The VA-Linked Health and Retirement Study

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October 12, 2022

HERC
Health Economics Resource Center

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VA
U.S. Department of Veterans Affairs
Veterans Health Administration
Health Services Research & Development Service

Overview

1. Health and Retirement Study (HRS) Overview

2. VA-Linked HRS Description

3. Accessing the VA-Linked HRS

4. Case Studies
   - Informal Caregiving and Veterans' mental health utilization
   - Impact of caregiving on VA utilization and costs
   - Impact of Millennium Act on long-term care service mix

1. HRS Overview

Audience Poll

- What is your experience with the Health and Retirement Study?

a) Never heard of it

b) I've heard of it, but never used it

c) I've had some experience working with HRS data

d) I've worked extensively with HRS data

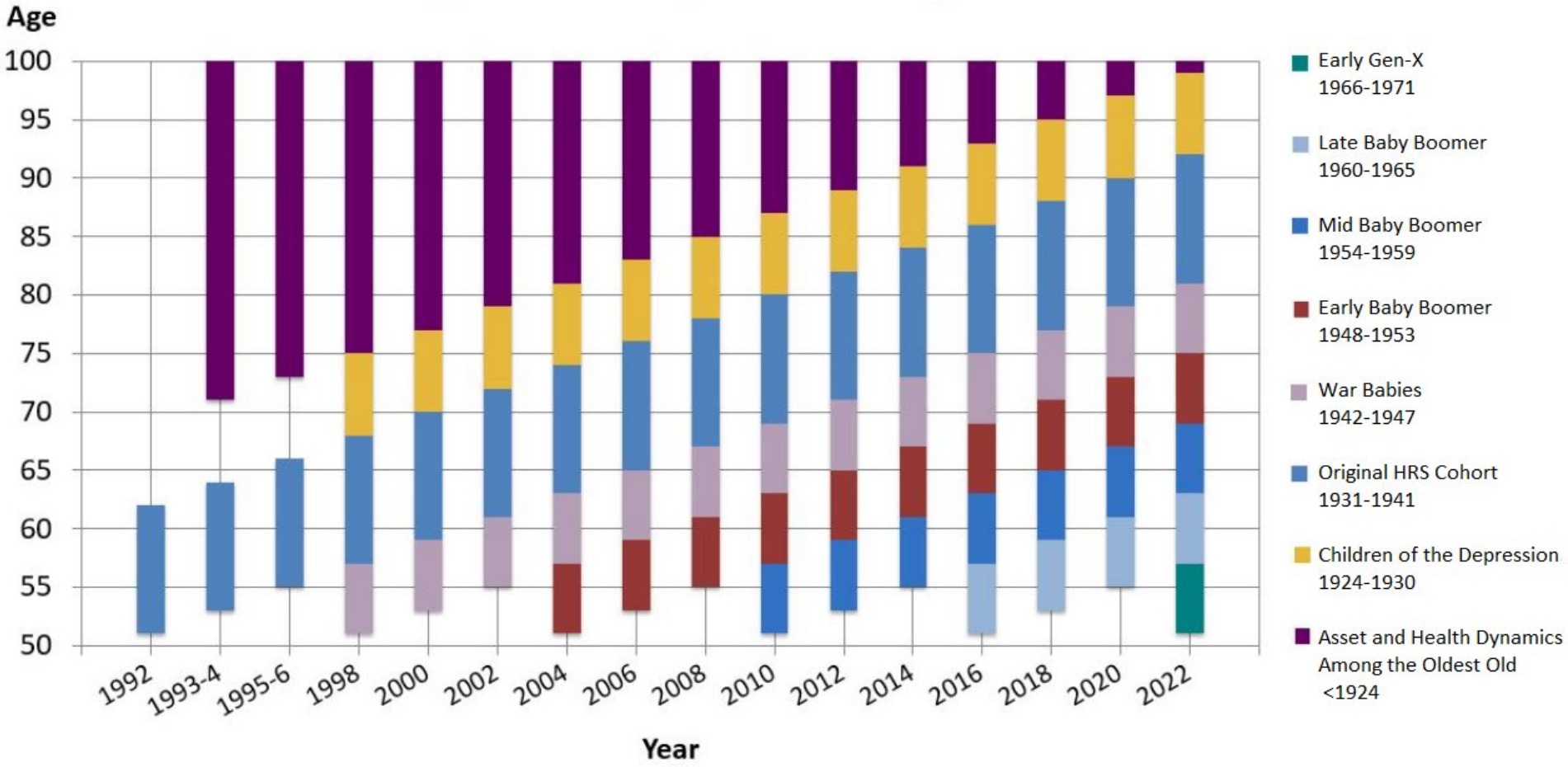
What is the HRS?

