



## Scientific Impact of MIDUS

**1750+ publications**

*appearing in*

**450+ scientific journals**

**26,000+**

**researchers world wide**

*using the publicly available data*

**275+ cross-study analyses**

*linking MIDUS to other studies*

**250+ dissertations/theses** *have used MIDUS data*

## *A landmark national study on midlife Americans*

### *MIDUS (Midlife in the United States):*

*seeks to understand why some remain healthy & well as they move across the decades of adult life, while others succumb to various illnesses & disabilities.*

MIDUS 1 was the first national, longitudinal study of aging to focus explicitly on midlife. Before MIDUS, midlife was not well studied, even though it is the longest segment of the life course. MIDUS looks at how well Americans are coping with midlife responsibilities and how these early influences affect later life health.

Studying health and well-being as an integrated biopsychosocial process is also central to MIDUS. MIDUS 2 was one of the first national studies to link psychosocial and behavioral factors to biomedical and neurological assessments obtained in laboratory settings.

The range of data collected is unprecedented, allowing researchers to integrate data from domains normally studied separately. This results in a more comprehensive approach to explaining why some face the challenges of midlife and aging better than others.

### **Unique Focus:**

- **Telling the tale of midlife** which was not well understood prior to MIDUS because most studies focused on old age.
- **Emphasizing protective factors** that keep people healthy even in the face of adversity, rather than focusing solely on pathways to disease and disability.

### **Wide Scope:**

- **Comprehensive assessments** 25,000+ variables
- **Lifespan data** on 11,000+ US adults initially aged 25-74
- **Longitudinal change** repeated assessments since 1995

**MIDUS** is led by the **UW-Madison Institute on Aging** and involves researchers from all over the US. It is funded by the National Institute on Aging.

# INTEGRATIVE SCIENCE in MIDUS

MIDUS collects data from multiple domains so it can be combined to study specific pathways leading to health & illness across the lifespan:

## How we age

is affected not just by our physical health and presence or absence of disease & disability, but also by our race, gender, education, and income.

It is also influenced by our mental abilities, emotional well-being, and ties with family, friends, and neighbors.

It is affected by the childhoods we had, the daily stresses we face, and the big challenges that come our way.

MIDUS is unique in looking at all these factors together in an integrative, multi-disciplinary science that works across, rather than within, disciplinary boundaries.

### Sociodemographic Factors



- Age
- Gender
- Culture
- Race/Ethnicity
- Marital Status
- Education
- Income
- Occupation

### Psychological Factors

- Personality
- Affect
- Coping
- Health Beliefs
- Religion/Spirituality
- Sense of Control
- Goals
- Optimism



### Social Factors

- Social Support
- Spousal Relations
- Child Abuse
- Parent-Child Ties
- Social Participation
- Job
- Altruism
- Neighborhood Quality



### Life Challenges

- **Daily Stressors** (work overload, family arguments, traffic problems)
- **Chronic Stressors** (caregiving, perceived discrimination/inequalities, work-family spillover, unemployment)
- **Acute Events** (divorce, remarriage, job change, deaths, relocation)
- **Historical Events** (Great Recession)



### Health Behaviors

- Smoking
- Drinking
- Drug Abuse
- Preventive & Alternative Healthcare
- Exercise



### Genomic & Neurobiological Factors

#### Brain

- Structure
- Function
- Connectivity

#### Genomics

- Markers
- Expression
- Regulation

#### Biomarkers

- Inflammatory
- Neuroendocrine
- Cardiovascular
- Musculoskeletal
- Neuropathy
- Glucose Metabolism



### Health/Illness Across the Lifespan



#### Mental:

- Anxiety
- Depression
- Cognition
- Well-Being

#### Mortality

#### Physical:

- Subjective Health
- Chronic Illness
- Disability/Functional Limitations
- Obesity



# HISTORY of MIDUS



## MIDUS Core Sample 1995-2022

### MIDUS 1 • 1995-1997

- MIDUS began in 1995 with funding from the **MacArthur Midlife Research Network**.
- Survey data was collected from a **national sample of 7000 US adults**, aged 25 to 74.
- **The first large, national twin sample** was included to study genetic influences.



