

# Putting the pieces together: why frailty and social context matter when it comes to dementia

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ASC/CCNA Webinar  
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CCNA  
Canadian Consortium  
on Neurodegeneration  
in Aging



CCNV  
Consortium canadien en  
neurodégénérescence  
associée au vieillissement



GERIATRIC MEDICINE  
RESEARCH

*Team 14: How multi-morbidity modifies the risk of dementia and the patterns of disease expression*

# Disclosures

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- Research on dementia in relation to frailty is funded through the CCNA by CIHR and partner organizations
- Research grants from Sanofi, GSK, Pfizer, Canadian Frailty Network for studies on frailty in relation to vaccine preventable illnesses
- Honoraria from Sanofi, Pfizer, Seqirus for advisory activities on vaccination for older adults

# Key points

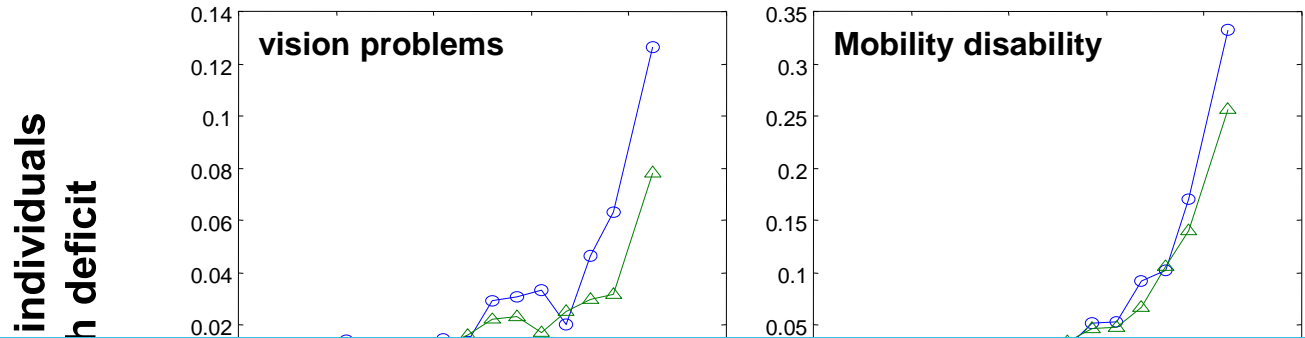
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- Frailty is not a single problem. Frail older adults have many things wrong at once.
- Social circumstances are particularly important for older people who are frail and/or who live with dementia (and the lack of supports is particularly problematic)
- Women tend to have higher frailty and social vulnerability than men, and women also experience more dementia (AD in particular) than men
- Frailty increases dementia expression for any given level of brain pathology
- Medication use and polypharmacy are important
- Preventing delirium and hospitalization is important
- Frailty impacts all aspects of dementia management

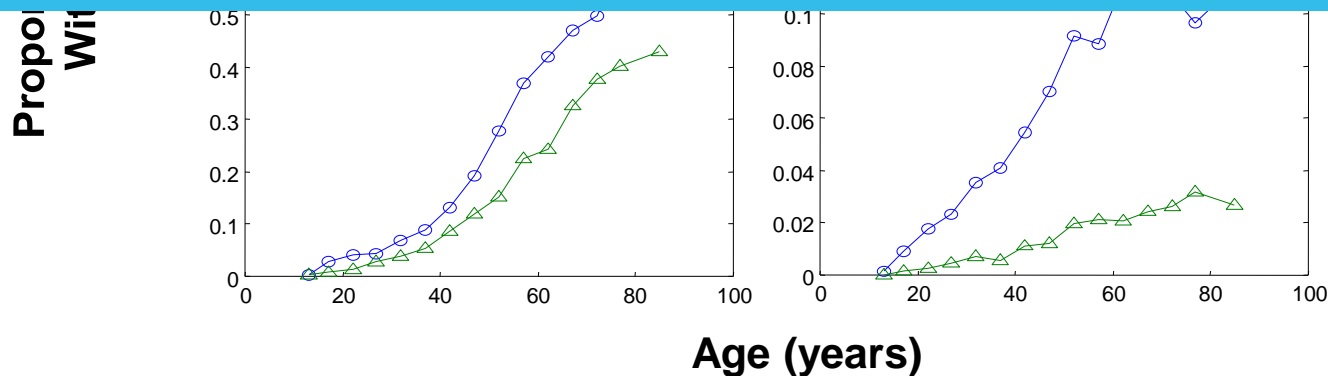


# With age, most health issues become more common.

(Canadian National Population Health Survey, n= 66,580)



The problems of old age come as a package  
- Fontana *et al.* Nature 2014

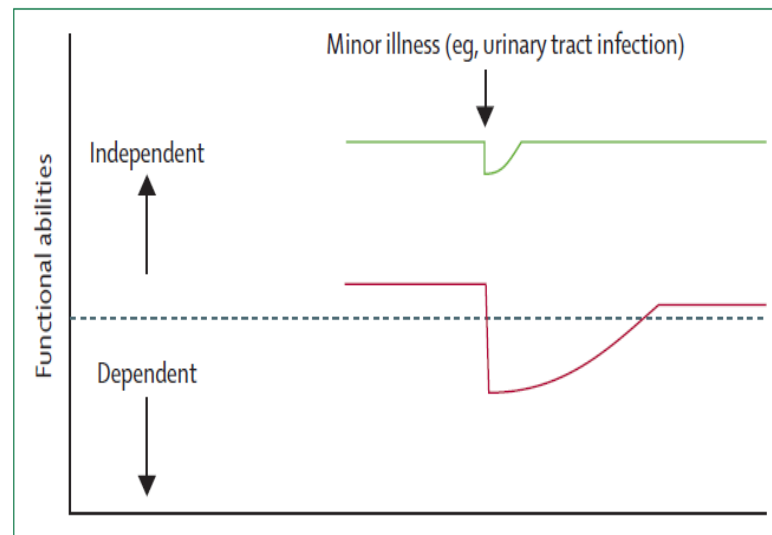




# What is Frailty?

Clegg et al., The Lancet, 2013

Frailty is a state of increased vulnerability to poor resolution of homeostasis after a stressor event, which increases the risk of adverse outcomes.



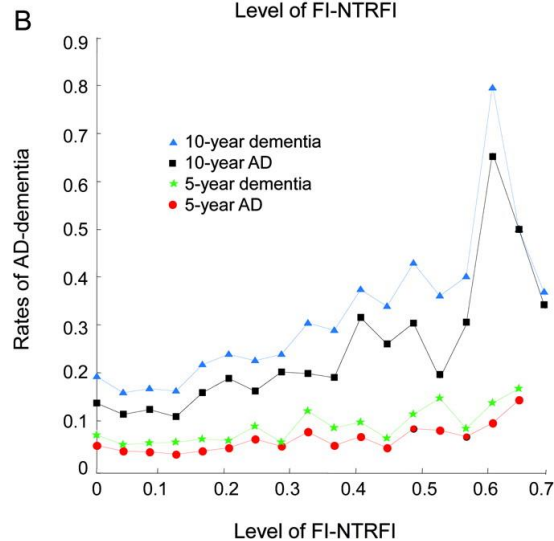
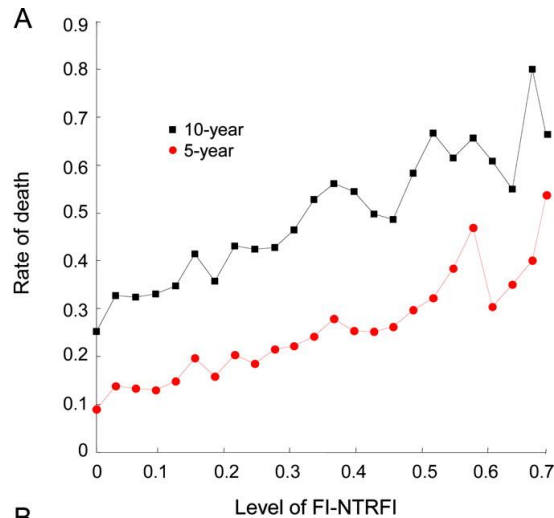
**Figure 1:** Vulnerability of frail elderly people to a sudden change in health status after a minor illness





