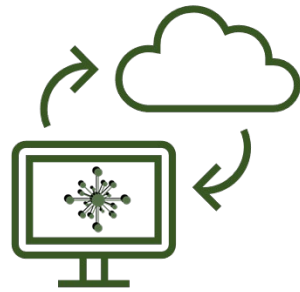


Leveraging VA Data to Develop the VA-Frailty Index



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Developing the VA-FI: variables were selected according to established criteria, with Geriatrician input

1. Related to health status
2. Increased in prevalence with age
3. Not saturated before age 65
4. Cover a range of health systems
5. If repeated measures, variables must be the same at each assessment

VA-FI domains:

1. Function
2. Morbidity
3. Cognition & Mood
4. Sensory impairment
5. Other/Geriatric



31-item VA-FI using VA claims, augmented with CMS data

• **Function:**



- Arthritis/gout
- Falls
- Fatigue
- Use of DME
- Muscle wasting/cachexia
- Gait abnormality
- Parkinson's Disease
- Peripheral vascular disease

• **Morbidity:**



- Anemia
- Atrial Fibrillation
- Cancer
- Chronic kidney disease
- Coronary artery disease
- Diabetes
- Heart Failure
- Hypertension
- Liver disease
- Lung disease
- Osteoporosis
- Stroke/TIA
- Thyroid disorder

• **Sensory:**



- Vision loss
- Hearing loss
- Peripheral neuropathy

• **Memory/Mood:**



- Dementia
- Depression
- Anxiety

• **Other/Geriatric:**

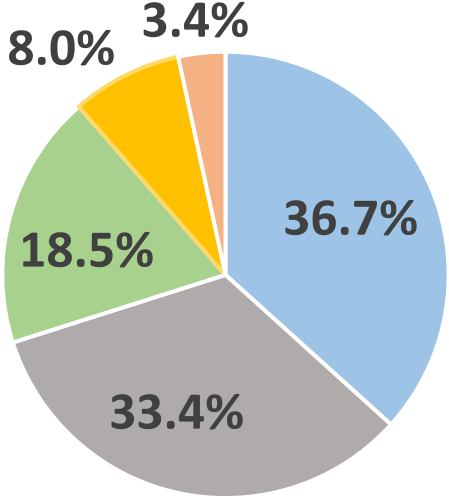
- Weight loss
- Chronic Pain
- Failure to thrive
- Incontinence