- Nationally representative, bi-annual longitudinal survey of the U.S. population >50
  - First wave: 1992
  - Most recent wave: 2020
- In-depth interviews on factors related to older adults' wellbeing:
  - Health, health services, labor force participation, economic status, family structure, and subjective expectations of events
- Follows individuals and their spouse/partner from entry until death

HRS Sampling

- Multi-stage area probability sample design
  - For details, see the HRS technical description of the 4-stage sampling design
- New birth cohort of participants added every 6 years
  - Interviewed every 2 years
  - 18,000-23,000 respondents in any given wave
- Respondents community dwelling at first wave
- Oversamples Black/African American, Hispanic, and Floridian respondents

HRS Cohorts



Source: University of Michigan Institute for Social Research. HRS Longitudinal Cohort Sample Design. 2020. Accessed September 20, 2022. https://hrs.isr.umich.edu/documentation/survey-design

HRS Core Interview Modes

- 1992-2004
  - Face-to-face interview at baseline
  - Telephone follow-up interviews
  - Face-to-face offered to respondents age 80+

- 2006 and beyond
  - Half of core sample randomly assigned to face-to-face interview enhanced with 1) physical and biomarker measures and 2) a mail-back psychosocial questionnaire
  - Other half sample assigned to telephone interview

What is in the Core HRS?

- Health
  - Physical/psychological self-report, cognitive functioning, conditions, disabilities, health behaviors
  - Collection of: biomarkers and genetics information
- Health services
  - Utilization, expenditure, insurance, out-of-pocket spending
  - Linkage to: Medicare claims, Medicaid Analytic Extracts, VA claims data
- Labor force
  - Employment status/history, retirement, earnings, disability, retirement, type of work
- Economic status
  - Income by source, wealth by asset type, capital gains/debt, consumption
  - Linkage to: pensions, Social Security earnings/benefits histories
- Family structure
  - Extended family, proximity, transfers to/from of money, time, housing
- Expectations
  - Decision making; subjective probabilities

Other HRS Modules

- Enhanced Face-to-Face Modules
  - Physical tests (grip strength, timed walk, lung function, balance, height and weight, waist circumference, and blood pressure)
  - Saliva for DNA extraction
  - Dried blood spots for biomarkers
  - Self-administered psychosocial function questionnaire

- Experimental Modules
  - Cover a range of topics
  - Usually 10% of the sample randomly selected
  - Sections M or V in codebooks

- Supplemental studies (off-year studies)
  - Cover a range of topics (e.g. Alzheimer's diagnostics, parents' financial investment in children, diabetes care management, prescription drug use)
  - Internet, mailed paper and pencil questionnaires, or in-home assessments

HRS Restricted Data Products

- Administrative Linkages
  - Medicaid, Medicare, VHA, Social Security Administration
- Other external linkages
  - Census Data, Contextual Data, Pension Estimation
- HRS Survey Data
  - Geographic information, health care information (cancer site and Part D information), industry/occupation information
- Genetic Data
  - Candidate gene and SNP files, Exome data

HRS Design Features

- Includes respondent, household, and helper level files
  - Unique person and household identifiers needed for data management
- In coupled households:
  - Designated financial respondent (housing, income, assets)
  - Designated family respondent (family composition, transfers)
  - Each answers own respondent-level questions
- Proxy respondents (spouse or family member)
- Exit interviews
  - Information on medical expenditures, family interactions, and other end-of-life information

Useful HRS Resources

- Health and Retirement Study
  - Main page, including a "Getting Started" page
  - Video tutorials with HRS overview and genetic data information
  - Download publicly available data here
- RAND
  - More accessible data files, including imputed files, and cleaned longitudinal and wave-specific files
  - RAND HRS Data Products
- Gerontological Society of America
  - Video tutorials with an HRS overview, and cognition, biomarker, sample design, weighting, complex variance estimation, and psychosocial data information

2. VA-Linked HRS Overview

VA-HRS Linkage Background

- HSR&D Study (SDR 10-180)
  - 2012-2015 study
  - PI: Kenneth Langa, MD, PhD
    - VA Ann Arbor & University of Michigan
  - Linkage performed under direction of Elizabeth Tarlov, PhD, RN
    - At VIReC when linkage performed

