

Frailty

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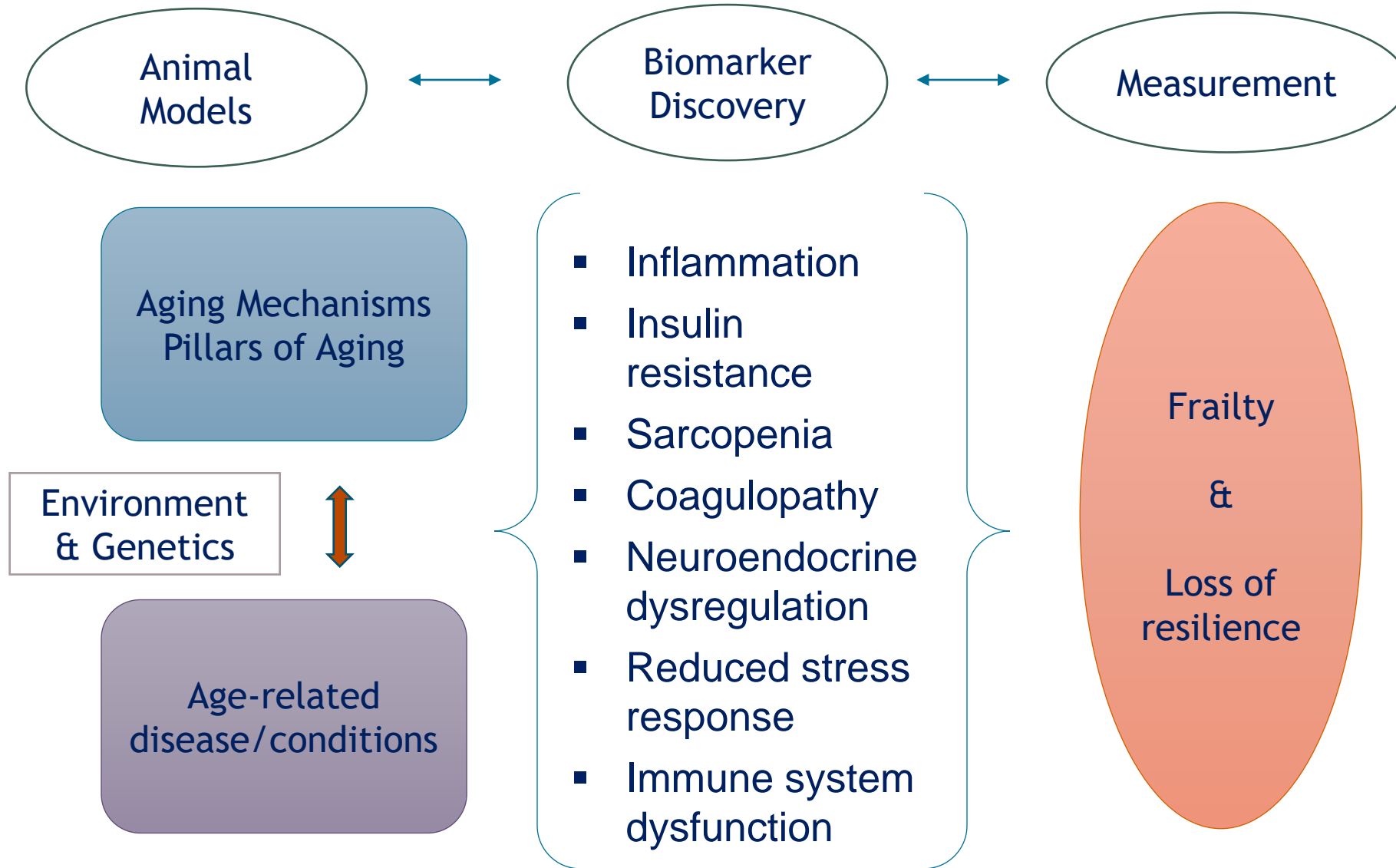
UT Health