### MIDUS 2 • 2004-2009

- Building on widespread scientific engagement with MIDUS 1, funding was received from the **National Institute on Aging (NIA)** to collect follow-up survey data about a decade later.
- MIDUS was also **expanded to include multiple projects**: survey, cognition, daily experiences, biomarkers, and neuroscience.



- A new **African American sample** was added from Milwaukee, WI.
- MIDUS 2 represented a **pivotal shift in the**

**MIDUS mission**: psychosocial factors could now be linked to biological assessments.

### MIDUS 3 • 2013-2022

- MIDUS 3 included a **third wave** of survey, cognitive, daily experience, biomarker, and neuroscience assessments.
- **New projects were added**: Genomics (how environmental conditions affect genetic influences on health) and Retention-Early Warning (reinstating participants who dropped out).



## MIDUS Refresher 1 Sample • 2011-2016

- Beginning in 2011, another grant from NIA allowed for the recruitment of a **new national and Milwaukee sample of 4000 US adults**, also aged 25-74.
- This brought the total number of MIDUS participants to over 11,000, greatly expanding the sample size on which research can be conducted.
- The Refresher sample also allows researchers to look at cohort differences in the **impact of historical events**, such as the 2008 Great Recession. Future surveys will include questions about the impact of the COVID-19 pandemic.



## MIDJA 1 & 2 • 2008-2014

- The MIDJA study (**Midlife in Japan**) is a parallel study that began in 2008 with 1000 adults, aged 30 to 79, from Tokyo.
- Survey and biomarker assessments were similar to those in MIDUS.
- Two waves of data were collected to study the **impact of cultural factors on aging**.



## Planned Future Waves

- The next funding period will include a **4<sup>th</sup> wave** of data from the Core sample, as well as a **2<sup>nd</sup> wave** of Refresher data.
- **All projects** (cognition, biomarkers, etc.) **will be included for both samples**.

# MIDUS COVERS MANY TOPICS:

# of  
articles  
published:

<i>Affect/Emotion</i>	414
<i>Aging</i>	378
<i>Allostatic Load</i>	66
<i>Altruism</i>	52
<i>Biomarkers</i>	432
<i>Cancer</i>	23
<i>Childhood/Early Life</i>	190
<i>Chronic &amp; Acute Challenges</i>	137
<i>Cognitive Function</i>	152
<i>Culture/Country</i>	103
<i>Daily Experiences</i>	223
<i>Gender</i>	244
<i>Genetics &amp; Twins</i>	128
<i>Health Behaviors</i>	239
<i>Historical Context/Recession</i>	37
<i>Mental Illness</i>	254
<i>Mortality</i>	69
<i>Neighborhood</i>	41
<i>Neuroscience</i>	26
<i>Non-normative Parenting</i>	23
<i>Obesity/Weight</i>	107
<i>Occupation &amp; Employment</i>	148
<i>Perceived Discrimination</i>	94
<i>Personality</i>	272
<i>Physical Health</i>	655
<i>Psychological Well-Being</i>	419
<i>Purpose in Life</i>	35
<i>Race &amp; Ethnicity</i>	200
<i>Religion &amp; Spirituality</i>	72
<i>Resilience</i>	54
<i>Sense of Control</i>	131
<i>Sexuality</i>	35
<i>Sleep</i>	91
<i>Social Inequalities/SES</i>	204
<i>Social Relationships</i>	424
<i>Social Responsibility</i>	62
<i>Volunteering</i>	46
<i>Work and Family</i>	57

## A Snapshot of MIDUS Findings

### The Long Reach of Childhood

MIDUS included multiple questions about memories of childhood experiences. Researchers have found that people's answers to these questions are linked with their adult health.

#### Happy childhoods are linked with better adult well-being:

- Those who reported getting more love and affection from their parents in childhood had better well-being 10 years later, including more positive emotions, satisfaction with life, good social functioning, and psychological well-being (fulfilling one's potential). [Chen 2018]



- Receiving greater support in childhood (family members looked out for each other) was linked to having lower allostatic load (a measure of risk factors in seven biological systems) at midlife.