- Objective:
  - Link Veterans Health Administration (VHA) administrative data for 1999-2013 with the 1992-2012 HRS
  - Bring linked VHA files into HRS environment

VA-HRS Linkage Approach

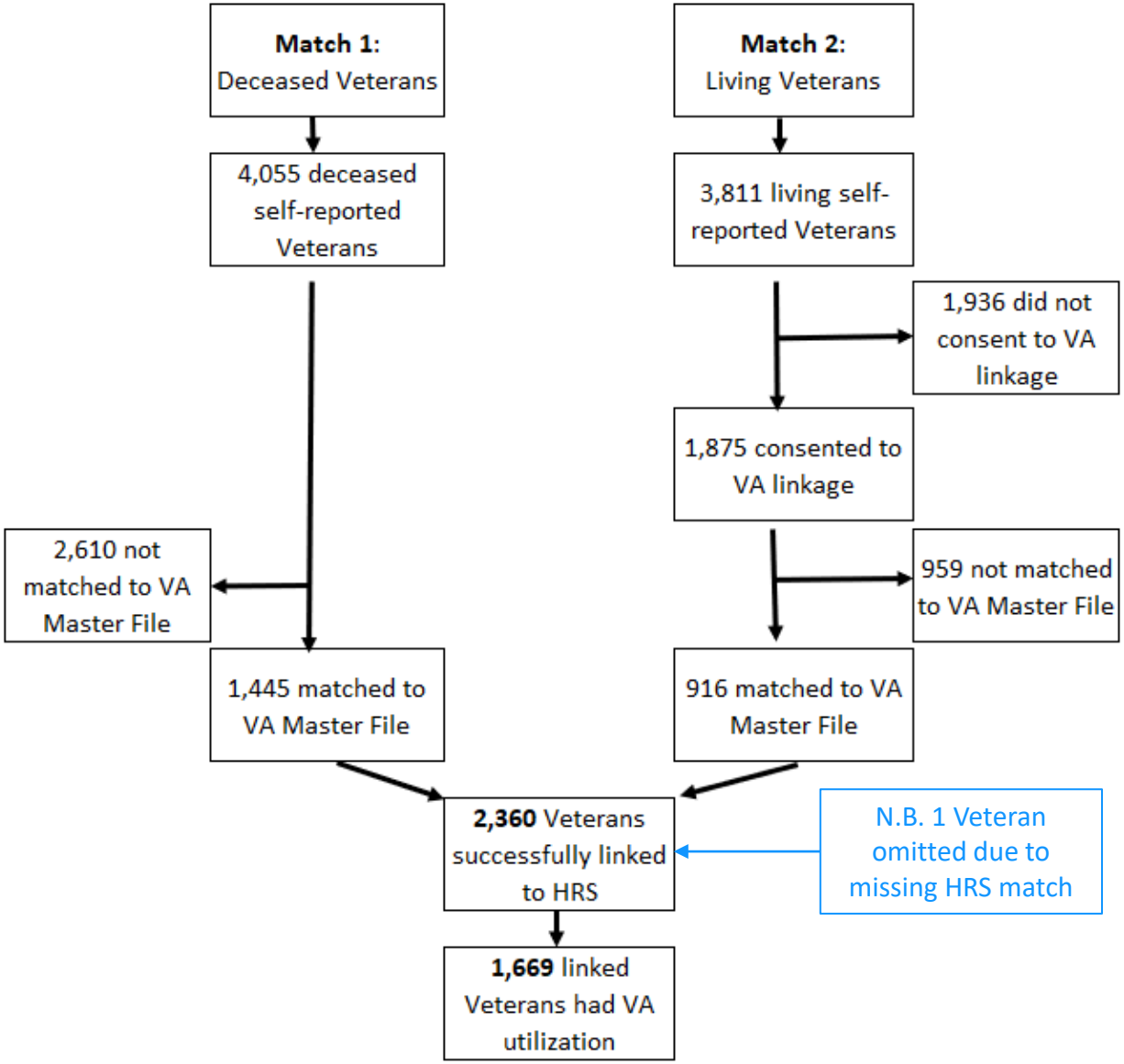
- HRS respondents self-identified as having served in U.S. military