# Having many things wrong is, in itself, strongly associated with dementia risk

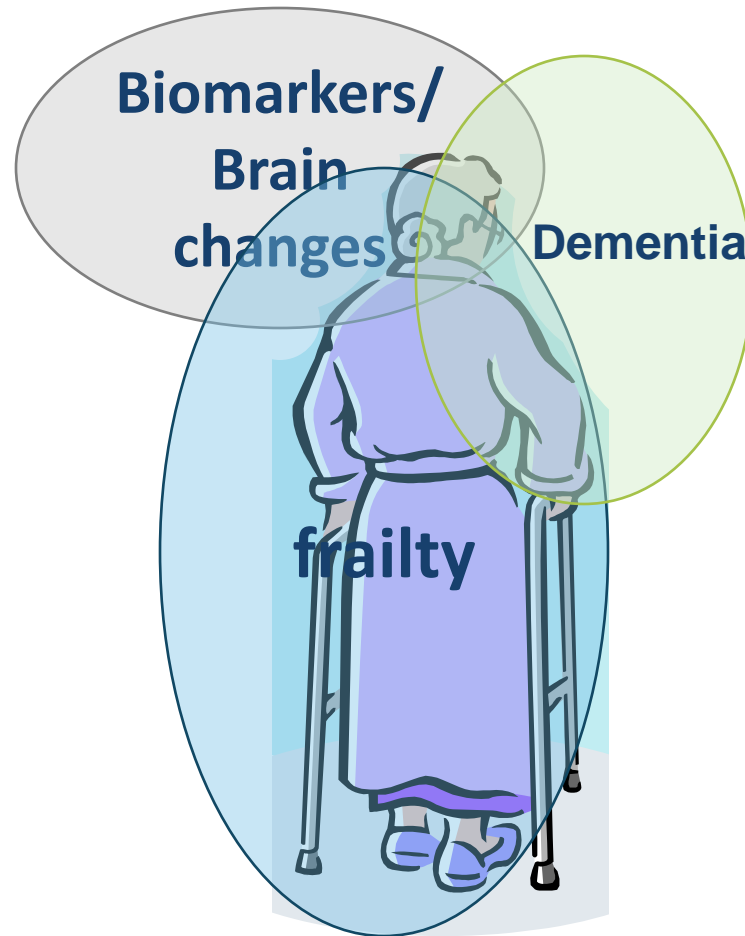
**Rates of death and Alzheimer disease (AD) dementia (A) Five-year (circles) and 10-year (squares) rates of death as a function of the frailty index of nontraditional risk factors (FI-NTRF).**



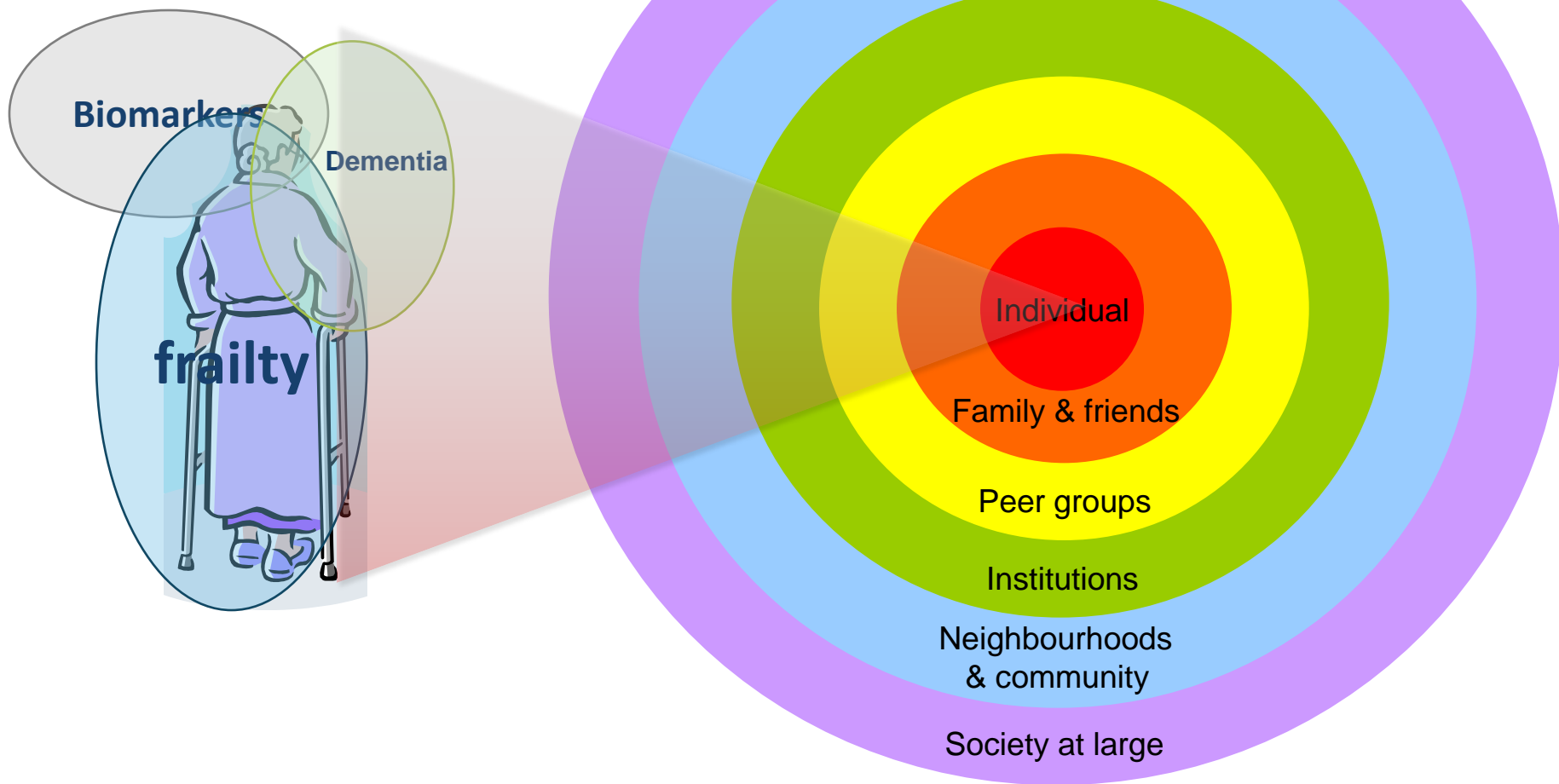
Song X et al. Neurology 2011;77:227-234

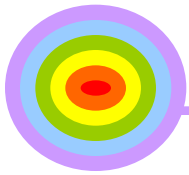


How does what is “above the neck” relate to a holistic view of the person?









# Social & societal implications of frailty

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*Individual Factors*



*Family and caregiver factors*



*Institutional factors*



*Health services and system factors*



*Community factors*



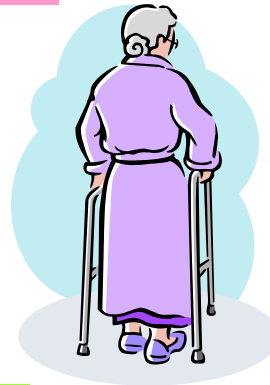
*Government and policy factors*



# Social factors and older adults' health: the evidence

**Survival:** rich social networks, social supports, group engagement, occupational status (gradient), social capital, trust

**Cognitive decline and dementia:** social supports, social connectedness, loneliness, social engagement, social vulnerability, SES (individual and neighbourhood-level)



**Self-assessed health:** social capital, trust, social supports, volunteerism, group participation, SES (individual and neighbourhood)

**Mental health:** neighbourhood social capital, social ties, social networks, social supports, SES

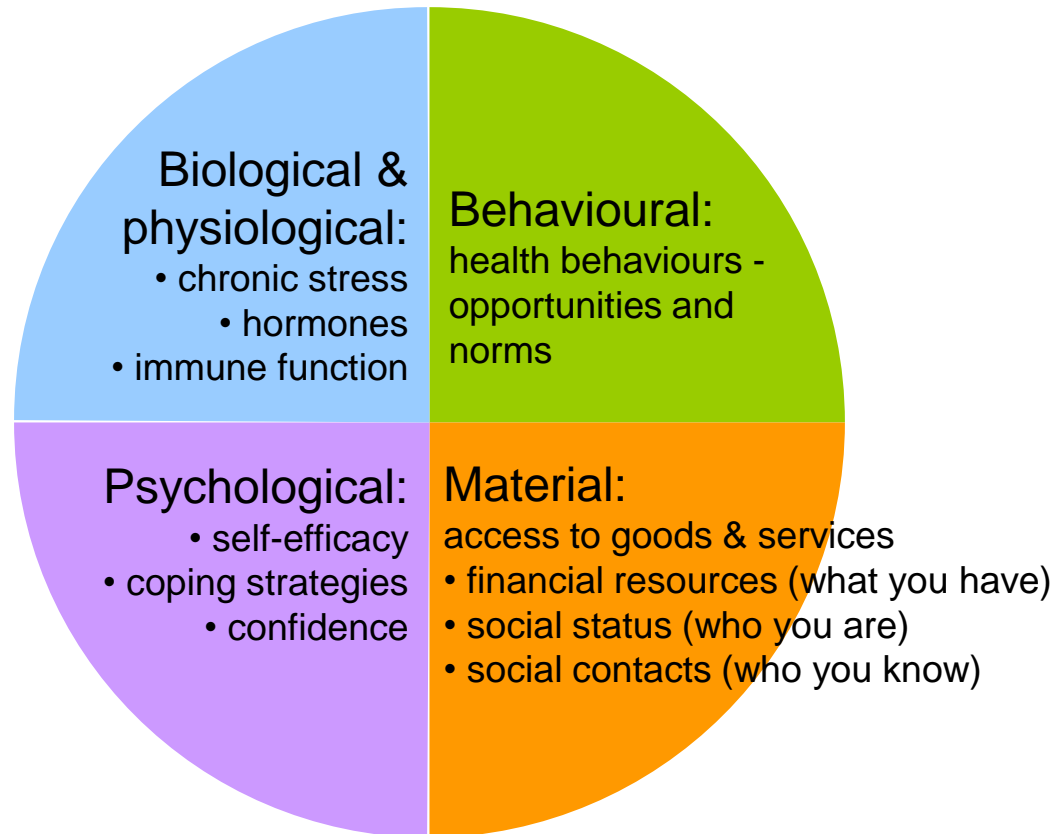
**Mobility and falls:** SES, living alone, social engagement, neighbourhood deprivation/SES

