions.

Scoring for the IQCODE using a previously published cutoff for dementia is included in the section on calculated variables below (see section 5.6).

Items included:

- Remembering things that have happened recently
- Recalling questions a few days later
- Remembering (his/her) address and phone number
- Remembering what day and month it is
- Remembering where things are usually kept
- Remembering where to find things that have been put in a different place than usual
- Knowing how to work familiar machines around the house
- Learning to use a new gadget or machine around the house
- Learning new things in general
- Following a story in a book or on TV
- Making decisions on everyday matters
- Handling money for shopping
- Handling financial matters, the pension or dealing with the bank
- Handling other everyday arithmetic problems, such as knowing how much food to buy, knowing how long between visits from family or Friends
- Using thinking skills to understand what is going on and to reason things through

[7] Jorm, A.F. 1994. A short form of the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE): Development and cross-validation. Psychological Medicine, 24: 145-153.

Behavior Problems

Proxy respondents also reported on the frequency of 10 different behavior problems, also from the HRS survey (items C53-C62). These behaviors included:

- Getting lost in a familiar environment
- Wandering off and not returning
- Being able to be left alone for an hour
- Seeing or hearing things not really there
- Becoming angry or hostile without reason
- Having difficulties falling asleep or waking frequently
- Doing things dangerous to themself
- Pacing or rocking movements while sitting
- Thinking people plotting against or trying to harm
- Drinking too much alcohol

Section C calculated variables	
IQCODE_w3	IQCODE score
R_IQCODE_w3	IQCODE score recoded[8]

Section D: Quality of life

This section consists of questions from the Veterans RAND 12 Item Health Survey (VR-12)[9], used to measure quality of life in relation to health. The questionnaire's twelve items correspond to eight domains of physical and mental health, including general health perceptions; physical functioning; role limitations due to physical and emotional problems; body ache; energy-fatigue, social functioning, and mental health. The 12 items are summarized in two scores, corresponding to a physical component (PCS) and a mental component (MCS), which provide an important contrast between the state of physical and psychological health.

Section D calculated variables	
VR12_PCS_w3	Veterans RAND 12 Item Health Survey (VR-12) Physical Component
VR12_MCS_w3	Veterans RAND 12 Item Health Survey (VR-12) Mental Component

[8] Mejía-Arango S, Águila E, López-Ortega M, et al. Health and social correlates of dementia in oldest-old Mexican-origin populations. Alzheimer's Dement. 2020;6: e12105. We followed the criteria used by Mejía-Arango et al. who, for responses collected through surrogate informants, classified people as likely to have dementia if their IQCODE score was ≥ 3.4 and < 3.4 for those cognitively normal, as recommended for community samples.

[9] Kazis LE, Miller DR, Skinner KM, Lee A, Ren XS, Clark JA, Rogers WH, Spiro III A, Selim A, Linzer M, Payne SM, Mansell D, Fincke BG. Applications of Methodologies of the Veterans Health Study in the VA Health Care System: Conclusions and Summary. J Ambulatory Care Management 2006a 29:2 182-188

Section F: Cognitive status

In addition to the Minimental Cabán, which was administered in previous waves, target participants completed the Spanish-language version of cognitive measures from the Health & Retirement Study (HRS), described in Ofstedal et al. (2005[10]). These included the HRS-modified Telephone Interview for Cognitive Status (TICS), which has cutpoints for cognitive impairment using a 27-point version (Langa et al., 2017[11]), and the original 35-point version (Herzog & Wallace, 1997[12]). The 27-point version includes memory (immediate and delayed recall), serial 7s, and backward counting. The 35-point version additionally includes orientation, object naming, and naming President/Governor. The TICS subtests, and an additional test of verbal fluency (animal naming), are described below.

Memory
The participant was asked to recall as many words as possible from a 10-word list, immediately after read once aloud by the interviewer (F3a) and then again after a 5-minute delay (F19a).

Serial 7s test
This is a common screening test for working memory. The participant was asked to subtract 7 from 100, and continue subtracting 7 from each subsequent number (total of 5 trials, score of 0-5).

Backwards count 20-1
Participants were instructed to count backwards from 20 to 1 (score of 0-2).

Orientation
A maximum score of 4 points was given for correctly stating the day of week and complete date (month, day, year).

Object naming
Participants were asked two questions:
"What do you usually use to cut paper?"
"What do you call the kind of prickly plant that grows in the desert?"

President/Governor naming
Participants were asked to name the current President of the U.S. and Governor of Puerto Rico. This was modified from the HRS by substituting Governor for Vice President.

[10] Ofstedal MB, Fisher GG, Herzog AR. Documentation of cognitive functioning measures in the Health and Retirement Study. Ann Arbor, MI: University of Michigan. 2005;10.
[11] Langa, K. M., Larson, E. B., Crimmins, E. M., Faul, J. D., Levine, D. A., Kabeto, M. U., & Weir, D. R. (2017). A comparison of the prevalence of dementia in the United States in 2000 and 2012. JAMA Internal Medicine, 177, 51-58.
[12] Herzog, A. R., & Wallace, R. B. (1997). Measures of cognitive functioning in the AHEAD Study. The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 52, 37-48.

Verbal fluency (animal naming)

This test measures language and executive function. Participants were asked to name as many animals as possible in 60 seconds, using the following instructions from the Mexican Health and Aging Study[13]: "I want you to think of all the animals you know, think of any animal that lives in the air, in the water, on the ground, in the forest, all kinds of animals. Now I want you to tell me all the animals you can. You have one minute to do this."

Section F calculated variables	
WLL_w3	Number of correct words initially mentioned
F5T_w3	Backwards count
SERIAL7_w3	Serial 7s test
WLD_w3	Number of correct words mentioned after 5 minutes
ANIMALS_w3	Number of animals named
TICS27_w3	TICS-27 score
R_TICS27_w3	TICS-27 score recoded
TICS35_w3	TICS-35 score
R_TICS35_w3	TICS-35 score recoded

Section H: Religiosity

The section contains questions from previous PREHCO waves about religious beliefs and practices, as well as about participation in church social activities.

Section I: Family network

This section gathers information on the number of sons, daughters, brothers, and sisters alive at the time of the interview and whether they live in Puerto Rico or the United States.

Section I calculated variables	
HIJOS_w3	Total number of children alive
HERMANOS_w3	Total number of siblings alive

[13] Wong R, Michaels-Obregon A, Palloni A. Cohort Profile: The Mexican Health and Aging Study (MHAS). Int J Epidemiol. 2017 Apr 1;46(2):e2. doi: 10.1093/ije/dyu263. PMID: 25626437; PMCID: PMC5837398.

