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NYU Langone Health

Geriatric Cardiology: 2025 and Beyond

John A. Dodson, MD, MPH
Director, Geriatric Cardiology Program
Director, Cardiovascular Digital Health Lab
NYU Grossman School of Medicine / NYU Langone Health

Leon H. Charney Division of Cardiology

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Program in Clinical Effectiveness 2012

3

3

Learning objectives

- Recognize the importance of aging related impairments in the treatment in older cardiac patients.
- Describe the current clinical and research landscape in geriatric cardiology.
- Identify future directions for the field.

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The demographic imperative

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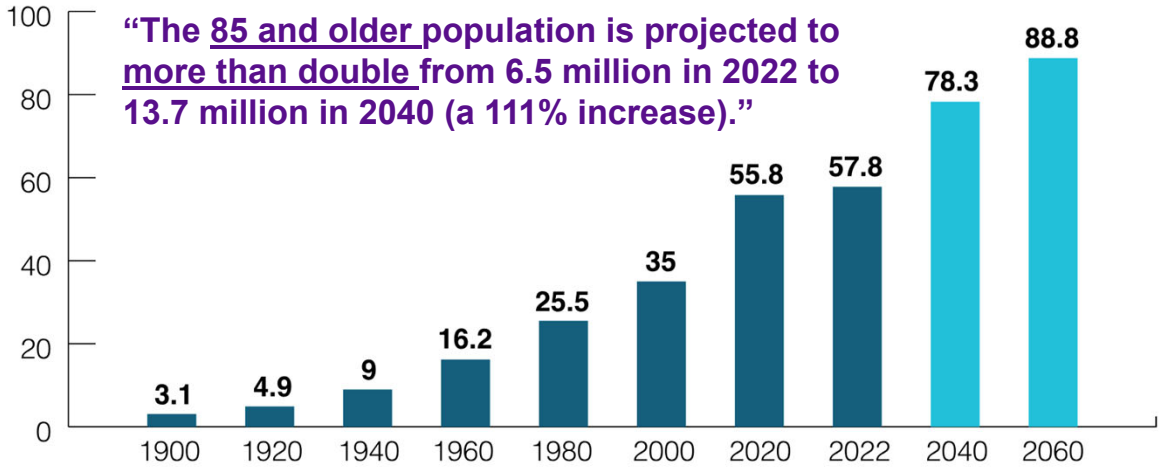
Number of Persons Age 65 and Older, 1900 - 2060 (numbers in millions)

"The 85 and older population is projected to more than double from 6.5 million in 2022 to 13.7 million in 2040 (a 111% increase)."



Note: 2040 and 2060 are projections

Source: U.S. Census Bureau, 2020 Decennial Census, Population Estimates and Projections

https://acl.gov/sites/default/files/Profile%20of%20OA/ACL_ProfileOlderAmericans2023_508.pdf

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The New York Times

THE NEW OLD AGE

Older People Need Geriatricians. Where Will They Come From?

The medical profession has been troubled for years by a persistent shortage of doctors who treat the oldest and sickest patients.

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New York Times, 1/3/2020

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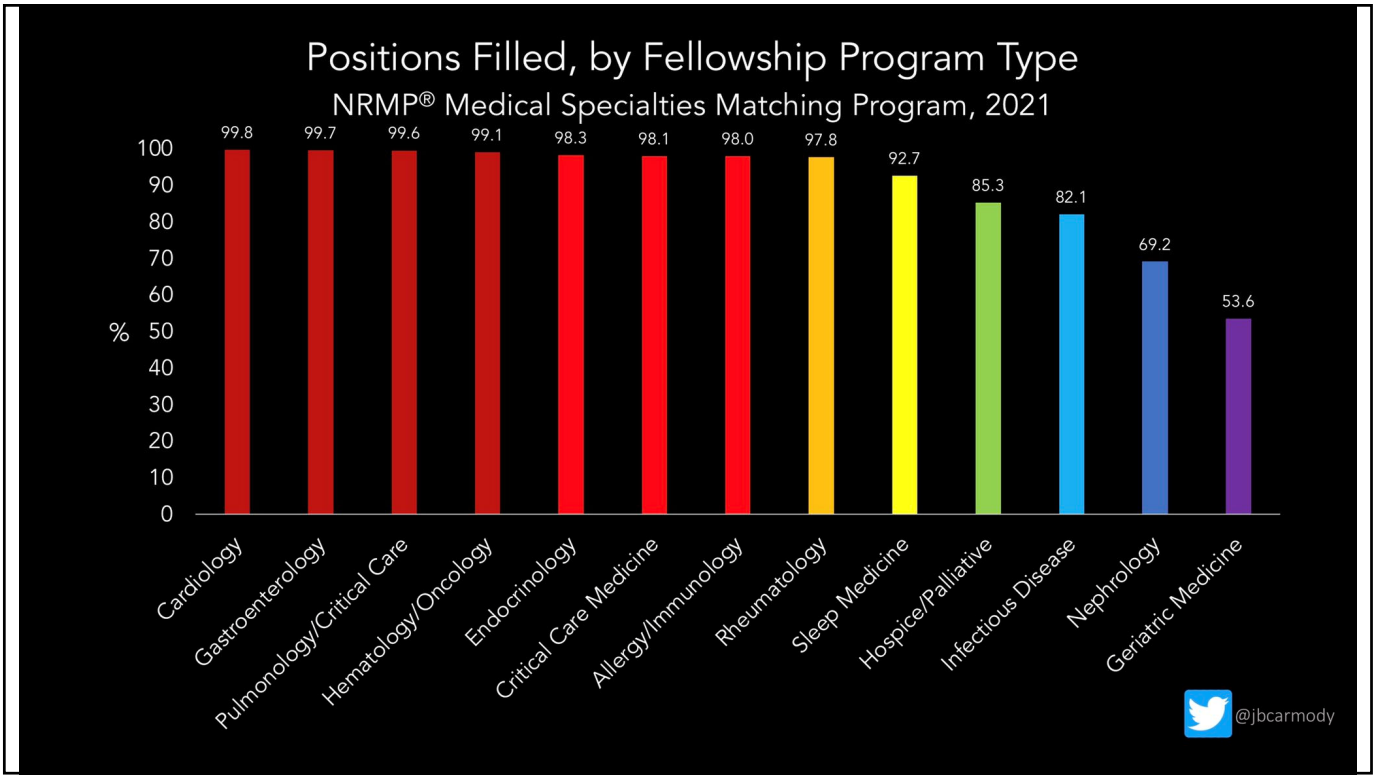

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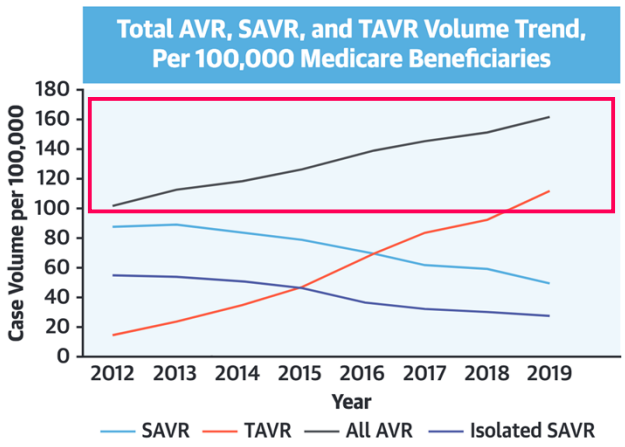
U.S. aortic valve replacement trends (age ≥65)

FIGURE 1 Temporal Trends in TAVR, SAVR, and All AVR Case Volume



Trends in transcatheter aortic valve replacement (TAVR), surgical aortic valve replacement (SAVR), and total AVR volumes between 2012 and 2019, displayed as per 100,000 Medicare beneficiaries. AVR = aortic valve replacement.