**Functional decline/dependence:** low social engagement, social networks, social engagement, social support, trust

**Institutionalization:** lack of social supports, social capital

**Frailty:** social vulnerability, SES, isolation, social supports

# Social factors and older adults' health: Mechanisms?



# Social circumstances are especially important in the face of frailty and dementia

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A supportive social environment can allow an older person with a given level of frailty and/or dementia to enjoy better health outcomes

Understanding an older frail person's social situation is crucial to planning discharge from hospital, or indeed planning for any transitions in care.

Risk factor



Management  
Care planning

# GENDER

Socially-constructed roles, behaviours, expressions and identities of girls, women, boys, men and gender diverse people.



# SEX

Biological attributes of humans and animals, including physical features, chromosomes, gene expression, hormones and anatomy.



**Have you considered the possibilities?**

Learn more: [www.cihr-irsc.gc.ca/shapingscience.html](http://www.cihr-irsc.gc.ca/shapingscience.html)

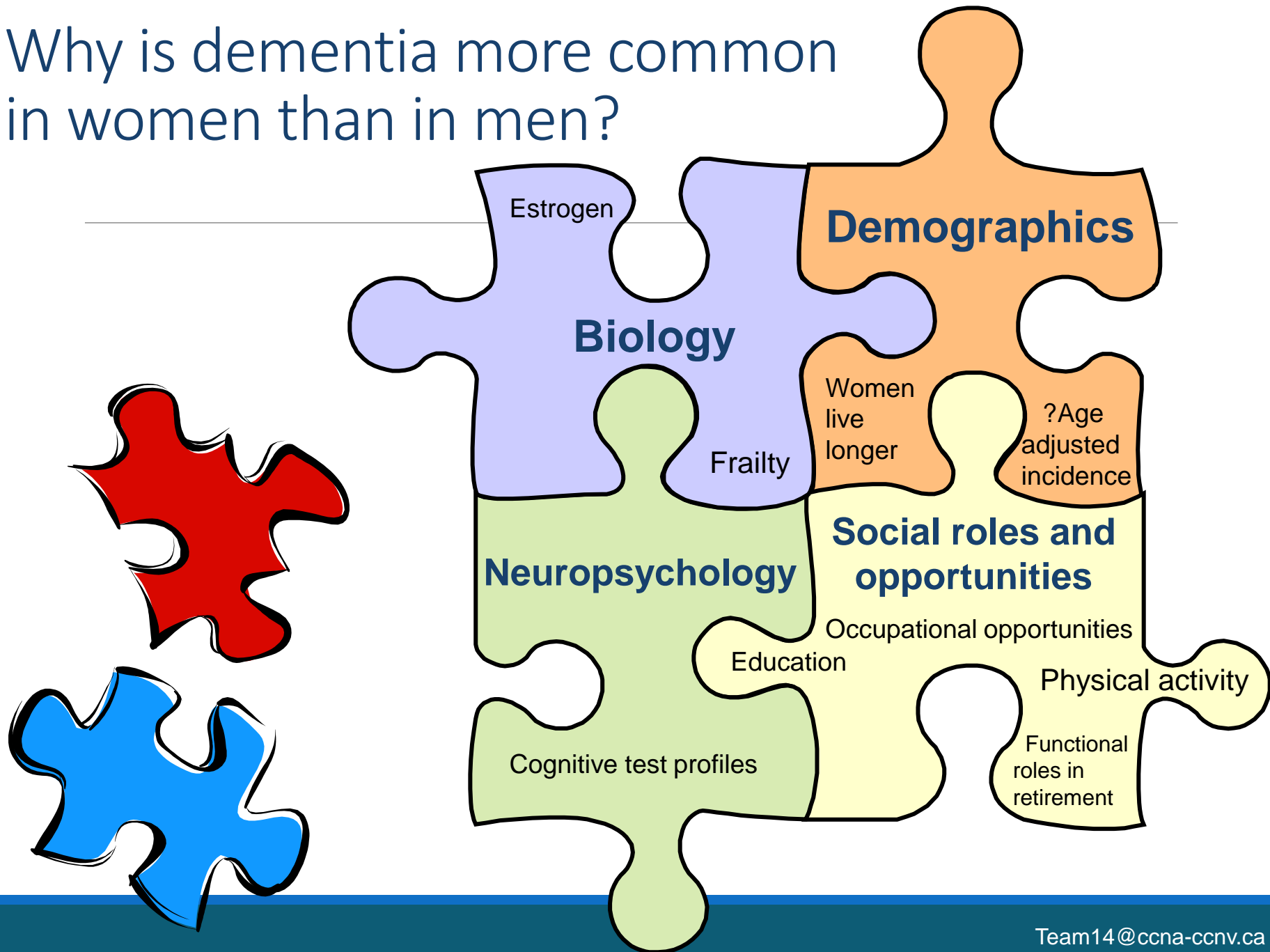


Canadian Institutes  
of Health Research

Instituts de recherche  
en santé du Canada

Canada

# Why is dementia more common in women than in men?







# Sex and gender differences in medication use matters!



- ❁ Community dwelling women more likely to receive:
  - ❁ a Potentially Inappropriate Medication
  - ❁ psychotropics in general
- ❁ Men more likely to receive Cholinesterase Inhibitors and antipsychotics
- ❁ Sex and gender differences in medication use among people with dementia most often represents an afterthought in studies
- ❁ Attention to sex and gender differences in medication use stands to improve care and make better use of healthcare resources

> [SAGE Open Med.](#) 2019 Apr 22;7:2050312119845715. doi: 10.1177/2050312119845715. eCollection 2019.

## **Sex and gender differences in polypharmacy in persons with dementia: A scoping review**

Shanna C Trenaman <sup>1 2</sup>, Megan Rideout <sup>3</sup>, Melissa K Andrew <sup>2 4</sup>

Affiliations + expand

PMID: 31041100 PMCID: [PMC6477755](#) DOI: [10.1177/2050312119845715](#)

[Free PMC article](#)

> [J Alzheimers Dis. 2017;58\(1\):231-242. doi: 10.3233/JAD-161280.](#)

# **Dynamics of Frailty and Cognition After Age 50: Why It Matters that Cognitive Decline is Mostly Seen in Old Age**

[Judith Godin](#), [Joshua J Armstrong](#), [Kenneth Rockwood](#), [Melissa K Andrew](#)

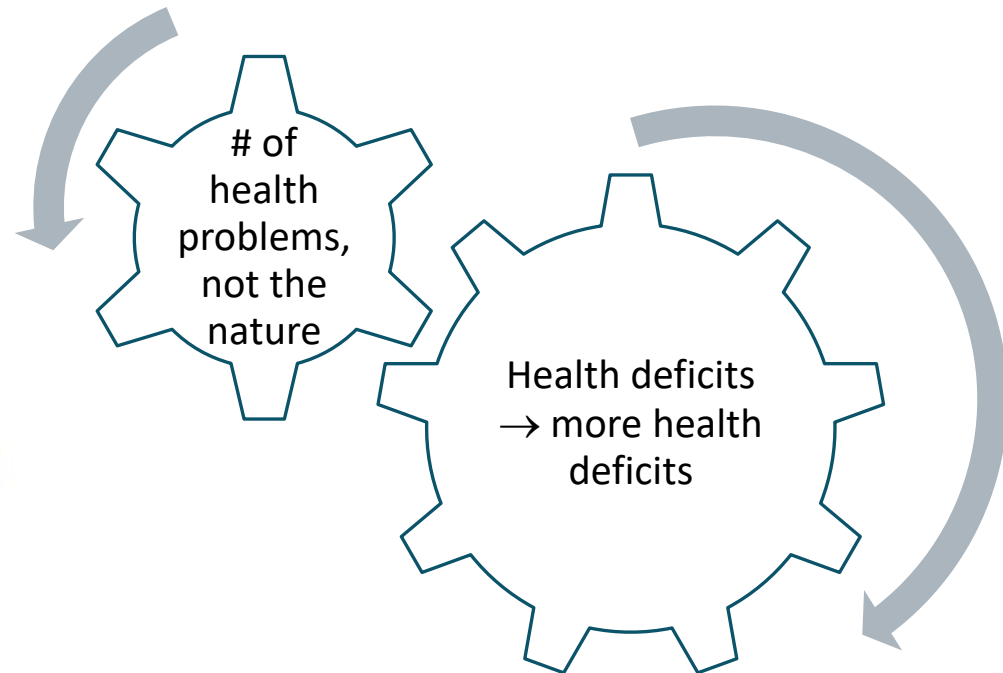
PMID: 28387672 DOI: [10.3233/JAD-161280](#)