The prevalence of frailty in VA changed over time: increased by ~50% since 2002

Prevalence of Frailty 2002: 30%

N=1,606,750

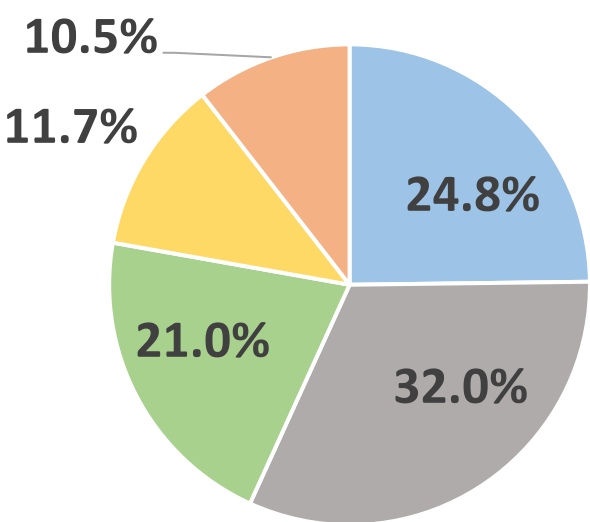
Mean age 75, 98% male



Prevalence of Frailty in 2018: 43%

N=2,359,207

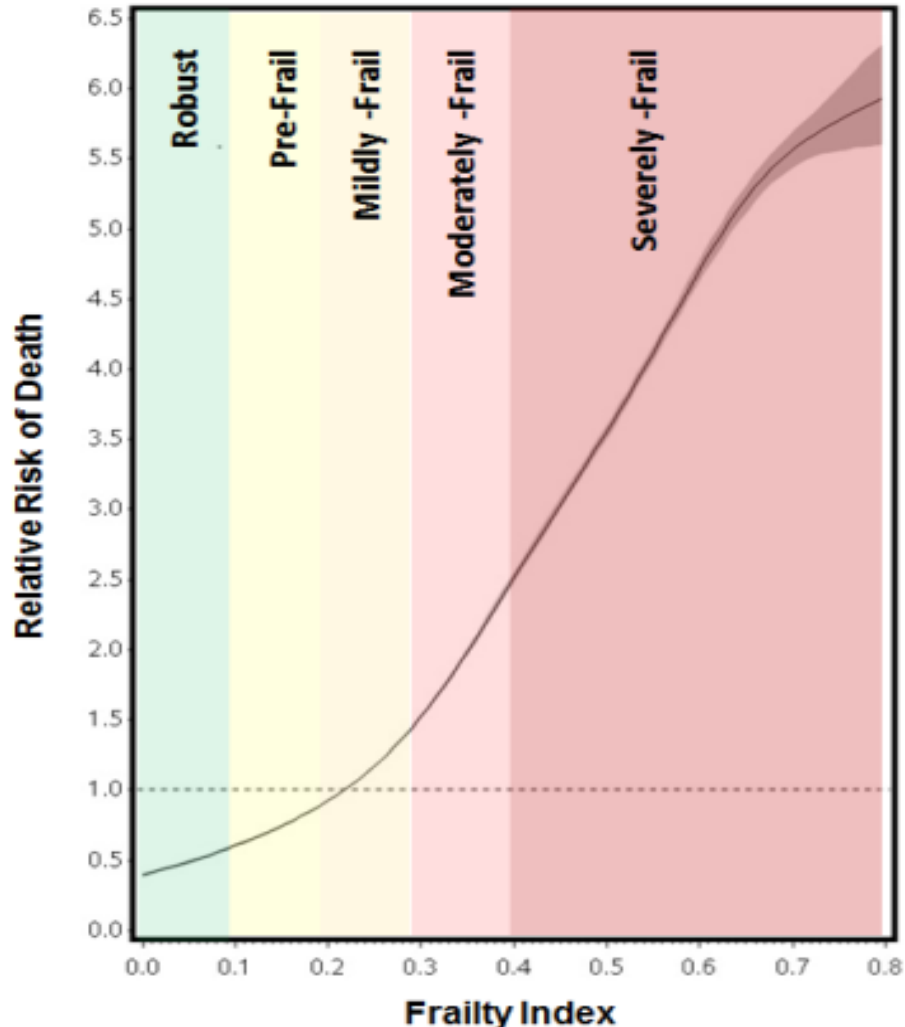
Mean age 76, 97% male



- Non-Frail
- Pre-Frail
- Mildly Frail
- Moderately Frail
- Severely Frail

The VA-FI identifies those at increased risk of mortality and can reset life expectancy estimates

