Unhealthy Longevity in the United States

A Study of Mortality by Health Status

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MORTALITY & LONGEVITY STRATEGIC RESEARCH PROGRAM STEERING COMMITTEE

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INTRODUCTION

Introduction

- Research conducted by Natalia Gavrilova and Leonid Gavrilov, University of Chicago
- Quantifying the differences in mortality and disease prevalence by health status
- CDC's National Health Interview Survey (NHIS) 2010 -2021
- Five definitions of unhealthy status
  - The first two are broad
    - (1) poor or fair self-rated health (SRH), and
    - (2) Frailty Index (FI) values equal to or higher than 0.2 (FI>=0.2); FI based on 64 health conditions
  - The three specific definitions include
    - (1) mental conditions,
    - (2) disability or activity limitations, and
    - (3) presence of chronic disease (based on a list of nine diseases)
  - A "healthy" group also studied for comparison
- Output is period life tables by unhealthy status, sex, age

Introduction: Construction of period life mortality tables

- Unhealthy longevity in this project was analyzed by construction of cross-sectional or period life tables. Construction of period life tables is a standard way of presenting mortality data in demography. With this approach, period life tables and life expectancies in this report were calculated in a manner different from that with which some actuaries are accustomed. Period life tables show survival of hypothetical rather than real birth cohorts. Life expectancy of a hypothetical birth cohort shows the average number of years a baby born in a particular population can be expected to live if it experiences the current age-specific mortality rates of that particular population throughout its life. It does not reflect the expectations of life for a real cohort of individuals at a given age.
- A period life table is the most effective way of summarizing mortality experience of a population and can also be used to make statistical inferences and comparisons between mortality experience of different populations.

Introduction: Construction of period life mortality tables cont'd

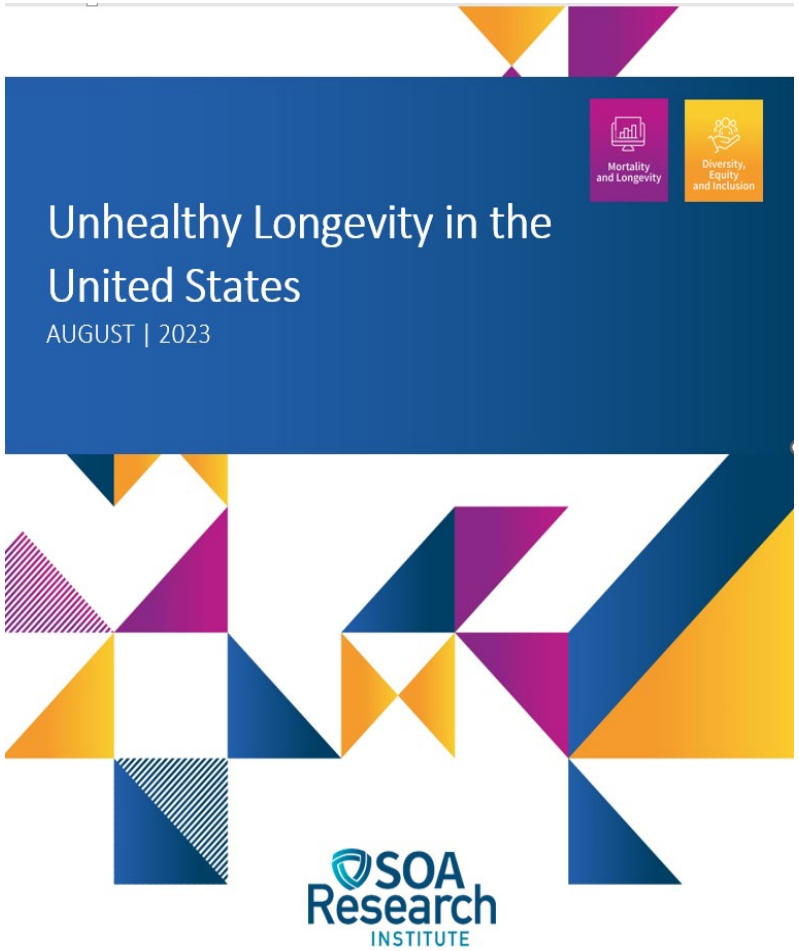
- It is important to note period life tables have certain limitations in the current application because *they do not take into account possible transitions between the studied healthy and unhealthy statuses*. The calculations assume all initially healthy persons are exposed to the mortality schedules only for healthy persons, and all initially unhealthy persons are exposed to the mortality schedules only for unhealthy persons for all ages and durations. In actuality, substantial changes in group membership occur over time with the predominant direction of change being from healthy to unhealthy. The NHIS data do not permit us to study such transitions. Thus, it is important in interpreting the results to remember such transitions are not included in the calculations.

