

Health and Economic Inequality

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My plan for today

1. Why health matters in everyday life

My plan for today

1. Why health matters in everyday life
2. How economists think about health

My plan for today

1. Why health matters in everyday life
2. How economists think about health
3. Some lessons from research on health

Health and life

Health affects almost all aspects of life



Learning



Working



Caring



Living long and
actively

- The costs of illness affect individuals, their families, and society
- $\Rightarrow$ The economics of households, inequality, and government finances

Health affects learning



Reading and taking notes

Adapting to severe vision loss

- Illness can make learning more difficult and also interrupt education
- Education, in turn, affects many outcomes, including in the labor market

Health affects our ability to work

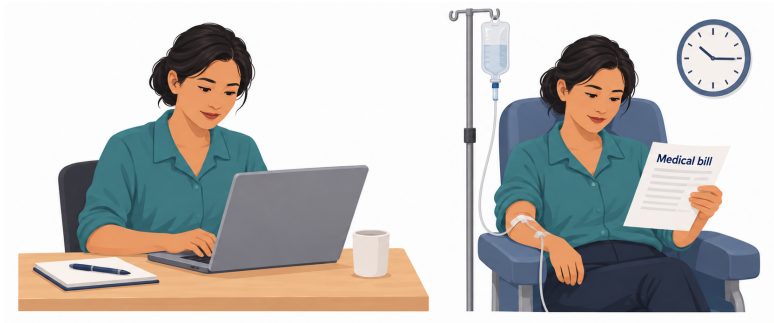


Putting skills to work

A broken arm interrupts the task

- Health problems can limit our ability to use our skills or remain employed
- Disability can shorten working lives and increase reliance on support

Poor health takes time and money



Time for work

Treatment, travel, and medical bills

- Appointments, treatment, and recovery take time and can increase expenses
- These demands can rise just when earnings fall

Health affects the whole family



Everyday care and play

Hospital care interrupts family routines

- Illness can constrain parents' care and investments in children's development and caregiving more generally
- Other family members may have to provide care or adjust their own work

Health shapes saving and retirement



Planning for later life

Care needs change financial plans

- Poor health can force earlier retirement and increase spending on care
- These pressures can deplete savings and reduce support for relatives and bequests

Health affects life expectancy



More years together

Earlier loss of a partner

- Poor health can shorten life and limit the years available to pursue our plans
- An early death also means lost years together for partners, children, and friends

Health also matters for society



Work and production

Medical and long-term
care

Government finances

- Health affects production, tax revenues, and spending on care and benefits
- Longer lives also change how long people receive pensions and support

Health shocks can also generate inequality



- Health shocks differ in their timing, severity, and persistence
- Early shocks can affect education, earnings, family formation, and life expectancy
- Effects can accumulate, even among people with similar starting resources

How economists think about health

How economists think about the world

- **Goal:** understand the world and evaluate policies to improve people's lives

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- **Tools:**
 - **Models: simplify a complicated world.** Help us reason through questions about how people behave and why
 - **Data: document patterns, estimate relationships, and assess explanations**
- **This lecture: combine models and data** to
 - Understand economic consequences of health
 - Study what might happen under different circumstances or policies

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Study how people respond through work, saving, and insurance. These choices do not change future health in the model

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- **Common factors affect both health and economic outcomes**

Allow differences already present early in life to shape health, earnings, and wealth

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Effects on economics opportunities, inequality, and the value of insurance

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Responses through work, saving, and other economic decisions
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Shared influences on health and economic outcomes
- **Health formation: additional evidence needed**
Distinguish the effects of medical care and other inputs from the reasons people choose them

Why is health formation difficult to study?