Section J: Social support

Social support was measured with the Lubben Social Network Scale (Lubben et al., 2006)[14]. This measure was developed to evaluate the perceived social support of an older adult based on the size of their social network, the trust that these ties generate and the frequency of contacts that this person has with others. This section also includes a series of questions from previous PREHCO waves about transfers, that is, about the help received and provided, as well as the person or institution that helps the participant the most and the one that mainly receives his help.

Section J calculated variables	
SSN_w3	Lubben Social Network Scale score

Section K: Loneliness

The three questions that make up this section were taken from the 11-item series of the 2016 Health and Retirement Study (HRS) in its Spanish version[15]. They cover the aspects of lack of companionship, exclusion, and isolation. This is a 3-item version of the UCLA Loneliness Scale (Hughes et al., 2004[16]).

Section L: Chronic diseases

The essential purpose of this section is to obtain information about diagnoses of common diseases.

Section M: Access to healthcare

This section collects information about the type of health insurance, the use of health services, and difficulties in obtaining some of these services.

Section N: Medications

This section measures the number of medications the interviewee uses: prescribed, recommended by a doctor, or self-initiated. Participants are asked whether they stopped taking any medications due to cost.

[14] Lubben J, Blozik E, Gillmann G, et al. Performance of an abbreviated version of the Lubben Social Network Scale among three European community-dwelling older adult populations. The Gerontologist. 2006;46(4):503-513.
[15] Health and Retirement Study, public use dataset. Produced and distributed by the University of Michigan with funding from the National Institute on Aging (grant number NIA U01AG009740). Ann Arbor, MI, (2016).
[16] Hughes, M. E., Waite, L. J., Hawkley, L. C., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys: results from two population-based studies. Research on Aging, 655-672.

Section P: Emotional stability and life satisfaction

Neuroticism

Neuroticism is one of the "Big 5" personality traits. High scores on this personality trait, in particular, are consistently linked to greater perceived stress. Low scores on neuroticism indicate greater "emotional stability."

As done in the HRS (Smith et al., 2013[17]), we measured neuroticism/emotional stability using four items from the Midlife Development Inventory (MIDI; Lachman & Weaver, 1997[18]). Participants were asked to rate how well four adjectives described them on a scale from 1 (not at all) to 4 (a lot).

Life satisfaction

Overall satisfaction with life, a measure of subjective well-being, was measured by a single item from the Hispanic Established Populations for the Epidemiologic Studies of the Elderly (H-EPESE; see Peek et al., 2006[19]. Interviewers asked respondents to think about their life as a whole and describe how satisfied they were with it on a scale from 1 to 4 (1 = completely satisfied; 4 = not at all satisfied).

Section P calculated variables	
NEUROT_w3	Neuroticism / emotional stability score

Section Q: Disability

This section explores the difficulties that the participant has in carrying out basic and instrumental activities of daily living (ADLs and IADLs). This section also includes questions about the help received by the participant to carry out these activities and about the people who provide that help.

Section R: Coping

The Brief Resilient Coping Scale (4 items) captures effectiveness in adaptively coping with stress. The scale focuses on the tendency to use flexible strategies effectively to actively solve problems despite stressful circumstances[20].

[17] Smith, J., Fisher, G., Ryan, L., Clarke, P., House, J., & Weir, D. (2013). Psychosocial and lifestyle questionnaire. Survey Research Center, Institute for Social Research.

[18] Lachman, M. E., & Weaver, S. L. (1997). The Midlife Development Inventory (MIDI) personality scales: Scale construction and scoring. Waltham, MA: Brandeis University.

[19] Peek, M. K., Stimpson, J. P., Townsend, A. L., & Markides, K. S. (2006). Well-being in older Mexican American spouses. The Gerontologist, 46(2), 258-265.

[20] Moret-Tatay C, Fernández-Muñoz JJ, Civera-Mollá C, Navarro-Pardo E, Alcover-de-la-Hera C. Psychometric properties and Factor structure of the BRCS in an elderly Spanish sample. Anales de Psicología/Annals of Psychology. 2015;31(3):1030-1034.

Section R calculated variables	
BRCS_w3	Brief Resilient Coping Scale score
R_BRCS_w3	Brief Resilient Coping Scale score recoded[21]

Section S: Perceived stress

This section consists of four questions that correspond to a reduced version of the Perceived Stress Scale. This instrument is designed to measure the degree to which situations in life are considered stressful. According to Cohen et al. (1983[22]) the 4-question scale has adequate reliability and validity.

Section S calculated variables	
PSS_w3	Perceived Stress Scale score[23].

Section T: Health behaviors

This section collects general information about cigarette smoking, consumption of alcoholic beverages, including the CAGE scale[24], possible dependence, basic physical activity, consumption of certain food groups, as well as sleep habits.

Questions on exercise and diet were drawn from the 10/66 Dementia Research Group (Prince et al., 2007 [25]) study materials[26]. Exercise (T14 – T15) was assessed by asking participants if they have walked a half kilometer in the past month and how many times this was done. Diet (T17 – T19) included intake of fish, meat, and fruit and vegetables and these questions have been used in previously published research (Albanese et al., 2009 [27]). An additional question asked how often the participant has been hungry because of not enough food (T20).

[21] Sinclair, V. G., & Wallston, K. A. (2004). The development and psychometric evaluation of the Brief Resilient Coping Scale. Assessment, 11(1), 94-101. The total score ranges from 4 to 20. The recoded score indicates low resilience (4 to 13), medium resilience (14 to 16), or high resilience (17 to 20).
[22] Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. Journal of Health and Social Behavior, 24, 385-396.
[23] The score ranges from 0 to 16. Higher scores correlate with more stress.
[24] Mayfield D, McLeod G, Hall P. The CAGE questionnaire: validation of a new alcoholism screening instrument. American Journal of Psychiatry. 1974;131(10):1121-1123. doi: 10.1176/ajp.131.10.1121.
[25] Prince, M., Ferri, C. P., Acosta, D., Albanese, E., Arizaga, R., Dewey, M., ... & Uwakwe, R. (2007). The protocols for the 10/66 dementia research group population-based research program. BMC public health, 7(1), 1-
[26] https://1066.alzint.org/population_based_study_prevalence.php
[27] Albanese, E., Dangour, A. D., Uauy, R., Acosta, D., Guerra, M., Guerra, S. S. G., ... & Prince, M. J. (2009). Dietary fish and meat intake and dementia in Latin America, China, and India: a 10/66 Dementia Research Group population-based study. The American Journal of Clinical Nutrition, 90(2), 392.

