THE CASE FOR FRAILTY

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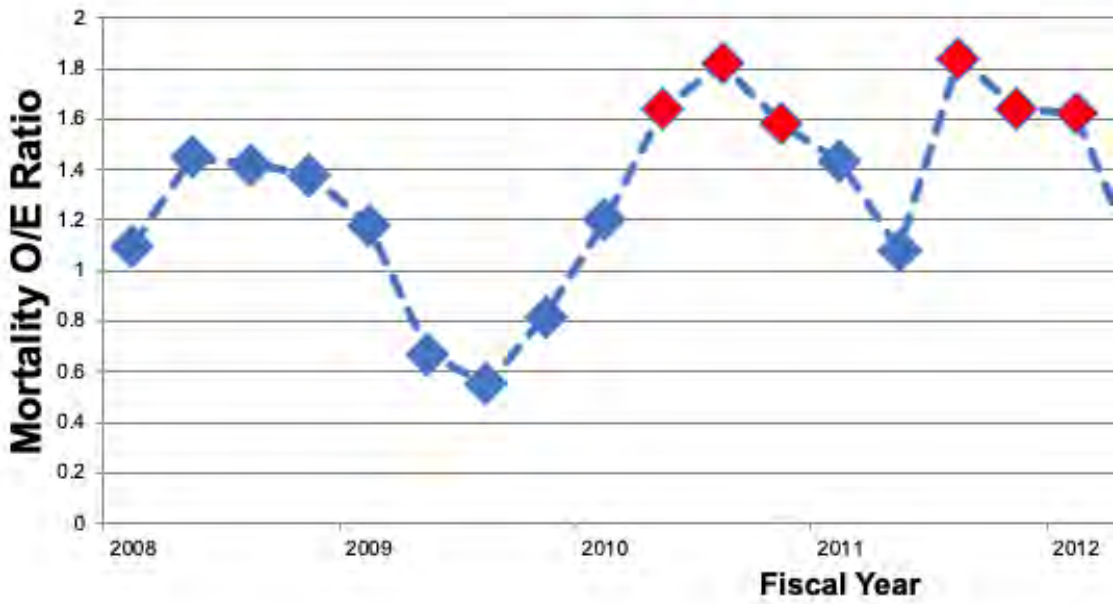
Disclosures

- Founder Managing Member
  - AutomatedAssessments LLC
  - FutureAssure LLC
    - Vital-iT™
  - BlueFlower LLC

- Will not be discussing FutureAssure LLC proprietary technology

If you are a Chief of Surgery:

Observed/Expected Mortality at the Omaha VAMC
(Red points are > 90% Confidence Interval)



Frailty is the Best Predictor of Postoperative Complications

Frailty and postoperative complications

The unadjusted incidence of complications after minor procedures was 3.9% in nonfrail, 7.3% in intermediately frail, and 11.4% in frail patients; after major procedures, the unadjusted incidence was 19.5% in nonfrail, 33.7% in intermediately frail, and 43.5% in frail patients.

J Am Coll Surg
Vol. 210, No. 6, June 2010

Frailty as a Predictor of Surgical Outcomes in Older Patients

Martin A Makary, MD, MPH, FACS, Dorry L Segev, MD, PhD, FACS, Peter J Pronovost, MD, PhD, Dora Syin, MD, Karen Bandeen-Roche, PhD, Purvi Patel, MD, MPH, Ryan Takenaga, MD, Lara Devgan, MD, MPH, Christine G Holzmueller, BLA, Jing Tian, MS, Linda P Fried, MD, MPH

Reality Check

Reality Check

Variable	Nonfrail (0 or 1 Trait) (n = 24)′	Prefrail (2 or 3 Traits) (n = 13)	Frail (≥4 Traits) (n = 23)	P
Hospital cost	$27,731 ± $15,693	$29,776 ± $12,782	$76,363 ± $48,595	<.001
Posthospital 6-mo cost	$6,472 ± $7,523	$21,874 ± $13,018	$34,339 ± $31,756	<.001
Total 6-mo postoperative cost	$33,453 ± $17,870	$51,650 ± $21,569	$110,702 ± $67,705	<.001
Medicare DRG payment	$23,142 ± $6,751	$25,425 ± $5,234	$27,399 ± $3,148	.028
Baseline health	802,872		2,530,000	
Age (y)	70 ± 5	75 ± 6	81 ± 6	<.001
Postdischarge variables				
Discharge institutionalization	0% (0)	15% (2)	59% (13)*	<.001
30-d readmission	4% (1)	15% (2)	32% (7)*	.044

Association of VA Surgeons

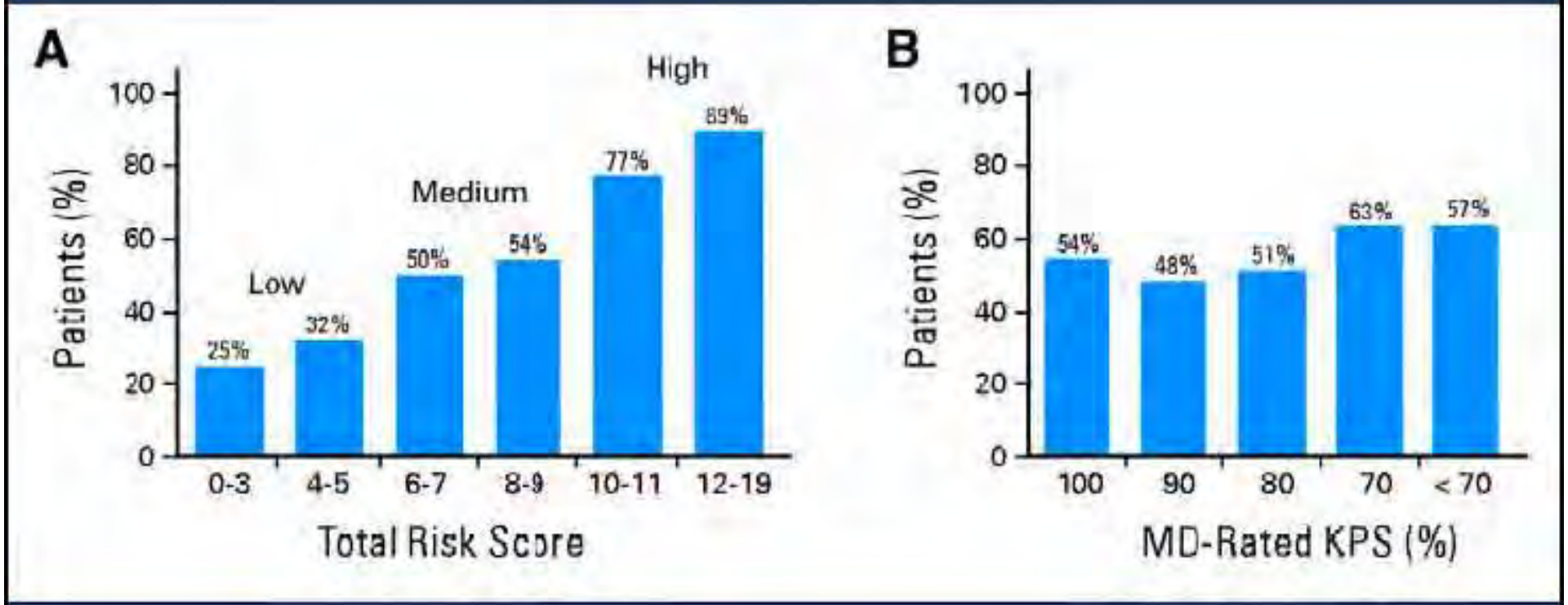
Frailty predicts increased hospital and six-month healthcare cost following colorectal surgery in older adults

Thomas N. Robinson, M.D., F.A.C.S.[a,b,*], Daniel S. Wu, M.D.[a,b], Gregory V. Stiegmann, M.D., F.A.C.S.[a,b], Marc Moss, M.D.[c]

The American Journal of Surgery, Vol 202, No 5, November 2011

How good is your eyeball…

Risk score versus physician-rated KPS to predict chemotherapy toxicity



Hurria A, JCO 2011;29:3457-3465

Journal of Cardiac Failure Vol. 29 No. 6 2023

Editorial Comment

Quantifying the Eyeball Test: Grip Strength at the Nexus of Frailty, Cachexia and Sarcopenia in Heart Failure