Mori M et al. *JACC* 2021;78:2161–2172

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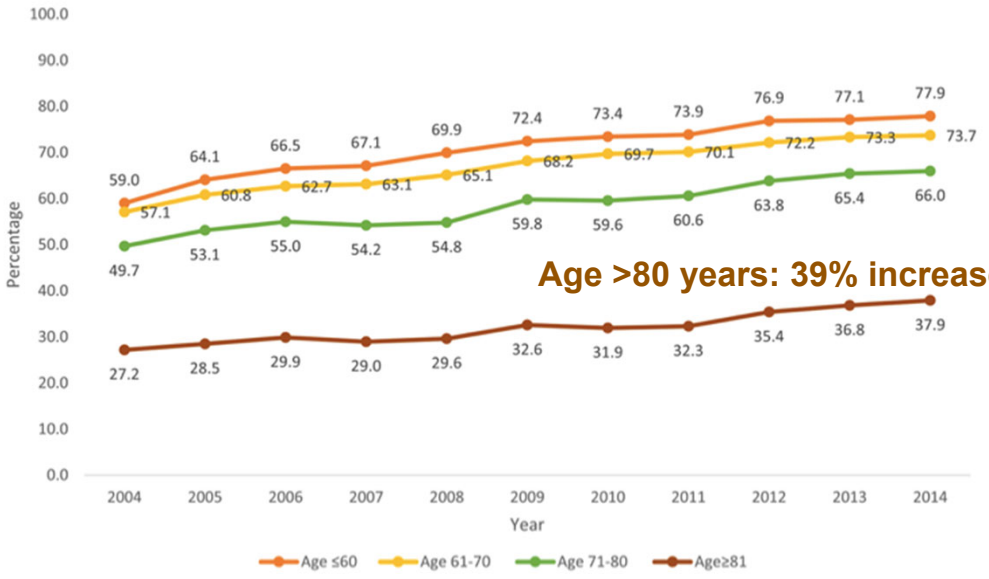
U.S. invasive angiography trends - NSTEMI



Rashid M et al. *Sci Rep* 2019;9:240

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Forman DE et al. *JACC* 2011; 57:1801-1810

11

"Mainstream cardiology has become, de facto, geriatric cardiology, but it still lacks a systematic approach that incorporates age-related complexities into clinical decision-making."

Forman DE et al. *JACC* 2011; 57:1801-1810

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Geriatric impairments

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Older CVD patient

<u>Comorbidities</u>
- Chronic kidney disease
- COPD
- Cancer
- Diabetes

<u>Geriatric impairments</u>
- Cognitive impairment
- Disability
- Frailty
- Frequent falls
- Urinary incontinence

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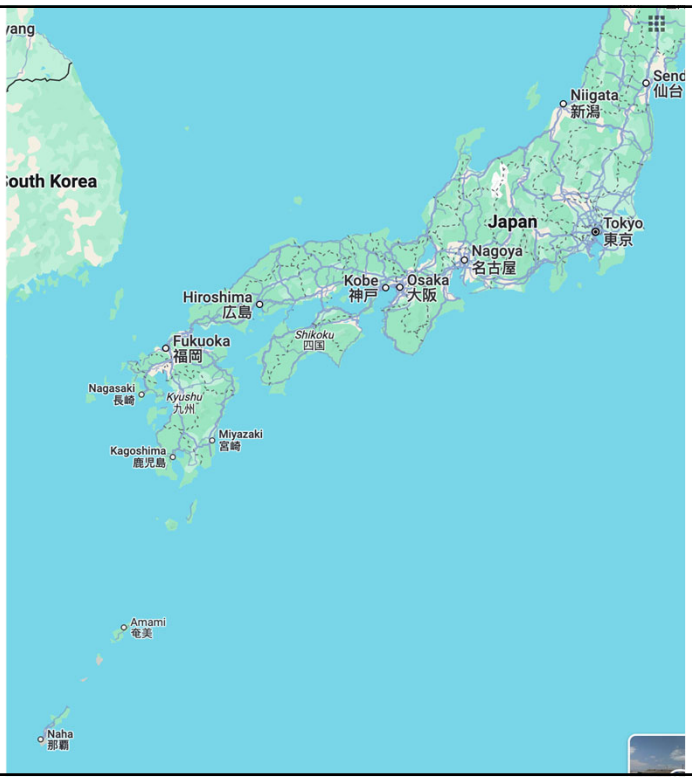

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Association Between Gait Speed as a Measure of Frailty and Risk of Cardiovascular Events After Myocardial Infarction

Yasushi Matsuzawa, MD,*† Masaaki Konishi, MD, PHD,*† Eiichi Akiyama, MD,*†
Hiroyuki Suzuki, MD,* Naoki Nakayama, MD, PHD,*† Masayoshi Kiyokuni, MD, PHD,*
Shinichi Sumita, MD, PHD,* Toshiaki Ebina, MD, PHD,* Masami Kosuge, MD, PHD,*
Kiyoshi Hibi, MD, PHD,* Kengo Tsukahara, MD, PHD,* Noriaki Iwahashi, MD, PHD,*
Mitsuaki Endo, MD, PHD,* Nobuhiko Maejima, MD,* Kenichiro Saka, MD,* Katsutaka Hashiba, MD,*
Kozo Okada, MD,* Masataka Taguri, PHD,‡ Satoshi Morita, PHD,‡ Seigo Sugiyama, MD, PHD,†
Hisao Ogawa, MD, PHD,† Hironobu Sashika, MD, PHD,§ Satoshi Umemura, MD, PHD,‖
Kazuo Kimura, MD, PHD*

Yokohama and Kumamoto, Japan

Matsuzawa Y et al. *J Am Coll Cardiol* 2013;61:1964-72

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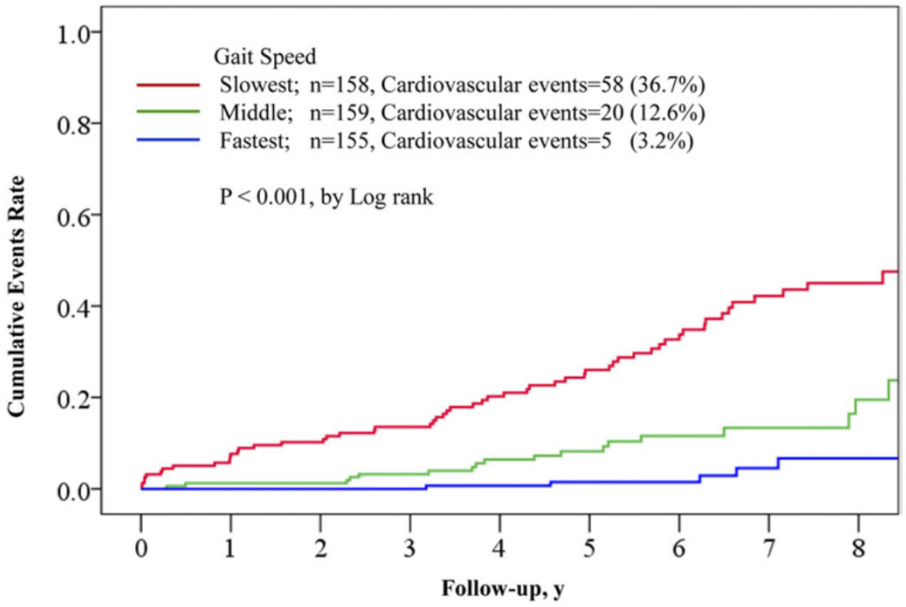
Slow gait post-MI and cardiac events