Introduction: Report

- Much Analysis in the Report
  - LE 45 is included in the report as changes in LE for unhealthy groups between 2010-2014 and 2015-2018 were very small. No differences moving from age 45 to age 65

- Available on SOA Website:

  https://www.soa.org/resources/research-reports/2023/unhealthy-longevity-us/



KEY TAKEAWAYS

Key Takeaway: Mental Conditions Worse LE45

- At age 45 mental conditions group had worse LE than disability and chronic disease groups

Group Male	LE45	2010–2014 Standard Error	95% Confidence Interval	LE45	2015–2018 Standard Error	95% Confidence Interval
No memory impairments	36.37	0.58	35.24–37.50	35.34	0.54	34.29–36.39
Memory impairments	19.31	1.30	16.76–21.85	20.85	1.57	17.78–23.91
No disability	45.55	1.85	41.92–49.18	43.20	1.33	36.15–41.39
Disability	23.55	0.73	22.11–24.99	22.86	0.86	21.18–24.54
No chronic diseases	42.90	1.99	39.00–46.80	39.76	1.26	37.28–42.24
Chronic diseases	31.25	0.56	30.15–32.36	30.64	0.61	29.45–31.83

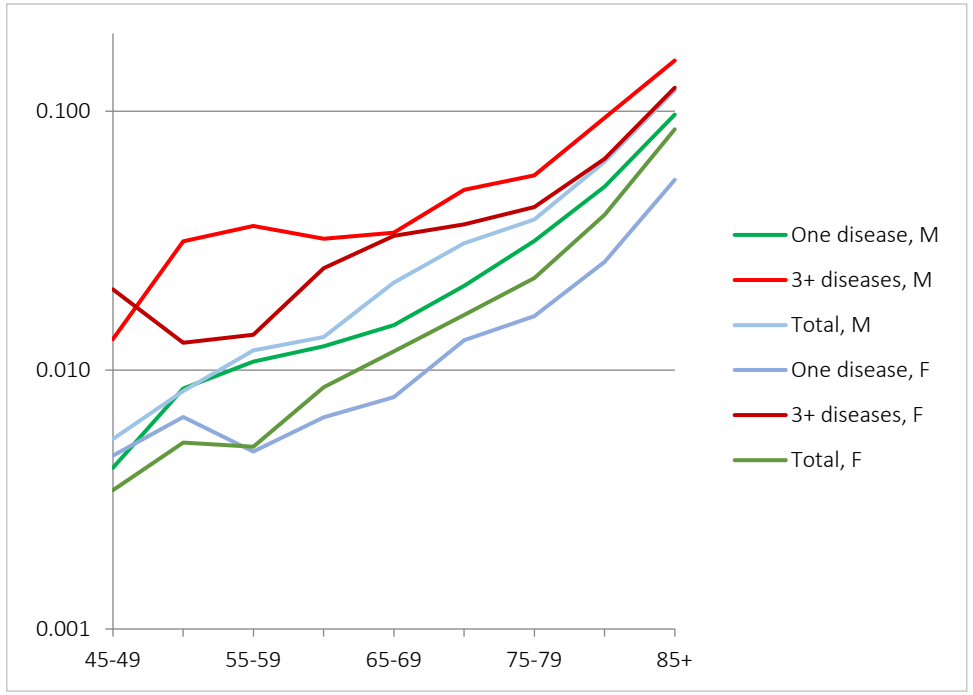
Group Female	LE45	2010–2014 Standard Error	95% Confidence Interval	LE45	2015–2018 Standard Error	95% Confidence Interval
No memory impairments	44.59	0.83	42.97–46.22	44.11	0.82	42.51–45.70
Memory impairments	24.82	1.39	22.09–27.55	25.49	1.77	22.02–28.97
No disability	59.81	3.66	52.64–66.98	56.19	2.95	50.42–61.96
Disability	30.83	0.80	29.27–32.39	30.66	0.91	28.88–32.44
No chronic diseases	48.43	1.86	44.79–52.08	44.76	1.40	42.00–47.51
Chronic diseases	38.37	0.63	37.13–39.61	38.85	0.73	37.41–40.29

Key Takeaway: Worse Mortality with More Chronic Disease

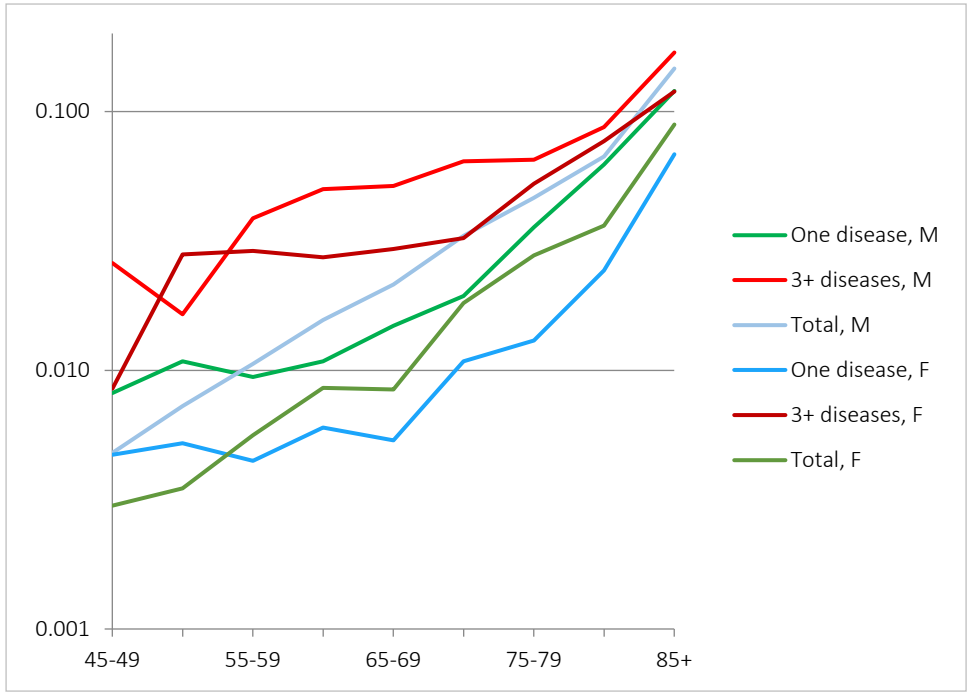
- Persons with three or more chronic diseases had significant increase in mortality versus persons with one or two chronic diseases