Sleeping problems (T21 – T24) were from the Behavioral Risk Factor Surveillance System (BRFSS) 2018 Annual Survey[28]. Two questions on sleep apnea, and two about sleeping medications were also included (T25 – T28).

Section U: Migration

This section includes information about moves to the United States in recent years and their reasons. In the two previous interviews, information was collected about moves to the United States and work experiences during those stays. It is emphasized that all interviewed participants resided in Puerto Rico at the time of the wave 3 interview.

Section V: Retirement and work

This section includes questions on retirement (the large majority of sample was retired) and reason for working of those who indicated working at the time of the interview.

Section W: Income and expenses

This section includes questions about personal income, the sources and the frequency of that income. Additional information about the household income and who contributes the most to household expenses is included in this section.

Section X: Financial stressors

The section includes questions from previous PREHCO waves about difficulties paying for daily expenses and health care.

Section Y: Anxiety

The section consists of 5 items from the Beck Anxiety Inventory (Beck et al., 1988[29]) to explore the anxiety symptoms. These are the five items used in the HRS to measure symptoms of anxiety (Smith et al., 2013).

Section Y calculated variables	
BAI_w3	Beck Anxiety Inventory (BAI) score

Section Z: Depressive Symptoms

This section contains the 15-item Spanish abbreviated version of the Yesavage out-of-clinical Geriatric Depression Scale (Sheikh & Yesavage[30]). This version of the GDS was used in PREHCO 1 and 2, and was taken from the multicenter SABE (Health, Wellbeing and Aging) study that investigated the health conditions of older adults in the main urban areas of seven

[28] https://www.cdc.gov/brfss/annual_data/annual_data.htm.
[29] Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. Journal of Consulting and Clinical Psychology, 56(6), 893-897.
[30] Sheikh J, Yesavage JA. Geriatric Depression Scale (GDS): recent evidence and development of a shorter version. Clinical Gerontologist. 1986; 5:165-173.

countries in Latin America and the Caribbean and was sponsored by the Pan American Health Organization (Peláez et al., 2000[31]).

Section Z calculated variables	
GDS_w3	Geriatric Depression Scale (GDS) score[32]
R_GDS_w3	Geriatric Depression Scale (GDS) score recoded[33]

Section AA: Neighborhood

These questions include 8 items from the HRS Psychosocial Questionnaire (Smith et al., 2013[34]) that were modified to have yes/no responses to reduce participant cognitive burden and time burden of the original 7-point response scale.

The 8 HRS items reflect two different constructs: 1) *neighborhood physical disorder* (vandalism/graffiti, safety walking alone at night, cleanliness, abandoned houses/stores), and 2) *neighborhood social trust* (feel part of neighborhood, trust people, people are friendly, people will help you).

Two additional exploratory PREHCO-generated questions were included: availability of areas to walk or play sports and happiness with the neighborhood.

Section AA calculated variables	
NEIG_D1_W3	Neighborhood physical disorder index score
NEIG_D2_W3	Neighborhood physical disorder index average
NEIG_C1_W3	Neighborhood social trust index score
NEIG_C2_W3	Neighborhood social trust index average

Section AB: Hurricane stressors

The lack of a standardized measure to evaluate the potential effects of major recent hurricanes on participants led us to adapt some questions previously used by Dr. Lisa Brown[35] that,

[31] Peláez, Martha, Palloni, Alberto, Albala, Cecilia, Alfonso, Juan Carlos, Ham-Chande, Roberto, Hennis, Anselm, … Prats, Omar. SABE - Survey on Health, Well-Being, and Aging in Latin America and the Caribbean, 2000. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2006-02-17. https://doi.org/10.3886/ICPSR03546.v1

[32] For those cases with valid answers in at least 10 of the 15 questions, the score was extrapolated to the 15 questions of the scale.

[33] The score was recoded into these categories: No depression (0-5 points), moderate depression (6-9 points) and severe depression (10-15 points).

[34] Smith, J., Fisher, G., Ryan, L., Clarke, P., House, J., & Weir, D. (2013). Psychosocial and lifestyle questionnaire. Survey Research Center, Institute for Social Research.

although they are not part of a scale, include the primary contributors to natural disaster-related stress by Lock et al (2012)[36].

Section AC: Earthquake and Covid-19 related stressors

This section includes exposure to the earthquakes recorded in Puerto Rico in 2020, as well as the experiences faced as a consequence of the pandemic.

Section AE: Physical performance

It is known that various brief performance-based measures of physical function can predict short-term disability and mortality. In this section, in addition to the anthropometric measurements from previous PREHCO waves, we included performance-based tests of physical function from previous PREHCO waves: one leg stand, get up and go, and grip strength.

Section AE calculated variables	
BMI_w3	Body mass index[37].
R_BMI_w3	Recoded Body mass index [38].
WHR_w3	Waist hip ratio
GS_D_w3	Grip strength right hand
GS_I_w3	Grip strength left hand
GS_H_w3	Maximum grip strength

Section AF: Cortisol

A hair sample was obtained from the participant to measure the stress hormone cortisol, and the cortisone. A series of questions are asked about hair care and the use of steroids and other medications that may affect cortisol measurement.

Section AH: Deceased

For participants who had died at the time of the interview, we interviewed a proxy about the cognitive state of the participant before death and gathered general data on health conditions at the time of death and the cause of death.

The Eight-item Informant Interview to Differentiate Aging and Dementia (AD8) was administered (Galvin et al., 2006[39]). The AD8 includes 8 items that assess memory,

[35] Dr. Lisa Brown is an expert in aging and hurricane-related stress and is a Professor at Palo Alto University.
[36] Lock S, Rubin GJ, Murray V, Rogers MB, Amlôt R, Williams R. Secondary stressors and extreme events and disasters: a systematic review of primary research from 2010-2011. PLoS currents. 2012;4.
[37] Calculated as weight in pounds divided by the square of height in inches and multiplied by 703.
[38] The value of the Body Mass Index recoded into the categories: less than 18.60 (underweight), 18.60 to 24.99 (normal weight), 25.00 to 29.99 (overweight) and 30 or more (obesity).

orientation, judgment, and function. Cut points are: normal cognition 0-1; impairment in cognition 2 or greater. The AD8 has previously been used to determine likelihood of dementia postmortem (Ferretti et al., 2010[40]).