- Two record matches conducted using probabilistic methods:
  - Match procedure for deceased HRS respondents
  - Match procedure for living respondents with signed authorization

- Matching algorithm used SSN, name, birth date, gender, and death date information

VA-HRS Linkage Sample

- 7,866 self-identified HRS respondents with U.S. military service
- **2,360** Veterans linked to HRS
  - 1,669 Veterans had VA utilization



Files Included in Linkage

- Respondent file (VAHRSA_R)
  - VA-HRS Demographics information (respondent level)
  - HRS identifiers, birth and death dates, gender, race/ethnicity, and VA utilization flag

- Enrollment History (VAHRSB_E)
  - VA-HRS access to care (enrollment level)
  - HRS identifiers, VA utilization flag, copay information, priority group, access and access change status

Files Included in Linkage

- HERC Average Cost files (VAHRSCx_C)
  - Discharge; Medical Surgical Care; Rehab, Mental Health, and Long Term Care; and Outpatient Care files
- Pharmacy (VAHRSFx_X)
  - Pharmacy Benefits Management files
- VA Fee Basis Files (VAHRSEx_F)
  - Inpatient Ancillary, Inpatient, Outpatient, Payments to pharmacies, ID cards for selected Veterans
- Outpatient Care (VAHRSJx_V)
  - Events and Visits

Files Included in Linkage

- Decision Support System (DSS) Files
  - Lab and Radiology (VAHRSDx_A)
- Inpatient Care Files
  - Non-VA Care (VAHRSGx_A)
  - Inpatient and Observation Bed Section files (VAHRSGx_A)
  - Inpatient Extended Care (VAHRSHx_A)

Data Documentation

- Documentation for all VA-linked files can be found here
  - Under Documentation and Links

- Page also includes other useful documents:
  - Data Descriptions
  - Codebooks
  - Linkage information
  - Protected Data policies (Removal of Title 38 S.7332 protected conditions)
  - Excluded Variables

3. Accessing VA-Linked HRS

Accessing VA-Linked Files

- Data accessed through HRS Virtual Desktop Infrastructure (VDI)
  - Remotely connect to a secure data enclave maintained by the Michigan Center for the Demography of Aging (MiCDA)
  - CMS data currently not accessible this way for VA funded projects

- Multi-step application process required to gain access and get set up on MiCDA VDI
  1. Apply for Restricted Data Agreement
  2. Team member submissions
  3. HRS Review and Approval
  4. Access set up by HRS staff

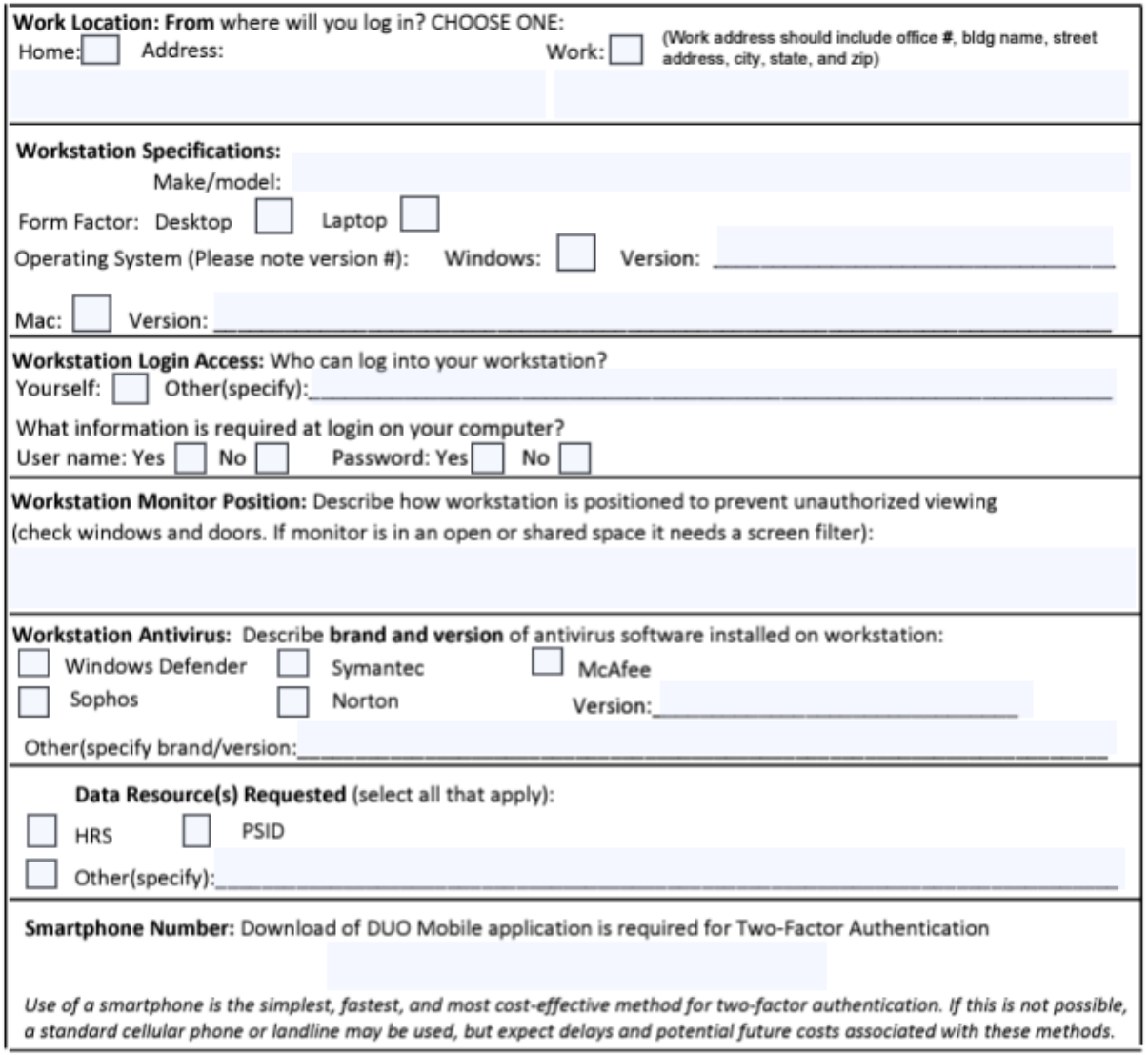
  - Applications reviewed twice a month (6-8 week approval process)