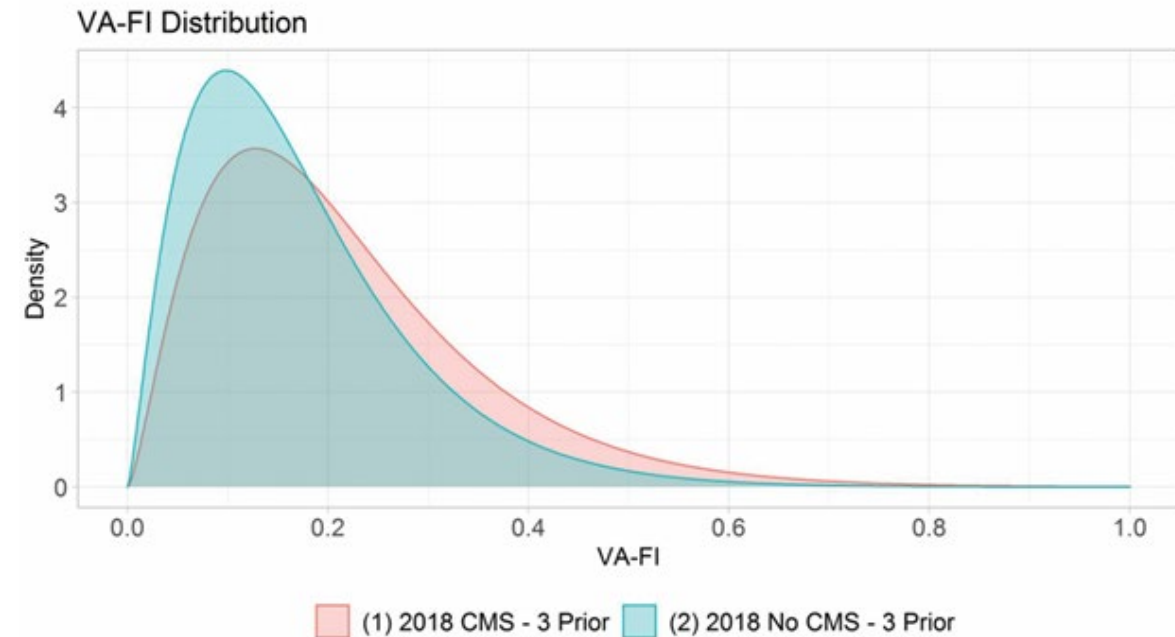
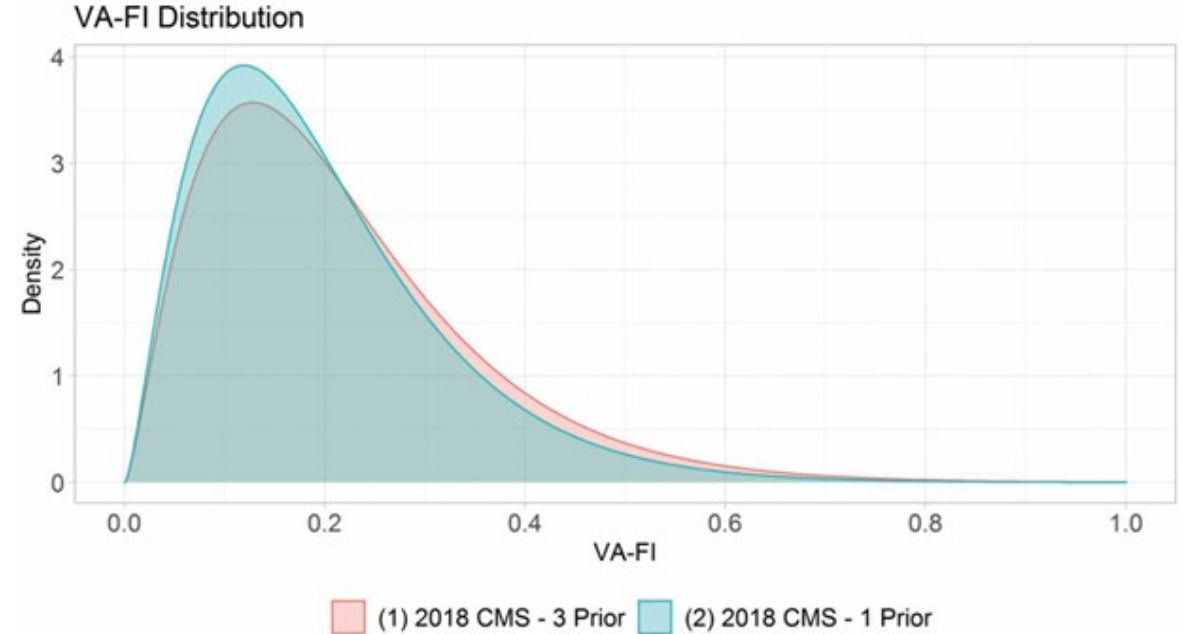
2-yr risk of all-cause mortality 2012-14