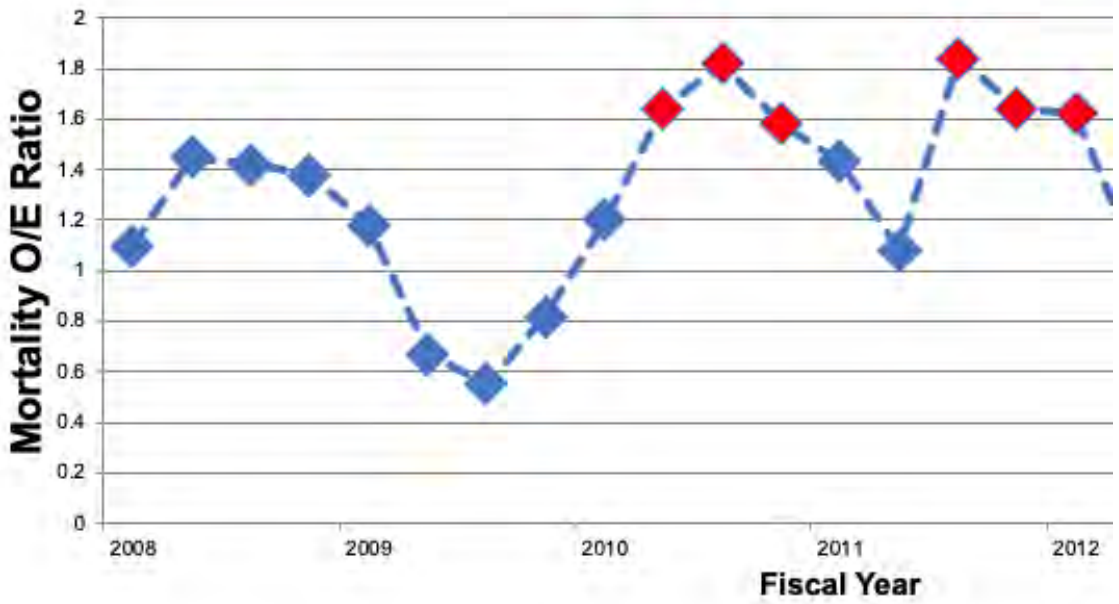
MICHAEL A. BURKE, MD

Atlanta, GA

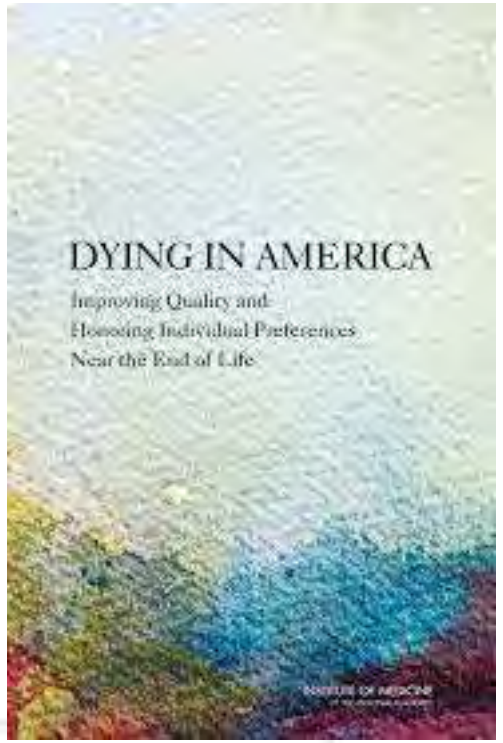
"I know it when I see it..." This famous phrase, written by Supreme Court Justice Potter Stewart in his concurrence to the majority decision in Jacobellis v Ohio in 1964, has a well-known parallel in clinical medicine: the "eyeball" test. Perhaps nowhere in cardiovascular medicine is the eyeball test more widely applied than in the assessment of frailty, a clinical entity marked by changes in physiological and cognitive function that leaves an individual more susceptible to adverse outcomes in response to stress. The eyeball test is frequently central in clinical decision making. However, quantitative analyses of the eyeball test have shown that clinicians: (1) do not accurately assess frailty and its associated risks; (2) are better at correctly identifying non-frail rather than frail patients; and (3) exhibit high interobserver variability when attempting to gauge frailty.14 Hence, the eyeball test is neither accurate nor precise.

If you are a Chief of Surgery:

Observed/Expected Mortality at the Omaha VAMC
(Red points are > 90% Confidence Interval)



If you had 6 months left to live would you want a major elective operation?

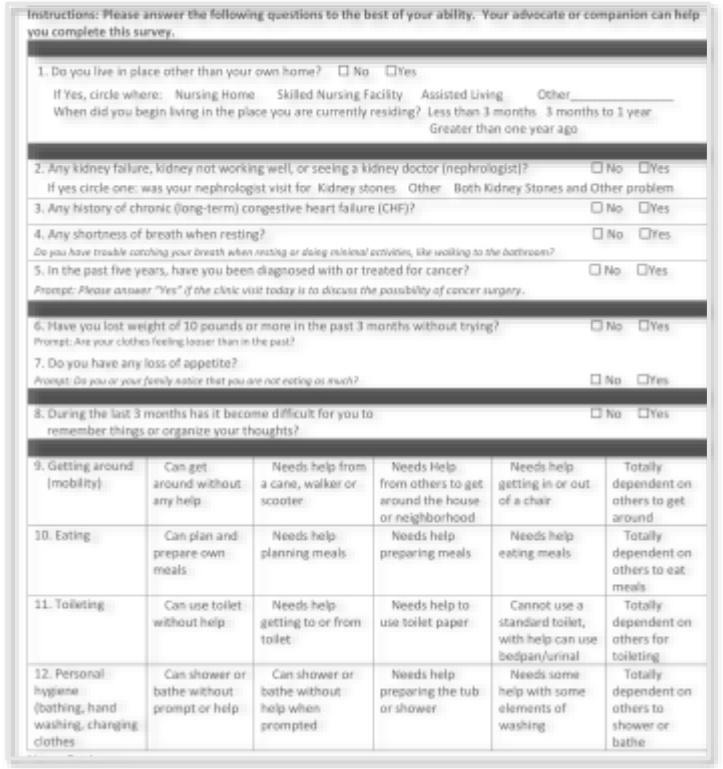


Risk Analysis Index (RAI)
14 Variables; weighted scale

- Age
- Sex
- Unintentional weight loss
- Poor appetite
- Cognitive impairment
- ADL: Mobility
- ADL: Eating
- ADL: Toileting
- ADL: Hygiene
- Living location (e.g., assisted living, SNF, etc)
- Any renal insufficiency/failure
- Any congestive heart failure
- Any shortness of Breath at rest or minimal activity
- Any history of cancer not in remission

Hall, DE. et al. *JAMA Surgery* 152(2) doi:10.1001/jamasurg.2016.4202 (Nov 23).

Current workflow…

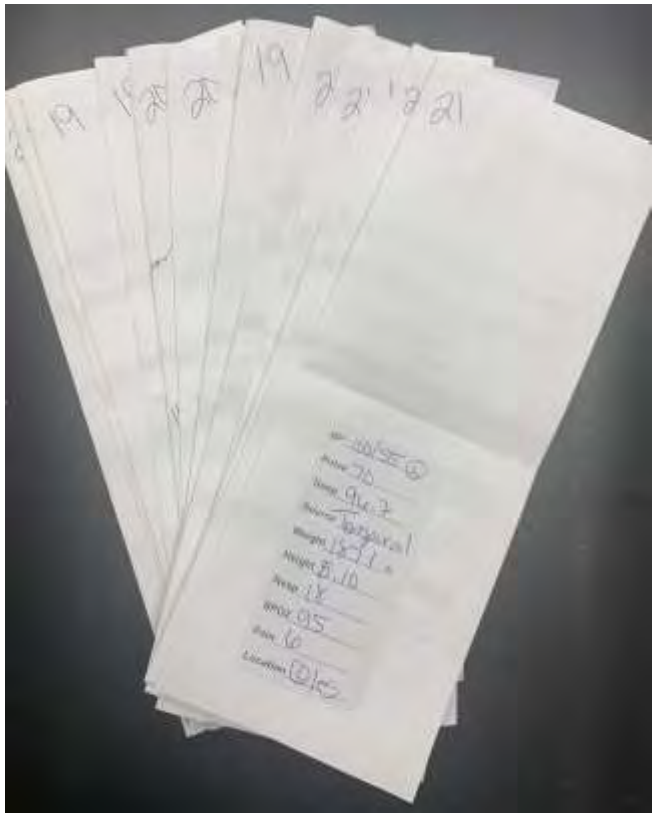


Instructions: Please answer the following questions to the best of your ability. Your advocate or companion can help you complete this survey.

1. Do you live in place other than your own home? ☐ No ☐Yes
   If Yes, circle where: Nursing Home Skilled Nursing Facility Assisted Living Other_____
   When did you begin living in the place you are currently residing? Less than 3 months 3 months to 1 year Greater than one year ago
2. Any kidney failure, kidney not working well, or seeing a kidney doctor (nephrologist)? ☐ No ☐Yes
   If yes circle one: was your nephrologist visit for Kidney stones Other Both Kidney Stones and Other problem
3. Any history of chronic (long-term) congestive heart failure (CHF)? ☐ No ☐Yes
4. Any shortness of breath when resting? ☐ No ☐Yes
   Do you have trouble catching your breath when resting or doing minimal activities, like walking to the bathroom?
5. In the past five years, have you been diagnosed with or treated for cancer? ☐ No ☐Yes
   Prompt: Please answer "Yes" if the clinic visit today is to discuss the possibility of cancer surgery.
6. Have you lost weight of 10 pounds or more in the past 3 months without trying? ☐ No ☐Yes
   Prompt: Are your clothes feeling looser than in the past?
7. Do you have any loss of appetite?
   Prompt: Do you or your family notice that you are not eating as much? ☐ No ☐Yes
8. During the last 3 months has it become difficult for you to remember things or organize your thoughts? ☐ No ☐Yes

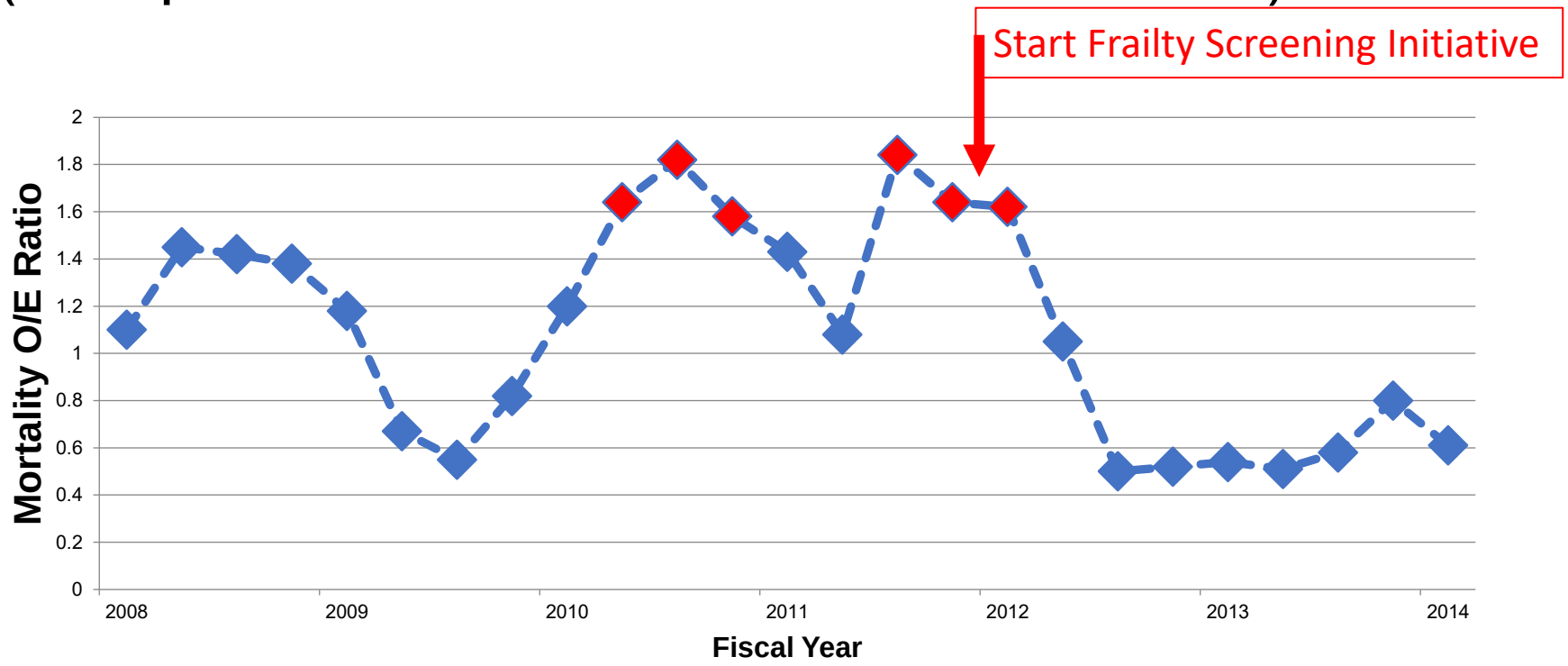
9. Getting around (mobility)	Can get around without any help	Needs help from a cane, walker or scooter	Needs Help from others to get around the house or neighborhood	Needs help getting in or out of a chair	Totally dependent on others to get around
10. Eating	Can plan and prepare own meals	Needs help planning meals	Needs help preparing meals	Needs help eating meals	Totally dependent on others to eat meals
11. Toileting	Can use toilet without help	Needs help getting to or from toilet	Needs help to use toilet paper	Cannot use a standard toilet, with help can use bedpan/urinal	Totally dependent on others for toileting
12. Personal hygiene (bathing, hand washing, changing clothes	Can shower or bathe without prompt or help	Can shower or bathe without help when prompted	Needs help preparing the tub or shower	Needs some help with some elements of washing	Totally dependent on others to shower or bathe

- Time intensive for clinic staff to administer
- Questionnaire only
  - Confirmed patient completion is accurate
- No physical assessments
- Optimize Vital Collection



What evidence supports Surgical Pause?