Matsuzawa Y et al. *J Am Coll Cardiol* 2013;61:1964-72

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ELSEVIER

JACC: Cardiovascular Interventions
Volume 11, Issue 22, 26 November 2018, Pages 2287-2296

Coronary

The Association of Frailty With In-Hospital Bleeding Among Older Adults With Acute Myocardial Infarction: Insights From the ACTION Registry

John A. Dodson MD, MPH [a], Judith S. Hochman MD [a], Matthew T. Roe MD [b], Anita Y. Chen MS [b], Sarwat I. Chaudhry MD [c], Stuart Katz MD [a], Hua Zhong PhD [a], Martha J. Radford MD [a], Jacob A. Udell MD, MPH [d], Akshay Bagai MD [e], Gregg C. Fonarow MD [f], Martha Gulati MD [g], Jonathan R. Enriquez MD [h], Kirk N. Garratt MD [i], Karen P. Alexander MD [b]

Show more

https://doi.org/10.1016/j.jcin.2018.08.028

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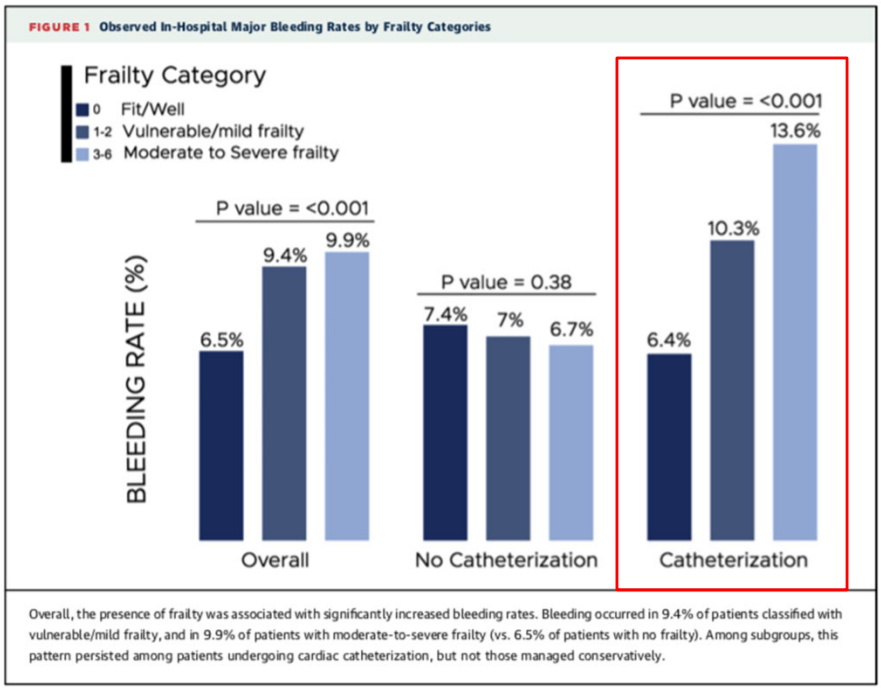

Dodson JA et al. *JACC Cardiovasc Interv* 2018;11:2287-96

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Original Article

Mini-Cog Performance

Novel Marker of Post Discharge Risk Among Patients Hospitalized for Heart Failure

Apurva Patel, MD; Roosha Parikh, MD; Erik H. Howell, MD; Eileen Hsich, MD; Steven H. Landers, MD, MPH; Eiran Z. Gorodeski, MD, MPH

Background—Heart failure (HF) guidelines recommend screening for cognitive impairment (CI) but do not identify how. The Mini-Cog is an ultrashort cognitive "vital signs" measure that has not been studied in patients hospitalized for HF. The purpose of this study was to evaluate whether CI as assessed by the Mini-Cog is associated with increased readmission or mortality risk after hospitalization for HF.

Methods and Results—We analyzed 720 consecutive patients who completed the Mini-Cog as a part of routine clinical care during hospitalization for HF. Our primary outcome was time between hospital discharge and first occurrence of readmission or mortality. There was a high prevalence of CI as quantified by Mini-Cog performance (23% of cohort). During a mean follow-up time of 6 months, 342 (48%) patients were readmitted, and 24 (3%) died. Poor Mini-Cog performance was an independent predictor of composite outcome (adjusted hazard ratio, 1.90; 95% confidence interval, 1.47–2.44; $P<0.0001$) and was identified as the most important predictor among 55 variables by random survival forest analysis. Inclusion of Mini-Cog performance in risk models improved accuracy (bootstrapped c-index, 0.602 versus 0.624) and risk reclassification (category-free net reclassification improvement, 27%; 95% confidence interval, 14%–40%; $P<0.001$). Secondary analysis of initial 30 days post discharge showed effect modification by venue of discharge, whereby patients with CI discharged to a facility had longer time to outcome as compared with those discharged home.

Conclusions—Mini-Cog performance is a novel marker of posthospitalization risk. Discharge to facility rather than home may be protective for those patients with HF and CI. It is unknown whether structured in-home support would yield similar outcomes. (***Circ Heart Fail*. 2015;8:8-16. DOI: 10.1161/CIRCHEARTFAILURE.114.001438.)**

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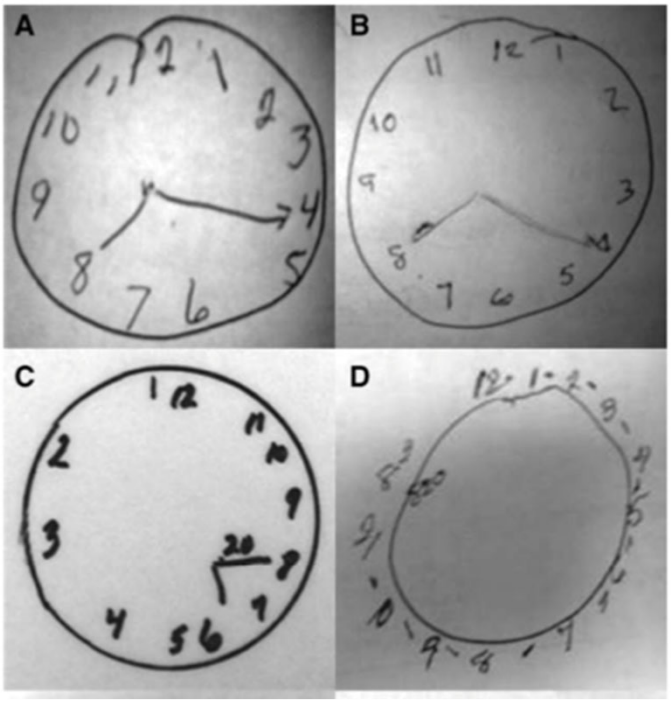