# Are frailty and cognition reciprocally related?

**Frailty:** Antecedent or consequence of cognitive impairment?

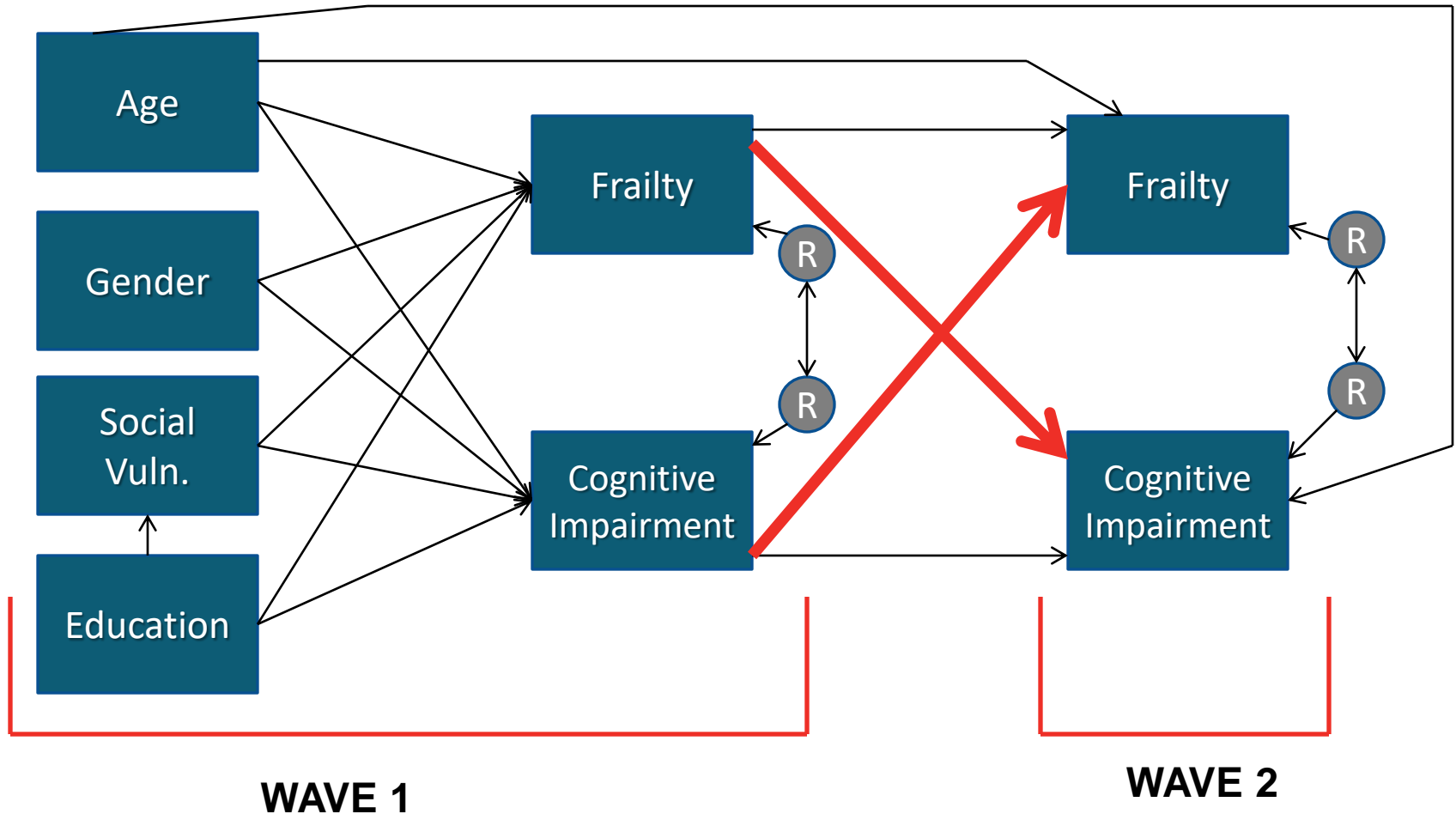
**Could Be Both:**





# In the big picture, it is all interrelated!

\*CFI=.98  
\*RMSEA=.04





**BLACK:** Better routes, rules could stimulate tourism



**Northern Pulp, Part 3:** Economic threat strains Pictou County's social ...



Halifax police officer found guilty of voyeurism



**LETHBRIDGE:** Minister should fall on her sword over data breach



## Groundbreaking Dalhousie study singles out frailty as key dementia risk

Premium content

John McPhee (jmcphree@herald.ca)

Published: Jan 18 at 7:35 p.m.

Updated: Jan 19 at 5 a.m.



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More 51



Lindsay Wallace, a doctoral student in psychology at Dalhousie University, and Dr. Kenneth Rockwood have co-authored a study that concludes a person's frailty is a bigger risk factor than brain plaque in developing dementia. They're shown in their offices at Camp Hill Hospital. - John McPhee

Dalhousie University researchers say your overall health is a bigger risk factor for developing dementia than protein

RIGHT NOW

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TEMPERATURE: 2°

FEELS LIKE: 2°

SSW 24 km/h

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- 2 **Police break up Halifax party, issue liquor control tickets**  
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- 3 **Cole Harbour teacher charged with assault now faces probation charge as well**  
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- 4 **Groundbreaking Dalhousie study singles out frailty as key dementia risk**  
1919 views
- 5 **Northern Pulp, Part 3: Economic threat strains Pictou County's social fabric**  
1135 views

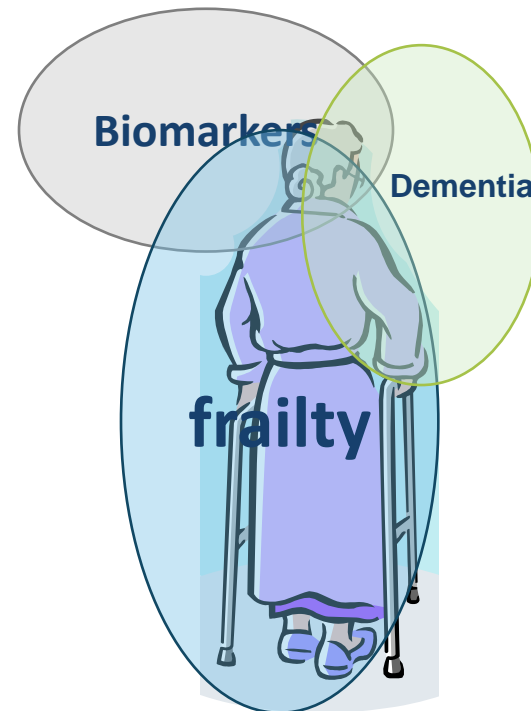
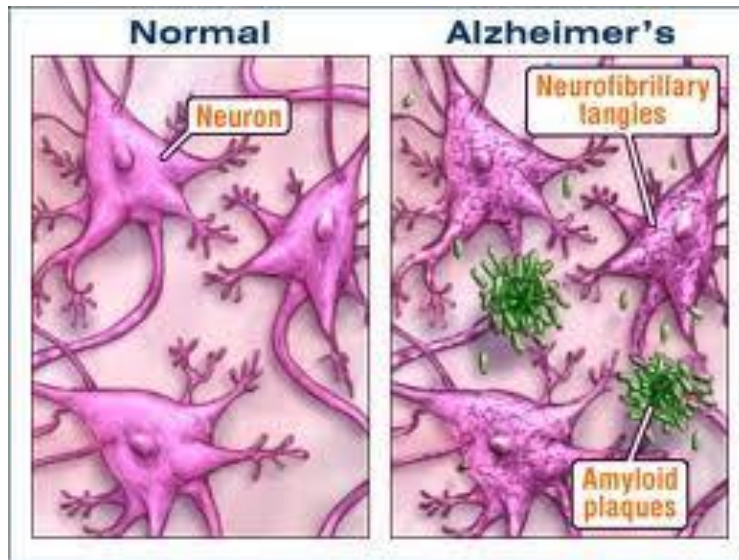
### Obituaries