Age-specific mortality in Log Scale for males and females in 2010-2018 by number of chronic diseases

2010-2014



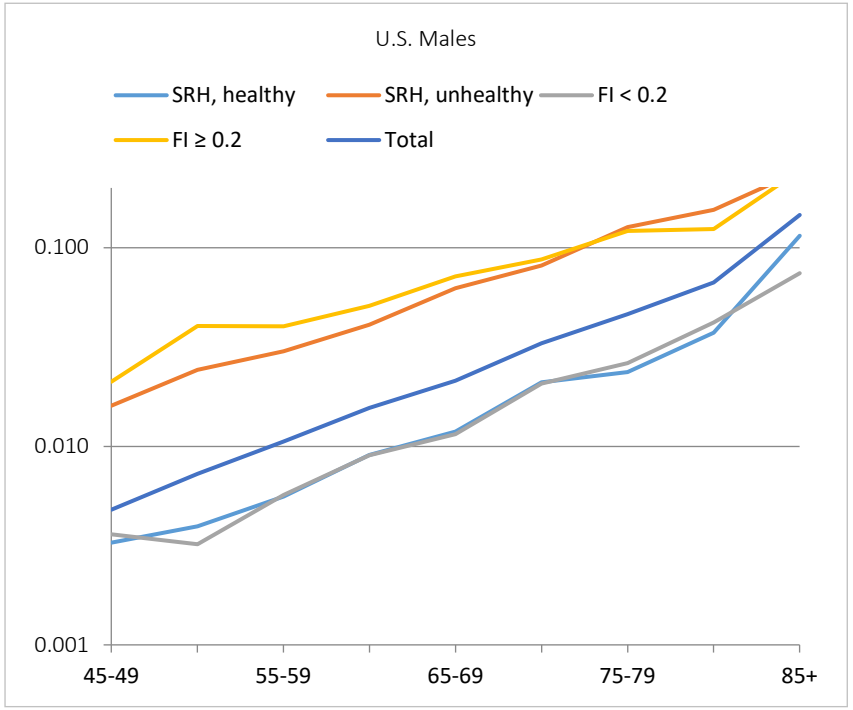
2015-2018

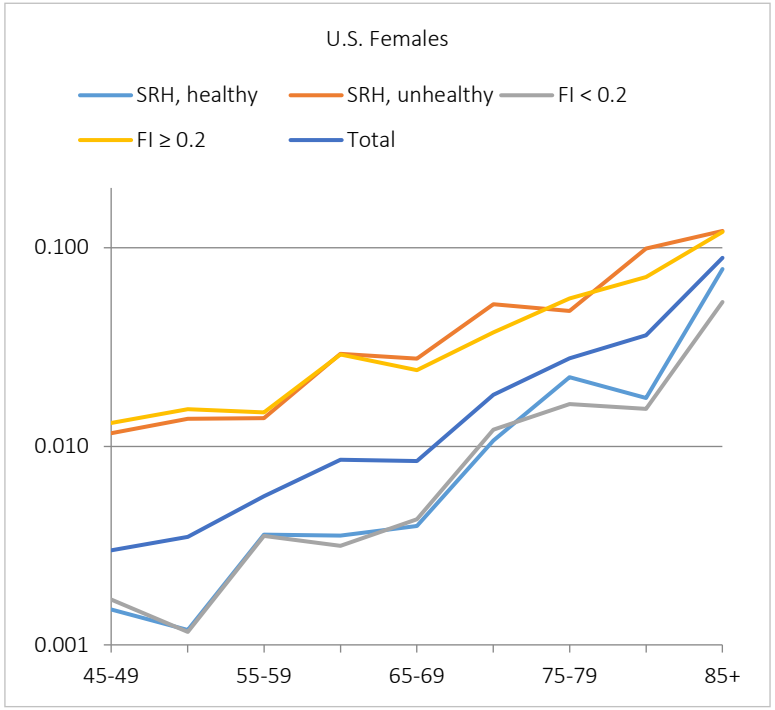


Key Takeaway: SRH Just As Good As FI

- The simple SRH definition compared to FI definition based on 64 health conditions produced virtually the same trajectory of age-specific mortality

Age-specific mortality in Log Scale for males and females in 2015-2018 according to different definitions of health:
(1) SRH and (2) FI with cutoff equal to 0.2





