

Exploring the USA's 2019 National Health Interview Survey

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Roadmap

- Overview, purpose
- Survey design: Target population, Sampling plan
- Data collection
- Surveys administered
- Question Topics: In 2019, Future Years
- Sample size, response rates
- Survey weights
- Calculations



National Health Interview Survey

- Annual survey conducted by Census workers since 1957
- Purpose: Main source of health information on US population
 - Focuses on the civilian, noninstitutionalized population
 - Inquires about the “amount, distribution, and effects of illness and disability in the United States”¹
 - Department of Health and Human Services uses it to monitor trends
 - Public health researchers use it to learn about access to health care, evaluate Federal health programs

• 1: National Center for Health Statistics. Survey Description, National Health Interview Survey, 2019. Hyattsville, Maryland. 2020.

Survey design: Target population

Included in Universe

- Household residents
- Persons in “Noninstitutional group quarters”
 - homeless shelters, rooming houses, and group homes



Excluded from Universe

- Persons with no fixed household address
- Active-duty military personnel and civilians on military bases
- Persons in long-term care institutions
 - Nursing homes, hospitals for ill/disabled
- Persons in correctional facilities
 - Jails, prisons, juvenile detention, halfway houses
- US nationals living in foreign countries

Survey design: Sampling

Sampling plan, Sampling process

- Redesigned after every decennial census. 2010 Census used for 2016-2025 NHIS
- Split the US into 1,689 geographic areas
 - Counties, county equivalents, or groups of counties. Usually contiguous, always within states.
- Divide areas in two strata based on density (urban vs rural)
 - Areas in some states only have one stratum
- Clusters of addresses are found within each stratum
 - 1st PSU: Each cluster **systematically** selected from each stratum
 - Clusters within geo areas; ~2,500 addresses per cluster
 - Number of clusters chosen is **proportional** to the size of the strata
 - Exception: more clusters chosen in 10 least populous states, D.C. to get minimum number of addresses
 - 2nd PSU: Addresses sampled within clusters (details not mentioned)
 - Commercial address lists used, some areas did not include all eligible household addresses

Final sample

- 534 clusters of addresses
 - Found in 310 geographic areas
 - Clusters determined which geographic areas were included (unlike previous iterations of survey)
 - There was at least one cluster selected in each state
- Reason for using clusters within strata:
 - Large simple random sample of households
 - “would be prohibitive”
 - “too dispersed throughout the nation for cost-effective interviewing”
 - Each month’s clustering sample said to be “nationally representative”
- Sampling probability: # of clusters proportional to size of strata to better estimate the variance in larger strata
- Difficulties: Figuring out how to sample addresses with an equal representation

Data collection

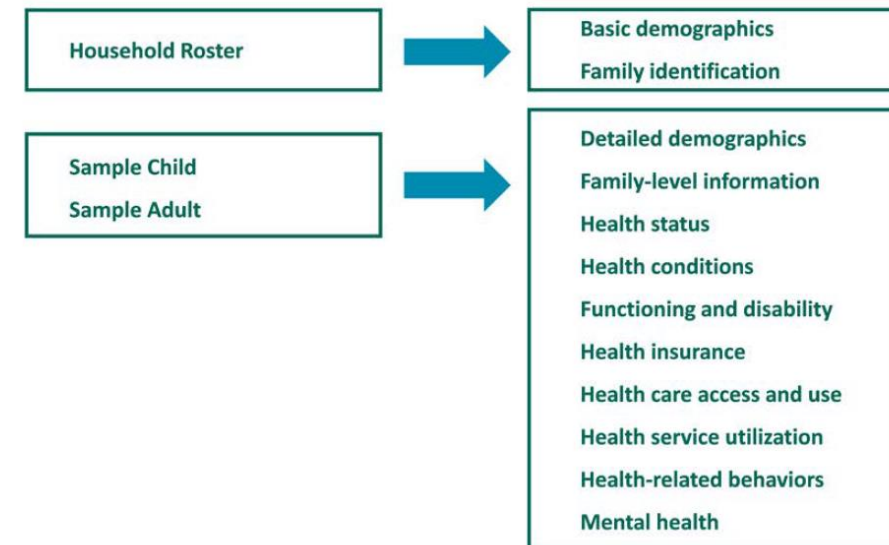
- Interviewers from Census Bureau
 - Voluntary Participation
 - Questions on computer
 - Questions based on prior answers
- Initial interview
 - Face-to-face
 - By phone if respondent requests, weather is bad, travel distance too far
- Follow-up
 - Conducted by phone
 - 34.3% of Sample Adult interviews in 2019 were conducted partially by phone (unclear if initial or follow-up)