# Neuropathologic burden and the degree of frailty in relation to global cognition and dementia

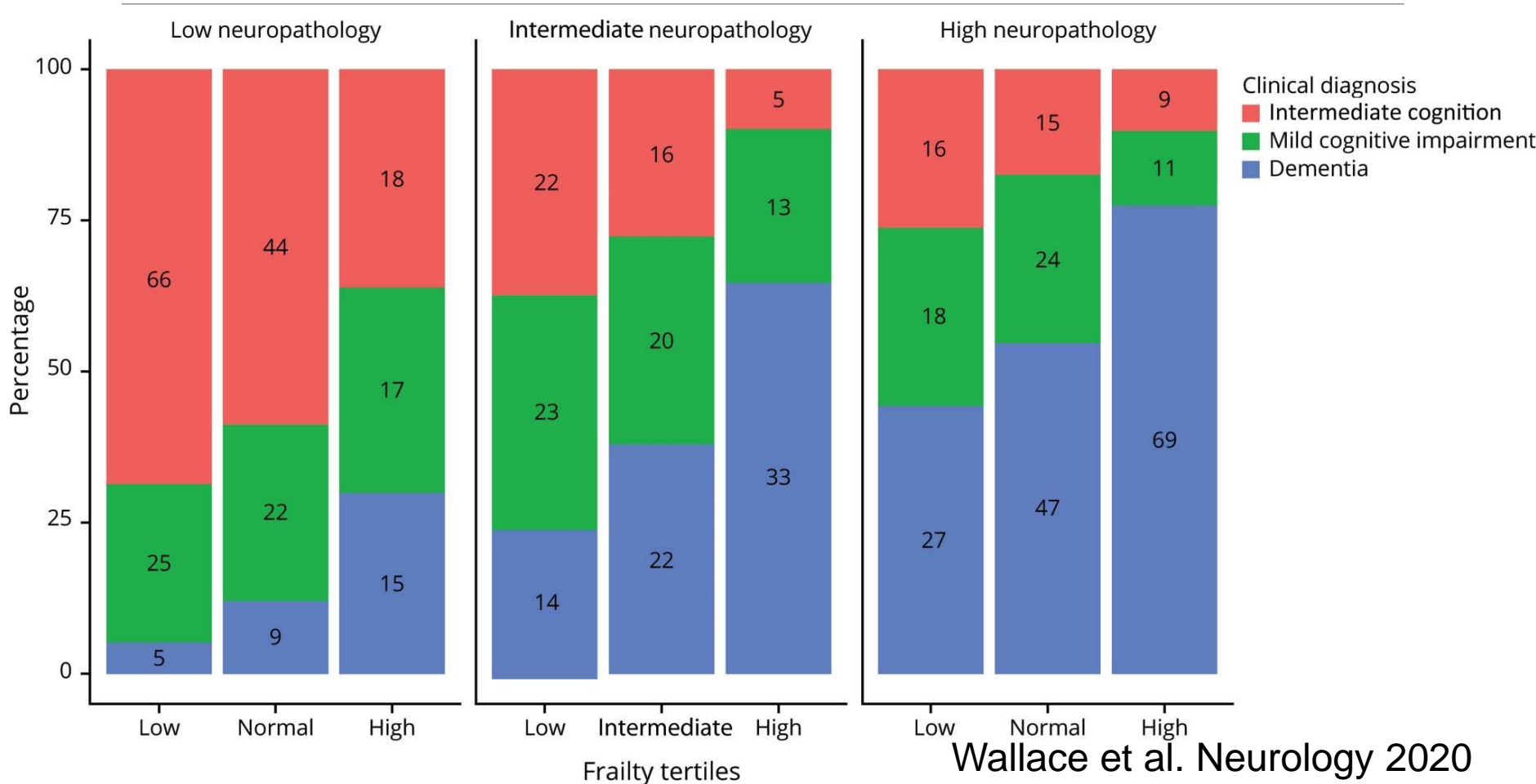
Lindsay M.K. Wallace, PhD, Olga Theou, PhD, Sultan Darvesh, MD, David A. Bennett, MD, Aron S. Buchman, MD, Melissa K. Andrew, MD, PhD, Susan A. Kirkland, PhD, John D. Fisk, MD, and Kenneth Rockwood, MD

**Correspondence**  
Dr. Rockwood  
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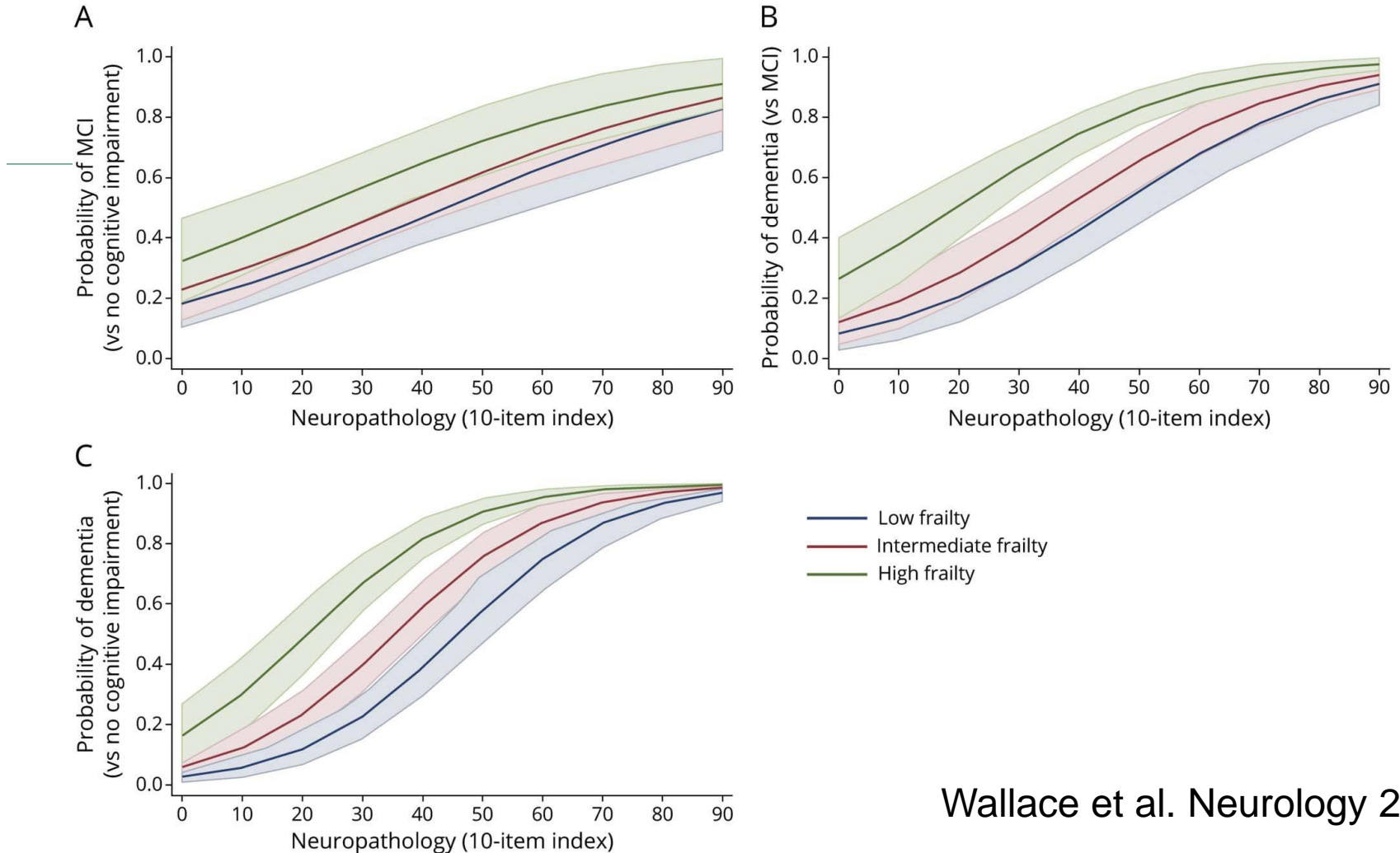
*Neurology*® 2020;95:e3269-e3279. doi:10.1212/WNL.0000000000010944