2002		Median Survival Time (Years)				
		Men			Women	
Frailty Score	Age	Age	Age	Age	Age	Age
	65-74	75-84	≥85	65-74	75-84	≥85
≤0.1	13.0	10.4	6.4	19.2	11.6	7.4
>0.1 - ≤0.2	12.4	8.7	5.7	15.1	10.5	6.5
>0.2 - ≤0.3	9.5	7.0	4.8	12.0	8.8	5.6
>0.3 - ≤0.4	6.8	5.4	3.8	8.5	7.0	4.5
>0.4	4.6	3.8	2.8	6.0	5.1	3.7
Overall	12.9	8.0	4.9	15.6	9.5	5.7

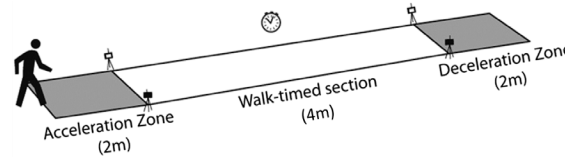
Data challenges

- How many years of look back do we need to calculate an FI?
- What happens if we do/don't include data from outside VHA?
 - 1 in 4 Veterans are reclassified to higher frailty category with CMS data
 - Yet - association with mortality is maintained



VA-FI vs clinical frailty measures: Construct Validity

- How well does the VA-FI correlate with clinical frailty assessments?
- 3 VA Boston clinics:
 - Primary Care Geriatrics
 - Geriatric Cardiology
 - Geriatric Oncology
- 132 patients, mean age 81



CGA-FI

Items marked with a star () must be completely assessed.

Name: [] RESET ALL Score: 0

Medical History* (21 items) [RESET]

Check any items that the patient has in his/her medical history.

<input type="checkbox"/> Angina	<input type="checkbox"/> COPD	<input type="checkbox"/> Heart failure
<input type="checkbox"/> Anxiety disorder	<input type="checkbox"/> Coronary artery disease	<input type="checkbox"/> Hypertension
<input type="checkbox"/> Arthritis	<input type="checkbox"/> Degenerative spine disease	<input type="checkbox"/> Myocardial infarction
<input type="checkbox"/> Asthma	<input type="checkbox"/> Dementia	<input type="checkbox"/> Peripheral vascular disease
<input type="checkbox"/> Atrial fibrillation/flutter	<input type="checkbox"/> Depression	<input type="checkbox"/> Sensory impairment
<input type="checkbox"/> Cancer within 5 years	<input type="checkbox"/> Diabetes	<input type="checkbox"/> Stroke/TIA
<input type="checkbox"/> Chronic kidney disease (eGFR <60)	<input type="checkbox"/> Fall within the past year	<input type="checkbox"/> Use of >= 5 prescription drugs

Functional Status* (22 items) [RESET]

Does the patient need help from another person to perform the following activities?

Activities of Daily Living	Instrumental Activities of Daily Living	Nagi & Rosow-Breslau Activities
<input type="checkbox"/> Feeding	<input type="checkbox"/> Using telephone	<input type="checkbox"/> Pulling or pushing a large object
<input type="checkbox"/> Dressing/undressing	<input type="checkbox"/> Using transportation	<input type="checkbox"/> Stooping, crouching or kneeling
<input type="checkbox"/> Grooming	<input type="checkbox"/> Shopping	<input type="checkbox"/> Lifting or carrying 10 lbs
<input type="checkbox"/> Walking (or use of a walker)	<input type="checkbox"/> Preparing own meals	<input type="checkbox"/> Reaching arms above shoulder
<input type="checkbox"/> Getting in and out of bed	<input type="checkbox"/> Housework	<input type="checkbox"/> Writing or handling small objects
<input type="checkbox"/> Toileting	<input type="checkbox"/> Taking own medications	<input type="checkbox"/> Walking up/down a flight of stairs
<input type="checkbox"/> Bathing or shower	<input type="checkbox"/> Managing money	<input type="checkbox"/> Walking half a mile
		<input type="checkbox"/> Heavy work around house

Performance Tests (4 items) [RESET]

Mental State Examination [MMSE] [MoCA] [Mini-Cog]