Section AH calculated variables	
AD8F_W3	Eight-item Informant Interview scale for deceased score
R_AD8F_W3	Eight-item Informant Interview scale for deceased score recoded

Section AI: Institutionalized

For participants who live permanently in an institution at the time of the interview, we interviewed a proxy about the participant's cognitive status, the reasons for institutionalization, the characteristics of the institution, and the health conditions of the participant.

The Eight-item Informant Interview to Differentiate Aging and Dementia (AD8) was administered (Galvin et al., 2006) as described above.

Section AI calculated variables	
AD8I_W3	Eight-item Informant Interview scale for institutionalized score
R_AD8I_W3	Eight-item Informant Interview scale for institutionalized score recoded.

Section AJ: Contacts

In order to be able to locate the participant in the future, he or she was asked to identify up to three close alternate contact people.

Section AK: Interviewer's perception

The purpose of this section, which is answered by the interviewer, is to obtain information about the difficulties that the interviewee may have had in completing the interview.

[39] Galvin, J. E., Roe, C. M., Xiong, C., & Morris, J. C. (2006). Validity and reliability of the AD8 informant interview in dementia. Neurology, 67(11), 1942-1948.
[40] Ferretti, R. E. D. L., Damin, A. E., Brucki, S. M. D., Morillo, L. S., Perroco, T. R., Campora, F., ... & Nitrini, R. (2010). Post-Mortem diagnosis of dementia by informant interview. Dementia & neuropsychologia, 4, 138-144.

3.2. Versions of the questionnaire

The questionnaire varies according to several factors, mainly the ability of the interviewee to complete self-report and their current status (living at home vs. deceased or institutionalized). As a result, there are four variants of the questionnaire (Table 2), these are: (1) questionnaire of the target interviewee, (2) questionnaire of the proxy of the interviewee[41], (3) questionnaire of the proxy of the deceased interviewee, and (4) questionnaire from the proxy of the institutionalized interviewee.

1. Questionnaire of the target interviewee: the main questionnaire is the one administered to those capable of completing self-report measures.
2. Questionnaire for the proxy of the interviewee: this version is answered by a proxy informant. The decision of the need for a proxy is made using two criteria: (1) the score obtained by the interviewee in the MMC and (2) the opinion of the interviewer in some cases with borderline MMC score[42]. The proxy provides information related to health and function, excluding some sections or individual questions that would require self-report (e.g., perceived stress, depressive symptoms).
3. Questionnaire for the proxy of the deceased participant: if the participant was believed to be alive but we were informed the person had died, a proxy completed a brief interview as described above.
4. Questionnaire of the proxy of the institutionalized participant: if the participant is institutionalized, a proxy completed a brief interview.

[41] Criteria to qualify the proxy: (1) knowing the interviewee for at least two years, (2) being 18 years old or older and, (3) if 60 years old or older, passing a reduced version of the mini-mental.

[42] A criterion was established that a total score on the minimental of 11 or more indicated that the interviewee was capable of answering on his/her own. A score of less than 9 indicated that it was necessary to use a substitute informant. For those cases in which the score was 9 or 10, the interviewer was the one who determined whether the interviewee was qualified to answer.

Table 2. Versions of the questionnaire.

Section	Target	Proxy	Deceased	Institutionalized
A: Demographics and minimental	Complete	Complete	A1, A17intro to A27, A30, A30a A36intro, A36a to A36d	A1, A17intro to A27, A30, A30a A36intro, A36a to A36d
B: Living arrangements	Complete	Complete		
C: Proxy cognition	C3, C4	Complete		
D: Quality of life	Complete			
F: Cognition	Complete			
H: Religiosity	Complete			
I: Family network	Complete	Complete		
J: Social support	Complete			
K: Loneliness	Complete			
L: Chronic diseases	Complete	Except L1 to L5, L77, L97 to L100		
M: Access to healthcare	Complete			
N: Medications	Complete			
P: Emotional stability	Complete			
Q: Disability	Complete	Q1 to Q28		
R: Coping	Complete			
S: Perceived stress	Complete			
T: Health behaviors	Complete	T21, T25 to T28		
U: Migration	Complete			
V: Retirement and work	Complete	V1, V2		
W: Income and expenses	Complete	Complete		
X: Financial stressors	Complete			
Y: Anxiety	Complete			
Z: Depression	Complete			
AA: Neighborhood	Complete			
AB: Hurricane stressors	Complete			
AC: Earthquake and Covid-19 related stressors	Complete			
AE: Physical performance	Complete	Complete		
AF: Cortisol	Complete	Complete		
AH: Deceased			Complete	
AI: Institutionalized				Complete
AJ: Contacts	Complete	Complete		
AK: Interviewer's perception	Complete	Complete	Complete	Complete

4. Fieldwork

A two-stage pilot test was conducted between October and December 2020. The final sample of the pilot test was 27 cases.

In the first stage, the cases were selected randomly using the following criteria:

- Geographic considerations: sections most affected by Hurricane María (Yabucoa, Humacao and nearby areas), sections most affected by Hurricane Irma (Loíza, Fajardo), sections affected by the earthquake (Guánica, Guayanilla, Yauco), and sections of the San Juan Metropolitan Area.
- Demographic characteristics: sex (male, female), age (<82, 82+).
- Type of previous interviews: regular, by proxy.

After completing the initial pilot interviews and examining responses and difficulties, a focus group was also held with the interviewers. As a result, changes were made to the questionnaire, some questions were removed and others were added. The final duration of the interview was substantially reduced and some procedures were streamlined.

After this revision, in a second wave, additional cases were assigned to test the updated version of the questionnaire. For this wave, and for convenience, only cases from the San Juan metropolitan area were assigned.

The primary fieldwork was carried out between the months of March 2021 and July 2022. The start of the field work of this third wave was delayed due to the pandemic, but the duration corresponds to that originally planned. The participation rates by strata were similar, despite problems recruiting interviewers in the western part of the island. Only the Guayama substrata in the southeast showed higher non-response rates. This situation is considered to be associated with the fact that Hurricane Maria in 2017 entered Puerto Rico through that region, causing a high number of residents to move.

4.1. Questionnaire administration and use of the REDCap platform

Data collection was carried out in a face-to-face interview with the interviewees in their homes[43].

Data were collected on electronic tablets using the REDCap (Research Electronic Data Capture) platform[44]. REDCap allows studies to build and manage databases and surveys. Surveys are conducted using an electronic device.

Because the interviews are conducted in the field, without guaranteed internet access, the REDCap mobile application was used that allows us to complete the interviews offline. The information is temporarily stored on the electronic device until it connects to the REDCap server at supervision appointments.