Observed/Expected Mortality at the Omaha VAMC
(Red points are > 90% Confidence Interval)



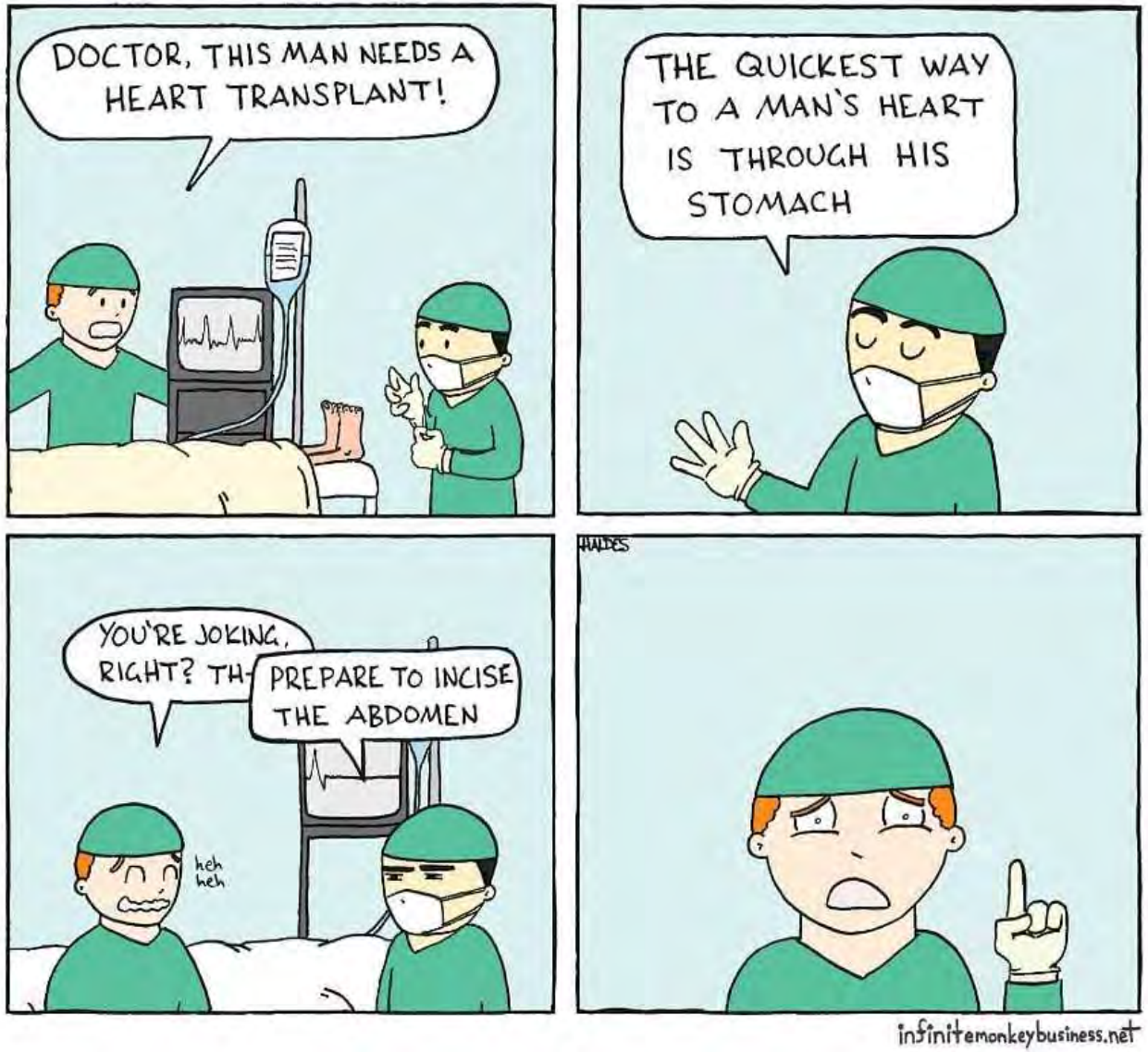
National Level Innovation in Patient Safety and Quality
The Surgical Pause - Veterans Health Administration

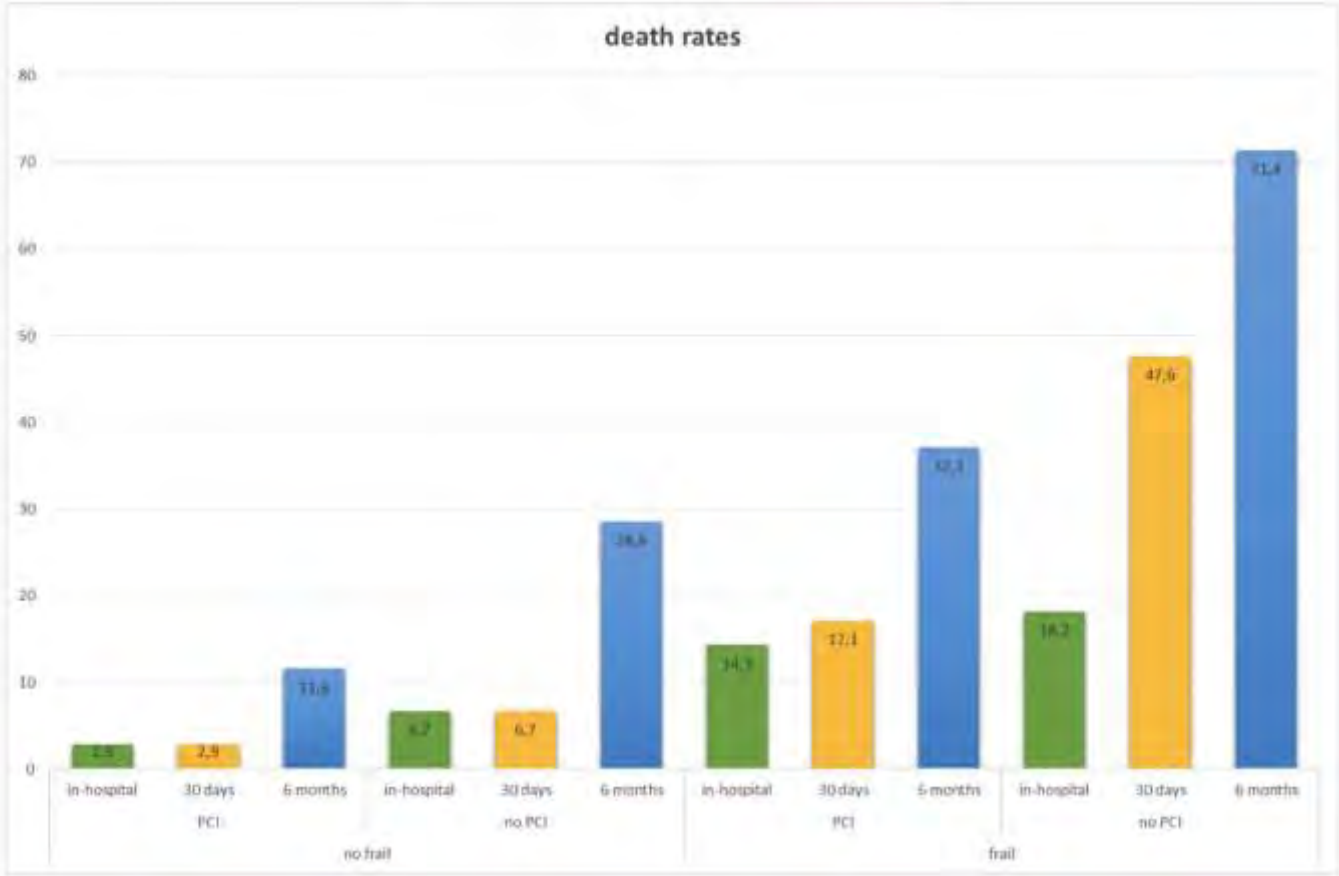
The Surgical Pause uses routine screening via the Risk Analysis Index (a bedside frailty assessment that can be completed in 30 seconds without disrupting workflow) to identify 5-10% of the highest risk patients who experience disproportionately high rates of postoperative complications, loss of independence, and mortality. For frail patients, a brief “pause” permits further evaluation to review goals of care and optimize treatment plans. For patients who decide to pursue surgery, multidisciplinary care plans can be tailored to mitigate frailty-associated risks prior to surgery through prehabilitative interventions such as nutritional supplementation, preoperative exercise to improve physical condition and respiratory function, and tailored surgical care (i.e., use of narcotic-sparing regional anesthetics during surgery), and systematic delirium assessment during recovery. Prehabilitative interventions shift the paradigm and effort from focusing on rescuing patients with postoperative complications to strengthening frail patients and mitigating potential complications before they happen. The Eisenberg Award panel was impressed by the simplicity and effectiveness of the Risk Analysis Index to permit clinicians to quickly screen patients, and they noted that the Surgical Pause’s overall methodological approach and implementation strategy makes it accessible and replicable by a wide variety of settings and facilities.

FOR EVERY SINGLE PATIENT GOING TO THE OPERATING ROOM/CONSIDERED FOR SURGICAL INTERVENTION I WANT YOU TO ASK A SINGULAR QUESTION:

- Is my patient FRAIL?

But that's not the heart!