Surveys administered

- Household roster
 - Who lives in the household and basic demographics
 - One “sample adult” randomly chosen (age 18+)
 - One “sample child” randomly chosen (age 17 or younger)
- Sample Adult / Sample Child
 - Interview Qs vary somewhat based on age, sex
 - Sample Adult information
 - Comes from adult unless physically or mentally unable to do so
 - Sample Child information
 - Comes from parent or adult responsible for health care of child. Could be sample adult
 - Either interview may appear first
 - Sample Adult can be done if no children in home
- 2019 redesign
 - Removed Family Interview:
 - Detailed relationships of family members, information on each family member on various topics like health insurance, employment and earnings

Figure 2. Topic organization in the Household Roster, Sample Adult and Sample Child modules: NHIS 2019.



Difficulties: How/why to change the survey in 2019 redesign

2019 Question Topics

Topics of Sample Adult Qs

Sample Adult health topics for 2019 are:

- I. Health Status and Conditions
asthma, arthritis, cancer, cardiovascular conditions, diabetes, cholesterol, hypertension, and other chronic conditions, self-reported health status, pregnancy status and height and weight
- II. Functioning and Disability
anxiety, communication, cognition, depression, hearing, mobility, self-care and upper body, social functioning (participation), and vision
- III. Pain and Pain Management
chronic pain and opioid use
- IV. Health Care Access and Health Service Utilization
difficulty paying for health care, utilization of services, immunizations, dental care, mental health care, physical and other therapeutic care, and prescription medication
- V. Health-Related Behaviors
cigarettes, e-cigarettes, and other tobacco products
- VI. Mental Health
generalized anxiety disorder (GAD-7) and depressive disorder (PHQ-8) scales
- VII. Preventive Care
aspirin use and cancer screenings

Topics of Sample Child Qs

Sample Child health topics for 2019 are:

- I. Health Status and Conditions
health status, asthma, diabetes, developmental conditions, and learning disabilities
- II. Functioning and Disability
anxiety, behavior, cognition, communication, depression, hearing, mobility, self-care and upper body, and vision
- III. Health Care Access and Health Service Utilization
difficulty paying for health care, utilization of services, immunizations, dental care, mental health care, physical and other therapeutic care, and prescription medication
- IV. Behavioral and Mental health
Baby Pediatric Symptom Checklist (BPSC) and Strengths and Difficulties Questionnaire (SDQ)
- V. Stressful Life Events

Future Question Topics

NHIS SAMPLE ADULT QUESTIONNAIRE

ADULT

Administered to one randomly selected adult in each household

	2019	2020	2021	2022	2023	2024	2025	2026	2027
ANNUAL CORE	Chronic Conditions: Hypertension, High cholesterol, Cardiovascular conditions, Asthma, Cancer, Diabetes, Other chronic conditions, Height and weight Functioning and Disability: Vision, Hearing, Mobility, Communication, Cognition, Self-care and upper-body limitations, Anxiety, Depression, Social functioning Health Insurance: Coverage status, Sources of coverage, Characteristics of coverage, Continuity of coverage, Reasons for no health insurance Health Care Access and Use: Primary and urgent care, Financial barriers to care, Prescription medication, Flu and pneumonia immunization Health-related Behaviors: Cigarettes and E-cigarettes Demographics: Marital status, Sexual orientation, Veterans status, Nativity, Schooling, Employment, Family income, Food-related program participation, Housing, Telephone use								
ROTATING CORE	Service Utilization: Dental care, Mental health care, Other services		Allergies and Other Conditions	Service Utilization: Dental care, Mental health care, Other services		Allergies and Other Conditions	Service Utilization: Dental care, Mental health care, Other services		Allergies and Other Conditions
			Psychological Distress			Psychological Distress			Psychological Distress
	Mental Health Assessment ¹	Industry and Occupation		Mental Health Assessment ¹	Industry and Occupation		Mental Health Assessment ¹	Industry and Occupation	
		Injuries			Injuries			Injuries	
	Chronic Pain: Severity and impact, Locations	Health-related Behaviors: Physical activity, Walking, Sleep, Fatigue, Smoking history and cessation, Alcohol use	Chronic Pain: Severity and impact, Locations	Health-related Behaviors: Physical activity, Walking, Sleep, Fatigue, Smoking history and cessation, Alcohol use	Chronic Pain: Severity and impact, Locations	Health-related Behaviors: Physical activity, Walking, Sleep, Fatigue, Smoking history and cessation, Alcohol use	Chronic Pain: Severity and impact, Locations	Health-related Behaviors: Physical activity, Walking, Sleep, Fatigue, Smoking history and cessation, Alcohol use	Chronic Pain: Severity and impact, Locations
	Preventive Services: Screening tests, Aspirin use		Preventive Services: Screening tests, Aspirin use	Preventive Services: Screening tests, Aspirin use	Preventive Services: Screening tests, Aspirin use	Preventive Services: Screening tests, Aspirin use	Preventive Services: Screening tests, Aspirin use	Preventive Services: Screening tests, Aspirin use	
SPONSORED CONTENT	Sustaining sponsors* add content every year. Annual sponsored content will include cancer control and prevention (NCI and NCCDPHP), immunizations (NCIRD), noncigarette tobacco product use (FDA), food security (USDA), and insulin use (NIDDK and NCCDPHP).								
	Other sponsors* add content for selected years. Sponsorships include expanded content on arthritis in 2019 (NCCDPHP and NIAMS), asthma in 2020 (NCCDPHP), diabetes in 2020 and insulin affordability in 2021 (NCCDPHP), prescription opioid use and pain management in 2020 (NCIPC), age of onset of disability in 2020 (ACL), epilepsy in 2021 (NCCDPHP), occupational health in 2021 (NIOSH), and complementary and integrative health in 2022 (NCCIH).								
EMERGING TOPICS	New topics of growing interest may be added by the National Center for Health Statistics, generally for 1 year. In 2019, NCHS added prescription opioid use and pain management.								