[43] Because of its brevity some of the deceased participant proxy or institutionalized participant proxy type interviews were conducted by telephone.

[44] The REDCap Consortium is made up of thousands of institutional partners active in more than one hundred countries that use and support their own individual REDCap systems (www.project-redcap.org).

4.2. Quality control

For 15.2% of completed cases we conducted some form of quality control (goal was 15%) in one of several modalities: full audio recording review (50 cases), phone call to confirm selected responses and verify the performance of the interviewer (52 cases), or revision to evaluate adherence to instructions for cognitive tests carried out (44 cases).

Minor adjustments were made to the interviewers' procedures as a result of the quality control process, especially at the beginning of the fieldwork.

The selection of cases for quality control was carried out randomly according to a pre-established procedure, except in some cases for which, for some reason, it was necessary or advisable to submit to the quality control process (such as errors identified when cleaning the data).

The results of all these quality control activities did not show any evidence of systematic errors in the data obtained.

4.3. Summary of fieldwork

Table 3 summarizes the results of the fieldwork of this third wave. After an estimated period of 14 years since the last interview, an overall response rate of 73.7% was obtained. Nine hundred and fifty-eight (958) participants were successfully contacted: 617 completed self-reports, 194 needed proxy interviews, 113 were proxy interviews for deceased participants, and 34 were proxy interviews for institutionalized participants.

Table 3. Summary of the W3 fieldwork.

Number of cases	1,299
Completed (response rate): - Targets - Proxies - Deceased Proxies - Institutionalized Proxies	958 (73.7%) 617 194 113 34
No response	341
Quality control	143 (15.2%)
Anthropometric measurements	691 (85.2%)
Hair sample	622 (76.7%)

5. Data

5.1. Files, location, and availability

Data and documentation are available at the Inter-university Consortium for Political and Social Research (ICPSR) (www.icpsr.umich.edu) and at the project webpage (https://sites.uab.edu/prehco).

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Table 4. W3 Data files.

File	Description
Aging in Puerto Rico PREHCO W3 958 cases 2-12-2024.sav	All W3 variables for the 958 cases completed in SPSS format.
PREHCO 4291 cases STATUS.sav	Death status, year of death, source of information and general status, indicating whether or not they participated in W3, for the 4,291 original cases.

Table 5. W3 Documentation.

File	Description and link
Cuestionario W3	Original W3 Questionnaire in Spanish.
W3 Questionnaire	English version of the W3 Questionnaire.
W3 Methodological Report	Description of third wave of the study, including information about the project, the questionnaire, the fieldwork, the data, the key variables, the sub-studies carried out and the website.
Informe metodológico W3	Spanish version of the W3 Methodological Report
Key variables	Names of key variables in the three waves of the project
Variables clave	Spanish version of the names of key variables in the three waves of the project
Codebook	Details about the third wave of the study (in Spanish and English) and detailed description of the variables in the database.
W3 Sample design	Details about the sample design utilized in the third wave of the project (in Spanish)
W3 Weighting factors	Details about the weighting factors for the W3 data (in Spanish)
W3 Sample design and weighting factors summary	Summary of sample design and weighting of data (in English)

5.2. Result codes and variable names

The variable CODE_w3 contains the final code for the 958 cases completed in this third wave.

1110 Target interview

1120 Proxy interview

5100 Proxy for deceased interview

6100 Proxy for institutionalized interview

The variable names in the database end in **_w3** and their names will be retained in the next wave of the project, the fourth, when the names will end in **_w4**.

5.3. Codebook

There is a digital codebook, corresponding to the data from this third wave, which presents additional information about the dataset. It provides general information on the study, especially for the third wave, and presents details about the variables in the public database: name, position, type, variable and value labels, missing values, frequency distributions and some descriptive statistics, depending on the nature of each variable.

5.4. Errors and limitations in data

There are some known errors or limitations in the database that users should consider. These errors do not affect the quality of the data collected, but are presented for the knowledge of users. They are mainly due to small modifications introduced in the questionnaire once the fieldwork began or to programming problems with the REDCap software.

Section I: Family network

Three (3) cases have values of -3 (information not available) in some variables due to problems with the operation of the REDCap platform. This caused the program to miss some of the questions.

Section AC: Earthquake and Covid-19 related stressors

The variable AC35_w3 was added after the start of the fieldwork, so it has 5 cases with a value -3 (information not available) and one additional case due to an interviewer's error.

Section AE: Physical performance

The variables AE24j_w3 and AE25j_w3 have 12 cases with values of -3 (information not available) due to changes made to the questionnaire.

Section AH: Deceased

The variables AH8m_w3, AH8n_w3 and AH10_w3 have 8 cases with values of -3 (information not available) due to changes made to the questionnaire.

Section AI: Institutionalized

The variables AI9_w3, AI7m_w3 and AI10_w3 have 2 cases with values of -3 (information not available) due to changes made to the questionnaire.

Section Z: Depression

The variables that integrate the Geriatric Depression Scale (GDS) were answered only by the 617 targets interviewees. Sixty-three (63) cases of the 617 responded do not know or did not answer any of the fifteen questions that compose the scale. One of the cases offered these answers to 4 of the questions. In these cases, the score obtained in the questions correctly answered was weighted. Especially, question Z15_w3 had 24 do not know responses and three did not answer responses. The score of the depression scale is presented in the variable GDS_w3.

5.5. Sampling design and data weighting

Sample design

The sample design for the PREHCO Project was developed between 2001-2002 and the first wave of the survey was completed between 2002 and 2003. Initially designed as a cross-sectional survey of the non-institutionalized older adult population aged 60 years or older in Puerto Rico, four years later, a second wave of the PREHCO project (2006-2007) converted PREHCO into a longitudinal study.

This third wave (2021-2022) was concluded 15 years after the second and 19 years after the first wave. The population was reduced to the group of 78 years and older. This is a consequence of the "natural decline" of the population in the initial sample of people aged 60 or over, and the sample loses due to different causes, including migration, in the period of time that has elapsed.

In the original sample design, Puerto Rico was stratified into 5 regions, which define the 5 strata of the sample, which were divided into two substrata: the main municipality and the rest of the region, except for Stratum 5 in the east of the country, which was divided into 4 substrata, for a total of 12 substrata.

The details of the original sample design can be consulted in the document "PREHCO First Wave Sample Description":

https://prehco.rcm.upr.edu/sites/default/files/website_pdf/sample2.pdf

The details of the sample design corresponding to this third wave of the project can be found in the document 'Sample Design of the PREHCO Study: Basic Elements and Behavior of the Sample in Longitudinal Follow-up Wave 3' (in Spanish).