Key Takeaway: Worse Mortality For Unhealthy

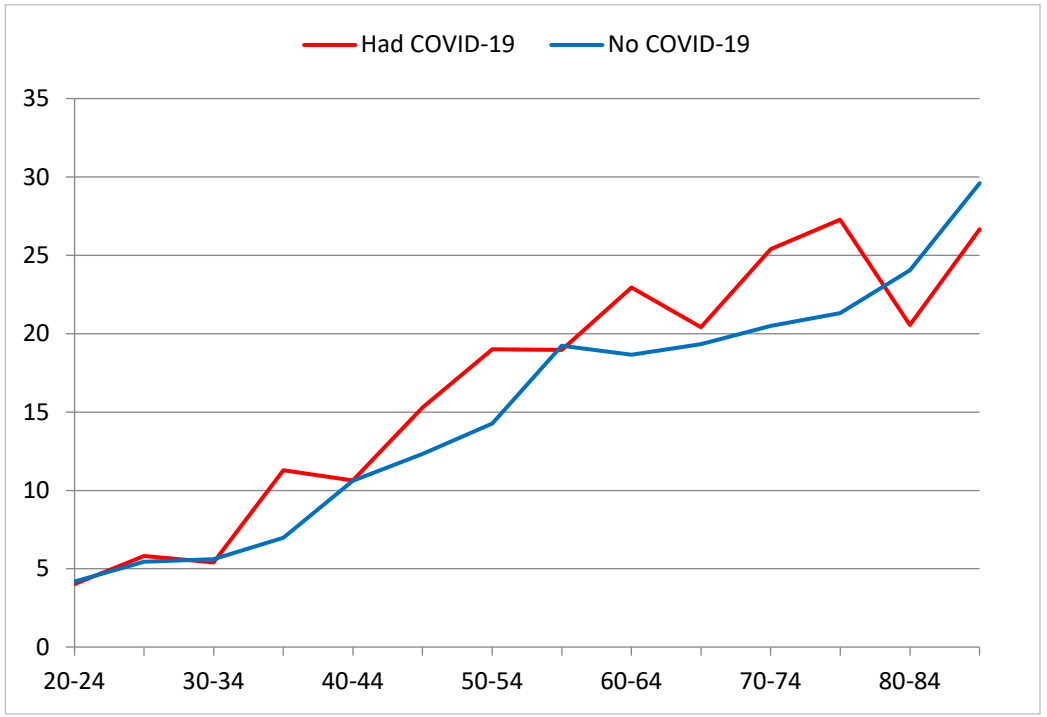
- As would be expected, unhealthy groups exhibited worse mortality compared to healthy groups regardless of the definition

Key Takeaway: COVID-19

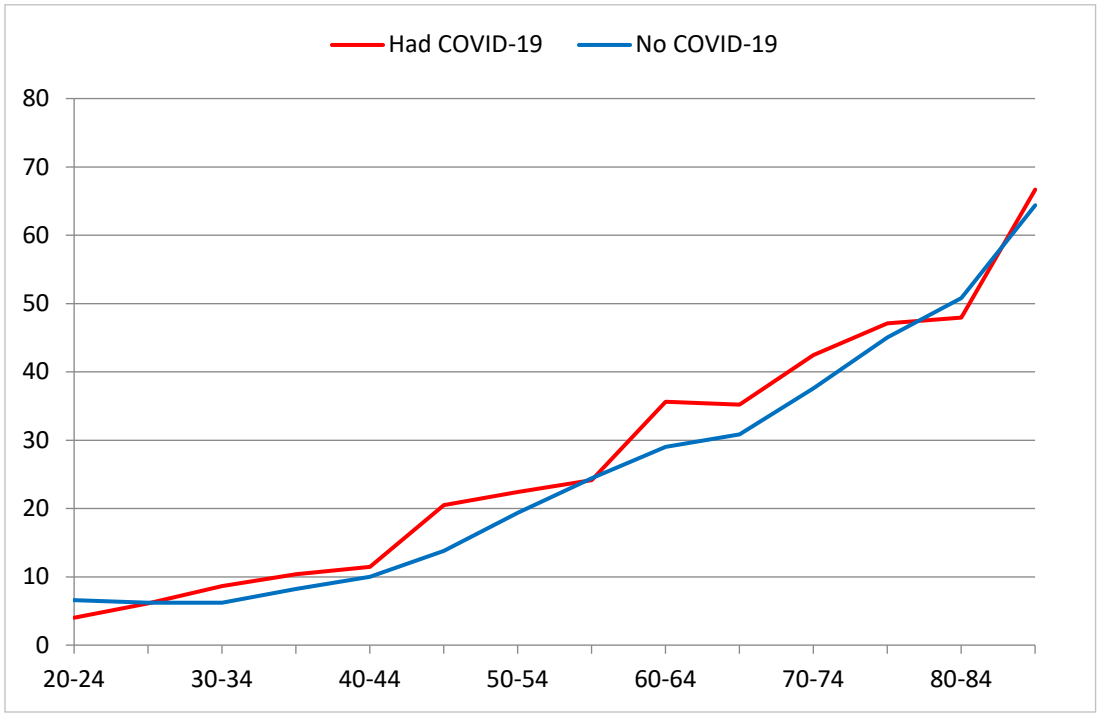
- Persons reporting having had COVID-19 found a higher prevalence of poor health than persons reporting never had COVID-19

Proportion of respondents who are unhealthy (2021 NHIS)