# At any level of neuropathology, dementia is more prevalent in those with higher frailty



# The relationship between neuropathology and dementia across levels of frailty: higher frailty, more dementia

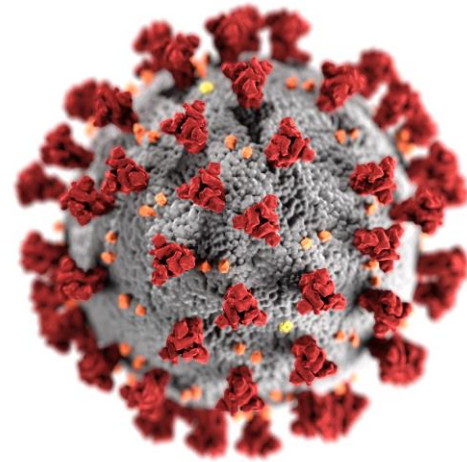


Wallace et al. Neurology 2020



# How do dementia and frailty relate to respiratory infection vulnerability and outcomes?

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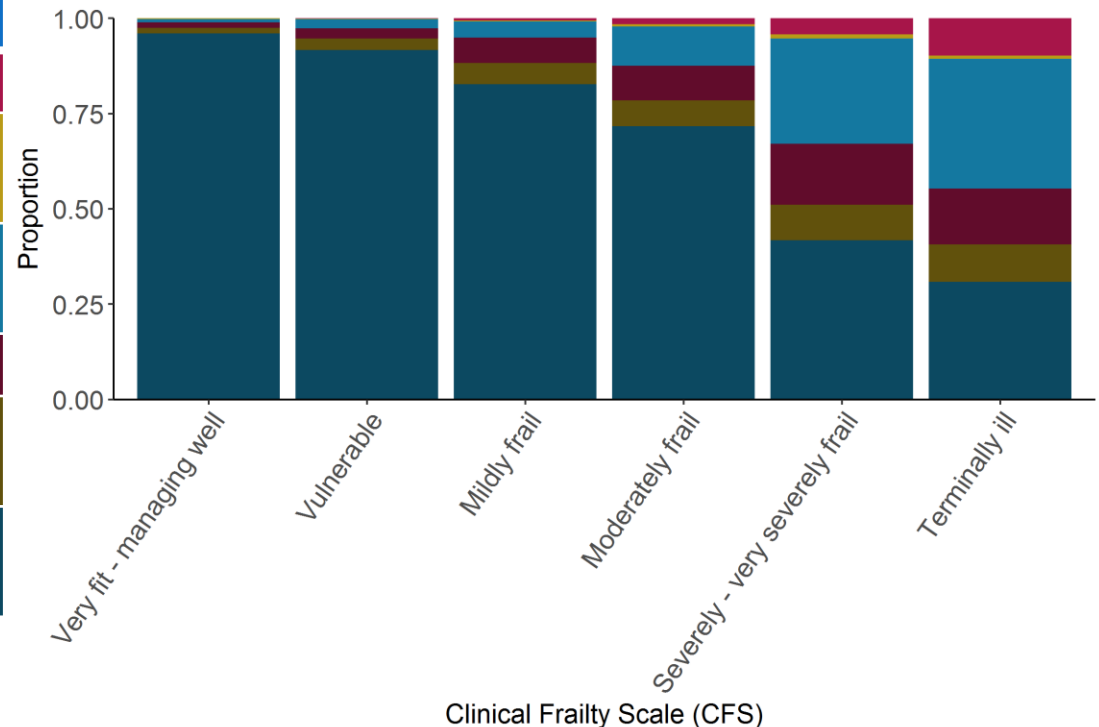


[cdc.gov](https://www.cdc.gov)

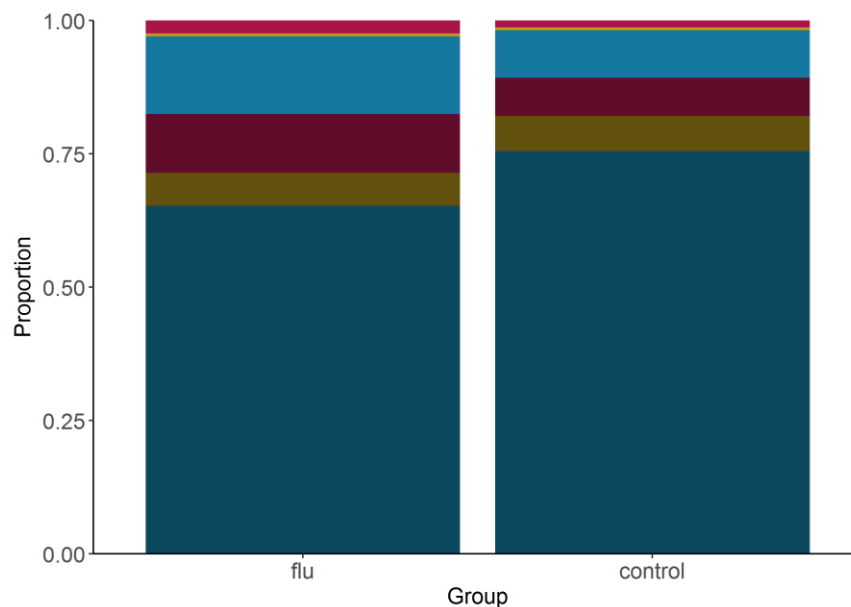
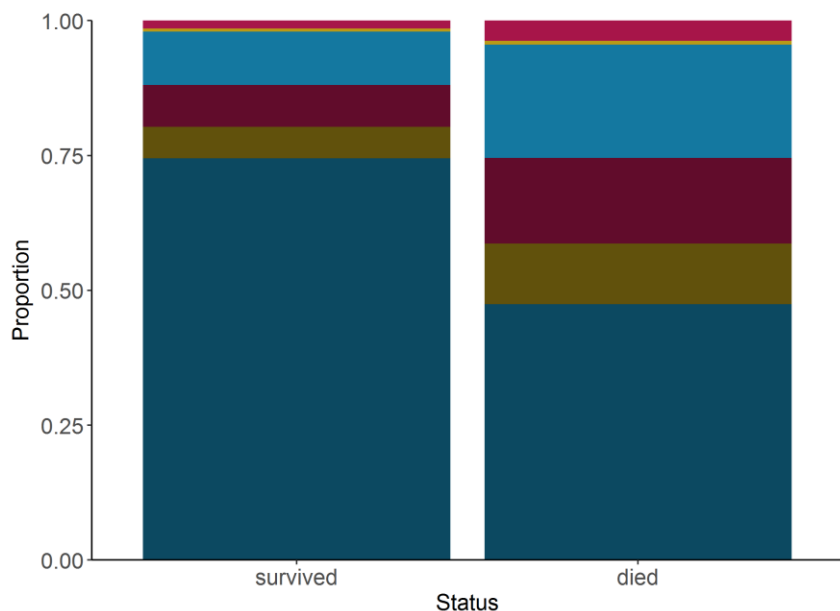
# Serious Outcomes Surveillance Network

- 6,298 patients who were age 65 years or older and who had data on cognitive status; admitted during 3 influenza seasons
- 52.7% were women; mean age 79.6 (SD = 8.4)
- 38.5% had lab confirmed influenza

Frequencies	Legend
108 (1.7%)	Dementia + Delirium
36 (0.6%)	Cognitive Impairment No Dementia (CIND) + Delirium
698 (11.1%)	Dementia
544 (8.6%)	Delirium
403 (6.4%)	Cognitive Impairment No Dementia (CNID)
4509 (71.6%)	Within Normal Limits (WNL)



# Serious Outcomes Surveillance Network



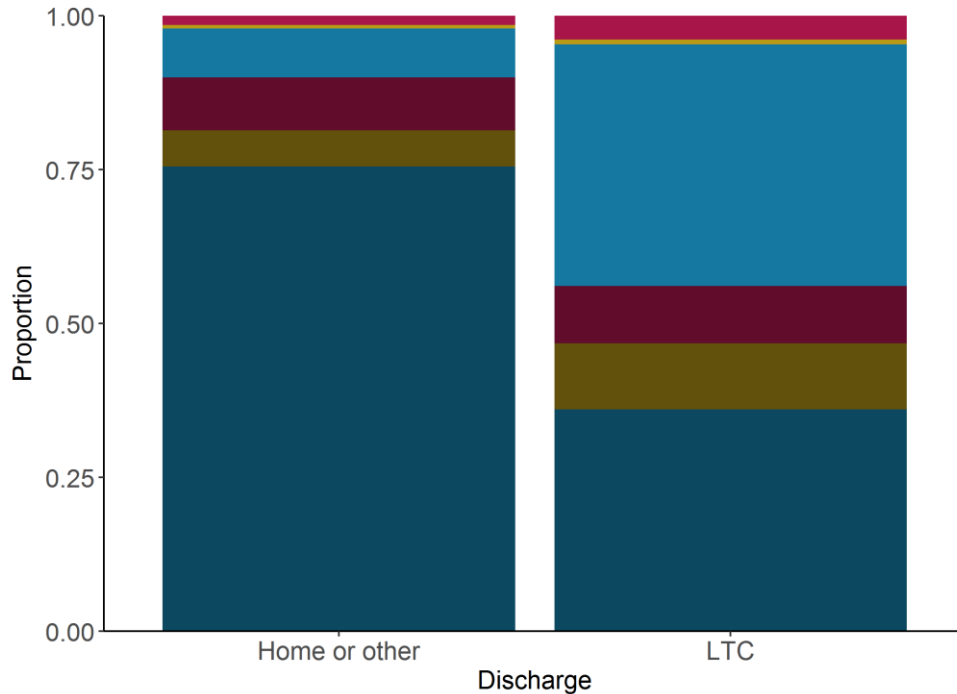
✳️ Having CIND (2.44, 1.87-3.15) or dementia (2.82, 2.31-3.43) was associated with higher odds of dying within 30 days post discharge.