- **Many inputs and circumstances shape health**

Nutrition, exercise, medical care, stress, and living and working conditions

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- **Much remains to be learned**

Which interventions improve health, for whom, at what ages, and at what cost

Some lessons we have learned so far

Health types

Borella, Bullano, De Nardi, Krueger, and Manresa (2025)

U.S. adults starting at ages 52–53

- **Health trajectories show evidence of health types**

People differ in initial health, speed of health deterioration, and timing of death

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- **Health trajectories show evidence of health types**

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- **Identify five types**

- Vigorous resilient
- Fair-health resilient
- Fair-health vulnerable
- Frail resilient
- Frail vulnerable

► Health trajectories

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► Health trajectories

- **Health histories help predict what happens next**

Information about future health and survival beyond initial health and demographic characteristics

The lifetime costs of bad health

De Nardi, Pashchenko, and Porapakkarm (2025)

U.S. men age 21 and older with a high-school degree or up to two years of college

- **Bad health implies large monetary costs that vary by health type**

Average: \$1,511 per year

Best health type: \$225; worst health type: \$8,896

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37% over the lifetime; 48% during working life

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- **Shorter lives: an important determinant of welfare losses**

Total loss: equivalent to 10.6% of annual consumption in the healthy benchmark

Contribution of shorter lives: 44% of that loss

Annualized monetary costs in 2013 dollars

Related work on mental health: Ascarza-Mendoza and Velasquez (2025)

Medical expenses, retirement saving, and Medicaid

De Nardi, French, Jones (2010) + De Nardi, French, Jones, McGee (2025)

- **Medical expenses: an important saving motive for retirees**
Resources for potentially large care needs late in life
- Median wealth would be 21% lower without medical expenses

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De Nardi, French, and Jones (2016)

- **Medicaid: valuable insurance against costly care**
Support for poorer retirees
Protection against catastrophic expenses for initially well-off retirees
For single retirees, compensation per \$1 of expected benefits lost:
More than \$1 in the lowest lifetime-income group; more than \$3 in the highest

Midlife Health and Later Life Economic Inequality

Russo, McGee, De Nardi, Borella, and Abram (2026)

- **How large is health inequality by race, ethnicity, and gender** from middle age onward?

Midlife Health and Later Life Economic Inequality

Russo, McGee, De Nardi, Borella, and Abram (2026)

- **How large is health inequality by race, ethnicity, and gender** from middle age onward?
- **How much do midlife health differences account for later-life inequality** in health and survival, disability and retirement benefits?

Both questions require good measurement

Health and Retirement Study: U.S. adults aged 51 and older
Interviews every two years; data from 1996–2018

- **Meaningful comparisons of health across people**
A common scale by race, ethnicity, and gender

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A common scale by race, ethnicity, and gender

- **A broad picture of health**

Diagnosed conditions and limitations in everyday activities

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Health and Retirement Study: U.S. adults aged 51 and older
Interviews every two years; data from 1996–2018

- **Meaningful comparisons of health across people**
A common scale by race, ethnicity, and gender
- **A broad picture of health**
Diagnosed conditions and limitations in everyday activities
- **Information about what happens next**
Following the same people to assess how well health predicts later outcomes

Two important ways of measuring health

- **Self-reported health: “How would you rate your general health?”**
 - Excellent
 - Very good
 - Good
 - Fair
 - Poor

Two important ways of measuring health

- **Self-reported health: “How would you rate your general health?”**
 - Excellent
 - Very good
 - Good
 - Fair
 - Poor
- **Frailty: the share of accumulated health deficits**

A measure developed in the medical literature

Deficit: specific health problem or limitation

Health deficits

Baseline Frailty

ADLs

Difficulty bathing
Difficulty dressing
Difficulty eating
Difficulty getting in/out of bed
Difficulty using the toilet
Difficulty walking across a room
Difficulty walking one block
Difficulty walking several blocks

IADLs

Difficulty grocery shopping
Difficulty making phone calls
Difficulty managing money
Difficulty preparing a hot meal
Difficulty taking medication
Difficulty using a map

Other Functional Limitations

Difficulty climbing one flight of stairs
Difficulty climbing several flights of stairs
Difficulty getting up from a chair
Difficulty kneeling or crouching

Difficulty lifting a weight heavier than 10 lbs
Difficulty lifting arms over the shoulders
Difficulty picking up a dime
Difficulty pulling/pushing large objects
Difficulty sitting for two hours

Diagnoses

Diagnosed with high blood pressure
Diagnosed with diabetes
Diagnosed with cancer
Diagnosed with lung disease
Diagnosed with a heart condition
Diagnosed with a stroke
Diagnosed with psychological or psychiatric problems
Diagnosed with arthritis

Healthcare Utilization

Has stayed in the hospital in the previous two years
Has stayed in a nursing home in the previous two years

Addictive Diseases

Has BMI larger than 30
Has ever smoked cigarettes

► More deficits

Frailty: the share of health deficits

- **Summarize the 35 deficits in one index**

Each deficit: 1 if present, 0 if absent

Equal weight for each observed indicator

Frailty: the share of health deficits

- **Summarize the 35 deficits in one index**

Each deficit: 1 if present, 0 if absent

Equal weight for each observed indicator

- **Count the share of deficits present**

$$\text{Frailty} = \frac{\text{Number of health deficits}}{\text{Number of indicators observed}}$$

- **Higher frailty means more health problems**

What is a good measure of health?