Table 6. Sample of older adults by strata.

	Strata					Total	Percent
	1	2	3	4	5		
Total targets	**425**	**238**	**179**	**228**	**229**	**1299**	**100%**
Total completed interviews	305	187	133	170	163	958	73.7
Target interviews	198	122	80	108	109	617	64.4
Proxy interviews	48	37	33	38	38	194	20.3
Proxy deceased interviews	42	24	18	16	13	113	11.8
Proxy institutionalized interviews	17	4	2	8	3	34	3.5
Sample drops	**120**	**51**	**46**	**58**	**66**	**341**	**26.3**
Refusals	36	17	10	15	10	88	25.8
Moved	49	20	20	22	37	148	43.4
Deceased target with no proxy	18	3	7	8	8	44	12.9
Institutionalized target with no proxy	10	2	4	3	6	25	7.3
Other reason	7	9	5	10	5	36	10.6

Weighting of the data

The calculation of the weighting factors was carried out independently for: the targets and for the targets and proxies together since the proxies had a reduced questionnaire. The calculation process was carried out in two stages.

In the first, the weighting factors of the sampling design were calculated, which implicitly include the strata and substrata as well as the probabilities of sample selection in each of them.

In the second stage, a post-stratification or re-weighting method known as Calibration was applied, through which the initial weights of the sampling design are adjusted to exactly reproduce the external population totals of the control variables, in our case two dimensions (sex-age), which generate 6 variables of the so-called Calibration Vector (H7879 H8084 H85mas M7879 M8084 M85mas), which adjusts to the requirements of the sample in this wave 3. The data of The population used was estimated from census data, provided by the State Data Center of Puerto Rico.

This weighting strategy is more sophisticated, it is an iterative procedure that makes gradual adjustments to the weight for each individual in the sample, starting with the sampling design weighting factor, as a base weight, until the population values of the control data are reached (called Calibration Marginals).

To calculate the Calibrated Weighting Factors, the STATA 17 software and the "sreweight" [45] command was used, developed by Daniele Pacifico in which he implemented the methodology proposed by Deville and Särndal (1992)[46] to re-weight surveys, which allows using several distance functions, and also added the recursive calibration algorithm proposed by Creedy (2003)[47], which produces rapid convergence.

The details of the calculation process of the Calibrated Weighting Factors can be found in the document: "'Sample Design of the PREHCO Study: Basic Elements and Behavior of the Sample in Longitudinal Follow-up Wave 3" (in Spanish).

Then the calibrated weighting factors were added to the database in the variables: FACTORT_w3 (for targets only – CODE_w3=1110) and FACTORTP_w3 (for targets and proxies – CODE_w3=1110 or 1120).

For those variables or indicators available only for targets, it is recommended to use FACTORT_w3, while for those variables or indicators available for targets and proxies, it is recommended to use FACTORTP_w3 (see section '3.2 Questionnaire versions').

The records in the database corresponding to proxies of deceased participants (CODE_w3=5100) or proxies of institutionalized participants (CODE_w3=6100) do not have a weighting factor. Participants who had died at the time of being contacted for the interview in this third wave, and who had been interviewed through a proxy, are not part of the population of 78 years or older in Puerto Rico. Institutionalized participants have not been

[45] Daniele Pacifico Italian Department of the Treasury Rome, Italy. sreweight: A Stata command to reweight survey data to external totals. The Stata Journal (2014) 14, Number 1, pp. 4–21

[46] Deville, J.-C., and C.-E. Särndal. 1992. Calibration estimators in survey sampling. Journal of the American Statistical Association 87: 376–382.

[47] Creedy, J. 2003. Survey reweighting for tax microsimulation modelling. Treasury Working Paper Series 03/17, New Zealand Treasury.

part of the study population since the beginning of the PREHCO project, although some brief information is collected from both types of participants to enable longitudinal analysis.

5.6. Missing values

Common codes for missing values have been used throughout the database. These values are presented in the following table:

Table 7. Missing value codes and labels.

-1	Does not know	Interviewee or proxy indicated not knowing the answer to the question.
-2	Does not answer	Interviewee or proxy did not answer the question.
-3	Not available	Data not collected due to programming error, final changes to the questionnaire or because it does not apply to the participant.
-4	Does not apply to target	The question does not apply to the target.
-5	Does not apply to proxy	The question does not apply to the proxy or substitute informant of the target.
-6	Does not apply to deceased proxy	The question does not apply to the proxy of the deceased target.
-7	Does not apply to institutionalized proxy	The question does not apply to the proxy of the institutionalized target.

6. Key variables in the three waves of the project

The differences in the structure of the database corresponding to the third wave, in relation to the two previous databases of the PREHCO project, suggested the location of a series of key variables in the database and their equivalents in the databases of the two previous waves of the project. These variables are presented below in Table 8.

Table 8. Key variables in the three waves of the project.

Measure	PREHCO 1	PREHCO 2	PREHCO 3
General information			
Identification number	CASEID	CASEID	CASEID
Result code	CODIGO	TCODE	CODIGO_W3
Weighting factor	FAC_T	FACTORT	FACTORT_w3 (for targets), FACTORTP_w3 (for targets and proxies)
Age	A1 (years of age at the time of W1 interview), A2_M (month of birth), A2_A (year of birth)	WEDA_R1 (years of age at the time of W2 interview)	EDAD_w3 (at the time of W3 interview, calculated with mob and yob)
Demographics			
Sex	SEXO	WSEX	SEXO_w3
Education	C10R1	WESC_R1	N/A
Marital status	MARI_R1	WMAR_R1	MARITAL_w3
Race	R2 (PREHCO categories)	WR2 (PREHCO categories) and WD39_1 WD39_2 WD39_3 (Census question)	N/A
Number of people in the household	C1NUM	WC1NUM	B1_w3
Physical Health			
Overall Self-Reported Health	G1	WG1	D1_w3
Diabetes	G8	WG8[48] WY11 (deceased), WF11 (institutionalized)	L12_w3, AH8D_w3 (deceased), AI7D_w3 (institutionalized)
Hypertension	G4	WG4[45] WY10 (deceased), WF10 (institutionalized)	L7_w3, AH8G_w3 (deceased), AI7G_w3 (institutionalized)
Myocardial infarction	G35	WG35, WY16 (deceased)), WF16 (institutionalized)	L41_w3, AH8I_w3 (deceased), AI7I_w3 (institutionalized)
Congestive heart failure	G36 (includes other conditions)	WG36[45] (includes other conditions)	L44_w3
Stroke	G40	WG40[45,] WY18 (deceased), WF18 (institutionalized)	L54_w3

[48] Only for those not reporting the condition in W1.