The American Journal of Cardiology
Volume 230, 1 November 2024, Pages 41-46

Impact of Frailty on Outcome of Older Patients With Non-ST Elevation Acute Myocardial Infarction Who Undergo Percutaneous Coronary Intervention

Marco Mele MD [a], Ilaria Ragnatela MD [b], Matteo Romano MD [b], Erika Tabella MD [b], Luciano Umberto Rossi MD [b], Francesco Maatone MD [b], Antonietta Mele MD [c], Antonella Liantonio MD [c], Paola Imbrici MD [c], Michele Correale MD, PhD [a], Francesco Santoro MD, PhD [b], Natale Daniele Brunetti MD, PhD [b]

Table 3
Multivariable forward stepwise logistic regression analysis: significant predictors of 30-day mortality

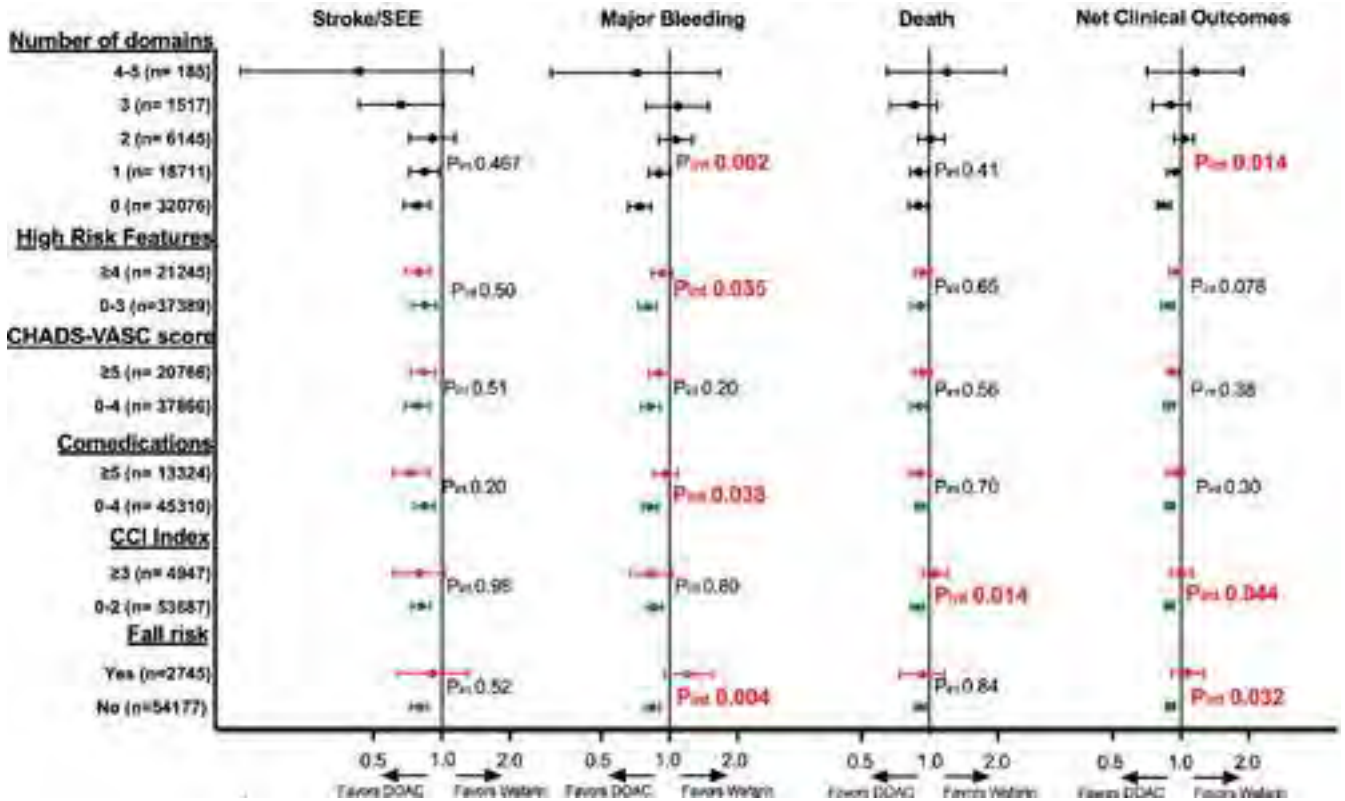
	OR	95% C.I.		p
ACEi/ARB	0.076	0.015	0.386	0.002
Frail	6.064	1.421	25.873	0.015
cTn-I	1.000	1.000	1.000	0.022

ACEi/ARB = angiotensin converting enzyme inhibitors angiotensin receptor antagonists; cTn-I = cardiac troponin I; LV = left ventricular.

Table 4
Multivariable forward stepwise logistic regression analysis: significant predictors of 6-month mortality

	OR	95% C.I.		p
ACEi/ARB	0.352	0.138	0.900	0.029
Frail	3.450	1.362	8.742	0.009
PCI	0.225	0.074	0.690	0.009
Severe LV dysfunction	4.651	1.671	12.947	0.003

ACEi/ARB = angiotensin converting enzyme inhibitors angiotensin receptor antagonists; LV = left ventricular; PCI = percutaneous coronary intervention.



Conclusion

In this pt level metanalysis of 4 AF trials of pts stratified by frailty status using 5 distinct measures and its combination, DOACs generally demonstrated lower risk of stroke/SEE and death compared to warfarin, with similar rates of major bleeding.

ANDRE NICOLAU et al.
FRAILTY STATUS AND OUTCOMES IN 58,634 PATIENTS WITH ATRIAL FIBRILLATION RANDOMIZED TO DOAC VS WARFARIN
***ACC* 2024; 83:22-22.**

JACC
JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

Frailty and Consideration of Advanced Therapies for Heart Failure

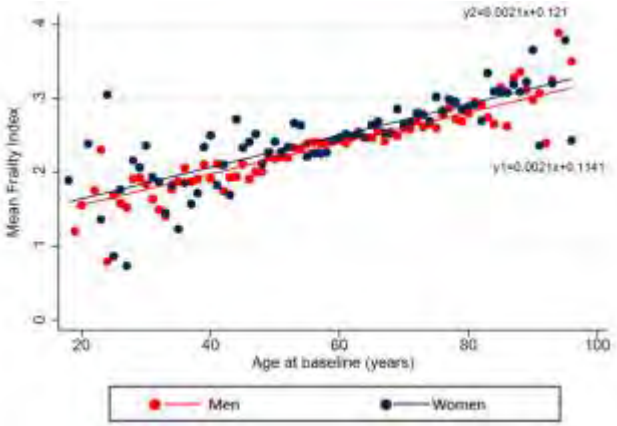
In addition, consideration of advanced HF therapies (e.g., LVADs, heart transplantation) may be complicated by underlying frailty and concern for clinical outcomes.[28] In a study at a major transplant center, patients referred or waitlisted for heart transplant were evaluated for frailty. Of these patients, 33% were determined to be frail. Frailty was associated with NYHA Class IV symptoms, lower BMI, higher intracardiac filling pressures and lower cardiac index, cognitive impairment and depression. Most interestingly, frailty was not associated with sex, age, LVEF or HF duration. Frailty was an independent predictor of increased all-cause mortality. Similar findings have been reported in patients undergoing lung transplantation.[29,30] A determination of frailty as an independent marker of outcomes should therefore be considered as part of the evaluation process of patients for advanced HF therapies.

1.Jha SR, Hanna MK, Chang S, et al. The prevalence and prognostic significance of frailty in patients with advanced heart failure referred for heart transplantation. *Transplantation* 2016;100:429-36.

ESC European Society of Cardiology
European Journal of Heart Failure (2020)
doi:10.1002/ejhf.1832
RESEARCH ARTICL

The prevalence and importance of frailty in heart failure with reduced ejection fraction – an analysis of PARADIGM-HF and ATMOSPHERE

Pooja Dewan[1], Alice Jackson[1], Pardeep S. Jhund[1], Li Shen[1], João Pedro Ferreira[2], Mark C. Petrie[1], William T. Abraham[3], Akshay S. Desai[4], Kenneth Dickstein[5], Lars Køber[6], Milton Packer[7], Jean L. Rouleau[8], Scott D. Solomon[4], Karl Swedberg[9], Michael R. Zile[10], and John J.V. McMurray[1]*