[Slopen 2016]

#### Unhappy childhoods are linked with problems even in old age:

- Those who reported more childhood abuse had more anxiety as adults, which in turn reduced their sleep quality and led to lower self-rated physical health and more functional limitations (such as not being able to walk up stairs). [Tracy 2020]
- Adverse childhood experiences were linked with reduced life satisfaction in adulthood, as well as less sense of purpose (lacking goals that give your life meaning).

[Mosley-Johnson 2019, Homan 2020]



#### What Shields Us?

- Those who reported childhood abuse had better mental health as adults if they felt close to others in their community. [Greenfield 2010]



- Adults who reported physical abuse in childhood but had a strong sense of personal control (believing they could overcome obstacles) had better physical health and less depression as adults.

[Pitzer 2010]

#### Poverty in Childhood Affects Later Life Health:

- Those from poorer families with lower socioeconomic status (SES) had higher BMI at midlife (measured by weight & height) than those from privileged families.

[Lee 2020]

- Women who grew up in poorer families were less likely to exercise as adults, and men were more likely to have unhealthy diets, which was linked to risk of metabolic syndrome (a cluster of symptoms such as a large waist & high blood pressure) which can contribute to diabetes and stroke. [Lee 2018]



# Experiences of Midlife

Prior to MIDUS, there was significant research on early childhood and older age, but an in-depth study of what happens to people during midlife was missing. Since midlife is a period of increased responsibility for work and family, the health and well-being of middle-aged Americans is of critical importance to society.



## Balancing Work & Family:

MIDUS was one of the first studies to generate nationally representative descriptions of how well work demands & family responsibilities fit together, and was the only

study that could tie it to long-term health:

- Work-family conflict (problems at home distract us at work, work makes us overly tired at home) has been linked to elevated blood sugar (glucose) and higher BMI, dysregulation of the stress hormone cortisol, and insomnia symptoms across 20 years. [Versey 2020, Zilioli 2016, Lee 2019]
- Problem focused coping (dealing directly with the source of the problem, such as by adjusting schedules) helped those with work-family conflict to experience less dissatisfaction with life. Those who just vented negative feelings did less well. [Sirgy 2020]

MIDUS was the first national study to show that combining work and family can also be beneficial. Skills learned at work can be useful at home, or relaxing at home can help us be ready for the next day's work.

- This type of work-family facilitation was associated with jobs where workers learned new skills often, had more control over their jobs, or received more help and support from their co-workers. [Stoiko, 2017]
- Those who reported more work-family facilitation showed more persistence in striving toward goals and less vulnerability to minor stressors, which led to better physical health (fewer headaches, backaches, less trouble sleeping). [Russo 2015]



## Reactions to Minor Daily Stresses are Important to Long-Term Health:

Midlife responsibilities can be challenging. MIDUS includes the largest longitudinal study of daily stress (arguments, problems at work) in the US. Research has shown it is not the number of stressful events we encounter, but our emotional reactions to them, that matters for health:

- People who reported more negative emotions on days a stressor occurred had more depression and anxiety, increased inflammation, higher allostatic load, and higher risk of mortality. [Charles 2013, Sin 2015, Piazza 2019, Chiang 2018]
- Those who were able to resolve their arguments by the end of the day showed roughly half the increase in negative emotions. [Witzel 2021]



## Marriage & Parenthood:

Arguably the most important midlife relationships.

- Having a caring spouse/partner was linked to better physical health and well-being, and less risk of mortality. [Selcuk 2016, Alonso-Ferres 2020]
- Numerous studies have linked parenthood to increased depression, which is contributed to stress. However, a MIDUS study showed that although parenting adolescents & young adults was stressful, parents whose children were 30+ years old experienced more life satisfaction and fewer chronic illnesses than people who never had children. [Simon 2019]
- Our children, no matter their age or challenges, are important to us. Parents who experienced the death of a child had a 32% higher likelihood of early mortality. [Song 2019]

## Midlife Stress May be Getting Worse:

Previous research has shown that as we get older, we have less stress. MIDUS 1 data showed this was true for people who were middle-aged in 1995. However, data collected from the MIDUS Refresher, after the Great Recession, showed that people who were middle-aged in 2012 were having a harder time. They reported 19% more stress than people in 1995. Additionally, financial concerns related to stressors increased by 27% and worries about future plans increased by 17%. [Almeida 2020]