- **Compare health measure's predictive power for key future outcomes**

Use current health to predict disability benefits, retirement benefits, and death two years later

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Use current health to predict disability benefits, retirement benefits, and death two years later

- **Frailty performs better overall**

Better fit for disability benefits and death in all six demographic groups

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Use current health to predict disability benefits, retirement benefits, and death two years later

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Better fit for disability benefits and death in all six demographic groups

- **More elaborate frailty measures add little**

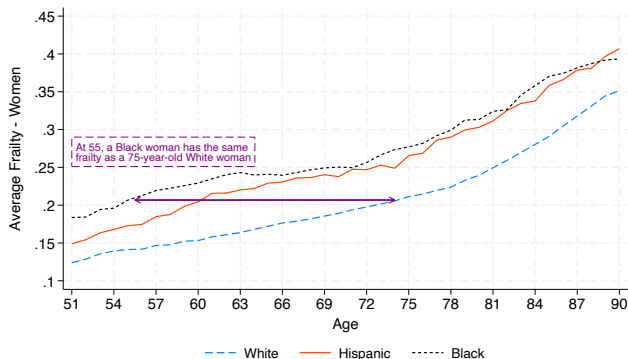
Adding deficits or estimating different weights yields limited gains

► Benefit receipt

► Survival

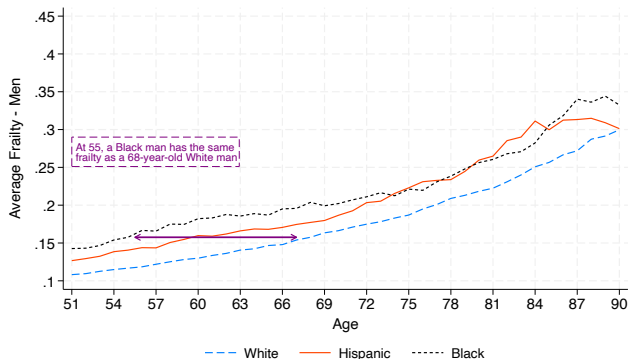
► Robustness

Large frailty disparities by age 55: women



Black women at **55**: average frailty of White women at **75**
Large gaps in biological age, much larger than in life expectancy

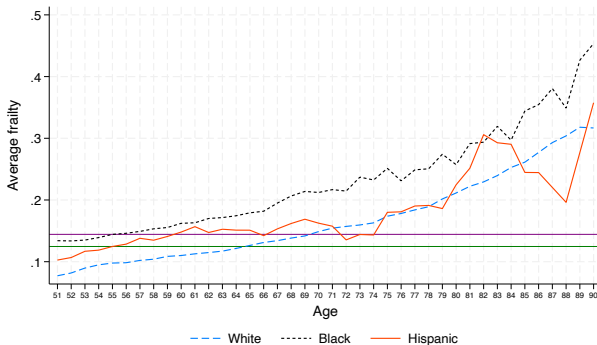
Large health disparities by age 55: men



Black men at **55**: average frailty of White men at **68**
Large gaps in biological age, much larger than in life expectancy

Health gaps persist within education groups

College-educated women



Black–White differences remain substantial

► Women by education

► Men by education

How important is health for future outcomes?

- **Estimate survival and changes in health**

Dependence on previous health and personal characteristics

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- **Estimate disability and retirement benefit receipt**

Dependence on current health, personal characteristics, and previous benefit receipt

How important is health for future outcomes?

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Dependence on previous health and personal characteristics

- **Estimate disability and retirement benefit receipt**

Dependence on current health, personal characteristics, and previous benefit receipt

- **Simulate people's remaining lives from age 55**

Update survival, health, and benefit receipt every two years

Calculate life expectancy and years in poor health or receiving benefits

Personal characteristics: age, race, ethnicity, sex, education, insurance, and marital status

► Simulation details

What if health were equalized at age 55?