Measure	PREHCO 1	PREHCO 2	PREHCO 3
TIA/mini stroke	N/A	N/A	L52_w3
Kidney disease	G21 (diabetes related)	WG21 (diabetes related), WY3=8 (renal failure as cause of death)	L24_w3 (diabetes related), AH8A_w3 (deceased), AI7A_w3 (institutionalized)
Cancer	G22 (skin cancer anytime), G24 (other cancer anytime), G26 (type), G27 (currently but not skin cancer)	WG22 [49] (skin cancer anytime), WG24 [46] (other cancer anytime), WG26 [46] (type), WG27 (currently but not skin cancer)	L31_w3 (currently has cancer), L33a_1_w3 to l33a_ot_w3 (type of cancer)
COPD	G31	WG31 [46]	L37_w3
Arthritis	G49	WG49 [46]	L61_w3
Health care access	K1 (health insurance), K50_1 to K50_5 (reasons why did not complete all the prescribed medical exams)	WK1 (health insurance), WK50_1 to WK50_3 (reasons why did not complete all the prescribed medical exams)	M1_w3 (health insurance), M17_1_w3 to M17_ot_w3 (why not complete medical exams), M23_w3 (days waiting physician), M24_w3 (days waiting specialist), M25_w3 (cannot get an appointment), M26_w3 to M36_w3 (additional variables)
Smoking	G161 (smoker anytime), G162 (currently smoker), G163A to G163C (current consumption)	WG161 (smoker anytime), WG162 (currently smoker), WG163_1 to WG163_3 (current consumption)	T1_w3 (smoker anytime), T2_w3 (currently smoker)
Alcohol use	G155 (last three months days/week drinking), G156A to G156D (number of drinks per type), CAGE scale items (G157 to G160)	WG155 (last three months days/week drinking), WG156_1 to WG156_4 (number of drinks per type), CAGE scale items (WG157 to WG160)	T7_w3 (last three months days/week drinking), T8a_w3 to T8d_w3 (number of drinks per type), CAGE scale items (T9_w3 to T12_w3)
Obesity	BMI and RBMI (body mass index), U2_P (waist), U3_P (hip)	WUBMI (body mass index), WU2E (waist), WU3E (hip)	AE5_w3 (height), AE8_w3 (weight), BMI_w3 (calculated BMI), R_BMI_w3 (BMI categories) WHR_w3 (waist/hip ratio)
Cognitive Health			
Minimental Cabán	FINALSCR (minimental score)	WFINSCR (minimental score)	MINIMEN_f_w3 (minimental score)

[49] Only for those not reporting the condition in W1.

Measure	PREHCO 1	PREHCO 2	PREHCO 3
Subjective Cognition	N/A	N/A	C3_w3 (ability to make judgments), C4_w3 (ability to organize daily activities), F1_w3 (self-rated memory), F2_w3 (memory compared with 2 years ago)
Memory (10-word immediate and delayed recall)	N/A	N/A	WLL_w3 (immediate correct), WLD_w3 (delayed correct)
Verbal Fluency (Animal naming)	N/A	N/A	ANIMALS_w3 (correct), F25b_w3 (incorrect), F25c_w3 (repeated)
Orientation	b2rchk (year, day, month combined score), b2rchk (weekday score)	WB1Tchk (year, day, month combined score), WB2Tchk (weekday score)	A5a_p_w3 (year score), A5b_p_w3 (month score), A5c_p_w3 (day score), A6_p_w3 (weekday score)
Serial 7s	N/A	N/A	SERIAL7_w3 (calculated)
Overall cognitive function (HRS-TICS score)	N/A	N/A	TICS27_w3, R_TICS27_w3 (recoded TICS27 score), TICS35_w3, R_TICS35_w3 (recoded TICS35 score)[50]
Informant Questionnaire on Cognitive Decline (IQCODE)	N/A	N/A	IQCODE_w3 (IQCODE score), R_IQCODE_w3 (recoded IQCODE)
The Eight-item Informant Interview to Differentiate Aging and Dementia (AD8)	N/A	N/A	AD8F_W3 (for deceased), AD8I_W3 (for institutionalized), R_AD8F_W3 (recoded), R_AD8I_W3 (recoded)
Disability			
Activities of Daily Living (ADLs)	I9 (eating), I10 (getting dressed), I11 (toilet), I12 (walking), I13 (up from bed), I14 (bathing)	WI9 (eating), WI10 (getting dressed), WI11 (toilet), WI12 (walking), WI13 (up from bed), WI14 (bathing)	Q1_w3 (eating), Q2_w3 (getting dressed), Q3_w3 (toilet), Q4_w3 (walking), Q5_w3 (up from bed), Q6_w3 (bathing)
Instrumental ADLs	I1 (phone use), I2 (transportation), I3 (shopping), I4 (food preparation), I5 (household chores), I6 (medication use), I7 (managing finances)	WI1 (phone use), WI2 (transportation), WI3 (shopping), WI4 (food preparation), WI5 (household chores), WI6 (medication use), WI7 (managing finances)	Q14_w3 (phone use), Q15_w3 (transportation), Q16_w3 (shopping), Q17_w3 (food preparation), Q18_w3 (household chores), Q19_w3 (medication use), Q20_w3 (managing finances)

[50] R_TICS27_w3: 0-6= dementia, 7-11= cognitive impairment no dementia (CIND), 12-27=normal.
R_TICS35_w3: 0-9= cognitive impairment.