With Fair or Poor SRH



With FI≥0.2



Key Takeaway: COVID-19

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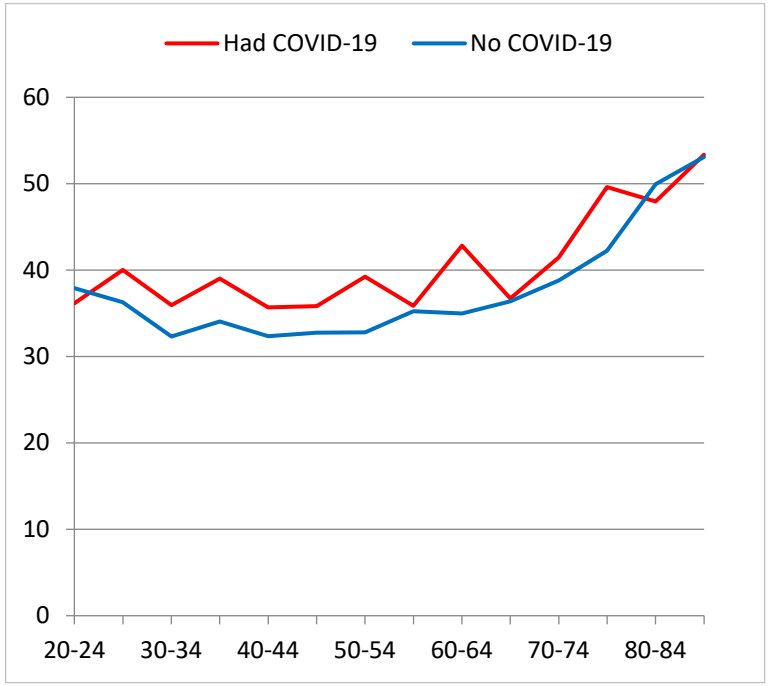
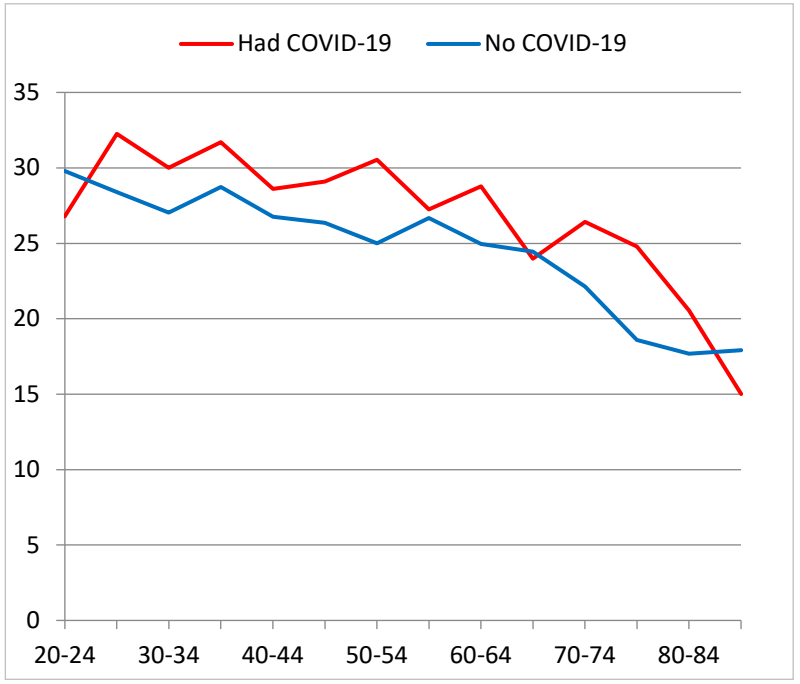
Proportion of respondents who are unhealthy (2021 NHIS)

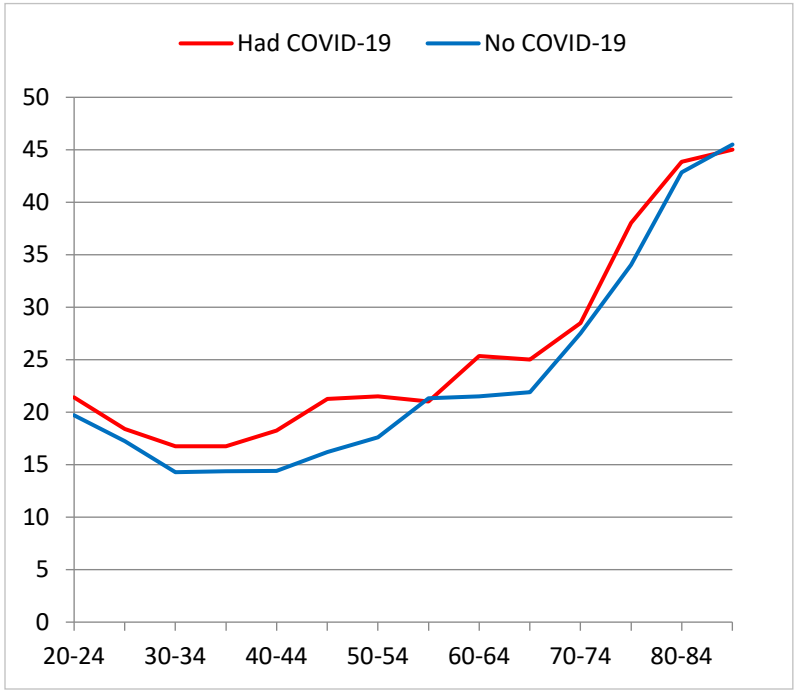
With Mental Conditions



With Mental Conditions (anxiety/depression)