San Antonio

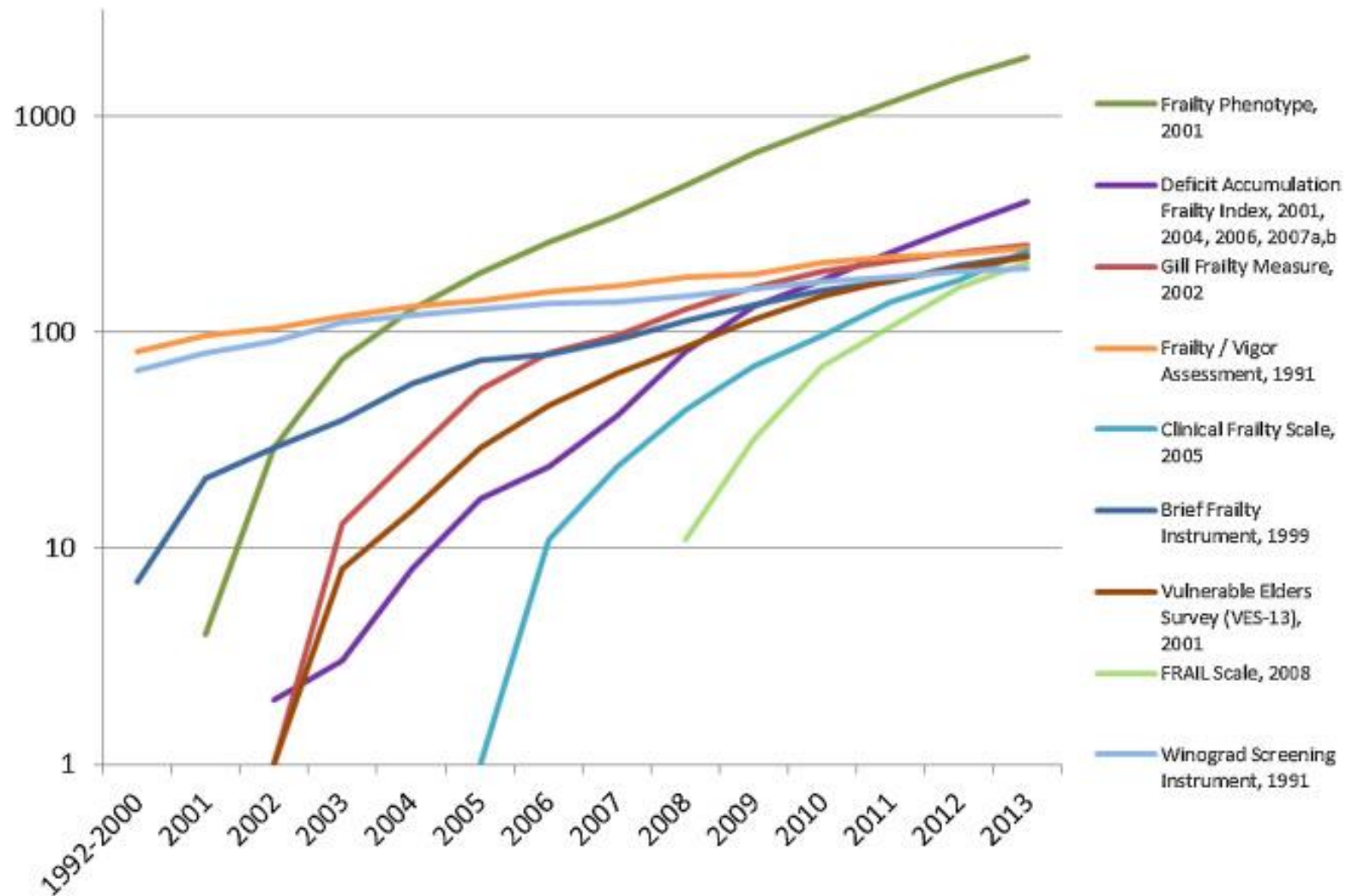
Frailty, a geriatric syndrome



Translational Frailty Research



Frailty Assessment Instruments: Review



Risk assessment (31%)

- Physical Frailty Phenotype (132 uses)
- Deficit Accumulation Index (37 uses)
- Gill Frailty Measure (12 uses)
- Clinical Frailty Scale & Vulnerable Elders Survey (11 uses each)
- Winograd Screening Instrument (10 uses)
- Brief Frailty Instrument (6 uses)

Etiology of frailty (22%)

- Physical Frailty Phenotype (121 uses)
- Deficit Accumulation Index (37 uses)

Methodology (14%)

- Physical Frailty Phenotype (33 uses)
- Deficit Accumulation Index (32 uses)
- Brief Frailty Instrument & Vulnerable Elders Survey (11 uses each)
- FRAIL Scale (10 uses)

Biomarkers of frailty (12%)

- Physical Frailty Phenotype (77 uses)
- Deficit Accumulation Index & FRAIL Scale (5 uses each)

Inclusion / exclusion criteria (10%)

- Physical Frailty Phenotype (22 uses)
- Vulnerable Elders Survey & Brief Frailty Instrument (11 uses each)
- Winograd Screening Instrument (10 uses)
- Deficit Accumulation Index, Frailty / Vigor Assessment, & Clinical Frailty Scale (5 uses each)

Estimating prevalence as primary goal (5%)

- Physical Frailty Phenotype (33 uses)
- Vulnerable Elders Survey (5 uses)

Guide for clinical decision-making (2%)

- Physical Frailty Phenotype (11 uses)
- Vulnerable Elders Survey (5 uses)

Frailty as a target for intervention (2%)

- Physical Frailty Phenotype (11 uses)
- Clinical Frailty Scale (5 uses)

What is Frailty?