- **Baseline: observed starting points**

Simulate remaining lives from each group's initial characteristics

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- **Counterfactual: the same initial health distribution**

Assign Black and Hispanic people the White health distribution at age 55, separately for men and women

What if health were equalized at age 55?

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Simulate remaining lives from each group's initial characteristics

- **Counterfactual: the same initial health distribution**

Assign Black and Hispanic people the White health distribution at age 55, separately for men and women

- **Compare the two sets of simulated lives**

Keep other initial characteristics and the estimated subsequent relationships unchanged

Longer lives, better health, and less disability

Black Americans after age 55: baseline → white initial health

	Men	Women
Remaining years of life	23.1 → 23.9	27.6 → 28.8
Share of life in poor or fair health	50.1% → 44.7%	65.1% → 56.6%
Years receiving disability benefits	1.6 → 1.3	1.5 → 1.1

- Longer lives also bring more years receiving retirement benefits

▸ Life expectancy

▸ Poor/fair health

▸ Disability

▸ Retirement

How much of the Black–White gap closes?

Share of each baseline gap closed by equalizing health at age 55

Outcome after 55	Men	Women
Remaining life expectancy	29%	46%
Share of life in poor or fair health	54%	64%
Years receiving disability benefits	43%	57%
Years receiving retirement benefits	28%	44%

Which differences at age 55 matter most?

Equalize health or jointly equalize education, insurance, and marital status

Outcome	Results for Black men and women
Life expectancy	Similar effects
Share of life in poor or fair health	Health more important
Years receiving disability benefits	Health more important
Years receiving retirement benefits	Similar effects

► Life expectancy

► Poor/fair health

► Disability

► Retirement

What do we learn from this paper?

- **Health inequality is already large in middle age**
Large racial and ethnic gaps at 55; Black–White differences persist within education groups

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- **Health inequality is already large in middle age**
Large racial and ethnic gaps at 55; Black–White differences persist within education groups
- **Midlife health accounts for substantial later-life inequality**
Large reductions in Black–White gaps in health, survival, and benefit receipt

What have we learned about health and economic inequality?

- **Health and its evolution are very unequally distributed**

Health inequality already present earlier on

Differences in illness risk, deterioration, and survival throughout life

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Differences in illness risk, deterioration, and survival throughout life

- **The costs are large and extend beyond medical bills**

Include lost earnings, lower-quality life, and shorter lives

Measurement and models help quantify the lifetime consequences

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Measurement and models help quantify the lifetime consequences

- **Household responses and public insurance matter**

Saving in anticipation of costly care helps

Valuable Medicaid protection for poorer and initially well-off retirees

What remains to be learned?

- **How can we improve health?**

Which interventions, for whom, at what ages, and at what cost?

How do we effectively incentivize health investments?

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- **How can we improve health?**

Which interventions, for whom, at what ages, and at what cost?

How do we effectively incentivize health investments?

- **How should we protect people against its economic consequences?**

Insurance design and households' work, saving, and care decisions

Effects on spending across public programs and on tax revenues

What remains to be learned?

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Which interventions, for whom, at what ages, and at what cost?

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Insurance design and households' work, saving, and care decisions

Effects on spending across public programs and on tax revenues

Health, economic opportunity, and public finances are closely connected

▸ Backup slides

▸ References

Supplementary material

- **Health types**

Frailty trajectories by type

- **Measurement**

Expanded deficit table, predictive fit, and robustness checks

- **Health inequality**

Comparisons within education groups for women and men

- **Counterfactuals**

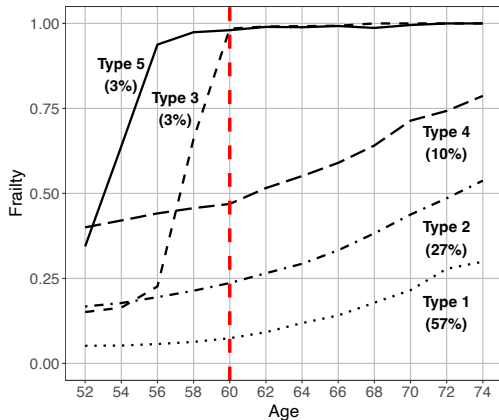
Simulation assumptions and detailed results for both experiments