With Memory Impairments



Key Takeaway: COVID-19

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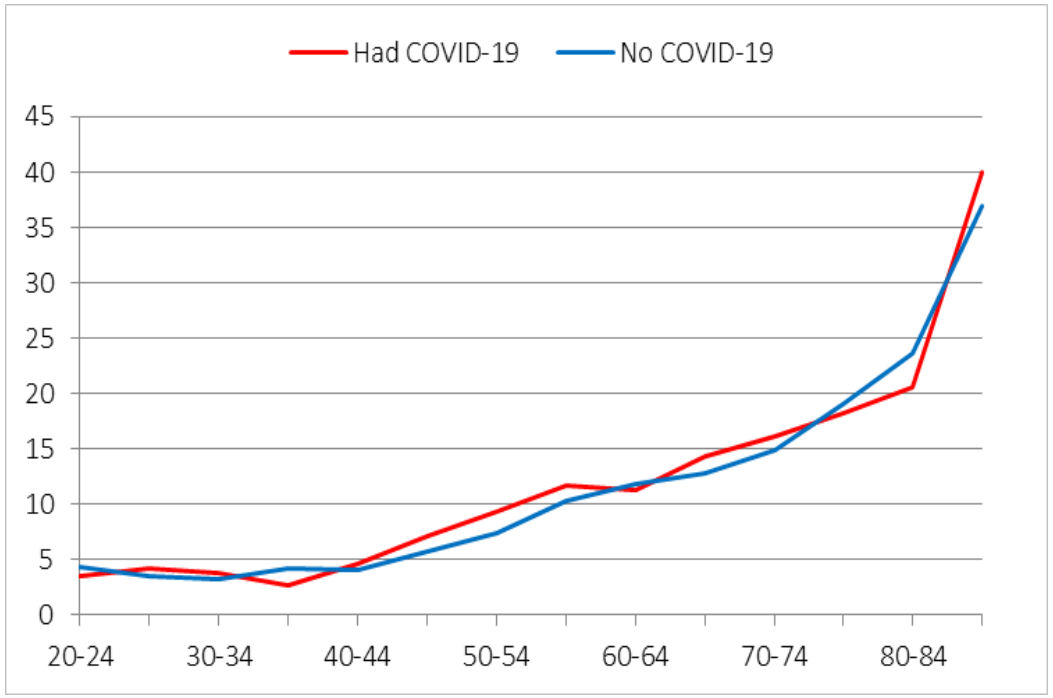
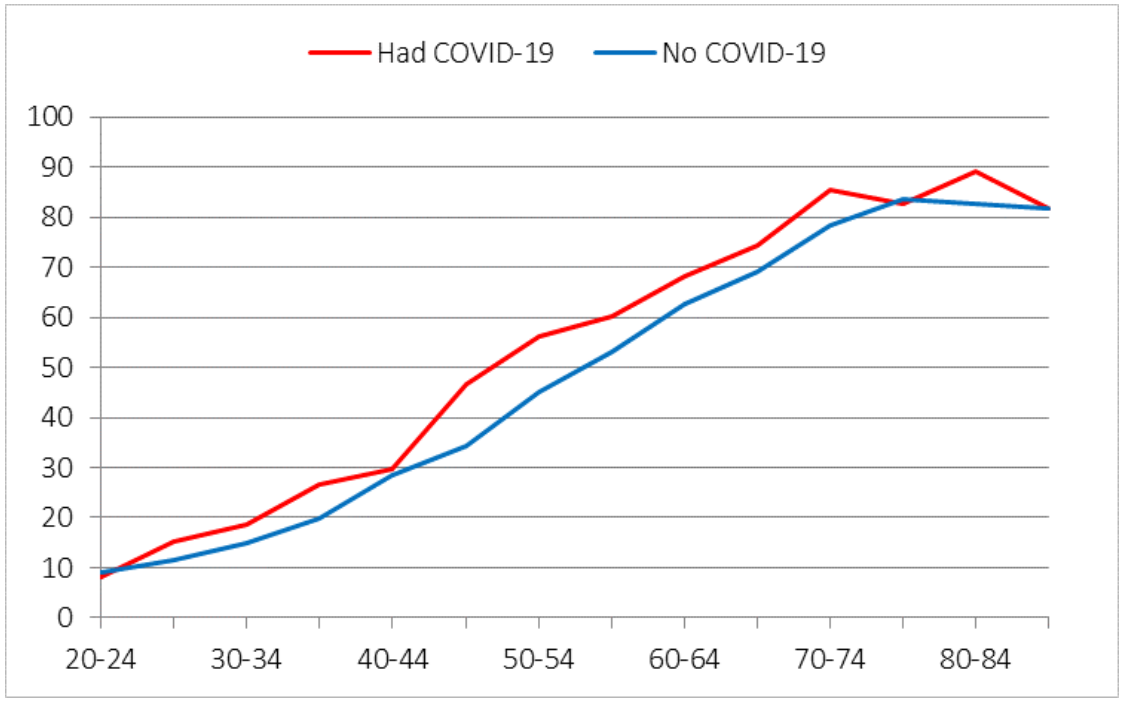
Proportion of respondents with unhealthy conditions (2021 NHIS)