1 points 0.7 points 0.3 points 0 points

Points (MMSE)

5 Repeated Chair Stands

0 points 0.25 points 0.5 points 0.75 points 1 points

Seconds

Gait Speed

1 points 0.7 points 0.3 points 0 points

Meters/Second

Dominant Handgrip Strength

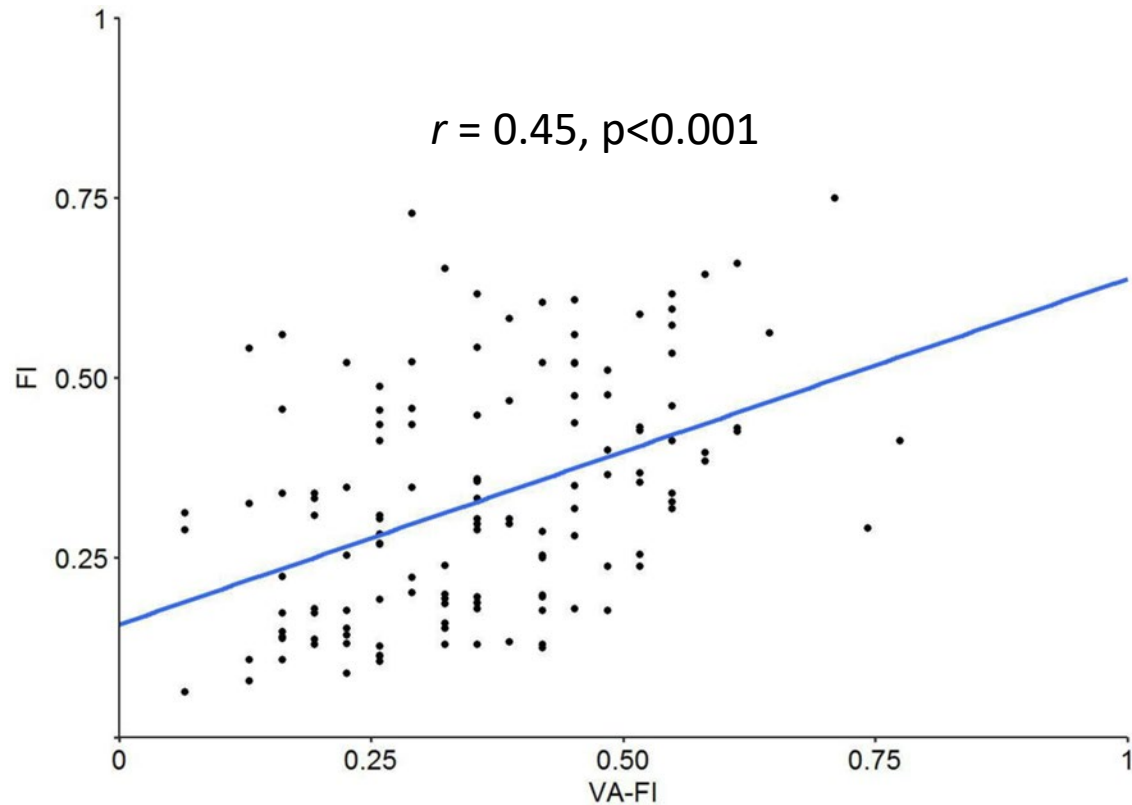
1 points 0.5 points 0 points

Kilograms (Male)

Nutritional Status (3 items) [RESET]

Weight loss > 10lbs in past year Body mass index < 21kg/m² Serum albumin < 3.5 g/L