Patel A et al. *Circ Heart Failure* 2015;8:8-16

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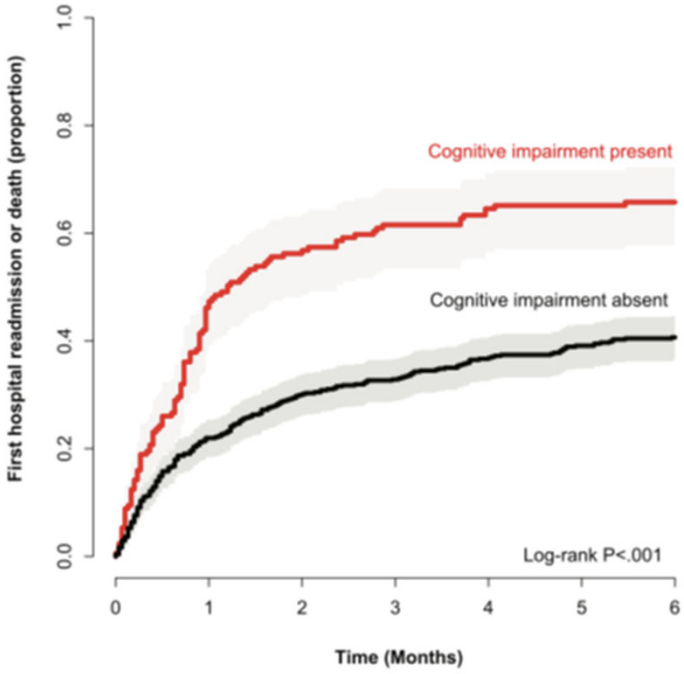

Patel A et al. *Circ Heart Failure* 2015;8:8-16

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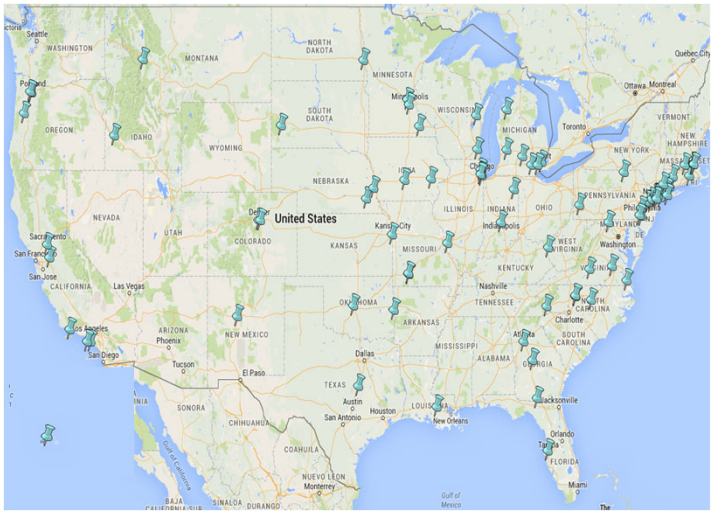
SILVER-AMI study

- NHLBI-funded cohort study
- Enrolled 3,041 patients age ≥75 with acute MI
- Goal: develop 6-month risk models (mortality, hospital readmission, health status decline)



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SILVER-AMI study

- Geriatric impairments measured:
  - Slow gait speed
  - Weak grip strength
  - Cognitive impairment
  - Visual impairment
  - Hearing impairment
  - Unintentional weight loss
  - Depression
  - Frequent falls

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Annals of Internal Medicine®

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‹ PREV ARTICLE | THIS ISSUE | NEXT ARTICLE ›

ORIGINAL RESEARCH | 7 JANUARY 2020

Predicting 6-Month Mortality for Older Adults Hospitalized With Acute Myocardial Infarction: A Cohort Study

John A. Dodson, MD, MPH; Alexandra M. Hajduk, PhD, MPH; Mary Geda, RN, MSN; Harlan M. Krumholz, MD; Terrence E. Murphy, PhD; Sui Tsang, MS; Mary E. Tinetti, MD; Michael G. Nanna, MD; Richard McNamara, MD; Thomas M. Gill, MD; Sarwat I. Chaudhry, MD

Article, Author, and Disclosure Information

VISUAL ABSTRACT

FULL ARTICLE

Abstract

Methods

Results

Abstract

Background: Older adults with acute myocardial infarction (AMI) have higher prevalence of functional impairments, including deficits in cognition, strength, and sensory domains, than their younger counterparts.

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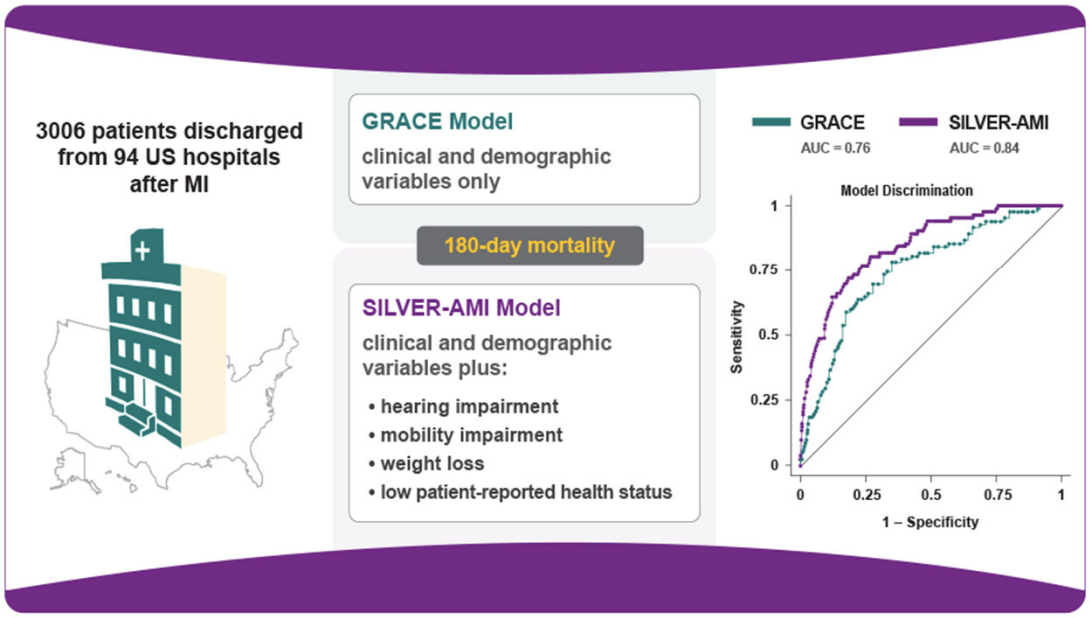
Does addition of information about functional impairment improve prediction of mortality after myocardial infarction (MI) in people 75 years or older?



Dodson JA et al. *Ann Intern Med* 2020 Jan 7;172(1):12-21

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Summary

- The U.S. population is aging
- Geriatric impairments are common in older patients
- Among cardiac patients, these impairments influence outcomes

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Geriatric cardiology: clinical

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Geriatric Cardiology Program at NYU

- Components:
  - Geriatric cardiology clinic
  - Multidisciplinary patient conference
  - Development of clinical tools

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Geriatric cardiology clinic

- Provides longitudinal cardiovascular for older adults (age ≥70) typically multiple comorbidities / geriatric impairments
- Also second opinion (self-referred, or from other cardiologists)

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Geriatric cardiology clinic

- Principles of geriatric assessment
  - Cognition
  - Physical function
  - Fall history
  - Orthostatic vital signs