With Disability



With Chronic Disease

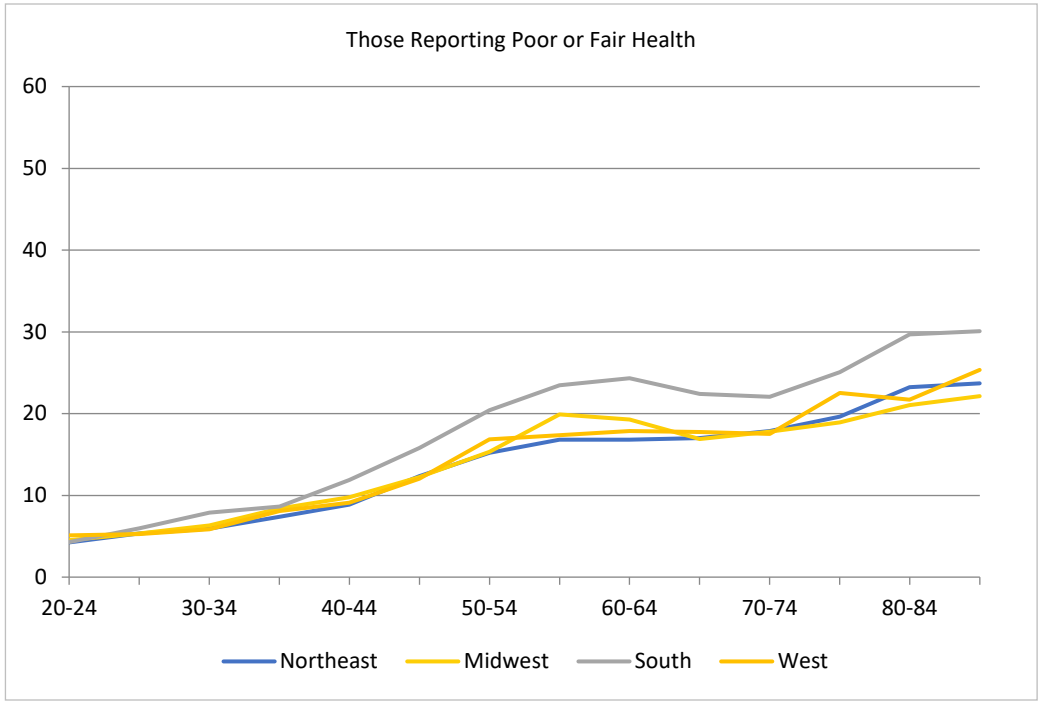


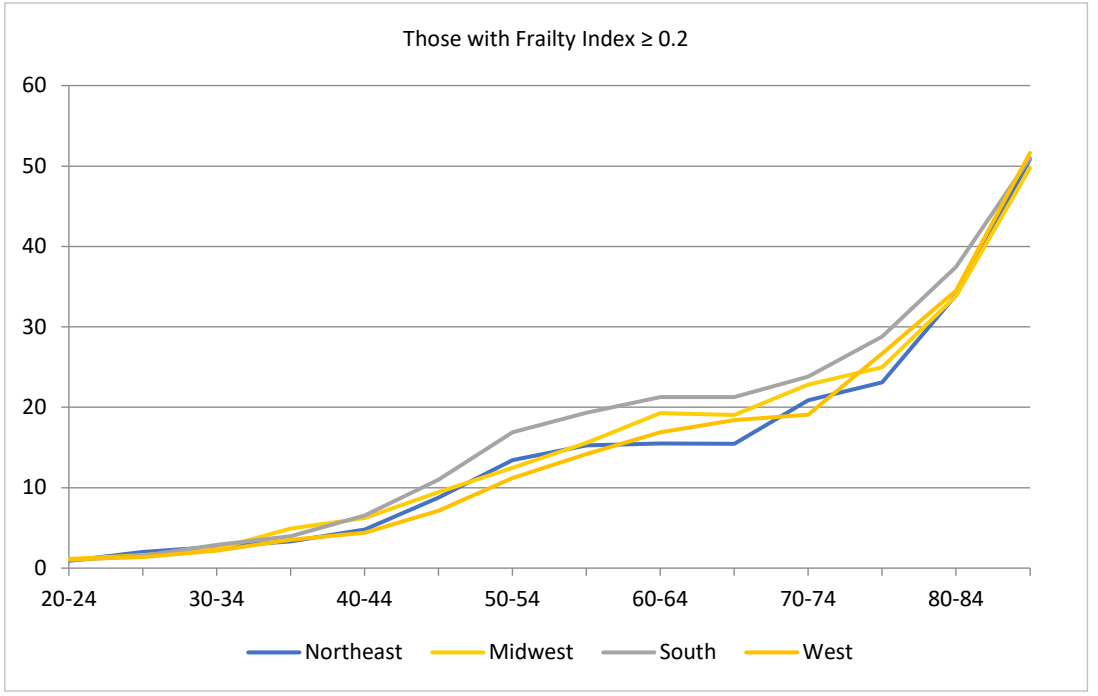
OTHER ANALYSIS

Other Analysis: Region

- Prevalence of unhealthy status by region: general definition SRH and FI

Percent of persons reporting poor or fair health and frailty as a function of age by region based on 2015-2018 NHIS sample