RDA Requirements

- Project title/abstract
- Description of:
  - Restricted data products and variables
  - Why public data is inadequate
  - Compliance plans with disclosure limitations
- Documentation of IRB review and approval of research plan from your institution
- From each data users and PI
  - CV
  - Signed and notarized MiCDA Confidentiality Agreement
  - Data Security Plan

Data Security Plan

- Must be updated annually
- Audits performed to ensure information is up-to-date
- Form can be accessed here



Work Location: From where will you log in? CHOOSE ONE:
Home: ☐ Address: Work: ☐ (Work address should include office #, bldg name, street address, city, state, and zip)

Workstation Specifications:
Make/model:
Form Factor: Desktop ☐ Laptop ☐
Operating System (Please note version #): Windows: ☐ Version: _____
Mac: ☐ Version: _____

Workstation Login Access: Who can log into your workstation?
Yourself: ☐ Other(specify): _____
What information is required at login on your computer?
User name: Yes ☐ No ☐ Password: Yes ☐ No ☐

Workstation Monitor Position: Describe how workstation is positioned to prevent unauthorized viewing (check windows and doors. If monitor is in an open or shared space it needs a screen filter):

Workstation Antivirus: Describe **brand and version** of antivirus software installed on workstation:
☐ Windows Defender ☐ Symantec ☐ McAfee
☐ Sophos ☐ Norton Version: _____
Other(specify brand/version): _____

Data Resource(s) Requested (select all that apply):
☐ HRS ☐ PSID
☐ Other(specify): _____

Smartphone Number: Download of DUO Mobile application is required for Two-Factor Authentication

Use of a smartphone is the simplest, fastest, and most cost-effective method for two-factor authentication. If this is not possible, a standard cellular phone or landline may be used, but expect delays and potential future costs associated with these methods.