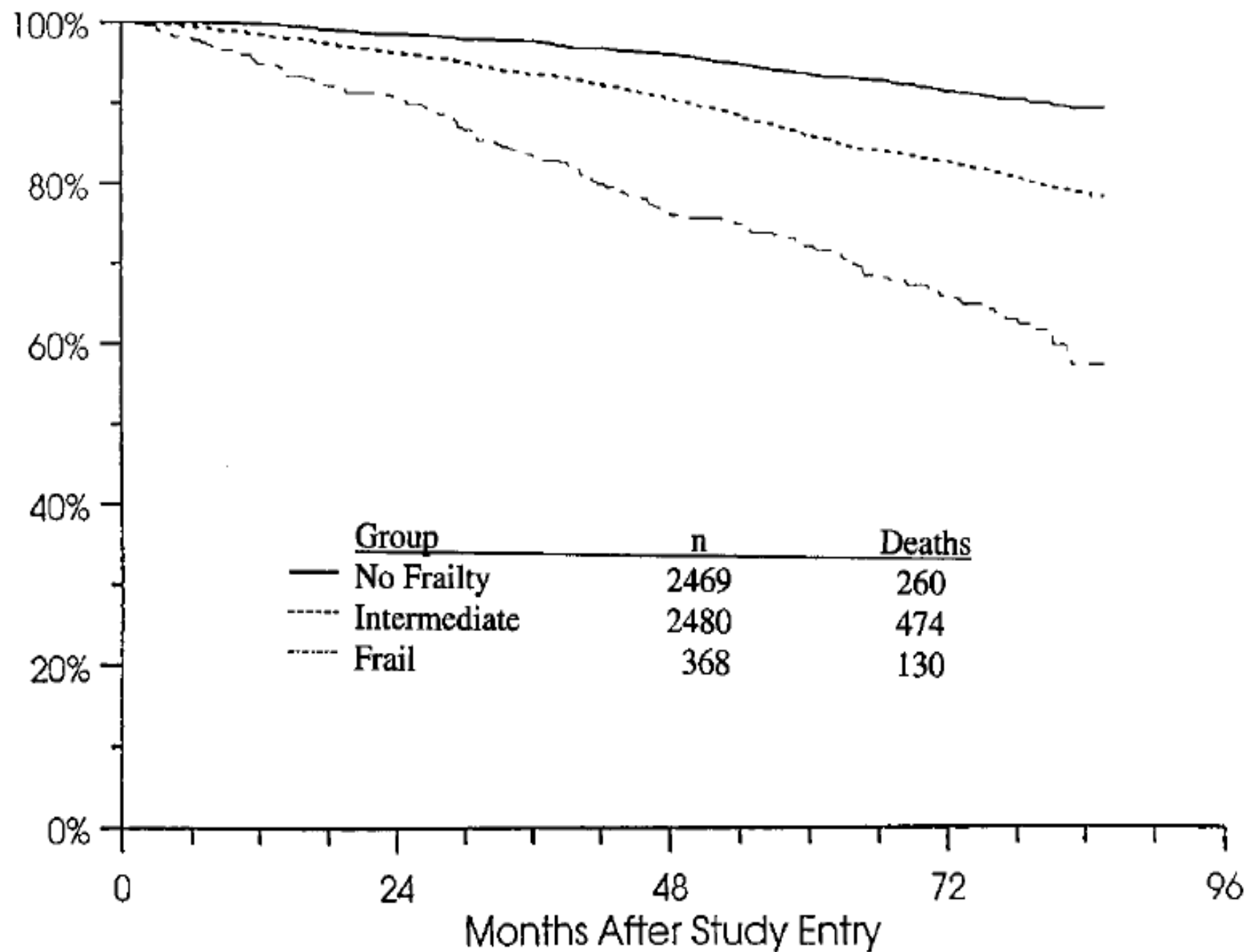
- Clinical, geriatric syndrome
- At risk population for poor outcomes
- Vulnerable to decline
- Poor tolerance to stressors



Fried Criteria

- Non-frail: 0-1, Pre-frail:2, Frail: 3+

| Grip Strength | Men | Women |
|--------------------------|--|------------------------------------|
| | BMI \leq 24: \leq 29 kg | BMI \leq 23: \leq 17 kg |
| | BMI 24.1-28: \leq 30 kg | BMI 23.1-26: \leq 17.3kg |
| | BMI $>$ 28: \leq 32 kg | BMI 26.1-29: \leq 18 kg |
| | | BMI $>$ 29: \leq 21 kg |
| Walking Speed | Men | Women |
| 15-foot walk | Height \leq 173 cm: \geq 7 sec | Height \leq 159 cm: \geq 7 sec |
| | Height $>$ 173 cm: \geq 6 sec | Height $>$ 159 cm: \geq 6 sec |
| Physical activity | Men | Women |
| | $<$ 383 kcal/week | $<$ 270 kcal/week |
| Exhaustion | | |
| | “I felt everything I did was an effort.” | |
| | “I could not get going.” | |
| Weight loss | | |
| | Unintentional loss of \geq 10 lbs in last year | |