* As of March 2020, sponsors include the National Cancer Institute (NCI), National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), National Center for Immunization and Respiratory Diseases (NCIRD), Food and Drug Administration (FDA), United States Department of Agriculture (USDA), National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), National Center for Injury Prevention and Control (NCIPC), Administration for Community Living (ACL), National Institute for Occupational Safety and Health (NIOSH), and National Center for Complementary and Integrative Health (NCCIH). NCCDPHP, NCIRD, NCIPC, and NIOSH are part of the Centers for Disease Control and Prevention. NCI, NIAMS, NIDDK, and NCCIH are part of the National Institutes of Health.

¹ Questions come from the Patient Health Questionnaire and the Generalized Anxiety Disorder scale.

Sample size, response rates

Sample size

- 35,404 Households
 - Completed a household roster
- 33,138 Households
 - Completed household roster and substantial portion of family interview
- 31,997 Sample Adult surveys
 - 35,365 eligible sample adults from HH with completed roster
- 9,193 Sample Children surveys
 - 10,155 eligible sample children from HH with completed roster

Response Rates

- Household roster completion 65.3%
 - $35,404/54,231 = 65.3\%$
- Household Response Rate 61.1%
 - $31,138/54,231 = 61.1\%$
- Final Sample Adult Response Rate 59.1%
 - $31,997/35,365 * 65.3\%$ completed household rosters
- Final Sample Child Response Rate 59.1%
 - $9,193/10,155 * 65.3\%$ completed household rosters
- It's unclear if there were any methods used to reduce nonresponse, aside from sending an Advance Letter.
 - NHIS Documentation did not mention specifics
 - Incentives were not mentioned either

Survey weights

Weights

- Base weight
 - inverse of probability of being in the sample (inclusion probability)
- Adjusted for non-response
 - Different response rates among different household and person-level subgroups
- Change in approach
 - 1997-2018: based on geography
 - Post-stratification: sum of weights equaled age, sex, race/eth and overall totals
 - 2019: multilevel logistic regression
 - Outcome: Households split into quintiles based on response propensities. **Predictors: related to response rates, health outcomes**
 - Weight: $1/(\text{median response propensity for quintile})$. Capped at 2.5
 - Covariates, cap to be reviewed annually
 - Raking used instead of post-stratification for sum of weights. Able to handle more variables.
 - Added: EDU attainment, census division, MSA
 - Multiplied by Adult or Child inclusion probability in HH

Sample Adult, Sample Child weights

- WTIA_A, WTIA_C
 - Interim: Annual, Before Post-Stratification (Raking) Calibration
- WTFA_A, WTFA_C
 - Final: Annual, After Calibration
 - (public use data file includes pseudo strata and pseudo PSUs)

<- The multilevel logistic regression (not covered in class) and the raking methodology were noteworthy design and calculation features.