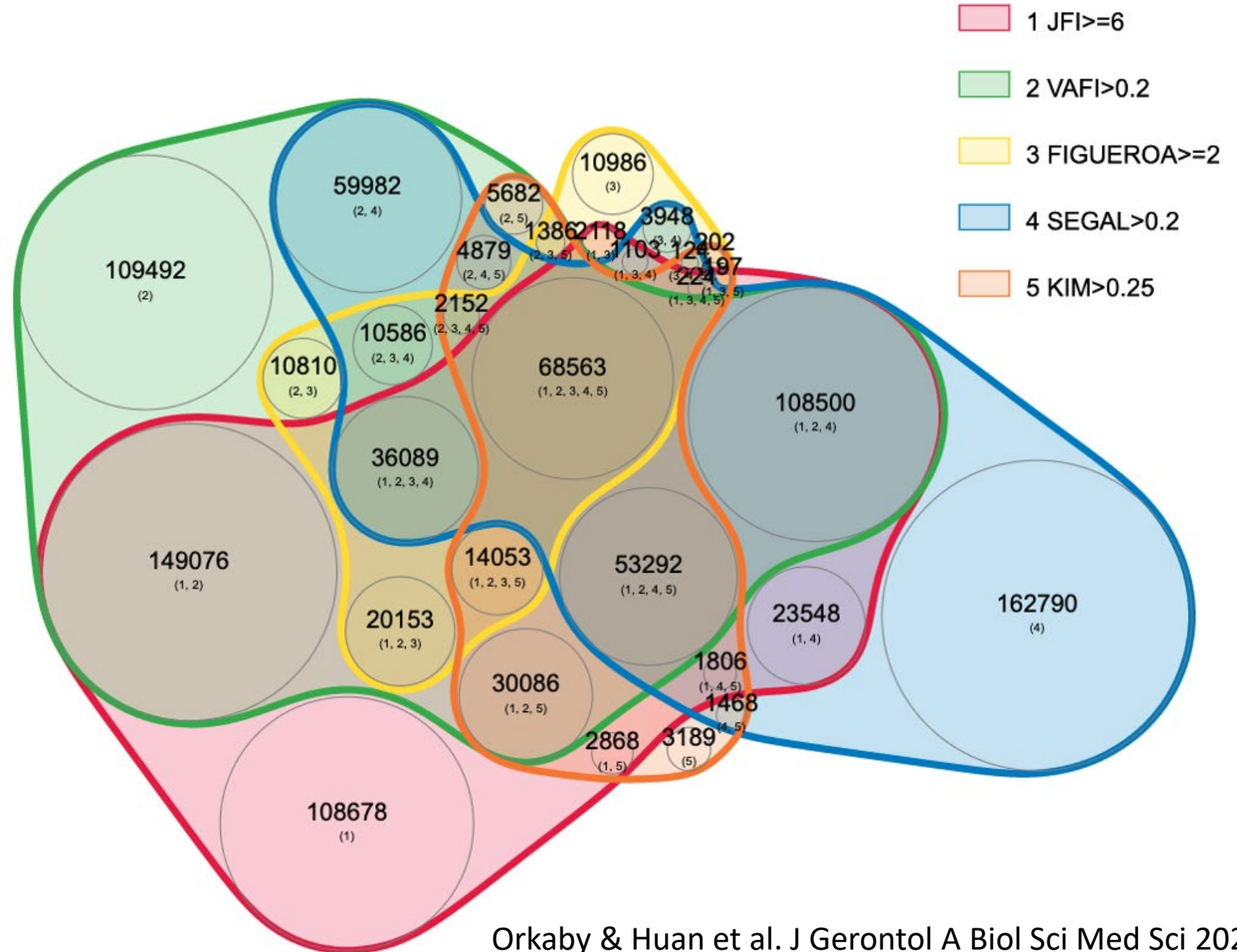
VA-FI vs in person Frailty measures: Construct Validity



Clinical frailty measures	Association between VA-FI and clinical frailty measure, univariable (effect estimate and 95% CI)	Association between VA-FI and clinical frailty measure, adjusted for Age, Race, and Charlson (effect estimate and 95% CI)
CGA-FI (continuous)	Beta 0.05 (0.03-0.07)	Beta 0.04 (0.02-0.06)
Clinical Frailty Scale (ordinal categories 1-4, 5-6, ≥ 7)	OR 1.70 (1.26, 2.91)	OR 1.65 (1.21, 2.25)
ADL Dependency (assistance/dependency in 1 or more ADLs)	OR 1.61 (1.22-2.12)	OR 1.56 (1.17-2.09)
IADL Dependency (assistance/dependency in 1 or more IADLs)	OR 1.69 (1.25-2.29)	OR 1.76 (1.27-2.46)
4-meter gait speed (continuous)	Beta -0.07 (-0.11,-0.02)	Beta -0.06 (-0.12, -0.01)