Frailty Predicts Surgical Outcomes

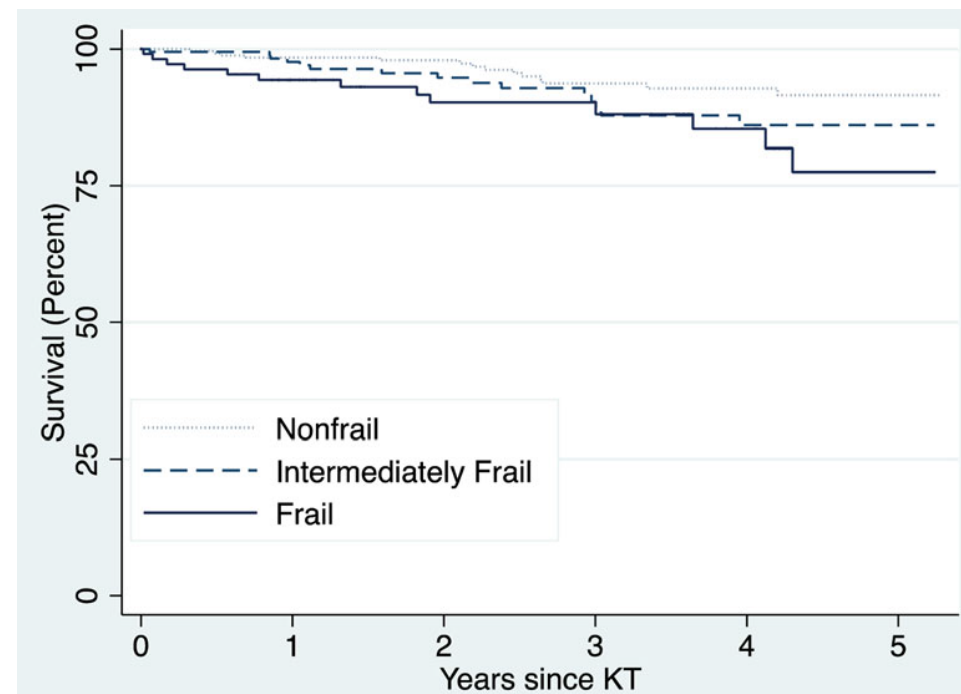
Elective procedures

- Postoperative complications
 - OR=2.5, 95% CI: 1.1-5.8
- Length of stay
 - OR=1.7, 95% CI: 1.3-2.2
- Discharge to SNF
 - OR=20.5, 95% CI: 5.5-75.7