✳️ Delirium was associated with higher odds of dying within 30 days post discharge (2.35, 1.91-2.89).

✳️ Having dementia was associated with higher odds of having lab-confirmed influenza (OR = 1.81, 95%CI = 1.56-2.10) compared to those WNL.

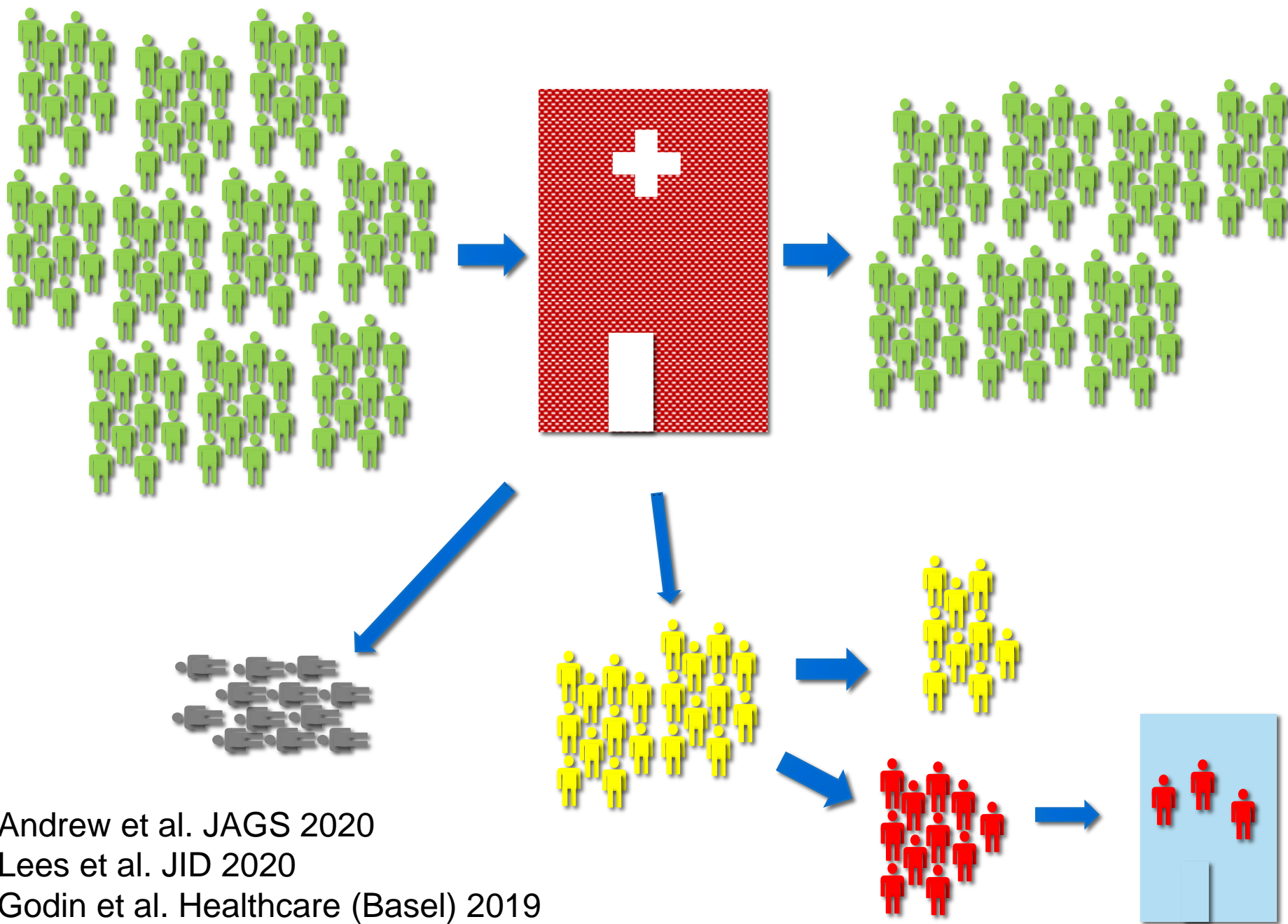
✳️ Having delirium was associated with higher odds of having influenza (1.65, 1.41-1.93).

# Serious Outcomes Surveillance Network



✿ Having CIND (3.31, 2.49-4.35) or dementia (8.44, 6.99-10.20) was associated with higher odds of being discharged to a long-term care facility.

✿ Delirium was associated with higher odds of being discharged to a long-term care facility (1.37, 1.07-1.73).