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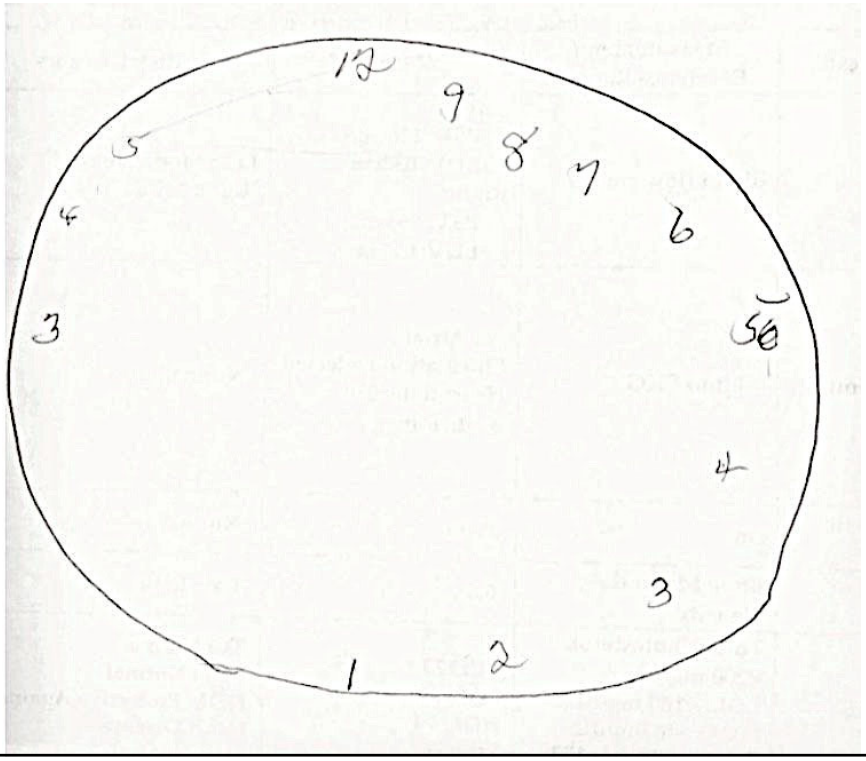

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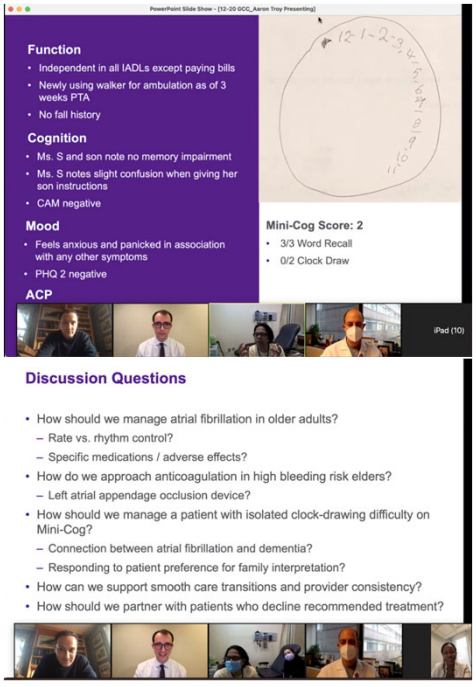
Sample referrals

- 2nd opinion prior to cardiac surgery
- Patient/family wants to reduce treatment burden
- CVD prevention questions (e.g. statin)
- Unexplained dyspnea
- Refractory orthostatic hypotension

Multidisciplinary patient conference



Case examples

- 82 y/o F with multiple myeloma and recurrent heart failure readmissions from IVIG infusions
- 78 y/o F with severe calcific mitral stenosis, moderate aortic stenosis, gait impairment, dyspnea on exertion
- 87 y/o M with cardiogenic shock, LVEF 35%, multivessel coronary disease including left main, stage IV CKD

Development of clinical tools: GeriKit

By 2050, the number of individuals > 85 in the US is going to triple.

- All physicians will be working with more and more geriatric patients.
- The number of geriatricians in this country is inadequate.
- Many medical schools do not have a dedicated geriatrics rotation.

We need training tools to teach everyone working with geriatric patients how to perform a geriatric assessment.

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Our solution

- One-stop-shop for geriatric screening
- Education focused for medical students, residents, and fellows
- Simple, interactive user interface
- Free in App Store

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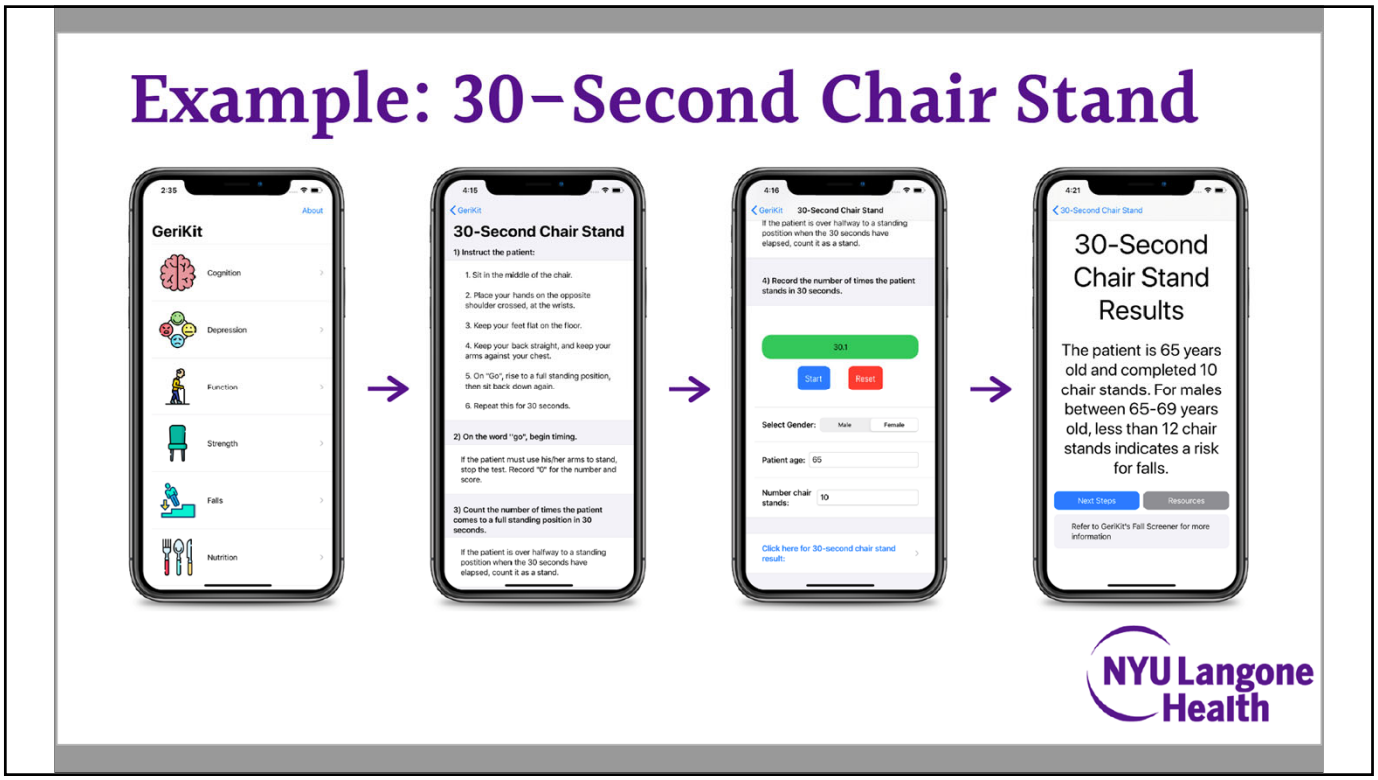
Example: 30–Second Chair Stand
GeriKit
Cognition
Depression
Function
Strength
Falls
Nutrition
30-Second Chair Stand
1) Instruct the patient:
1. Sit in the middle of the chair.
2. Place your hands on the opposite shoulder crossed, at the wrists.
3. Keep your feet flat on the floor.
4. Keep your back straight, and keep your arms against your chest.
5. On "Go", rise to a full standing position, then sit back down again.
6. Repeat this for 30 seconds.
2) On the word "go", begin timing.
If the patient must use his/her arms to stand, stop the test. Record "0" for the number and score.
3) Count the number of times the patient comes to a full standing position in 30 seconds.
If the patient is over halfway to a standing position when the 30 seconds have elapsed, count it as a stand.
4) Record the number of times the patient stands in 30 seconds.
30.1
Start
Reset
Select Gender:
Male
Female
Patient age:
65
Number chair stands:
10
Click here for 30-second chair stand result:
30-Second Chair Stand Results
The patient is 65 years old and completed 10 chair stands. For males between 65-69 years old, less than 12 chair stands indicates a risk for falls.
Next Steps
Resources
Refer to GeriKit's Fall Screener for more information
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GERIKIT 2.0
GK
Our free Geriatrics Assessment Toollkit- now with more features to better care for your geriatric patients!
1 Updated strength and falls screening
2 Further stratified for inpatient versus ambulatory use
3 Now with delirium, frailty, and hearing screening
4 Available in the AppStore and soon in the GooglePlay store
About
GeriKit
Cognition
Delirium
Depression
Function
Strength
NYU Langone Health
NYU Langone Health
DOWNLOAD OUR APP HERE