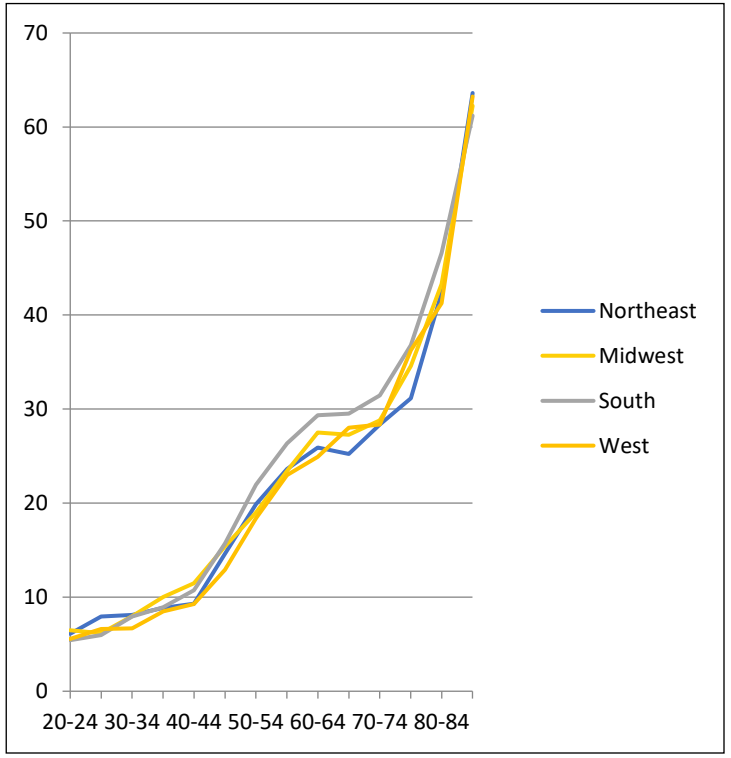


Other Analysis: Region

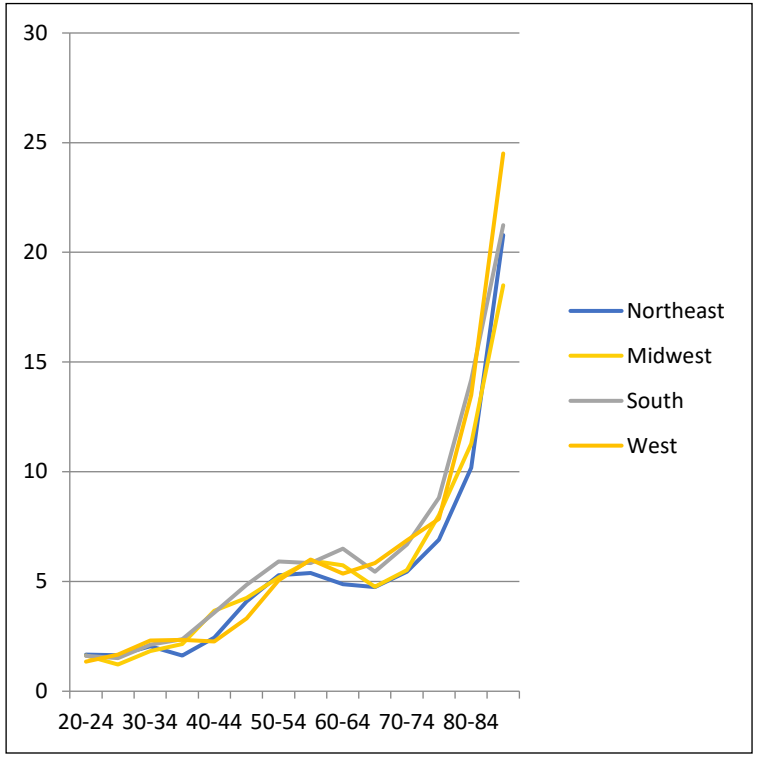
- Prevalence of unhealthy status by region: specific definition

Percent of persons reporting unhealthy status as a function of age by region based on 2015-2018 NHIS sample

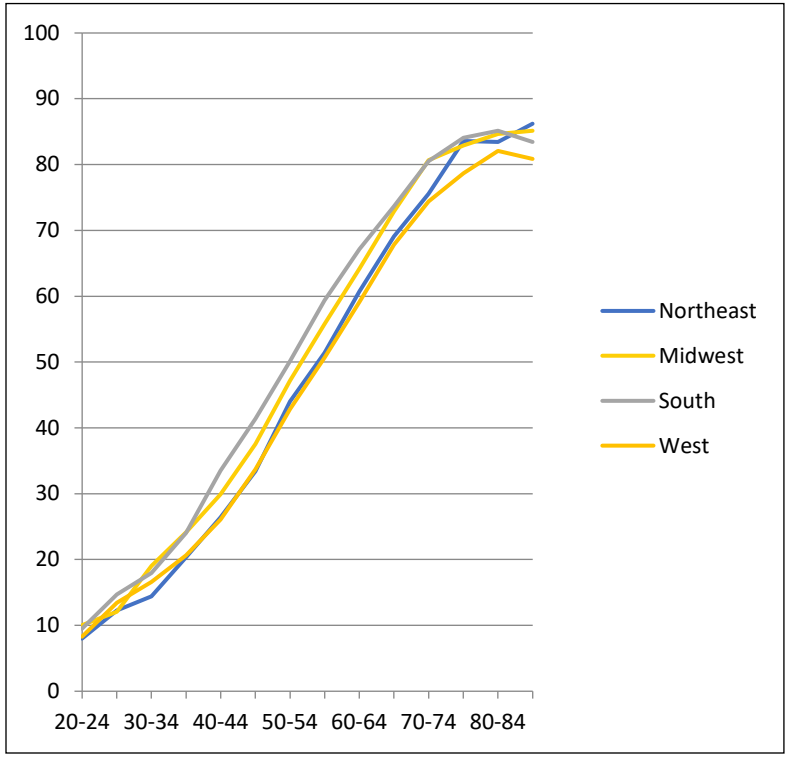
Disability



Mental Conditions



Chronic Disease



Other Analysis: Cause of Death

- 2015-2018 data only for SRH difference in LE between healthy and unhealthy groups is 18 years
  - Deaths due to cancer (5 yrs) and CVD (4 yrs) combined represent half of excess mortality at age 45
- 2015-2018 data difference in LE between disabled and not disabled groups is 23 years
  - Deaths due to CVD (6 yrs) contributes slightly more than cancer (5) yrs

Other Analysis: Race

- 2015-2018 data poor health status by race almost always higher prevalence for Black/African-American population than white population for all studied definitions of health

QUESTIONS?