Working in MiCDA VDI

- Software available:
  - R, Matlab, M-plus, Stata, SAS, SPSS, ArcGIS

- Export of statistical summary information ONLY
  - Data Export Rules found here
  - Analyses of <50 pages summarized and submitted with a checklist form
  - Document approved and exported to researcher's (Secure File Transfer Protocol) SFTP folder (e.g. using WinSCP)
  - Process can take a few days

Project Modifications

- Annual renewals required
  - Submitted within 30 days of expiration date
  - Requires Data Security Plan approval before submission
- Update project research plan or IRB review
- Add/remove team members or update team member information
- Submit a CMS data use agreement
- Additional data request
- Add new research project
- Project termination

HRS Data Access Resources

- HRS Contacts
  - Helpdesk can be contacted through this form or directly via email: hrsquestions@umich.edu
  - Application questions: hrsrdaapplication@umich.edu.
- FAQs
  - https://hrs.isr.umich.edu/data-products/restricted-data/faqs

4. Case Studies

Case Study 1:
Informal Care Receipt and Older Veterans' Mental Health Use

- Background:
  - MH symptoms are undertreated among older adults, including those with cognitive disorder/dementia
  - Informal caregivers have been linked to medical care outcomes and may represent potential for increasing access and quality

- Research Aim:
  - Examine association of caregiving network characteristics with MH utilization in older Veterans with and without cognitive disorder

Why is the VA-HRS Data Needed?

- HRS survey uniquely has:
  - Detailed information on caregiver network characteristics
  - Continuous and algorithm-derived categorical measures of cognitive function – independent of formal clinical diagnosis
  - Can track change over time

- VA admin data uniquely has:
  - Encounter-level records of mental health-related service utilization in MH specialty settings and Primary Care

Analytic Approach

- Data: 2000-2012 VA-linked HRS
- Cohort: Available records from 2,360 Veterans with linked VA data, aged ≥50 and not living in nursing home
- Outcome variables (VA + HRS): 3 indicators of MH service use
  - VA EHR:
    - Any encounter in MH stop code
    - Any encounter in Primary Care stop code with MH diagnosis
  - HRS: Self-report of MH care use
- Key independent variables (HRS)
  - Caregiving network characteristics (size, intensity, gender, relationship, any formal)
  - Cognitive status
- Modeling Approach
  - Mixed effects models with binary utilization outcomes
  - Cognitive status as moderator
- Covariates (HRS)
  - Demographics, functional limitations medical conditions, household income and wealth, depressive symptoms (brief CES-D), wave # dummy variable (VA MH policy change)

Early Findings

- Across six HRS waves (2000-2012), N=8839 person-observations:
  - M_{age} = 72.12 yrs (9.5), range 50-99
  - 3% female, 12% Black/AA; 3% Latino
  - 72% married
  - Cognitive status: ~ 71% normal, 20% cog imp, 8% dementia
  - N=1538 (17%) have ≥1 informal caregiver (range 0-7); 3% Veterans had any formal help
    - Mean hours help/mon = 25.3 (107.6)
    - Mean days help/mon = 3.6 (9.5)
    - Primary CG: 90% female; 63% spouse

- Wave-specific examinations show:
  - Increase in Veterans' MH utilization between 2000 and 2012, across indicators (10% → 27% combined utilization)
  - In 2000 and 2012, significant within-wave associations of MH utilization and CG network size

Case Study 2:
Unpaid Care Receipt and VA Cost and Utilization

- Background:
  - Value of caregiving implicitly acknowledged through VA policies paying stipends to caregivers of Veterans
  - No evidence on whether and how much caregivers might affect VA cost and utilization

- Research Aim:
  - What is the impact of informal caregiving from adult children on VA cost and utilization outcomes?

Why is the VA-HRS Data Needed?

- VA EHR data does not have key covariates:
  - Indicator for presence of a caregiver
  - Detailed care need variables (e.g. functional status information)

- Causal inference is difficult without an instrumental variable approach
  - Literature outside VA relies on family structure variables
  - VA EHR does not have viable instrumental variables

Analytic Approach

- Data: 2000-2012 VA-linked HRS
- Cohort: 2,360 Veterans with linked VA data
  - 12,010 person-wave observations
- Outcome variables (VA EHR)
  - Utilization and cost for Inpatient, Outpatient, Institutional long-term care, Home- and community-based services, and any VA care
- Key independent variable: Any unpaid car receipt from an adult child
- Modeling Approach
  - Two-stage residual inclusion
  - # of adult daughters used as an instrument in first stage regression predicting receipt of unpaid care
  - Two-part models with GLM second stage for Costs and probit models for any utilization; Bootstrapped standard errors
- Covariates
  - # ADLs/IADLs, mental health diagnoses, age, education, race, ethnicity, marital status, household wealth, and wave dummies

Early Results or Highlights

- Receipt of unpaid care results in:
  - Reductions in bi-annual inpatient care (11.0% point), outpatient care (38.9% point), institutional long-term care (2.3% point), and overall utilization (39.4% point) ($p<0.01$)
  - Reduced bi-annual costs in inpatient ($6,310), outpatient ($3,360), and overall care ($13,095) ($p<0.01$)