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Other geriatric cardiology programs

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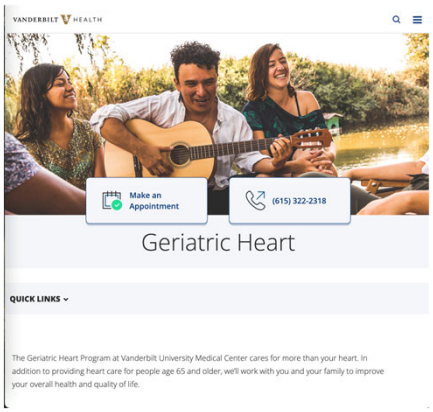

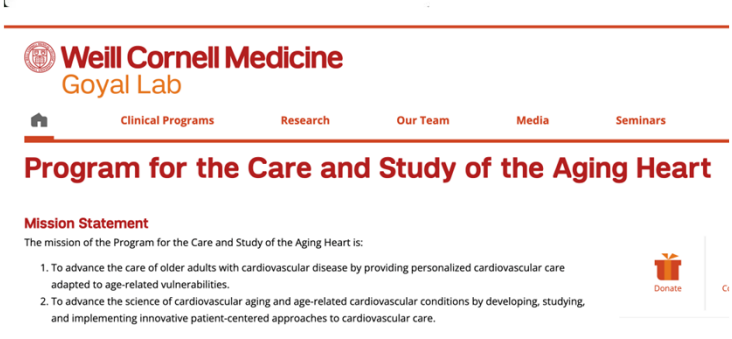

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GERIATRIC CARDIOLOGY
MEMBER SECTION

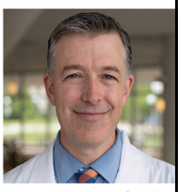
Geriatric Member Section

- + Join the Geriatric Cardiology Member Section
- + Get Involved
- + Section Initiatives
- Recommended Readings
- Section News and Updates Hub

The ACC DocMatter Community

CONNECT NOW with Geriatric Member experts on DocMatter, the online community for ACC members.

Welcome to the Geriatric Cardiology Section.



Scott L. Hummel, MD, FACC

Since its inception in 2012, the ACC Geriatric Cardiology Section quickly gained momentum and now has over 1,000 members and well over 300 Fellows-in-Training (FITs), making it one of the larger member special interest sections of the College.

The mission of the Geriatric Cardiology Member Section Leadership Council and Member Section is to provide a professional home for members with competencies in care of older adults with cardiovascular disease, as well those interested in advancing these skills.

This is aligned with the mission of the American College of Cardiology in transforming cardiovascular care and improving heart health for older adults.

The Geriatric Cardiology Section Leadership Council (GCSLC) guides the course of the Geriatric Cardiology Section and advises the leadership of the ACC on the evolving dimensions of aging in the context of providing patient-centered care for the rapidly expanding population of older adults with, or at risk for, cardiovascular disease.

Read more >>>

"**The Geriatric Cardiology Section** is the ACC member's professional home for education, research and clinical care for cardiovascular disease in the aging population, with a diverse set of activities ranging from the biology and pathophysiology of aging, to decision-making about therapies, to post-acute care, to palliative care for all ages."

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Geriatric cardiology: research

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Mean age in selected pivotal randomized trials

- WOSCOPS (primary prevention statin): 55 years
- ACCORD (A1c <6% in DM): 62 years
- CURE (clopidogrel in NSTEMI): 64 years
- FAME 2 (FFR PCI): 64 years
- MADIT 2 (primary prevention ICD): 64 years
- PARTNER (TAVR): 83 years

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AHA/ACC/AGS Scientific Statement

Knowledge Gaps in Cardiovascular Care of the Older Adult Population

A Scientific Statement From the American Heart Association, American College of Cardiology, and American Geriatrics Society

Michael W. Rich, MD, FAHA, FACC, Chair; Deborah A. Chyun, PhD, RN, FAHA, Co-Chair; Adam H. Skolnick, MD, FACC; Karen P. Alexander, MD, FAHA, FACC; Daniel E. Forman, MD, FACC; Dalane W. Kitzman, MD, FAHA, FACC; Mathew S. Maurer, MD, FACC; James B. McClurken, MD, FACC; Barbara M. Resnick, PhD, CRNP; Win K. Shen, MD, FAHA, FACC; David L. Tirschwell, MD, MSc, FAHA; on behalf of the American Heart Association Older Populations Committee of the Council on Clinical Cardiology, Council on Cardiovascular and Stroke Nursing, Council on Cardiovascular Surgery and Anesthesia, and Stroke Council; American College of Cardiology; and American Geriatrics Society

Rich MW et al. *Circulation* 2016;133:2103-2122

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Authors recommend study designs that:

(1) do not exclude patients from enrollment based on age or comorbidities

(2) include outcomes beyond mortality (e.g. physical function, independence, quality of life)

Rich MW et al. *Circulation* 2016;133:2103-2122

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Example: mobile cardiac rehab

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Traditional cardiac rehab: Components

- Baseline medical evaluation
- Structured exercise
- Lifestyle counseling
- Psychosocial support
- Education