Health types follow different trajectories

Borella, Bullano, De Nardi, Krueger, and Manresa (2025)

Five health types

1. Vigorous resilient
2. Fair-health resilient
3. Fair-health vulnerable
4. Frail resilient
5. Frail vulnerable



Frailty: share of health deficits
Assigned 1 after death

Red line: end of the period used to
identify types

Baseline and expanded health deficits

	Baseline Frailty	Augmented Frailty
<i>ADLs</i>	Difficulty lifting a weight heavier than 10 lbs	Pain
Difficulty bathing	Difficulty lifting arms over the shoulders	Frequently troubled by pain
Difficulty dressing	Difficulty picking up a dime	
Difficulty eating	Difficulty pulling/pushing large objects	Mental health
Difficulty getting in/out of bed	Difficulty sitting for two hours	Felt depressed
Difficulty using the toilet		Felt like everything was an effort
Difficulty walking across a room	<i>Diagnoses</i>	Had restless sleep
Difficulty walking one block	Diagnosed with high blood pressure	Did not feel happy most of the time
Difficulty walking several blocks	Diagnosed with diabetes	Felt alone
	Diagnosed with cancer	Felt sad
<i>IADLs</i>	Diagnosed with lung disease	Could not get going
Difficulty grocery shopping	Diagnosed with a heart condition	Did not enjoy life
Difficulty making phone calls	Diagnosed with a stroke	
Difficulty managing money	Diagnosed with psychological or psychiatric problems	Cognition
Difficulty preparing a hot meal	Diagnosed with arthritis	Gets lost in familiar environment
Difficulty taking medication		Wanders off
Difficulty using a map	<i>Healthcare Utilization</i>	Cannot be left alone
	Has stayed in the hospital in the previous two years	Has hallucinations
<i>Other Functional Limitations</i>	Has stayed in a nursing home in the previous two years	Cannot count backwards from 20
Difficulty climbing one flight of stairs	<i>Addictive Diseases</i>	Harmful habits
Difficulty climbing several flights of stairs	Has BMI larger than 30	Smokes now
Difficulty getting up from a chair	Has ever smoked cigarettes	Heavy alcohol use
Difficulty kneeling or crouching		

Predictive fit: benefit receipt

McFadden's pseudo- R^2 in next-wave outcome models

Disability receipt

Health measure	W women	H women	B women	W men	H men	B men
Basic Controls	0.048	0.046	0.036	0.045	0.022	0.032
SRHS	0.212	0.122	0.129	0.186	0.112	0.122
Frailty	0.244	0.193	0.185	0.245	0.222	0.175
Frailty and SRHS	0.268	0.202	0.199	0.264	0.241	0.196

Retirement claiming

Health measure	W women	H women	B women	W men	H men	B men
Basic Controls	0.118	0.081	0.083	0.134	0.101	0.120
SRHS	0.128	0.110	0.102	0.140	0.128	0.126
Frailty	0.126	0.091	0.097	0.142	0.112	0.139
Frailty and SRHS	0.132	0.123	0.114	0.147	0.145	0.145

Predictive fit: survival

McFadden's pseudo- R^2 in next-wave mortality models

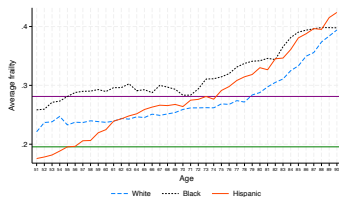
Health measure	W women	H women	B women	W men	H men	B men
Basic Controls	0.166	0.157	0.120	0.140	0.157	0.109
SRHS	0.240	0.194	0.169	0.219	0.212	0.151
Frailty	0.266	0.221	0.189	0.237	0.244	0.176
Frailty and SRHS	0.276	0.230	0.201	0.251	0.253	0.182

Alternative health measures and reporting differences

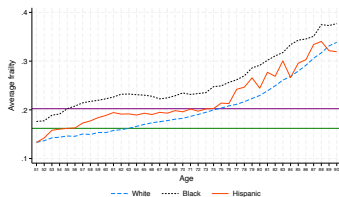
- Expand the measure to 51 deficits, including pain, cognition, and mental health
- Compare equal weights with weights based on principal components
- Exclude diagnoses to examine sensitivity to differences in access and diagnosis
- Baseline frailty performs well overall, with some variation across outcomes