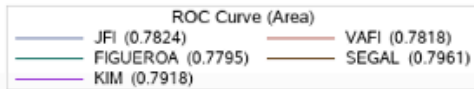
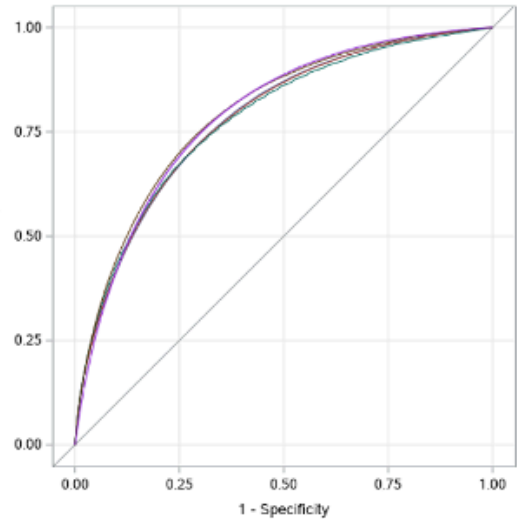
How do claims-based frailty indices compare in VA data? Each identifies somewhat different people

- 2.6 Million Veterans, ≥ 65 seen in 2014
- 80% White, 9% Black
- 7 to 26% frail
- Only $\sim 3\%$ frail by all CFIs

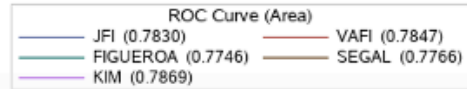
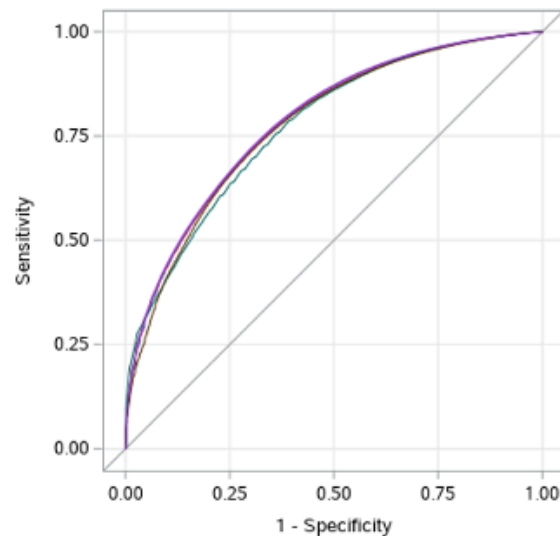


Yet – all CFIs identify increased risk of long-term institutionalization and mortality