Andrew et al. JAGS 2020

Lees et al. JID 2020

Godin et al. Healthcare (Basel) 2019

# NOT Adding Life to Years

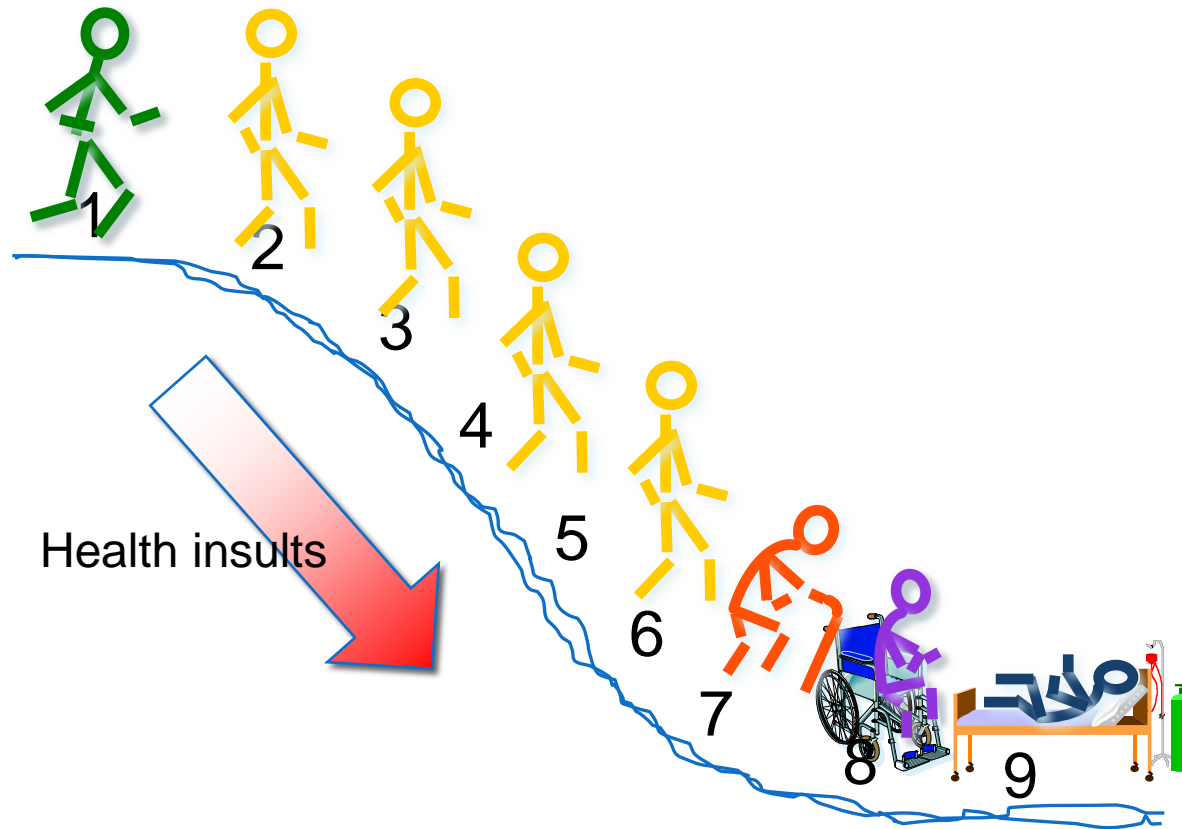
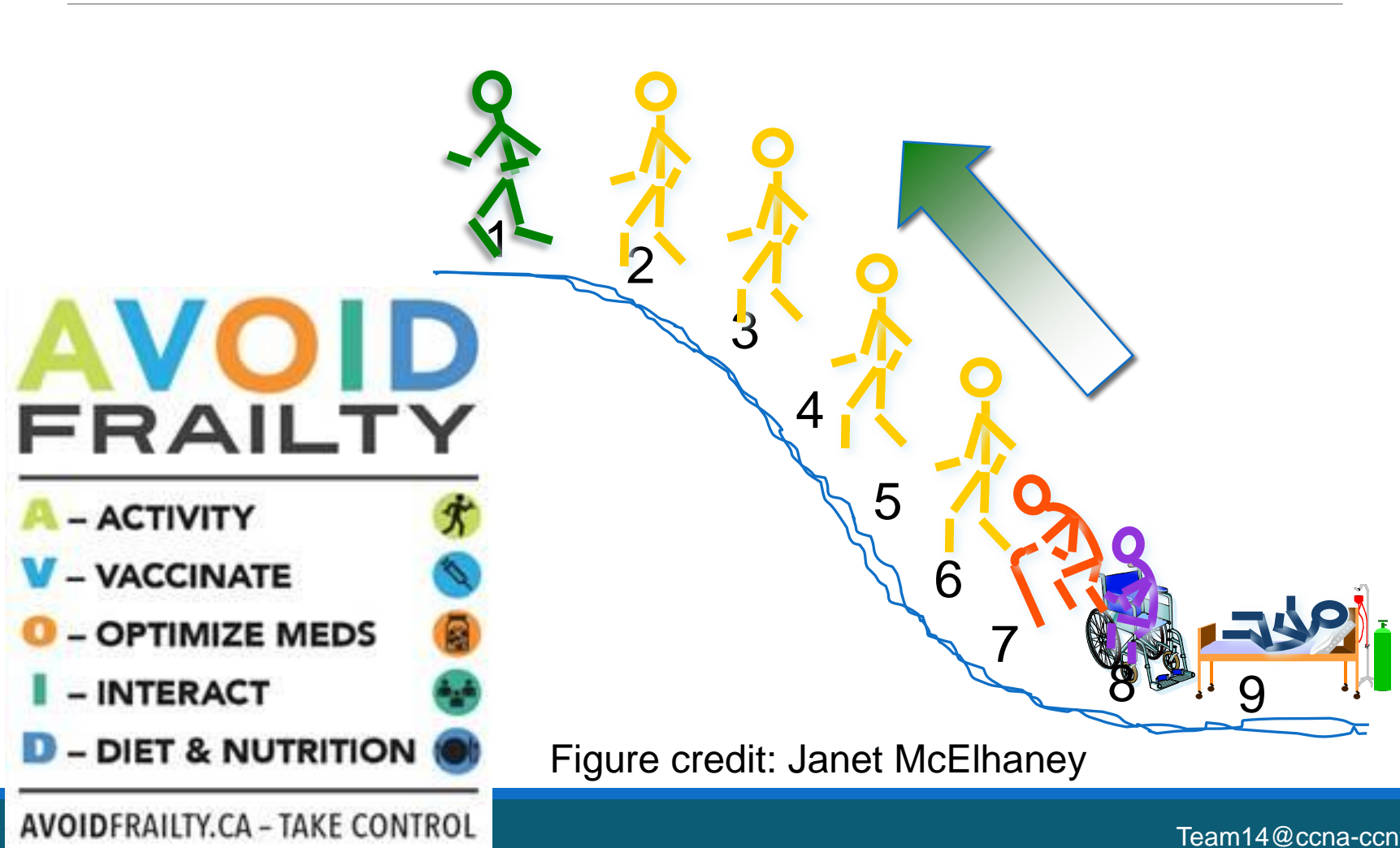


Figure credit: Janet McElhaney

# Adding Life to Years: Can we AVOID frailty and disability?



# Clinical approach to dementia management

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## 1. Prevention

- Physical exercise, social activity, sleep, nutrition, alcohol, vaccination

## 2. Control of “risk factors”

- Vascular: blood pressure, cholesterol, diabetes, stroke risks
- Hearing, alcohol

## 3. Information and supports

- Alzheimer Society, Day Programs, Continuing Care NS
- Advance care planning: POA, Personal Directive

## 4. Safety: falls, fire, flood, firearms, driving

## 5. Medications (stop or reduce harmful medications)

## 6. Consider specific treatment for dementia and its symptoms



# CCNA at a Glance



**CCNA**  
Canadian Consortium  
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in Aging



**CCNV**  
Consortium canadien en  
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associée au vieillissement

## 350+ RESEARCHERS & CLINICIANS

350+ Canadian researchers and clinicians have come together to accelerate discovery in research on age-related neurodegenerative diseases (NDD).

## 3 THEMES & 20 TEAMS

Research in the CCNA is divided into 3 themes:

### THEME 1: PREVENTION (TEAMS 1-6)

Aims to identify the underlying mechanisms to prevent NDD.

### THEME 2: TREATMENT (TEAMS 7-13)

Aims to improve diagnosis and treatment of NDD.

### THEME 3: QUALITY OF LIFE (TEAMS 14-20)

Aims to improve the management of NDD and the quality of life of those with lived experience.

## 8 NATIONAL PLATFORMS

National Platforms facilitate research and create opportunities for collaboration by pooling and drawing on big data.

## 4 CROSS-CUTTING PROGRAMS

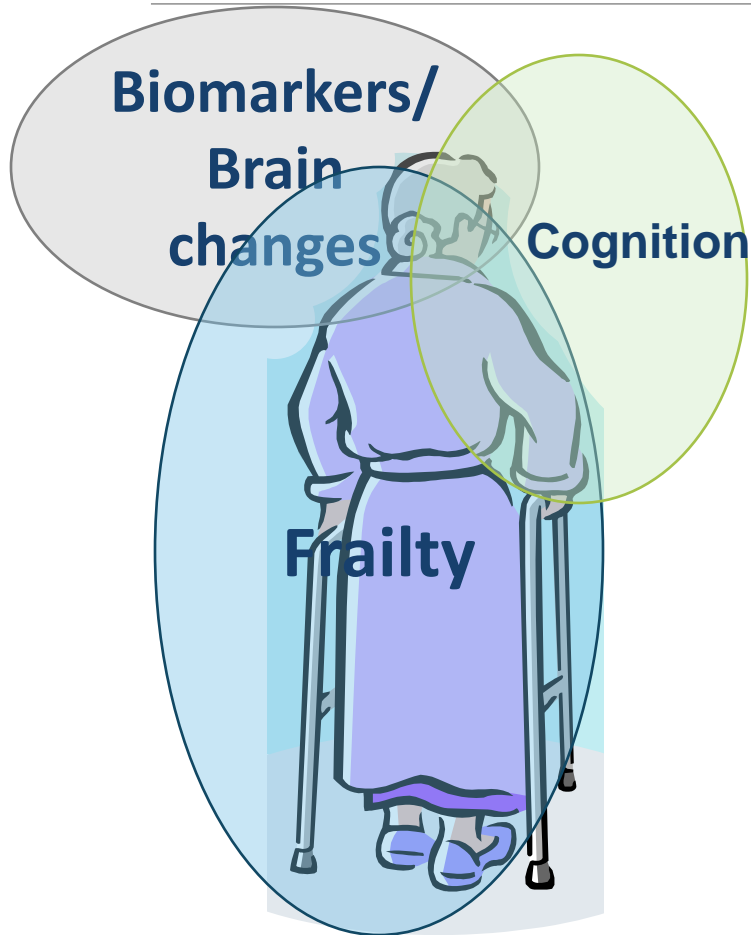
Cross Cutting Programs support the work of CCNA's 20 teams, and accelerate idea uptake.

## PARTNER ORGANIZATIONS

The CCNA is a Government of Canada initiative, also supported by several national, provincial and industry organizations.



# As part of the CCNA, Team 14 is working to:



- **ILLUSTRATE** that the cumulative burden of health and social problems have a significant impact on risk of cognitive decline
- **HIGHLIGHT** the importance of considering sex and gender in all of our work
- **STRESS** the need for researchers, health care providers, and policy makers to consider overall health and cognitive decline simultaneously
- **INSPIRE** further evaluation of how sex, gender and frailty influence dementia risk, disease expression, and management



# Thank you for listening.

**Email:** Team14@ccna-ccnv.ca



**GERIATRIC MEDICINE  
RESEARCH**



Thanks to many colleagues and collaborators!  
Kenneth Rockwood, Lindsay Wallace, Shanna  
Trenaman, Judith Godin, Sherri Fay, Shelly McNeil,  
Janet McElhaney