Measure	PREHCO 1	PREHCO 2	PREHCO 3
Physical Performance			
Balance (one leg stand)	U6_S (time), LEGSTAND (calculated variable)	WU7e (time)	AE17a_w3 (time), AE17_w3 (10 sec achieved)
Mobility (timed Up and Go test)	U7_S (time), get_up (calculated variable)	WU8E (time)	AE21_w3 (time)
Grip Strength	N/A	WU11F (hand used), WU11E_1 (adjustment), WU11E_2 (first measurement), WU11E_3 (second measurement)	AE24a_w3 (first hand used), AE24b_w3 (first measurement), AE24c_w3 (second measurement), AE25a_w3 (second hand used), AE25b_w3 (first measurement), AE25c_w3 (second measurement)
Mental Health			
Geriatric Depression Scale (GDS 15-item)	G171 to G185, DEPRE_Y (calculated)	WG171 to WG185, WDEPRE_Y (calculated)	Z1_w3 to Z15_w3, GDS_w3 (calculated)
Self-reported Depression	G149	WG149 [51]	L105_w3
Anxiety (BAI 5-item)	N/A	N/A	BAI_w3 (calculated)
Quality of Life (VR-12)	N/A	N/A	VR12_PCS_w3 (VR-12 Physical Component Score) VR12_MCS_w3 (VR-12 Mental Component Score)
Life Satisfaction (single item)	N/A	N/A	P5_w3
Perceived stress (PSS 4-item)	N/A	N/A	PSS_w3
Late-Life Stressors			
Hurricane-related stressors	N/A	N/A	AB1_w3 to AB39_w3 (items about Hurricane Maria)
Financial stressors	N71 (paying daily expenses), N72 (paying health expenses)	WN71 (paying daily expenses), WN72 (paying health expenses)	X1_w3 (paying daily expenses), X2_w3 (paying health expenses)
Loneliness (UCLA 3-item)	N/A	N/A	K1_w3 -- K3_w3
Resilience-Enhancing Factors			
Active Coping (Brief Resilient Coping Scale)	N/A	N/A	BRCS_w3 (Brief Resilience Coping Scale)

[51] Only for those not reporting the condition in W1.

Measure	PREHCO 1	PREHCO 2	PREHCO 3
			R_BRCS_w3 (Brief Resilience Coping Scale recoded)[52]
Emotional Stability	N/A	N/A	NEUROT_w3 (neuroticism)
Religiosity	D31 (religion), D32 (attends religious services), D33 (frequency), D34 (religiousness), D35 (compared with when was 40), D36 (religion helps to deal with health problems), D37 (religion helps to deal with other problems), D38 (frequency of participation)	WD31 (religion), WD32 (attends religious services), WD33 (frequency), WD34 (religiousness), WD35 (compared with previous interview), WD36 (religion helps to deal with health problems), WD37 (religion helps to deal with other problems), WD38 (frequency of participation)	H1_w3 (religion), H2_w3 (religiousness), H3_w3 (compared with 10 years ago), H4_w3 (attendance of religious services), H5_w3 (frequency), H6_w3 (religion helps to deal with health problems), H7_w3 (religion helps to deal with other problems), H8_w3 (frequency of participation)
Social Support (Lubben Social Network Scale – 6 (LSNS-6)	N/A	N/A	SSN_w3
Family Social Network	C1num=1 (living alone), C4r1_1 to C4r10_1 =1 (spouse in the household), L4r21=1 and Dond_r21=1,2,3 or 4 to L4r40=1 and Dond_r40=1,2,3 or 4 (living children in PR)	Wc1num=1 (living alone), Wpar_r1 to Wpar_r18=1 (spouse in the household), Wl4r21=1 and Wdon_r21=1,2,3 or 4 to Wl4r53=1 and Wdon_r53=1,2,3 or 4 (living children in PR)	B1_w3=1 (living alone), B2c_p2_w3 to B2c_p9_w3 =1 (spouse in the household), I2_w3+I5_w3 (living children in PR), I20_w3+I23_w3 (living siblings in PR)
Early Life Social and Environmental Conditions			
Literacy	C8R1 (reported ability to read), C9R1 (reported ability to write)	WC8R1 (reported ability to read), WC9R1 (reported ability to write)	N/A
Childhood Health	H14 (self-reported childhood health status), H17A (typhus), H17B (hepatitis), H17C (tuberculosis), H17D (rheumatic fever), H17E (polio), H17F (malaria), H17G (dengue), H17H (measles), H17I (chickenpox), H17J (mumps), H17K (smallpox), H17L (pneumonia), H17M (asthma), H17N (chronic bronchitis)	WH14 (self-reported childhood health status) , WH17A (typhus), WH17B (hepatitis), WH17C (tuberculosis), WH17D (rheumatic fever), WH17E (polio), WH17F (malaria), WH17G (dengue), WH17H (measles), WH17I (chickenpox), WH17J (mumps), WH17K (smallpox), WH17L (pneumonia), WH17M (asthma), WH17N (chronic bronchitis)	N/A

[52] Scores of 4-13 indicate low resilient coping, 14-16 indicate medium resilient coping and 17-20 indicate high resilient coping.

Measure	PREHCO 1	PREHCO 2	PREHCO 3
Knee Height	U5_P (knee height in inches)	WU5E (knee height in inches)	N/A
Adult SES and Working Conditions			
Income	N56 to N60 (household income brackets)	WN55 (reported household income), WN56 to WN60 (household income brackets)	W20_w3 (reported household income), W21_w3 to W25_w3 (household income brackets)
Migration	O3 (moved after 18), O4 (times moved after 18) O10b (years lived in the US), O11 (3 months or more/year outside PR)	WO10b (years lived in the US after 18), WO11 (3 months or more/year outside PR)	U1_w3 (lived in the US last 15 years for 3 months or more), U4_w3 (main reason to move to the US), U5_w3 (main reason to return from the US), U6_w3 (3 months or more/year outside PR)
Occupation	CODE_N25 (main lifetime occupation)	N/A	N/A
Retirement	N5 (retired)	WN5 (retired)	V1_w3 (retired), V2_w3 (age at retirement)

7. Ancillary studies developed in this wave

Two ancillary studies that were developed immediately after completing the field work of this third wave are described below: a study on the participants' caregivers and a saliva sample collection from the participants in the municipalities of San Juan and Loíza.

7.1. Saliva samples

The collection of saliva samples, initially planned in this wave of the project, was dropped from the study after the initial problems faced by interviewers and interviewees in the pilot test, in terms of dealing with a potential infectious fluid in the middle of the pandemic. Once the fieldwork of the third wave was completed, and because of the improvement in the COVID-19 emergency, saliva samples were obtained in the municipalities of San Juan and Loíza (295 cases) due to the impossibility of collecting all of the planned samples. 229 samples (77.6%) were collected and stored to allow future analysis.

7.2. Caregivers study

After completing the third wave and considering the experience in the field, we decided to complement the data we collected with information from the caregivers of the participants. We designed a 65-item questionnaire for the 194 proxies, which included demographic data, caregivers' burden and experience, financial stressors, self-reported health status, quality of life, depressive symptoms, anxiety, and others. 132 interviews were completed (68.0%). Once processed the data can be obtained at ICPSR.

8. Project website

The website for third wave of the project is https://sites.uab.edu/prehco. It includes information about the project, the research team, the questionnaires used in the three waves, a link to the page of the Inter-university Consortium for Political and Social Research (ICPSR) at the University of Michigan, where the databases and other documentation are located, how to contact the project, as well as other information of interest.