Panel C. Adjusted LTI



Panel D. Adjusted Death

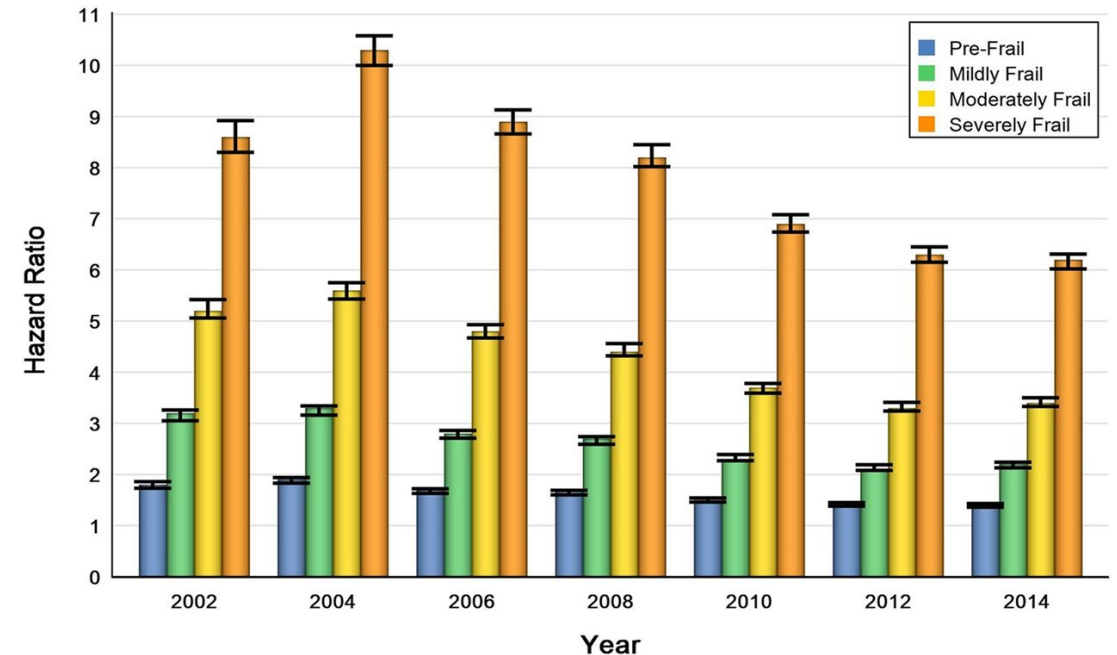


Area Under the Curve (AUC)	JFI	VAFI	Figuroa	Segal	Kim
AUC – for LTI					
Frailty	0.69	0.71	0.66		
Frailty + age + sex	0.77	0.77	0.77		
Frailty + utilization	0.71	0.72	0.69		0.73
Frailty + age + sex + utilization	0.78	0.78	0.78	0.80	0.79
AUC – for Death					
Frailty	0.67	0.70	0.60		
Frailty + age + sex	0.78	0.78	0.77		
Frailty + utilization	0.68	0.70	0.63		0.70
Frailty + age + sex + utilization	0.78	0.78	0.77	0.78	0.79

VA-FI has become a powerful tool for epidemiologic research across VA

- Atrial Fibrillation
- Anticoagulation
- Cancer
- Cardiovascular disease
- COVID and flu
- Diabetes
- Institutionalization
- Military exposures and aging
- Surgery
- Suicide risk
- Elder abuse, social determinants of health

Association between VA-FI level and CV Mortality Over Time



Making the VA-FI and other frailty tools accessible

VA U.S. Department of Veterans Affairs CIPHER

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Phenotype Knowledgebase

Browse existing EHR phenotypes and metadata in our searchable online database.

CIPHER: CENTRALIZED INTERACTIVE PHENOMICS RESOURCE

Developed by the U.S. Department of Veterans Affairs (VA), CIPHER is an online knowledge-sharing platform that aims to optimize electronic health records (EHR) data for use in research and clinical operations. The CIPHER knowledgebase contains:

- EHR-based phenotype definitions
- Data mappings
- Programming code
- Tools for visualizing data and generating phenotypes

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Veterans Affairs Frailty Index

Basic Information and Contact

Abbreviations and Keywords

VA-FI VA-FI-10

Publication

[Updating and Validating the U.S. Veterans Affairs Frailty Index: Transitioning From ICD-9 to ICD-10](#)

[The Burden of Frailty Among U.S. Veterans and Its Association With Mortality, 2002-2012](#)

Data Classification(s)

Health Access and Metrics

Related Disease

Geriatric

Author(s)

Geriatrics Phenotyping Core

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GECDAC has Macros for frailty available for clinical and operations

Why Measure Frailty

Help Me Choose a Frailty Tool

Overview of Frailty Tools



U.S. Department of Veterans Affairs
Veterans Health Administration
Geriatric Research, Education, and Clinical Centers

Why are you measuring frailty?

REFRESH



Screening or brief risk assessment



Comprehensive assessment and care planning



Risk assessment before stressful treatment (e.g., surgery, chemotherapy)



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