Case Study 3:
Impact of the Millennium Act on LTC Service Mix

- Background:
  - The 1999 Millennium Act aimed to ensure access to 6 home- and community-based services (HCBS) for qualifying Veterans
  - No evaluations had assessed whether the Act impacted Veterans' long-term care service mix

- Research Aims:
  - Determine whether the Millennium Act significantly changed Veterans Health Administration (VHA) users' utilization of institutional, paid home, and unpaid home care relative to a non-VHA user population that was not exposed to VHA HCBS expansion efforts

Why is the VA-HRS Data Needed?

- VA EHR data does not have key covariates:
  - Unpaid caregiving
  - Functional measures (key for matching when function is a qualifying characteristic)
- HRS provides an unexposed comparison group
  - Medicare users without exposure to VA (or other health system) HCBS expansion efforts with comparable measures over time
- Longitudinal nature of HRS allows change over time to be tracked
  - Consistent measurement collection before and after the passing of the Millennium Act
  - Allows parallel trend assessment and 10 years of follow-up data

Analytic Approach

- Data: 1998-2012 VA-linked HRS
- Cohort: 7,049 Medicare enrollees (6,106 non-VHA users and 943 VHA users)
  - Aged 65+ without Medicaid coverage in 1998
- Outcome variable (HRS)
  - Self-reported utilization of 1) any and # hours of paid I/ADL assistance; 2) any and # hours of unpaid I/ADL assistance; 3) any nursing home stay or long stay
- Key independent variable: Whether respondent was a VHA user
- Modeling Approach
  - Coarsened exact matching to match VHA users and non-users
  - Difference-in-differences estimator
- Covariates
  - CEM matching on ADL limitation, age, gender, household income, state of residence, and race/ethnicity
  - Race/ethnicity, marital status, household income and wealth, education, insurance, rural residence, self-rated health, I/ADL limitations, depression measure, and hospitalizations in prior wave, and survey wave

Results and Highlights

TABLE 2 VHA user and non-VHA user long-term care utilization before and after the Millennium Act

	VHA users[a]		Non-VHA users[a]			
	Pre-Millennium Act	Post-Millennium Act	Pre-Millennium Act	Post-Millennium Act		
	Mean/ proportion (overall SD)	Mean/ proportion (overall SD)	Mean/ proportion (overall SD)	Mean/ proportion (overall SD)	Weighted and adjusted difference-in-differences coefficient[b,c] (95% CI)	Sig.[d]
Any nursing home use	0.019 (0.136)	0.086 (0.281)	0.023 (0.151)	0.107 (0.309)	0.007 (−0.009, 0.022)	
Nursing home long stay	0.004 (0.060)	0.011 (0.104)	0.003 (0.057)	0.014 (0.119)	0.0003 (−0.007, 0.008)	
Any paid care receipt	0.013 (0.113)	0.038 (0.191)	0.010 (0.100)	0.035 (0.185)	0.0006 (−0.011, 0.0125)	
Weekly hours of paid care receipt	0.147 (3.460)	1.365 (12.573)	0.145 (4.077)	1.692 (15.930)	−0.033 (−0.718, 0.652)	
Any unpaid care receipt	0.050 (0.217)	0.176 (0.380)	0.031 (0.174)	0.168 (0.374)	−0.007 (−0.027, 0.0135)	
Weekly hours of unpaid care receipt	1.552 (12.984)	8.972 (33.450)	1.030 (10.366)	7.158 (30.039)	1.480 (−0.232, 3.187)	$p < 0.10$

Source: Jacobs JC, Wagner TH, Trivedi R, Lorenz K, Van Houtven CH. (2021). Long-term care service mix in the Veterans Health Administration after home care expansion. *Health Services Research*, 56: 1126-1136.

Summary

- Some limitations of VA-linked HRS data:
  - Time period (1999-2013)
  - Sample size (n=2,036)

- Unique strengths enable researchers to explore topics and apply methods not possible with EHR data alone
  - Leverages robust HRS sampling and collection methods
  - Fills in key EHR data gaps
  - Enables longitudinal analyses

Thank you!

Follow up questions?

Email Jo Jacobs at josephine.jacobs@va.gov

Email Mary Wyman at mfwyman@wisc.edu