Calculating: Insurance Coverage Rates

Weighted

- Overall, national figures:

	Final Weights	Share of Total
Insured (covered)	220,392,011	88.0%
Uninsured (not covered)	29,139,272	11.6%
Don't know	802,899	0.3%
Total	250,334,182	100.0%

- 95% CIs:
 - Insured 87.4-89%
 - Uninsured 11-12%
 - Don't know 0.2-Undetermined %
- Unweighted frequencies are
 - Insured 90.68%
 - Uninsured 9.02%
 - Don't know 0.30%

Note: Percentages used along with final weights for ease of interpretability

By Age, Income Group

Age Group	Insured	Uninsured	Don't Know
18-29	82.0%	17.4%	0.6%
30-49	84.0%	15.7%	0.3%
50-64	89.3%	10.5%	0.2%
65-84	98.8%	1.0%	0.2%
85+	99.0%	0.8%	0.2%

Family Income Group	Insured	Uninsured	Don't Know
\$0 to \$34,999	80.6%	19.0%	0.4%
\$35,000 to \$49,999	82.1%	17.7%	0.2%
\$50,000 to \$74,999	86.9%	12.7%	0.4%
\$75,000 to \$99,999	92.9%	6.9%	0.3%
\$100,000 or greater	95.4%	4.3%	0.3%

Coverage rates by Age and Income Groups

Insured %					
Age Group	\$0 to \$34,999	\$35,000 to \$49,999	\$50,000 to \$74,999	\$75,000 to \$99,999	\$100,000 or greater
18-29	75.5%	75.8%	79.3%	87.1%	92.1%
30-49	66.7%	72.3%	83.2%	91.9%	94.6%
50-64	79.4%	82.5%	88.3%	94.0%	96.5%
65-84	98.1%	98.3%	99.1%	99.8%	99.5%
85+	99.0%	100.0%	100.0%	100.0%	97.1%

Don't know %					
Age Group	\$0 to \$34,999	\$35,000 to \$49,999	\$50,000 to \$74,999	\$75,000 to \$99,999	\$100,000 or greater
18-29	0.4%	0.3%	1.0%	0.7%	0.7%
30-49	0.6%	0.2%	0.3%	0.1%	0.2%
50-64	0.3%	0.2%	0.1%	0.3%	0.2%
65-84	0.3%	0.0%	0.3%	0.0%	0.2%
85+	0.0%	0.0%	0.0%	0.0%	0.0%

Uninsured %					
Age Group	\$0 to \$34,999	\$35,000 to \$49,999	\$50,000 to \$74,999	\$75,000 to \$99,999	\$100,000 or greater
18-29	24.2%	23.8%	19.7%	12.2%	7.2%
30-49	32.7%	27.5%	16.6%	7.9%	5.3%
50-64	20.3%	17.3%	11.5%	5.7%	3.3%
65-84	1.6%	1.7%	0.6%	0.2%	0.3%
85+	1.0%	0.0%	0.0%	0.0%	2.9%

*Medicaid income cap varies by state and household size. Likely worth further disaggregating lowest income groups. Many youth may be on parent's insurance plan until age 26.

Other categorical variables: sex, race (with and without Hispanic ethnicity), educational attainment

Types of Coverage

For Adults 18-64

	Final Weights	Share of Total
Private	132,923,518	67.3%
Medicaid and other public	26,720,871	13.5%
Other coverage	8,658,490	4.4%
Uninsured	28,637,929	14.5%
Don't know	692,745	0.4%
Total	197,633,554	100%