Frailty by education: women

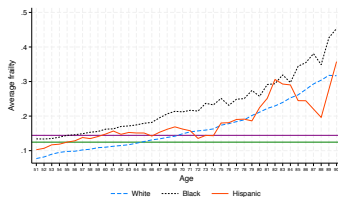
Less than high school



High school



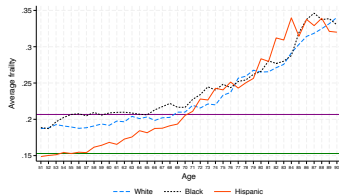
College



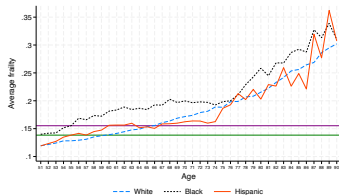
Black–White frailty gaps persist within each education group

Frailty by education: men

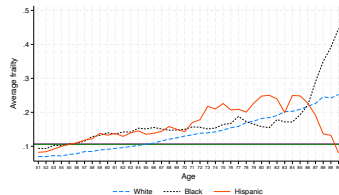
Less than high school



High school



College



Black-White frailty gaps persist within each education group

Simulation implementation

- Initial observations come from ages 53–57, with simulated lives starting at 55
- Frailty is grouped into five categories using quintile cutoffs
- Education and marital status remain fixed during the simulation
- Insurance remains fixed except for modeled Medicare transitions
- Disability benefits convert to retirement benefits at full retirement age

Observed states and persistent health differences

- The model assumes the observed state summarizes relevant prior history
- Different underlying decision models can generate the same transition laws
- Persistent unobserved types can complicate the interpretation of changing health alone
- A particular treatment, welfare effect, or optimal policy requires additional structure

Remaining life expectancy: both experiments

	Group	Baseline	Health	Socioeconomic
Men	White	25.9	25.9	25.9
	Hispanic	27.2	27.6	28.0
	Black	23.1	23.9	24.0
Women	White	30.2	30.2	30.2
	Hispanic	31.8	32.4	32.6
	Black	27.6	28.8	28.7

Years after 55

Health: White initial frailty distribution

Socioeconomic: White initial education, insurance, and marital status distributions

[◀ Back to outcomes](#)

[◀ Back to comparison](#)

Life in poor or fair health: both experiments

	Group	Baseline	Health	Socioeconomic
Men	White	40.1	40.1	40.1
	Hispanic	48.3	46.1	45.2
	Black	50.1	44.7	49.0
Women	White	51.8	51.8	51.8
	Hispanic	61.7	57.7	58.7
	Black	65.1	56.6	64.4

Percent of remaining life

Health: White initial frailty distribution

Socioeconomic: White initial education, insurance, and marital status distributions

[◀ Back to outcomes](#)

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Disability benefit receipt: both experiments

	Group	Baseline	Health	Socioeconomic
Men	White	0.9	0.9	0.9
	Hispanic	0.9	0.7	0.9
	Black	1.6	1.3	1.5
Women	White	0.8	0.8	0.8
	Hispanic	0.7	0.5	0.7
	Black	1.5	1.1	1.4

Years after 55

Health: White initial frailty distribution

Socioeconomic: White initial education, insurance, and marital status distributions

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Years without either benefit: both experiments

	Group	Baseline	Health	Socioeconomic
Men	White	8.0	8.0	8.0
	Hispanic	8.1	8.4	8.6
	Black	7.0	7.5	7.4
Women	White	8.0	8.0	8.0
	Hispanic	8.3	8.5	8.7
	Black	7.2	7.8	7.5

Years after 55

Health: White initial frailty distribution

Socioeconomic: White initial education, insurance, and marital status distributions

Retirement benefit receipt: both experiments

	Group	Baseline	Health	Socioeconomic
Men	White	17.2	17.2	17.2
	Hispanic	18.3	18.6	18.6
	Black	14.7	15.4	15.3
Women	White	21.5	21.5	21.5
	Hispanic	22.9	23.5	23.3
	Black	19.0	20.1	19.9

Years after 55

Health: White initial frailty distribution

Socioeconomic: White initial education, insurance, and marital status distributions

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