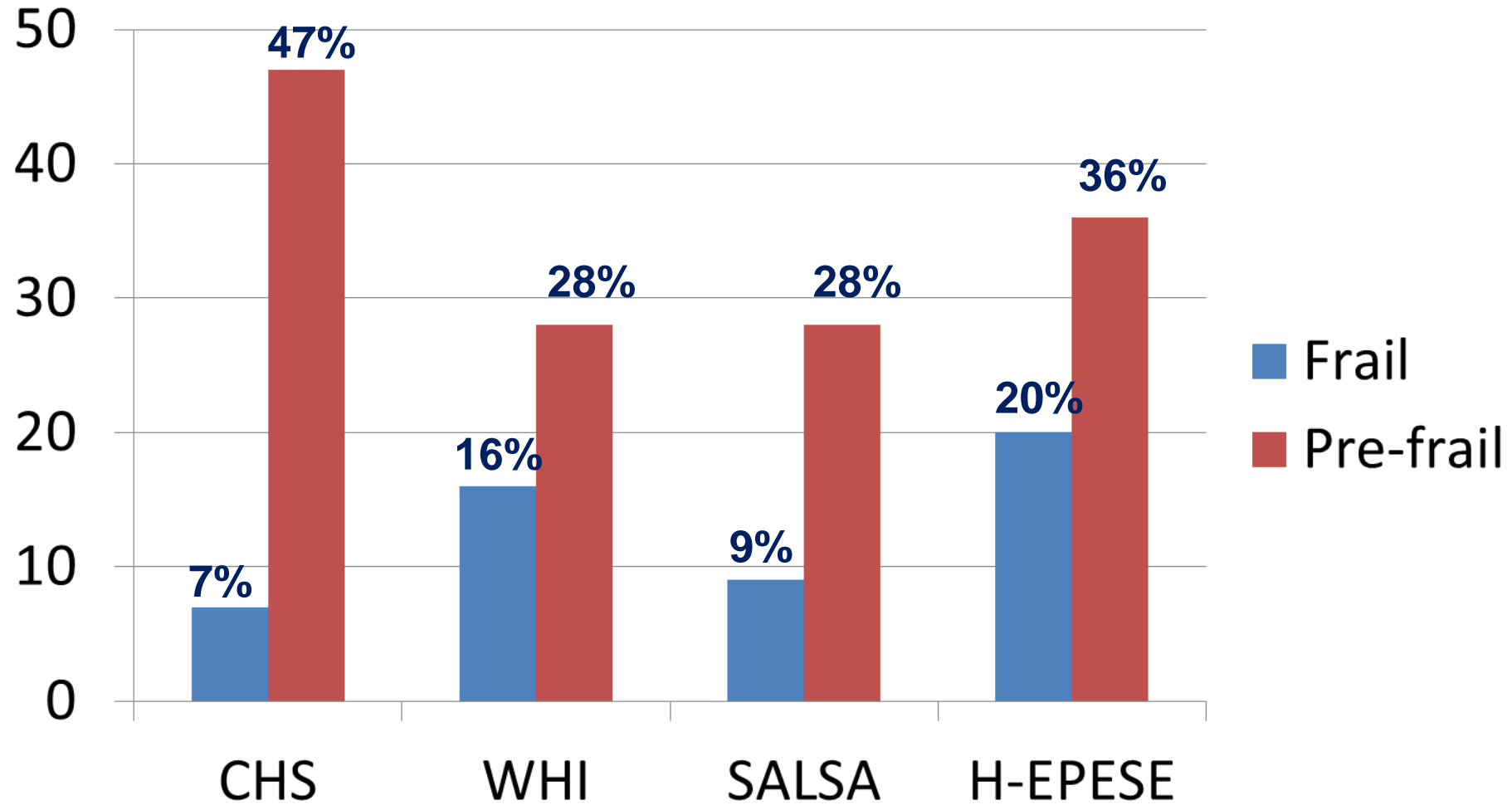
Kidney transplantation

HR for death by frailty

2.17 (95% CI: 1.01-4.65, $p = 0.047$)