➢ Program duration: 36 sessions over 3 months

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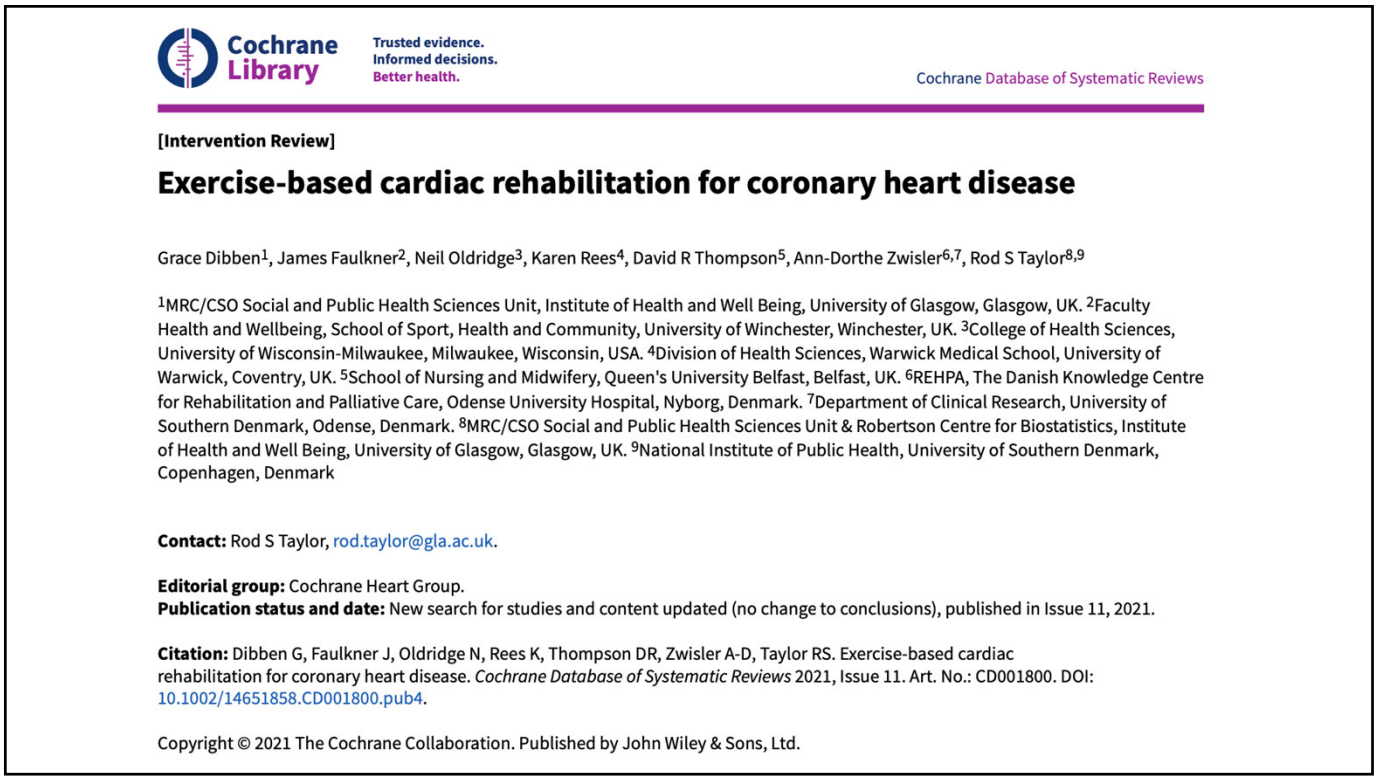

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Cochrane Database of Systematic Reviews

[Intervention Review]

Exercise-based cardiac rehabilitation for coronary heart disease

Grace Dibben[1], James Faulkner[2], Neil Oldridge[3], Karen Rees[4], David R Thompson[5], Ann-Dorthe Zwisler[6,7], Rod S Taylor[8,9]

[1]MRC/CSO Social and Public Health Sciences Unit, Institute of Health and Well Being, University of Glasgow, Glasgow, UK. [2]Faculty Health and Wellbeing, School of Sport, Health and Community, University of Winchester, Winchester, UK. [3]College of Health Sciences, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin, USA. [4]Division of Health Sciences, Warwick Medical School, University of Warwick, Coventry, UK. [5]School of Nursing and Midwifery, Queen's University Belfast, Belfast, UK. [6]REHPA, The Danish Knowledge Centre for Rehabilitation and Palliative Care, Odense University Hospital, Nyborg, Denmark. [7]Department of Clinical Research, University of Southern Denmark, Odense, Denmark. [8]MRC/CSO Social and Public Health Sciences Unit & Robertson Centre for Biostatistics, Institute of Health and Well Being, University of Glasgow, Glasgow, UK. [9]National Institute of Public Health, University of Southern Denmark, Copenhagen, Denmark

Contact: Rod S Taylor, rod.taylor@gla.ac.uk.

Editorial group: Cochrane Heart Group.
Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 11, 2021.

Citation: Dibben G, Faulkner J, Oldridge N, Rees K, Thompson DR, Zwisler A-D, Taylor RS. Exercise-based cardiac rehabilitation for coronary heart disease. *Cochrane Database of Systematic Reviews* 2021, Issue 11. Art. No.: CD001800. DOI: 10.1002/14651858.CD001800.pub4.

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Traditional cardiac rehab: Evidence

- 85 trials of 23,450 patients with ischemic heart disease
- 6-12 months: large reduction in MI (RR 0.72, 95% CI 0.55 to 0.93; large reduction in all-cause hospitalization (RR 0.58, 95% CI 0.43-0.77)
- At long term follow-up: large reduction in CV mortality (RR 0.58, 95% CI 0.43 to 0.78; 8 trials) and MI (RR 0.67, 95% CI 0.50 to 0.90)

Challenges with traditional cardiac rehab

- Low initial referral rates (~25% nationally are referred)
- Attrition (people stop going even if they attend first session)
- Barriers are especially high in older patients

RESEARCH ARTICLE | Originally Published 14 January 2020 | Check for updates

Tracking Cardiac Rehabilitation Participation and Completion Among Medicare Beneficiaries to Inform the Efforts of a National Initiative

Matthew D. Ritchey, PT, DPT, OCS, MPH, Sha Maresh, DrPH, Jessica McNeely, PhD, Thomas Shaffer, MHS, Sandra L. Jackson, PhD, MPH, Steven J. Keteyian, PhD, Clinton A. Brawner, PhD, Mary A. Whooley, MD, Tiffany Chang, MPH, Haley Stolp, MPH, Linda Schieb, MSPH, and Janet Wright, MD | AUTHOR INFO & AFFILIATIONS

Circulation: Cardiovascular Quality and Outcomes • Volume 13, Number 1 • https://doi.org/10.1161/CIRCOUTCOMES.119.005902

25,932 / 235

PDF/EPUB

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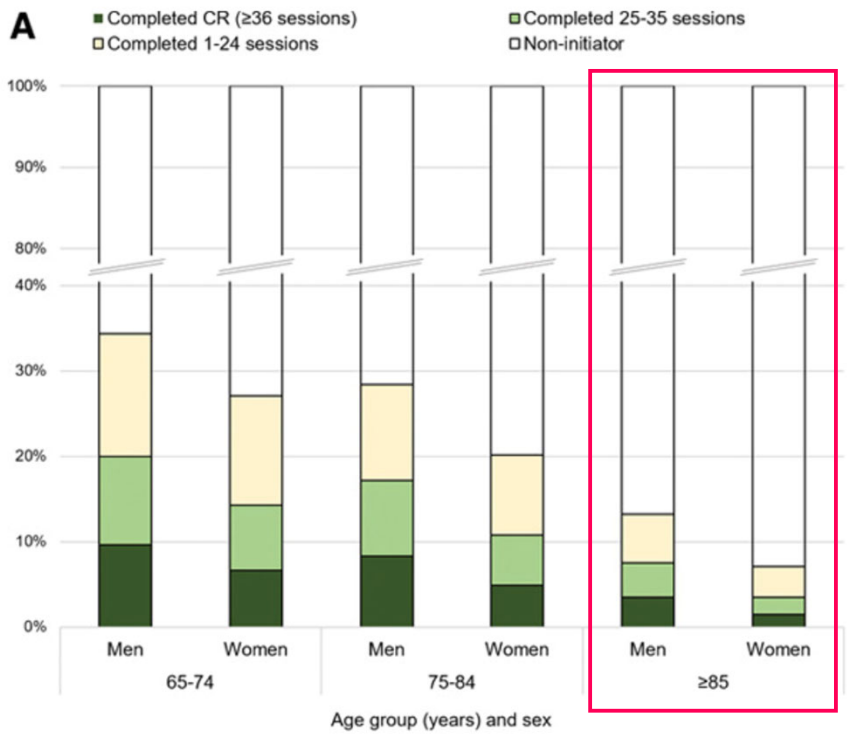

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Mobile cardiac rehab

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Mobile cardiac rehabilitation

- Definition: cardiac rehab delivered remotely that uses portable electronic devices (e.g. Fitbit, Apple watch, smartphones, tablets)
- Idea: to replicate the benefits of traditional (in-person) cardiac rehabilitation at home
- Evidence generally points towards mobile rehab programs having similar effectiveness compared with in-person programs*
- Mobile cardiac rehab is generally not reimbursed (exceptions: VA, Kaiser, COVID-19 pandemic)