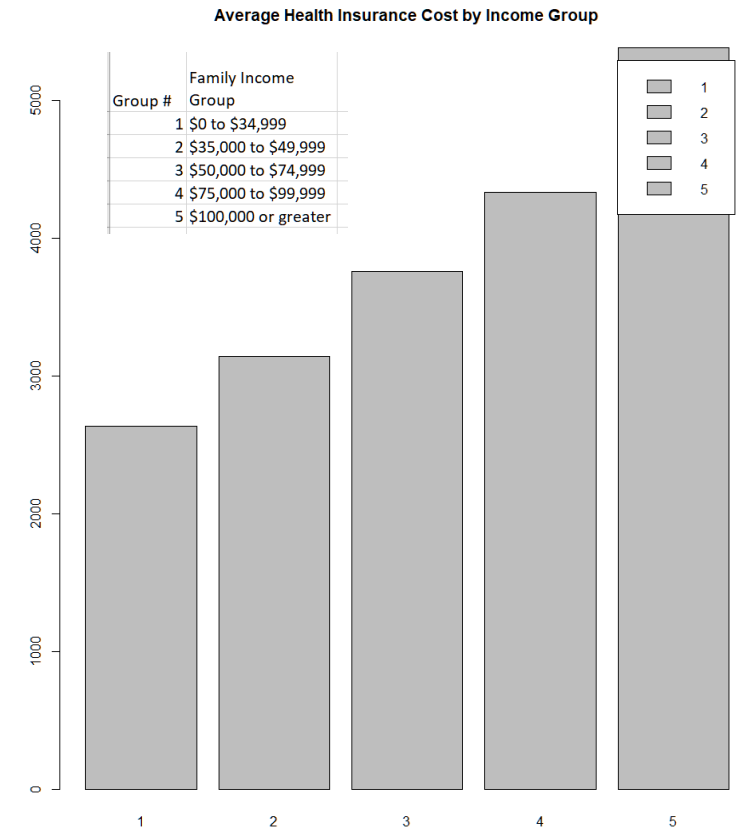
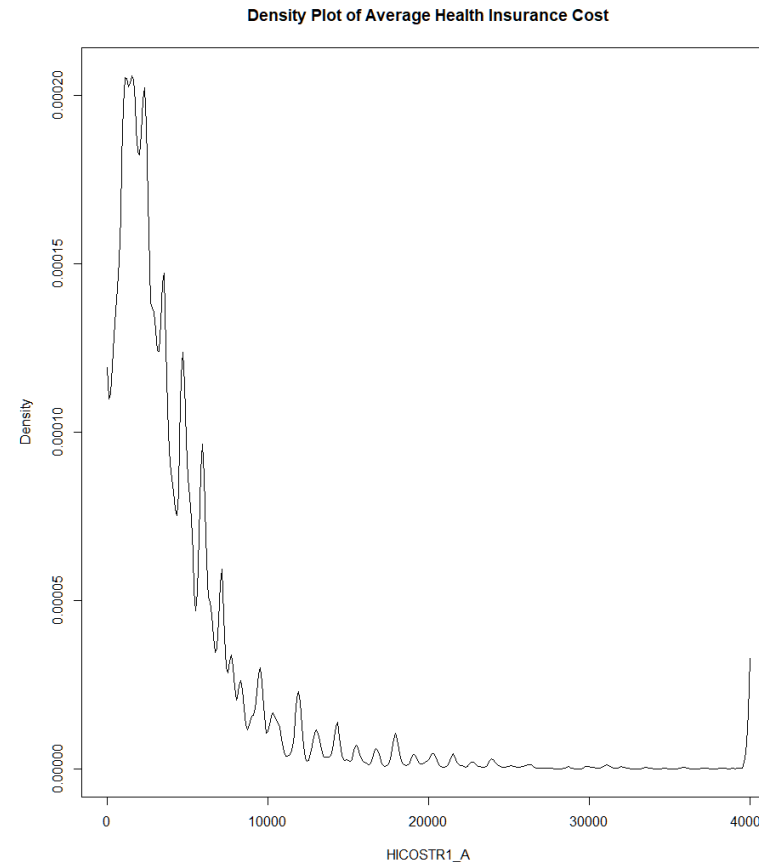
For Adults 65 or older

	Final Weights	Share of Total
Private	21,440,131	40.7%
Dual eligible	4,021,734	7.6%
Medicare Advantage	14,727,161	27.9%
Medicare only excluding Medicare Advantage	7,133,482	13.5%
Other coverage	4,677,094	8.9%
Uninsured	501,344	1.0%
Don't know	199,683	0.4%
Total	52,700,629	100.0%

Cost of Annual Premiums (Private Insurance)

	Annual Premiums
Mean	4,346
SE	57.441
DEFF	1.8554
Variance	23,106,560

Percentile	Lower	Upper
0%	1	1
10%	756	840
20%	1,300	1,368
30%	1,800	1,820
40%	2,400	2,400
50%	2,964	3,000
60%	3,600	3,900
70%	4,800	4,800
80%	6,000	6,120
90%	8,400	9,360
100%	40,000	40,000



Note: This does not include Adults without Coverage.
Worth looking into very high Annual Premiums.

Deductibles of Private Health Care Plans

	Final Weights	Share of Total
Have a deductible	82,096,503	73.9%
Do not have a deductible	29,068,110	26.1%
Total	111,164,613	100.0%

	Final Weights	Share of Total
Do not have a high deductible health plan	42,910,087	52.3%
Have a high deductible health plan	39,186,417	47.7%
Total	82,096,504	100.0%

Top table: Universe includes those with Private Plan

Bottom table: Universe includes only those with a deductible

- High deductible varies based on the number of people in household. Deductible threshold for one person is \$1,350 and for two or more people it's \$2,700.

Differences due to rounding.

References

- National Center for Health Statistics. National Health Interview Survey, 2019. Public-use data file and documentation. <https://www.cdc.gov/nchs/nhis/data-questionnaires-documentation.htm>. 2020.
 - Link to public data, documentation: <https://www.cdc.gov/nchs/nhis/2019nhis.htm>