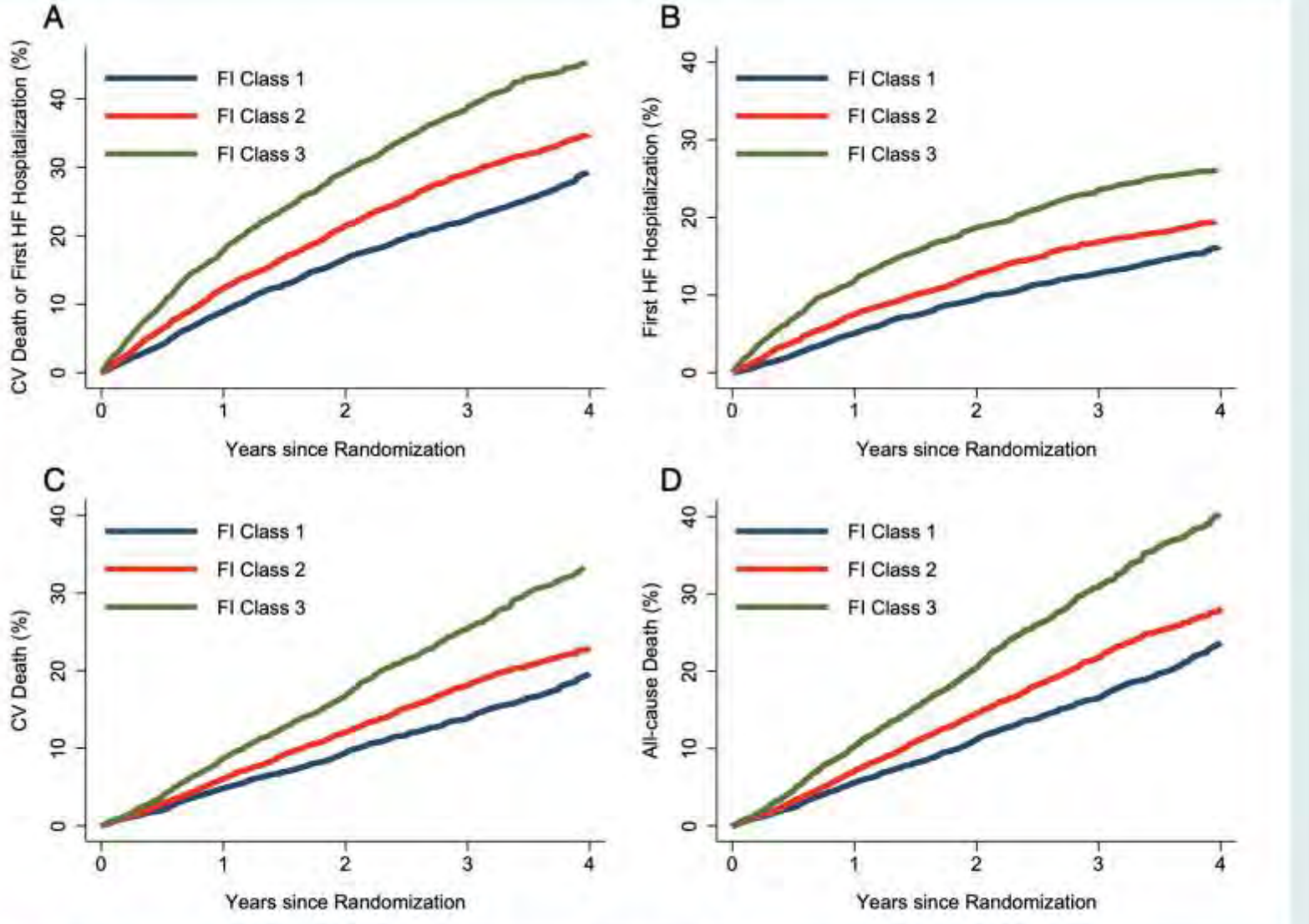


Figure 3 Clinical outcomes according to frailty index (FI) in heart failure (HF) with reduced ejection fraction. (*A*) Cumulative incidence curve of risk of first HF hospitalization or cardiovascular (CV) death. (*B*) Cumulative incidence curve of risk of first HF hospitalization. (*C*) Cumulative incidence curve of risk of CV death. (*D*) Kaplan–Meier curve of all-cause death.

Frailty Conceptualized

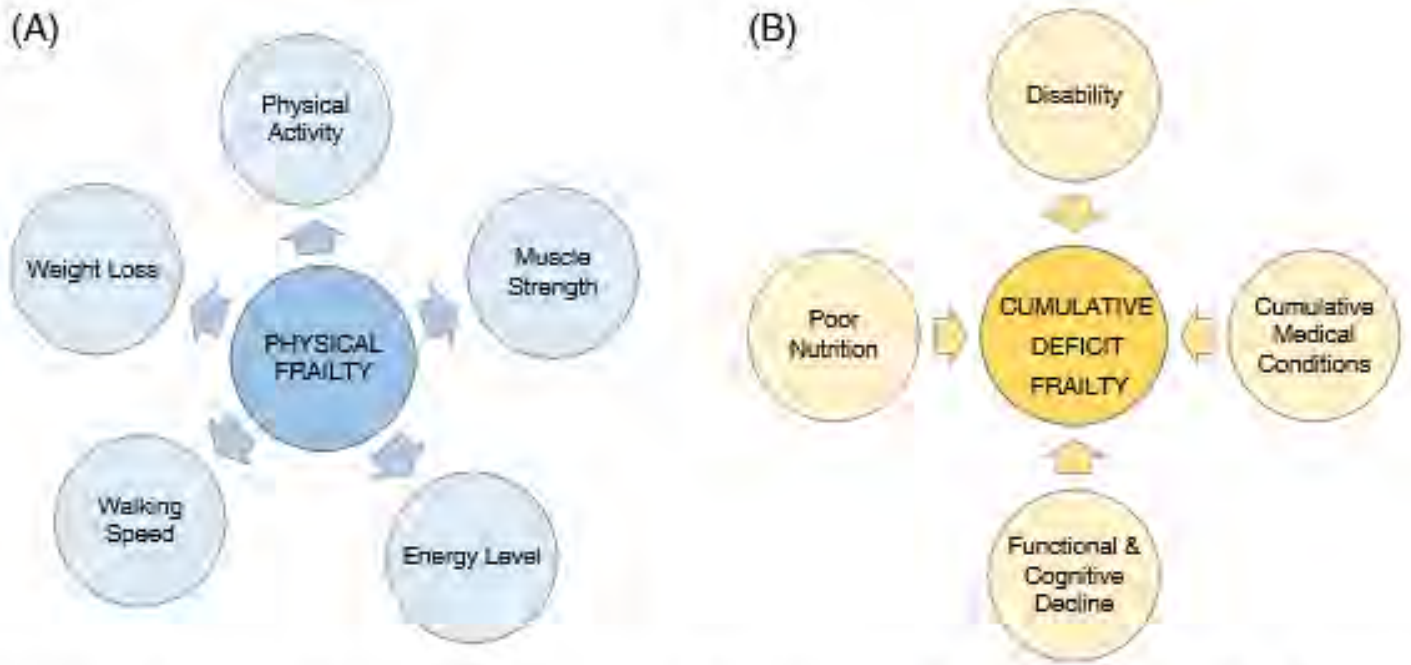


Figure 1. Representation of conceptual framework of two major theories on frailty. (A) Physical frailty, also termed phenotypic or syndromic frailty, is hypothesized to have a specific age-related biological basis that drives the appearance of signs and symptoms (outward pointing arrows). (B) Cumulative deficit frailty is hypothesized to be driven by cumulative nonspecific health, functional, psychological, and cognitive deficits (inward pointing arrows). Both concepts of frailty predict vulnerability to adverse outcomes and have led to multiple derivative frailty detection tools.

Journal of the American Geriatrics Society

Pages: 1565-1570 | First Published: 29 May 2019

https://doi.org/10.1111/jgs.15974

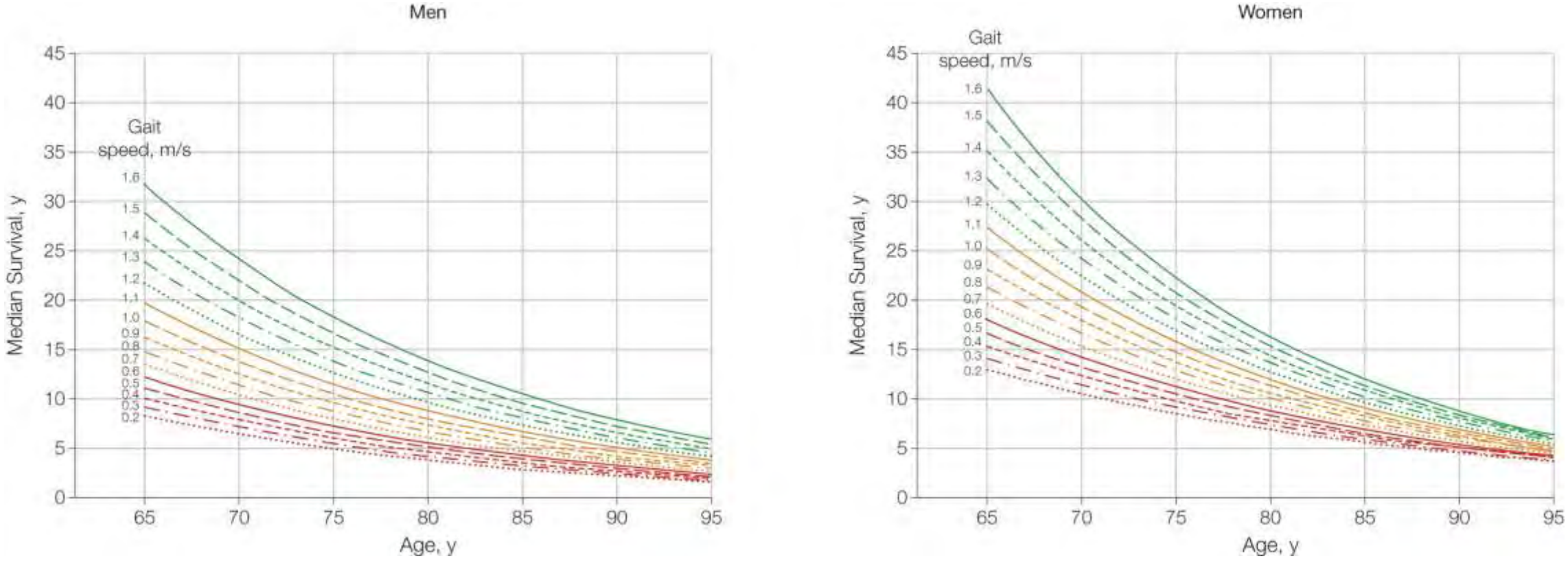
SPECIAL ARTICLES

Moving Frailty Toward Clinical Practice: NIA Intramural Frailty Science Symposium Summary