# A Snapshot of MIDUS Findings

## The High Costs of Inequality

*Inequality in America has become an important issue in public discussions and is a major theme within MIDUS. Results from MIDUS and other national studies are showing that inequality unfairly compromises health and quality of life.*



### Socioeconomic Disparities:

Socioeconomic status (SES) is calculated by factors such as income, level of education, and occupational prestige. Those of lower SES, who are poor, often have less access to resources (good jobs, healthcare, college), which creates inequality.

### Poor Americans are in Despair:

- Drug- and alcohol-related deaths and suicides have increased over the last two decades, dubbed “deaths of despair,” which has raised questions about whether mental health is declining in the US.
- Data from the MIDUS Refresher (2012) was the first to show that poor adults in the lowest SES really are in despair. Compared to their same-aged counterparts from MIDUS 1 (1995), they were less happy, had more negative emotions (sadness, hopelessness), and were less satisfied with life. [Goldman 2018]

### Rich Americans are Living Longer:

- Meanwhile, having a higher SES was associated with having less distress and some improvement in well-being since the '90s.
- Higher SES was also associated with lower risk of mortality 24 years later, even for siblings within the same family who likely had similar advantages growing up. [Goldman 2018, Finegood 2021]

### Racial Disparities in Health:

*Important advances in understanding racial disparities in health have been made using MIDUS data from Milwaukee, where 1100 African Americans have been recruited to increase minority respondents in the study. As a highly segregated city, Milwaukee represents the context in which many US Blacks live.*

- How quickly one's heart rate can change in response to challenges is a sign of a healthy heart. This heart rate reactivity generally declines with age, but the decline among Milwaukee African Americans occurred at significantly earlier ages compared to Whites. This difference may reflect exposure to the chronic stresses of urban neighborhoods, which have been implicated in accelerated aging. [Fuller-Rowell 2013]



### Discrimination Promotes Poor Health:

MIDUS was the first national study to comprehensively measure perceived discrimination, including reports of major life-time discrimination (such as being hassled by the police) and chronic everyday discrimination (such as being treated with less courtesy at a restaurant).

- The first MIDUS paper about perceived discrimination has been cited over 2800 times, and showed that although discrimination was more prevalent among African Americans and other disadvantaged groups, it was also common in the total population, with 34% reporting exposure to major lifetime discrimination and 61% reporting day-to-day discrimination. [Kessler 1999]
- Discrimination reported by lesbian, gay, and bisexual men and women was linked to increased inflammation (CRP & IL-6), which is associated with chronic illness. [Wardecker 2021]
- Greater lifetime discrimination among people of color predicted poorer sleep, which led to higher inflammation. [Ong 2019]
- Weight discrimination was associated with a 60% increased chance of dying. [Sutin 2015]
- Age discrimination was associated with having fewer positive emotions, more physical limitations, and more chronic illnesses. [Stokes 2020]



- Sleep was examined in some participants who wore an activity monitor for 7 days. Results showed that African Americans got 40 fewer minutes of sleep a night and had 10% lower sleep efficiency (less time in bed actually asleep) compared to Whites. This explained a significant portion of racial differences in cardiometabolic disease risk (blood pressure, insulin resistance, cholesterol, inflammation). [Curtis 2017]
  - Why? African Americans had more wakefulness during the night, which was partly accounted for by living in poorer neighborhoods. [Fuller-Rowell 2016]

## Aging

*MIDUS has shown that positive aging is the ability to remain actively engaged in life, even in the face of age-related challenges, rather than the commonly held belief that only disease-free individuals age well.*



### Having a Purpose is Associated with Better Health & Living Longer:

*One of the most important developments in health research has been the recognition that psychological well-being (PWB) matters for physical health. MIDUS was the first national study to include comprehensive measures of PWB, which includes:*

*having good relationships, feeling in charge of your life, liking yourself.*

*Results about another aspect of well-being, purpose in life (having meaningful goals that make life worth living), have shown that it declines for some as they grow older. However, those who are able to remain engaged, with high levels of purpose even into old age, may reap substantial health benefits:*