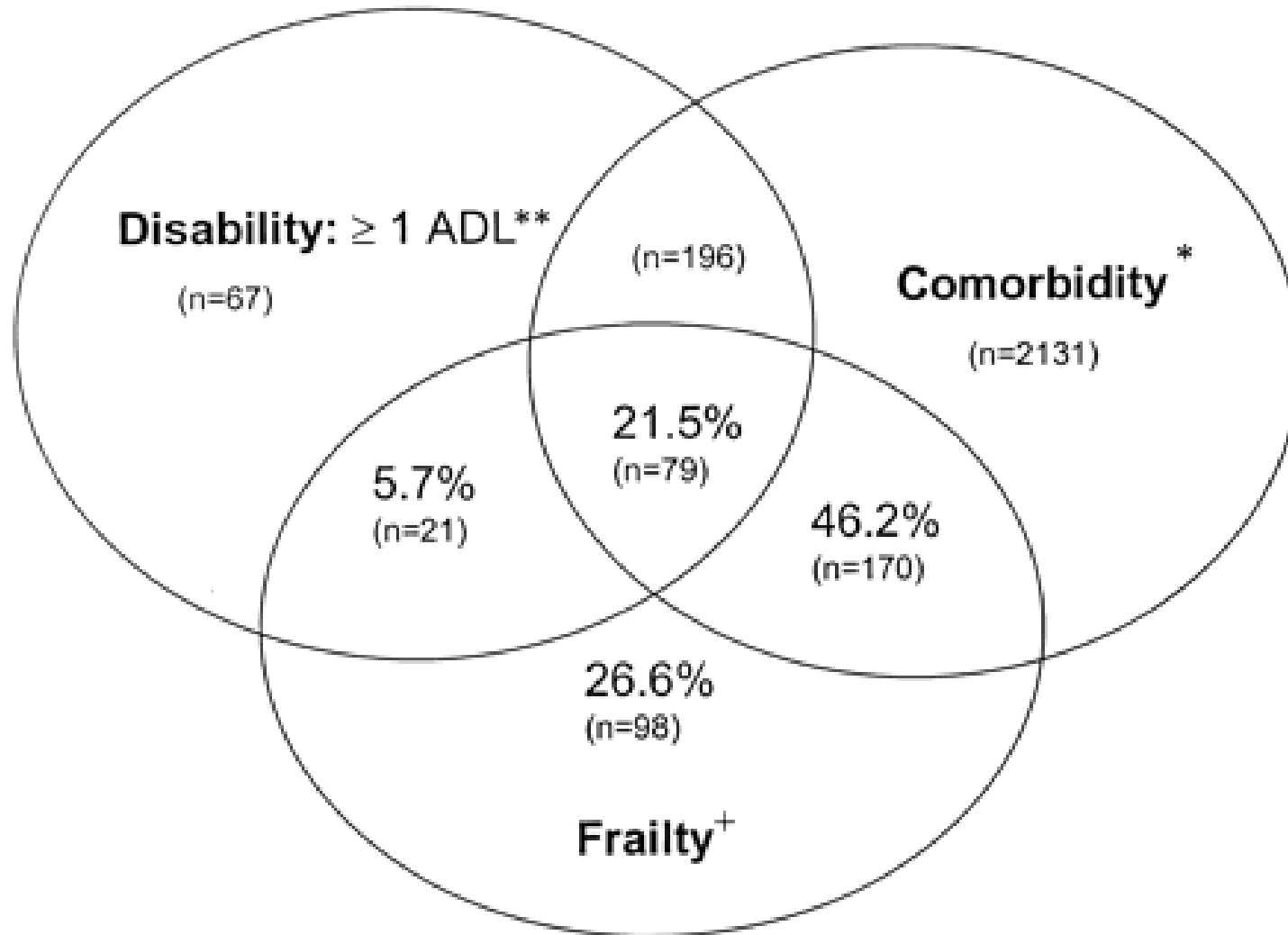


Frailty Prevalence Across Cohorts



Frailty, Disability & Comorbidity

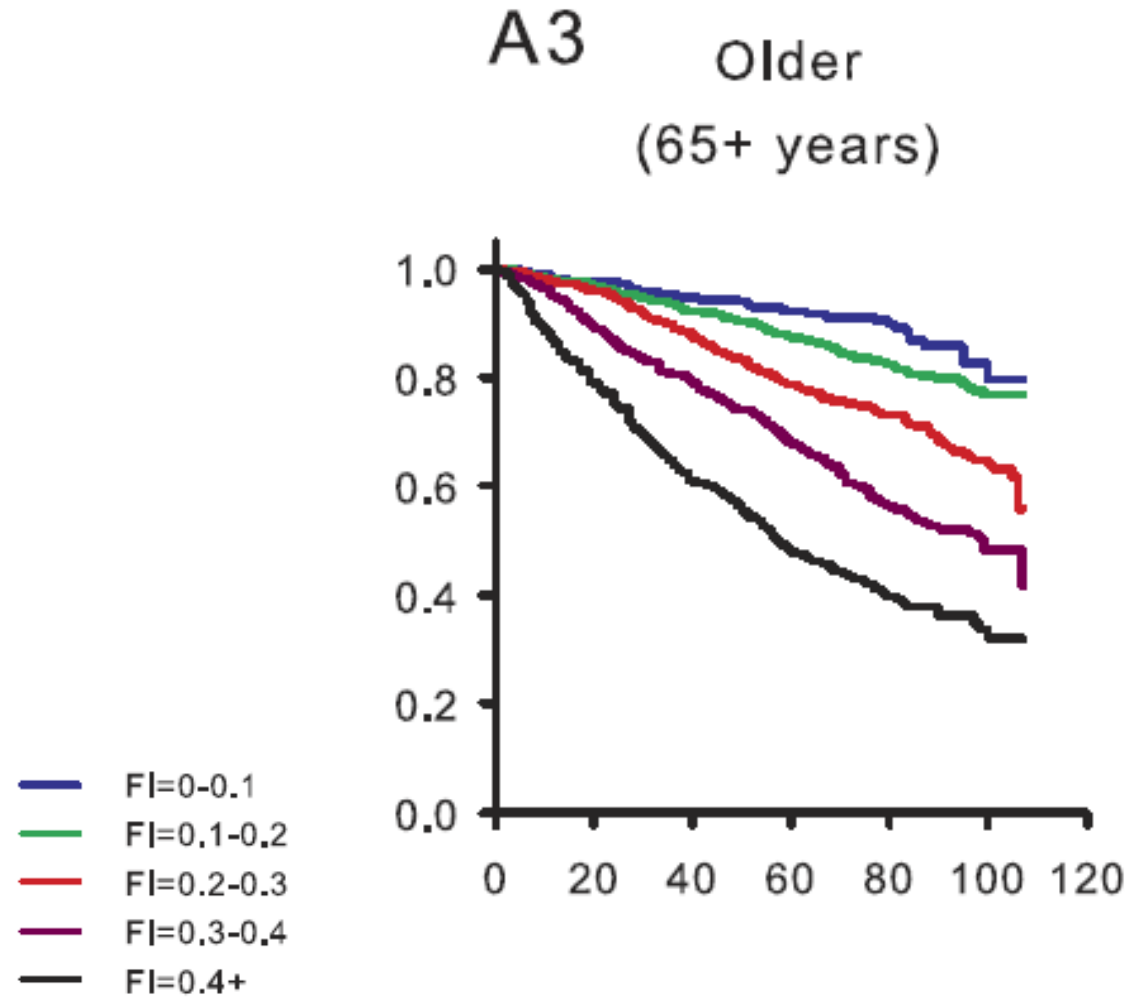
Fried LP, Tangen CM, Walston J. *J Gerontol* 56:M146-M157 (2001)