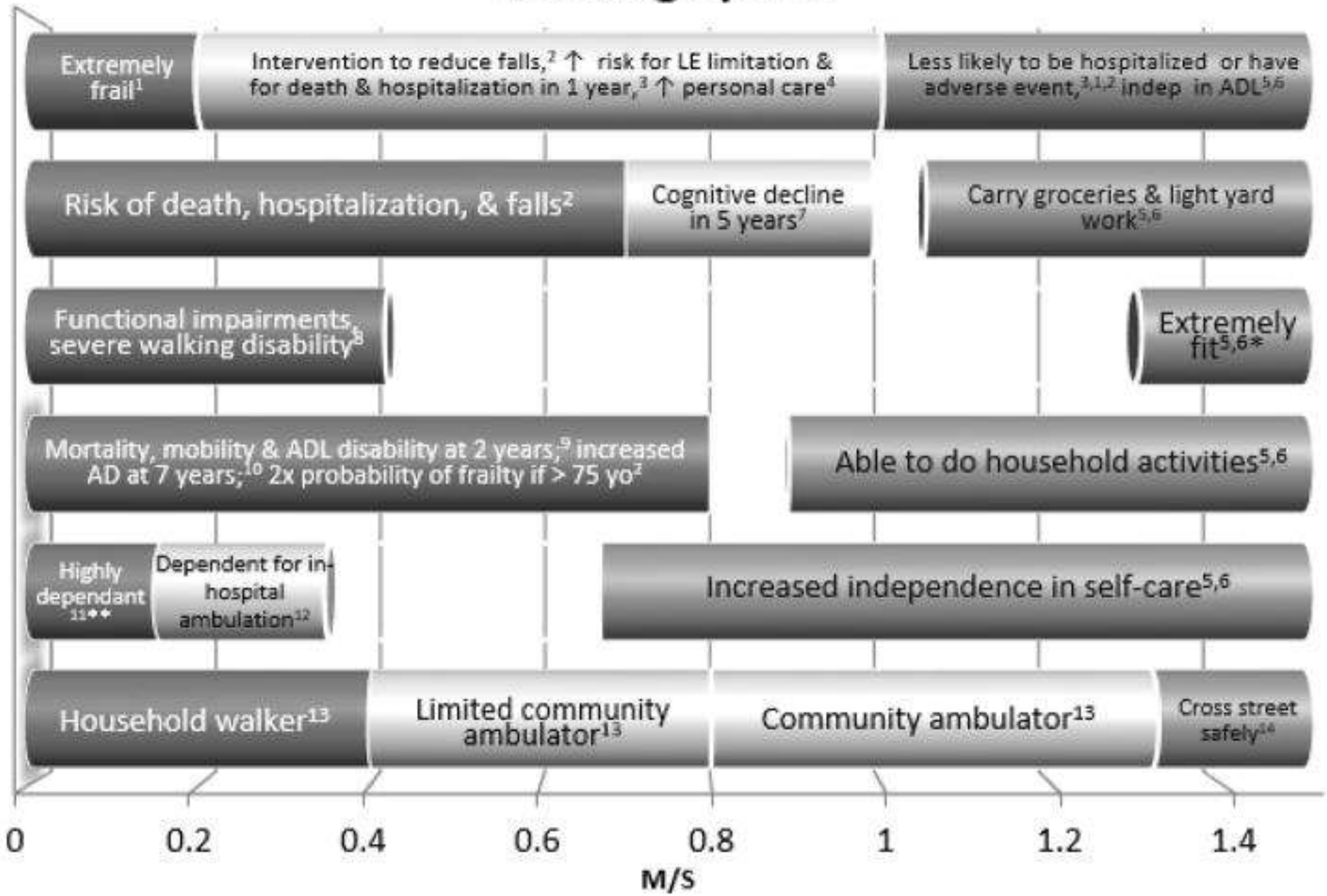
Jeremy Walston, MD, Karen Bandeen-Roche, PhD,† Brian Buta, MHS,* Howard Bergman, MD,‡ Thomas M. Gill, MD,§ John E. Morley, MD,‖ Linda P. Fried, MD,† Thomas N. Robinson, MD,¶** Jonathan Afilalo, MD,†† Anne B. Newman, MD,‡‡ Carlos Lopez-Otin, MD,§§ Rafa De Cabo, PhD,‖‖ Olga Theou, MD,¶¶ Stephanie Studenski, MD,‖‖ Harvey J. Cohen, MD,*** and Luigi Ferrucci, MD, PhD‖‖*

From: **Gait Speed and Survival in Older Adults**

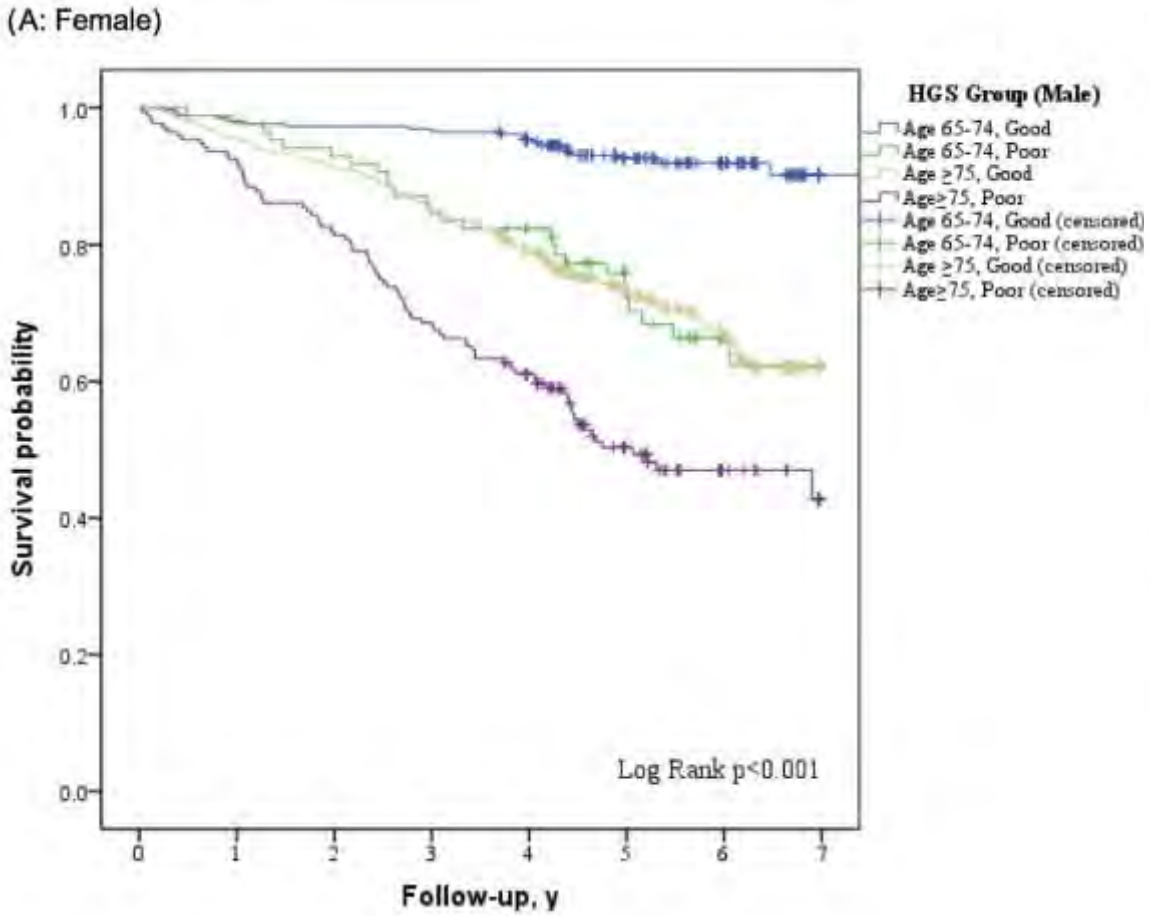
JAMA. 2011;305(1):50-58. doi:10.1001/jama.2010.1923