- Those with multiple chronic conditions (arthritis, diabetes) who had a strong sense of purpose showed lower inflammation (IL-6 & CRP), which may reduce the severity of their symptoms. [Friedman 2012]
- Higher purpose was linked to lower allostatic load, which measures wear & tear in seven biological systems and predicts chronic illness. [Zilioli 2015]
- Scans of brain circuitry showed that those with greater well-being, including purpose in life, reacted longer to positive images, which was associated with having healthier levels of the stress hormone cortisol over the course of the day. [Heller 2013]
- People with a higher sense of purpose had lower risk of heart attacks and stroke, and lived longer, even after adjusting for such factors as body weight & smoking. [Cohen 2016]

### Cognitive Decline is Not Inevitable

*Before MIDUS, cognitive testing was done on small laboratory samples that had limited generalizability. A new MIDUS telephone interview made it possible to perform the first study of cognitive (thinking) abilities on a nationally representative sample. Testing revealed that there is wide variation in how much mental functioning declines with age. Some people in their 70s & 80s did as well on tests as others in their 30s & 40s.*



- In a mental challenge that tested reaction time, those with college degrees reacted as quickly as people who were ten years younger but who didn't have a degree. [Tun 2008]
- Those without a college degree who engaged frequently in mentally challenging activities (reading, writing, crosswords) showed less decline in cognitive ability across 9 years. [Stieger 2021]
- Being neurotic (worrying a lot) predicted having significantly worse memory, but being more open to experiences was associated with having a better memory, 20 years later. [Stephan 2020]



## MIDUS Data

*are available to all researchers via:*

[icpsr.umich.edu](http://icpsr.umich.edu)  
[midus.colectica.org](http://midus.colectica.org)

### MIDUS data have captured the attention of the scientific community:

- MIDUS is the most frequently downloaded dataset from the National Archive of Data on Aging.
- Since 2016, total downloads of MIDUS data have increased by more than 76%.
- More articles are now published by researchers from the scientific community than by the MIDUS investigators leading the study.

### MIDUS data are easy to use:

- MIDUS has played a prominent role in developing cutting-edge data management strategies for large studies.
- MIDUS uses the Data Documentation Initiative (DDI) to create easy to use, standardized metadata.
- Groundbreaking DDI upgrades in MIDUS have included customizable data downloads and harmonized variables across waves of MIDUS.

# WHAT'S NEXT FOR MIDUS?

# 6

## MORE YEARS of RESEARCH

*funded by NIA in 2022, including:*

### New waves of data:

- MIDUS will collect a **4th wave** of data from original participants (Core sample) and a **2nd wave** of data from the Refresher sample.
- **All projects** (daily experiences, biomarkers, cognitive functioning, neuroscience, and genomics) **will be included for both samples.**
- **MIDUS 4** assessments on the Core sample **will span 30 years of aging** and afford unprecedented opportunities to investigate how cumulative socioeconomic and psychosocial profiles matter for many health outcomes.

### A new focus on Alzheimer's disease (AD):

MIDUS is uniquely situated to study AD because:

- Multiple factors assessed from prior decades can be used to **identify markers of risk before AD symptomatology appears.**
- MIDUS tracks cumulative exposures to stress, which are believed to increase risk for AD.
- Unlike most AD studies, MIDUS has unusual depth on protective factors— psychosocial resources, behavioral, emotional, and lifestyle factors— known to buffer against diverse disease outcomes. These will yield new insights into **factors that protect against cognitive decline.**



## MIDUS

*will continue to tell tales of hardship & resilience.*

*It will also reveal more of what people can do, some related to health practices & behaviors, others related to emotional experiences, which can help prevent illness & promote well-being with aging.*

### Examining the impact of the COVID-19 pandemic:

- MIDUS has followed adults living through different periods of history characterized by growing inequality, including the aftermath of the Great Recession of 2008 and the COVID-19 pandemic.
- **MIDUS will examine whether those hit hardest by the Great Recession will also suffer disproportionately from the pandemic.**



**MIDUS**   
Midlife in the United States 2022

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