Frailty index

Frailty index

- Accumulation of deficits with age
- Deficits:
 - › Impairments
 - › Disabilities
 - › Diseases
- Derived from CGA
- Continuous value
- Adaptable to
 - Existing data sets
 - Electronic health record data



Self-Report & Laboratory Frailty Index Predicts Mortality

Self-Report

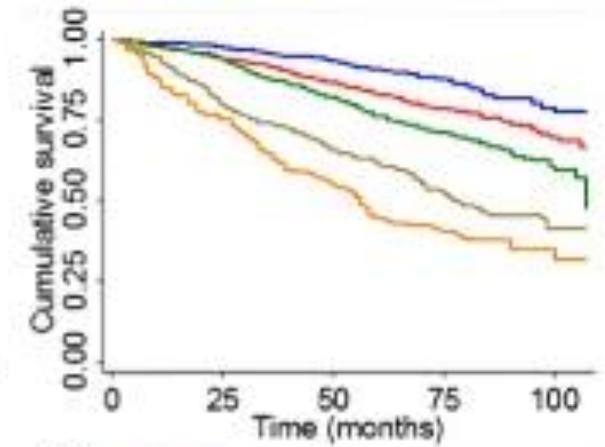
- Diseases, impairments, symptoms
- ADL/IADLs

Laboratory

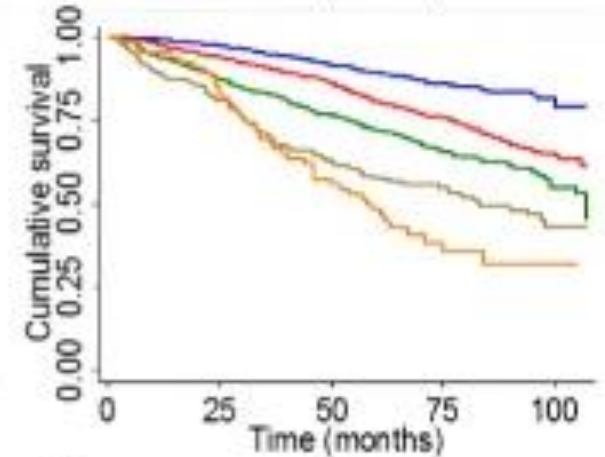
- Vital signs
- Chemistries
- CBC
- Iron studies
- Vit D, B12

Frailty Index Groups: ■ 0-0.1 ■ 0.1-0.2 ■ 0.2-0.3 ■ 0.3-0.4 ■ >0.4

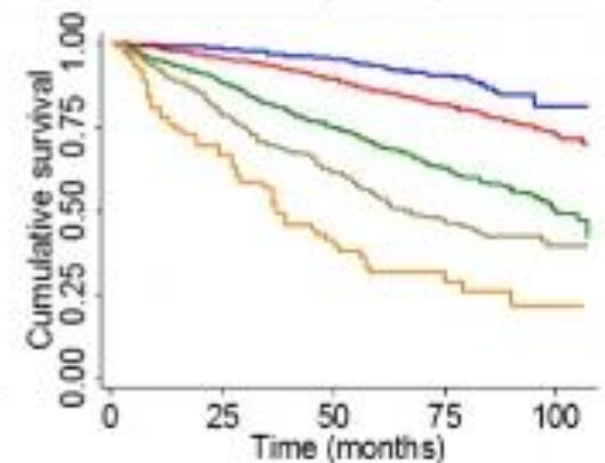
FI-Self-report



FI-Lab



FI-Combined



Clinical Frailty Scale – Predicts Hospital LOS & Readmission

Juma et al., Canadian Geriatrics J, 2016

Clinical Frailty Scale*



1 Very Fit – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.



2 Well – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.



3 Managing Well – People whose **medical problems are well controlled**, but are **not regularly active** beyond routine walking.



4 Vulnerable – While **not dependent** on others for daily help, often **symptoms limit activities**. A common complaint is being "slowed up", and/or being tired during the day.



5 Mildly Frail – These people often have **more evident slowing**, and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.



6 Moderately Frail – People need help with **all outside activities** and with **keeping house**. Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.



7 Severely Frail – **Completely dependent for personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).



8 Very Severely Frail – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.



9. Terminally Ill - Approaching the end of life. This category applies to people with a **life expectancy <6 months**, who are **not otherwise evidently frail**.

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common symptoms in mild dementia include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In moderate dementia, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In severe dementia, they cannot do personal care without help.

* 1. Canadian Study on Health & Aging, Revised 2008.

2. K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005; 173:489-495.

FRAIL Scale

- Approximates Fried frailty phenotype

Fatigue: Are you fatigued?

Resistance: Cannot walk up 1 flight of stairs?

Aerobic: Cannot walk 1 block?