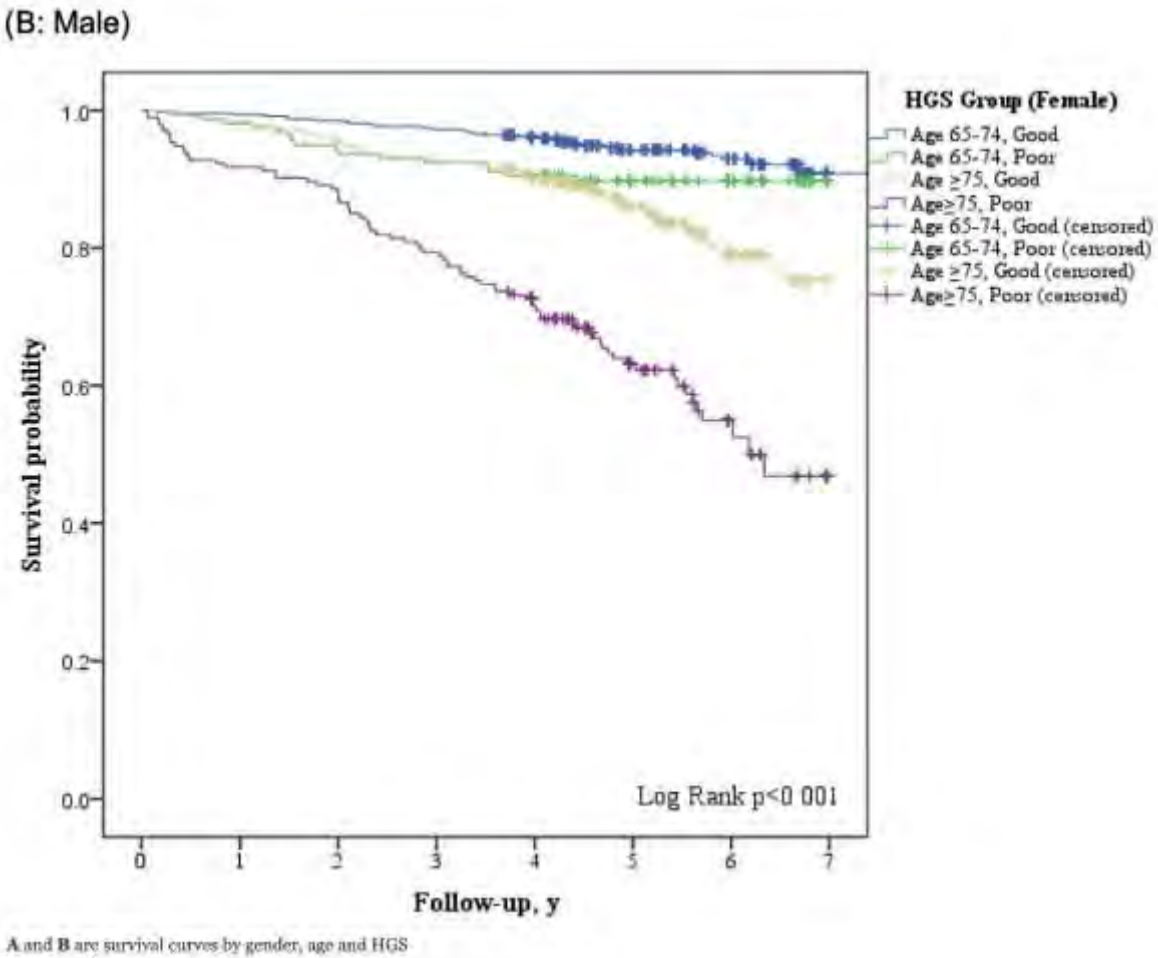


Walking Speed



Grip Strength





A and B are survival curves by gender, age and HGS

REVIEW

Highly Suggestive Evidence – Lower Cardiovascular Mortality

Highly Suggestive Evidence – Lower All-Cause Mortality

Highly Suggestive Evidence – Lower Risk of disability

Weak Evidence – Cardiac Death

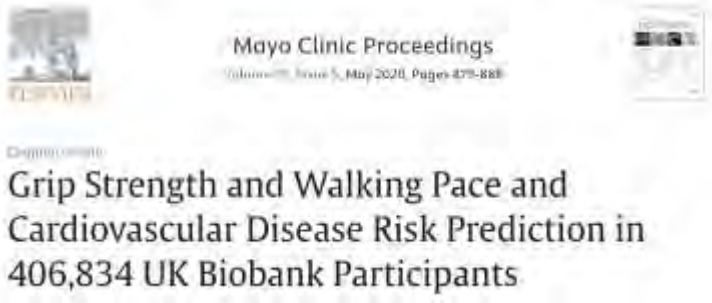
High Grip Strength

Convincing Evidence – Chair Rise Performance Overtime

Weak Evidence – Hospital Admissions

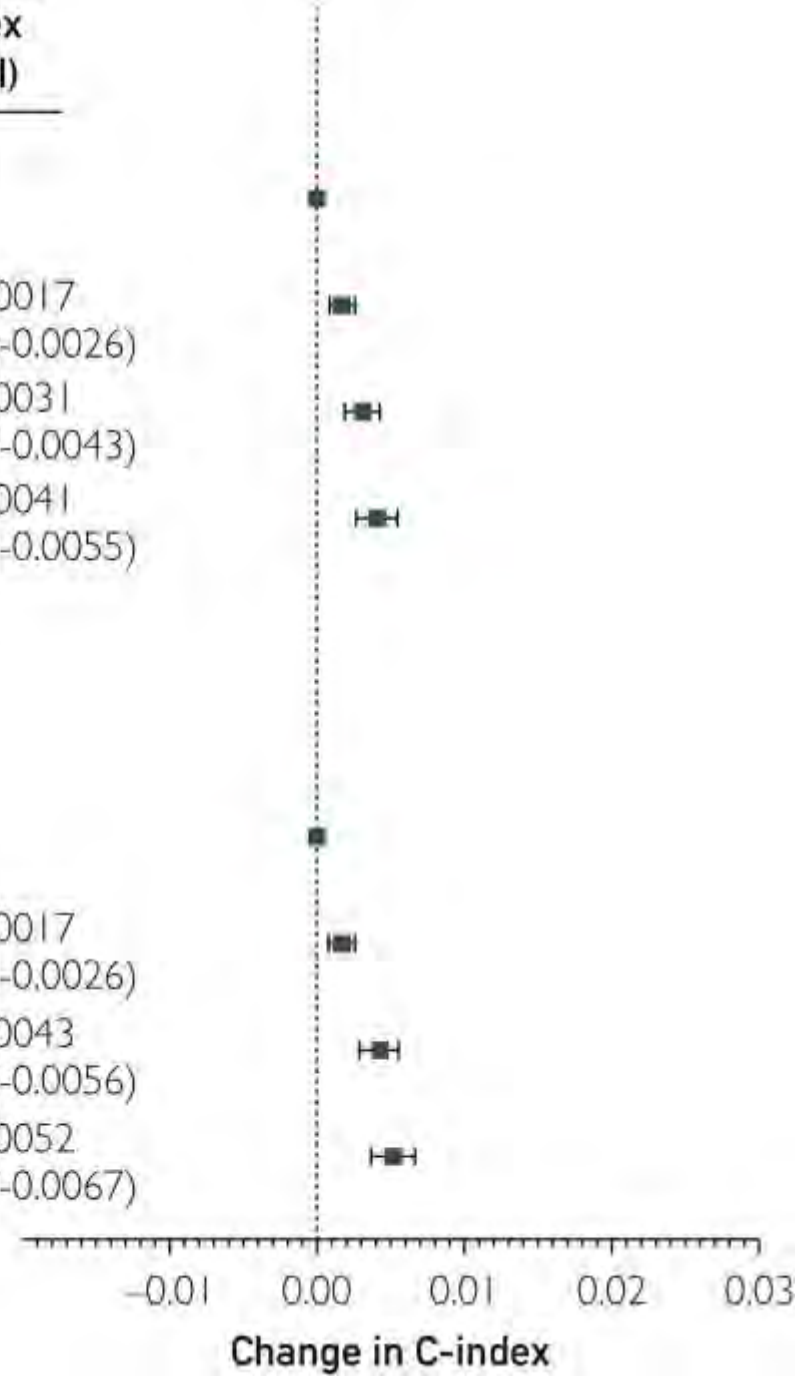
Weak Evidence – Inability to Balance

Weak Evidence – Walking Speed



The main finding of the present study is that in this large and comprehensive single-protocol cohort, the addition of grip strength and/or usual walking place resulted in an improvement in the prediction of CVD when added to established CVD risk scores (ACC/AHA and SCORE) and therefore the ability to classify people as high or low risk. Usual walking pace improved prediction to a greater extent than did grip strength, but the combination of the 2 provided the greatest improvement. These findings clearly suggest that grip strength and usual walking place, both of which are cheap, fast, and easy to measure, may have utility in clinical practice in improving the identification of people at high risk of fatal and nonfatal CVD outcomes who would benefit most from primary prevention.

	N participants	n cases	C-index (95% CI)	Change in C-index (95% CI)
CVD (AHA/ACC)	406,834	7274		
Classical risk factors			0.7463 (0.7406-0.7521)	
Classical risk factors plus grip				+0.0017 (0.0009-0.0026)
Classical risk factor plus walking pace				+0.0031 (0.0019-0.0043)
Classical risk factors plus grip and walking pace				+0.0041 (0.0027-0.0055)
CVD (AHA/ACC)	406,834	7274		
Classical risk factors (no lipids)			0.7378 (0.7324-0.7432)	
Classical risk factors (no lipids) plus grip				+0.0017 (0.0008-0.0026)
Classical risk factors (no lipids) plus walking pace				+0.0043 (0.0029-0.0056)
Classical risk factors (no lipids) plus grip and walking pace				+0.0052 (0.0037-0.0067)



Mayo Clinic Proceedings

Grip Strength and Walking Pace and Cardiovascular Disease Risk Prediction in 406,834 UK Biobank Participants

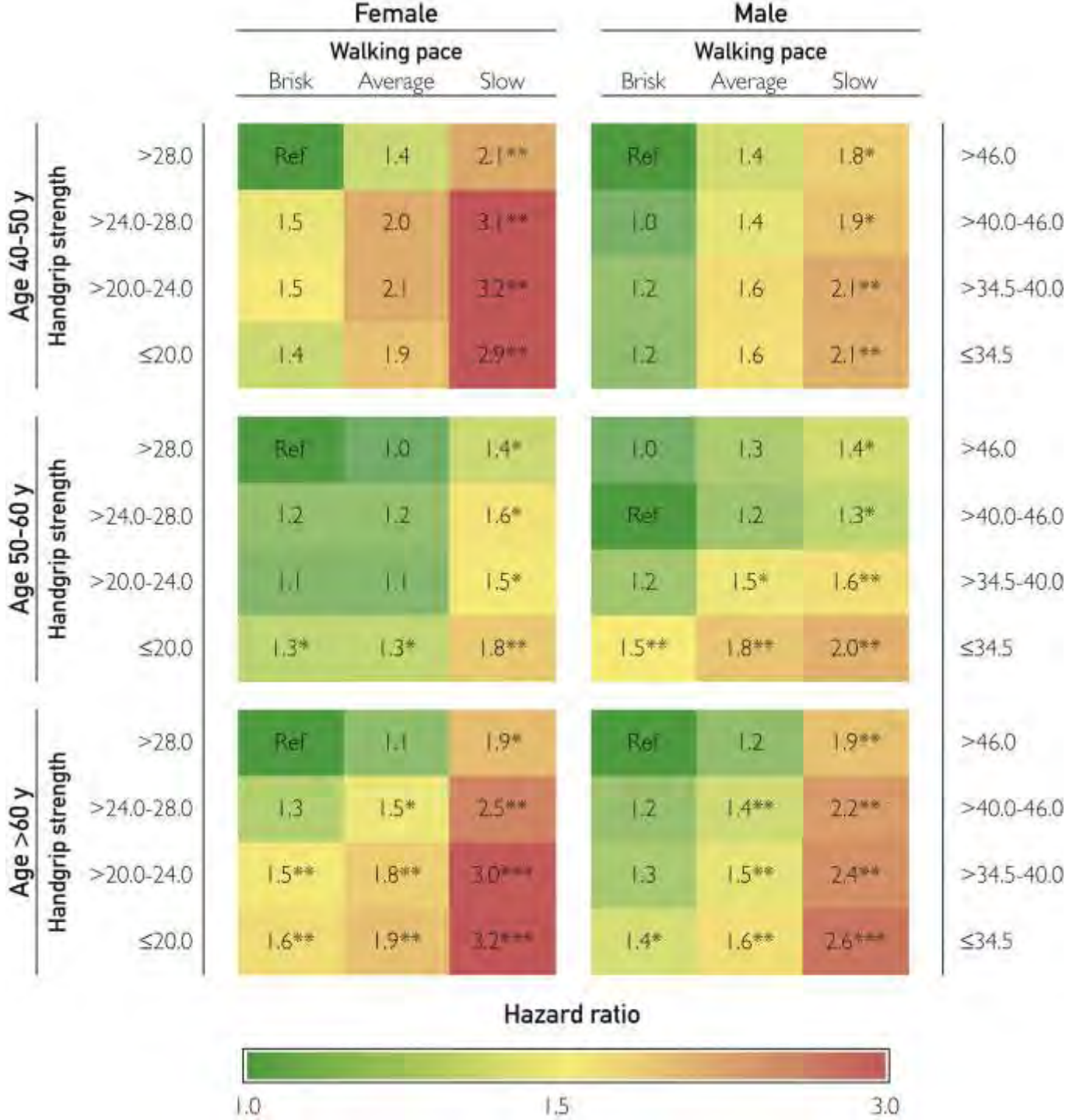
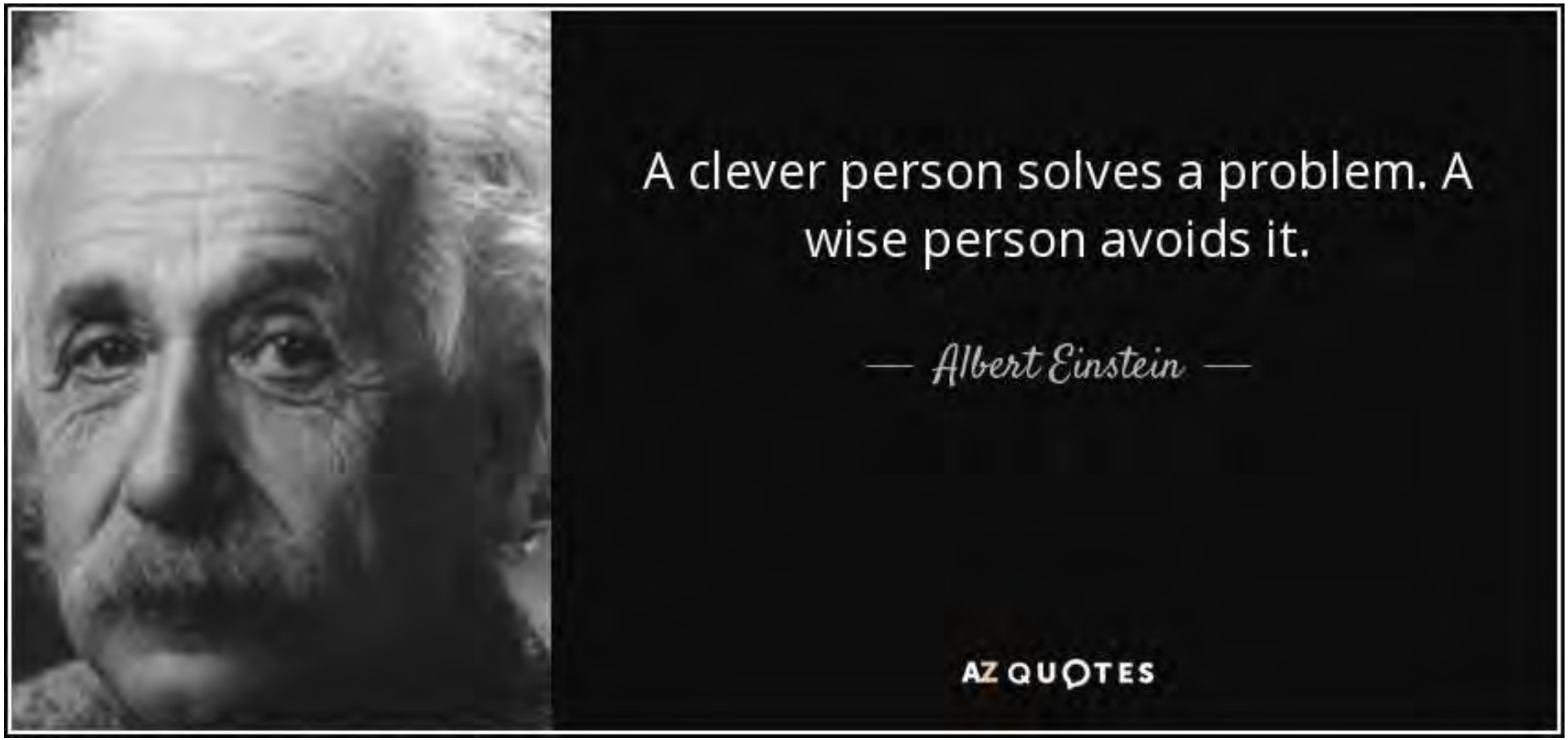


Figure 1. Cardiovascular disease risk matrix for the combined effect of grip strength and walking pace by sex and age. Risk matrixes were developed using Cox regression models for the overall data, by sex and by age and sex groups (40 to 50, 51 to 60, >60 years for both women and men). Self-reported walking pace and sex-specific quartiles of handgrip were mutually adjusted in the models and were additionally adjusted for age, sex, ethnicity, diabetes, systolic blood pressure, total cholesterol level, high-density lipoprotein cholesterol level, and smoking. ***P<.001; **P<.01; *P<.05. Ref = reference.

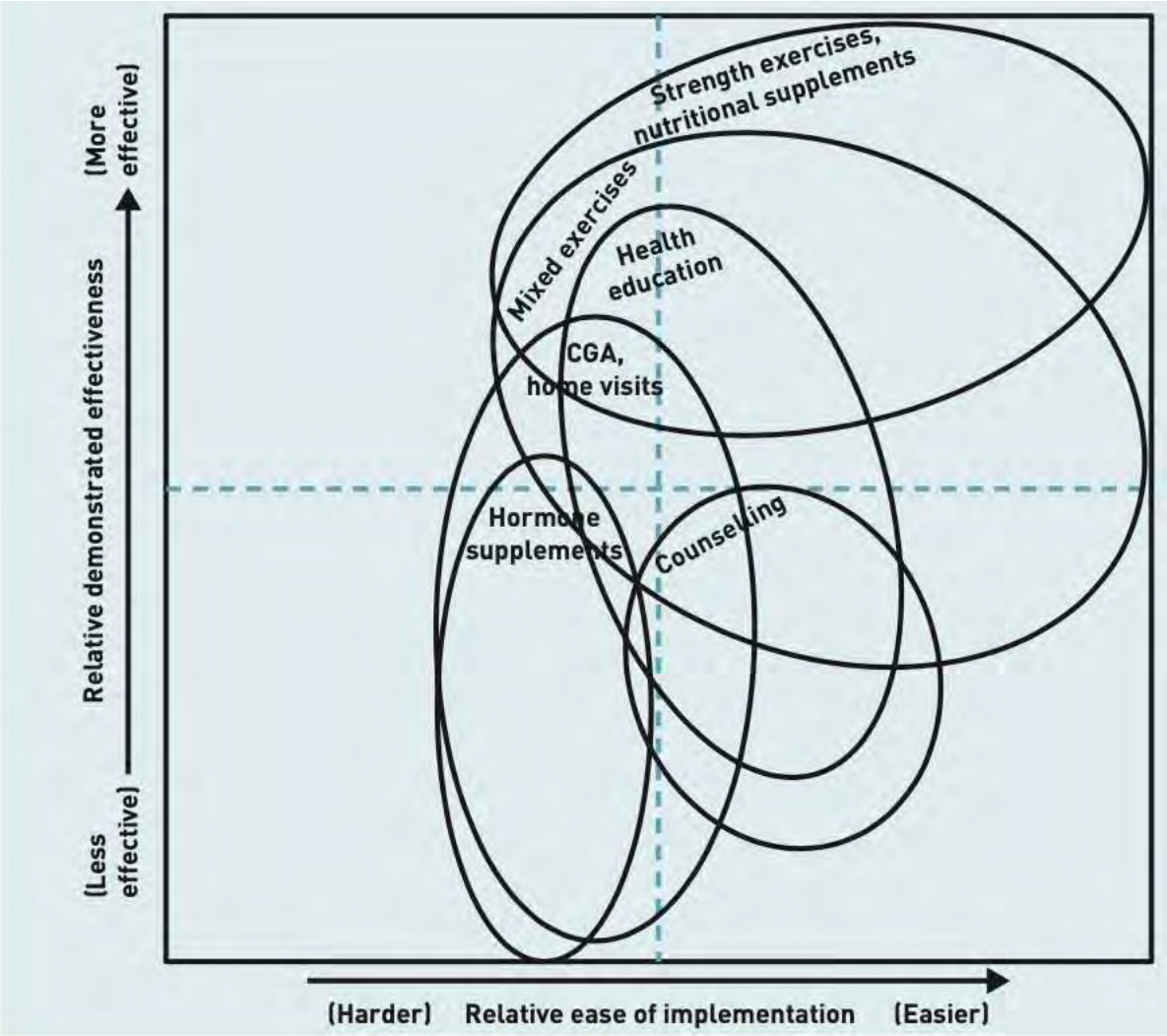

A clever person solves a problem. A wise person avoids it.
— Albert Einstein —
AZ QUOTES

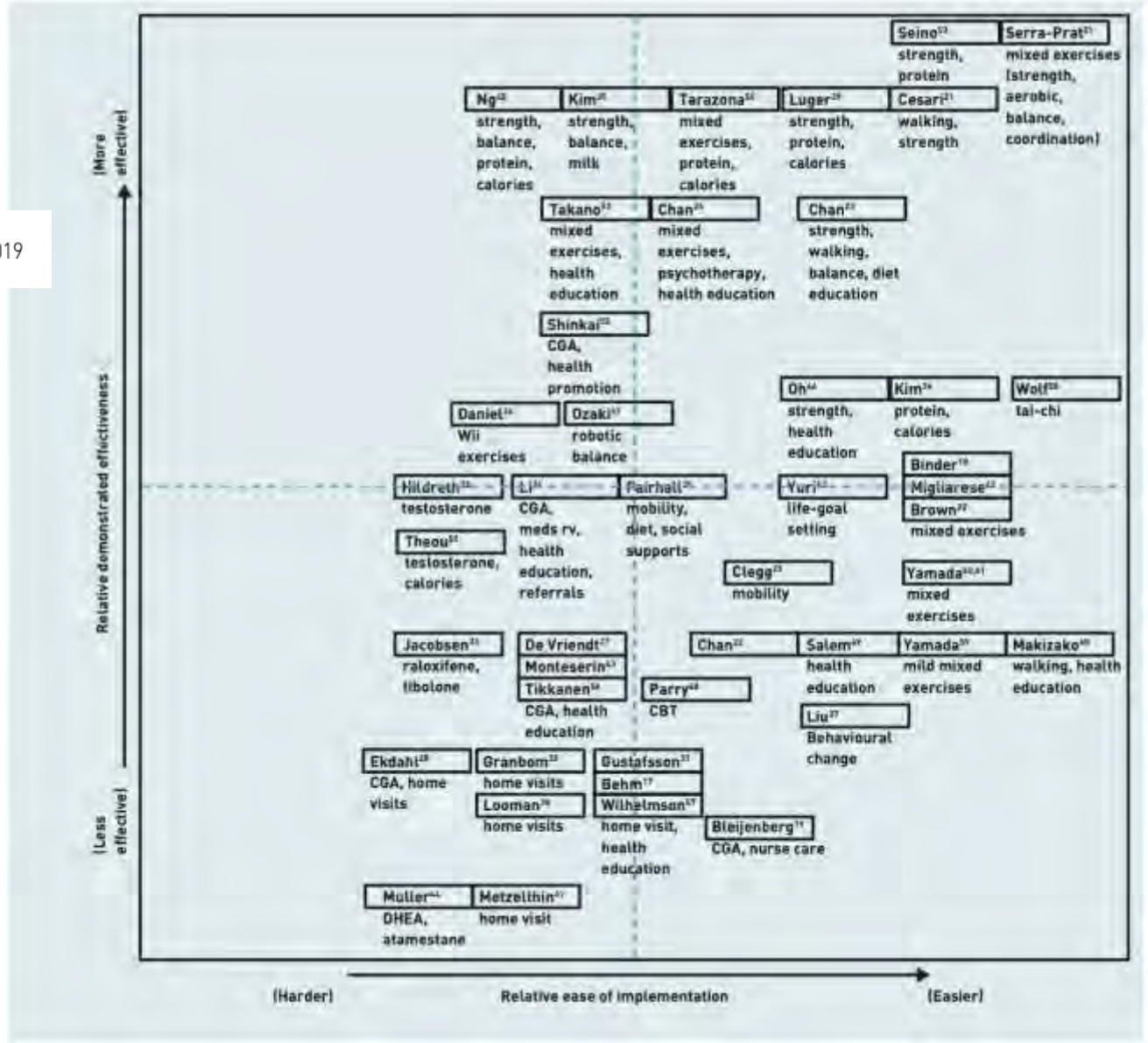
Research

John Travers, Roman Romero-Ortuno, Jade Bailey and Marie-Therese Cooney

Delaying and reversing frailty:

a systematic review of primary care interventions






THANK YOU