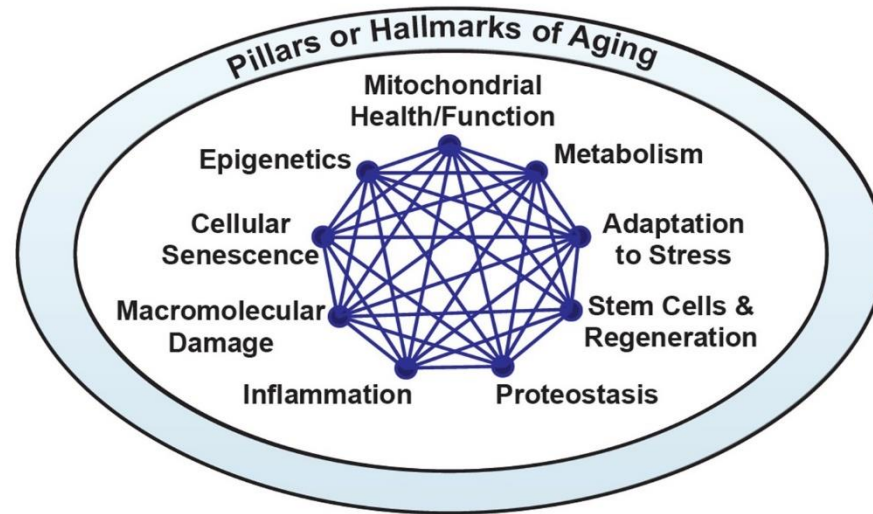
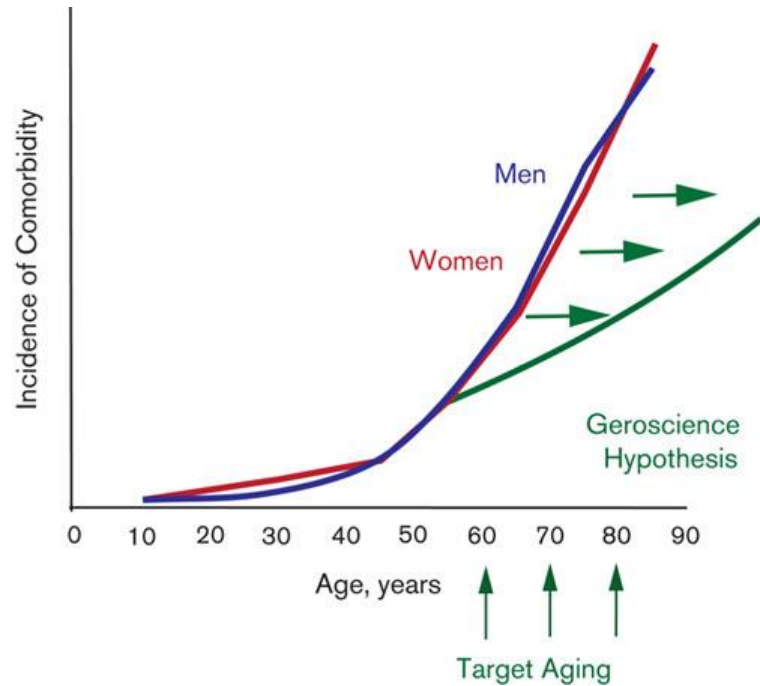
Illnesses: Do you have more than 5 illnesses?

Loss of weight: Have you lost more than 5% of your weight in the past 6 months?

Scoring:

Robust (score=0), Prefrail (score=1-2), and Frail (score=3-5)

The Geroscience Approach to Improve Healthspan



Translational Geroscience Network
<https://www.gerosciencenetwork.org/>



Justice, Jamie N., et al. Cardiovascular endocrinology & metabolism 7.4 (2018): 80.

Kennedy, Brian K., et al. "Geroscience: linking aging to chronic disease." Cell 159.4 (2014): 709-713.

Espinoza, Justice, Kuchel, Newman, Pignolo; Chapter 2 Clinical Geroscience, Hazzard's Geriatric Medicine and Gerontology, 8th edition

Frailty as an outcome in clinical trials

- Few clinical trials including frailty as a primary outcome
- Differing frailty measures used, components of frailty or physical function
 - › Components of frailty phenotype
 - gait, strength, physical activity, exhaustion
 - › Physical function: strength, balance, flexibility
 - › Disability
 - › Falls, fear of falling
 - › Cardiometabolic: BMI, CV indices
 - › Cognition, depressive symptoms
 - › Quality of life
- Trials including frailty have focused on differing stages of frailty or specific populations
 - › Primary prevention
 - › Secondary prevention (i.e., progression of frailty)

Summary

- Frailty is a geriatric syndrome
- Increased risk for poor health outcomes
- Several instruments available
- Selection of instrument influenced by the research/clinical goal
- Frailty assessment is becoming more common in research & clinical practice

Resources

Frailty Science – <https://frailtyscience.org>

Global Frailty Network – Frailty Seminar Series

Acknowledgements



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<https://sapepper.barshop.uthscsa.edu/>



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