*With limited evidence in older patients

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ESC European Society of Cardiology
European Journal of Preventive Cardiology (2022) **29**, 1017–1043
doi:10.1093/eurjpc/zwab106

FULL RESEARCH PAPER

Effectiveness of home-based cardiac telerehabilitation as an alternative to Phase 2 cardiac rehabilitation of coronary heart disease: a systematic review and meta-analysis

Hadassah Joann Ramachandran [1]*, Ying Jiang[1], Wilson Wai San Tam[1], Tee Joo Yeo[2], and Wenru Wang[1]*

[1]Alice Lee Centre for Nursing Studies, Yong Loo Lin School of Medicine, National University of Singapore, Block MD 11, 10 Medical Drive, Singapore 117597, Singapore; and [2]Cardiac Rehabilitation, Department of Cardiology, National University Heart Centre, Singapore, Singapore

Received 16 March 2021; revised 14 May 2021; editorial decision 29 May 2021; accepted 2 June 2021; online publish-ahead-of-print 13 July 2021

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Mobile cardiac rehabilitation

- Meta-analysis of 14 randomized clinical trials comparing mobile vs. traditional CR
- Main finding: outcomes were generally equivalent (functional capacity, CV hospitalization)
- Mean age was <65 years in all but 2 trials (these 2 trials had total of 274 participants)

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Ramachandran HJ et al. *Eur J Prevent Cardiol* 2022;29:1017-43

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Limitations of prior mobile cardiac rehab studies

- Very few older patients
- Non-randomized design (some)
- Bespoke interventions that are not scalable
- Publication bias

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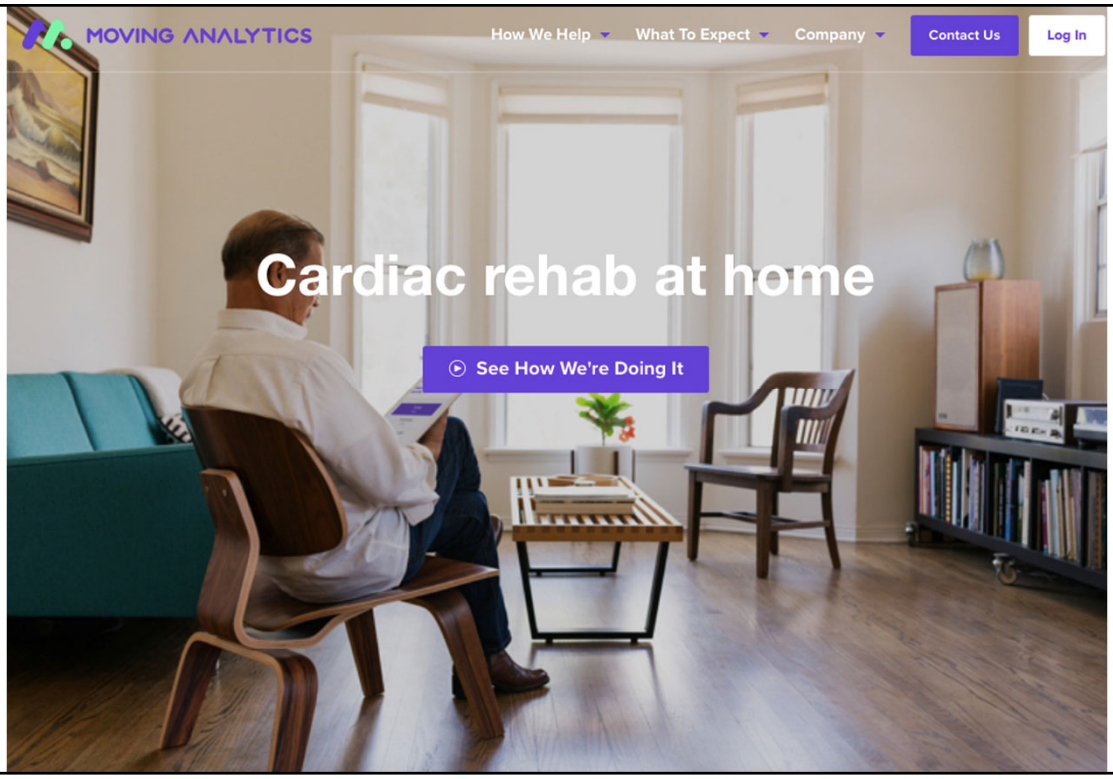

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RESILIENT trial

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JAMA Network | Open

Original Investigation | Cardiology

Rehabilitation at Home Using Mobile Health for Older Adults Hospitalized for Ischemic Heart Disease
The RESILIENT Randomized Clinical Trial

John A. Dodson, MD, MPH; Samrachana Adhikari, PhD; Antoinette Schoenthaler, EdD; Judith S. Hochman, MD; Greg Sweeney, DPT; Barbara George, EdD; Kevin Marzo, MD; Lee A. Jennings, MD; Lara C. Kovell, MD; Matthew Vorsanger, MD; Stephanie Pena, MS; Yuchen Meng, MA; Ashwini Varghese, MPH; Camila Johanek, MS; Michelle Rojas, BA; Riley McConnell, MPH; Jonathan Whiteson, MD; Andrea B. Troxel, ScD

Abstract

IMPORTANCE Among older adults with ischemic heart disease, participation in traditional ambulatory cardiac rehabilitation (CR) remains low. While mobile health CR (mHealth-CR) provides a novel opportunity to deliver care, age-specific impairments to technology use may limit uptake, and efficacy data are currently lacking.

OBJECTIVE To test whether mHealth-CR improves functional capacity in older adults.

DESIGN, SETTING, AND PARTICIPANTS The RESILIENT phase 2, multicenter, randomized clinical trial recruited patients aged 65 years or older with ischemic heart disease (defined as a hospital visit for myocardial infarction or coronary revascularization) from 5 academic hospitals in New York, Connecticut, and Massachusetts between January 9, 2020, and April 22, 2024.

INTERVENTION Participants were randomized 3:1 to mHealth-CR or usual care. mHealth-CR consisted of commercially available software delivered on a tablet computer, coupled with remote monitoring and weekly exercise therapist telephone calls, delivered over a 3-month duration. As RESILIENT was a trial conducted in a routine care setting to inform decision-making, participants in both arms were also allowed to receive traditional CR at their cardiologist's discretion.

Key Points

Question Does mobile health cardiac rehabilitation (mHealth-CR) improve functional capacity among older adults with ischemic heart disease?

Findings In this randomized clinical trial of 400 adults aged 65 years or older with ischemic heart disease, receipt of mHealth-CR vs usual care did not significantly improve functional capacity beyond a clinically meaningful threshold of 25 m in 6-minute walk distance.

Meaning The findings suggest that mHealth-CR interventions may not benefit the older adult population and more age-tailored strategies may be required.

Dodson JA et al. *JAMA Open* 2025;8(1):e2453499

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RESILIENT Trial

- Question: does mobile cardiac rehab (mHealth-CR) improve functional capacity in older patients (age ≥65 years) with ischemic heart disease, compared with usual care?

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Design

- Phase 2, multicenter, randomized pragmatic clinical trial, with blinded assessment of primary endpoint
- Randomization was 3:1 (mHealth-CR vs. Usual Care)

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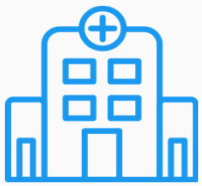
Funding and Organization

Funded by the U.S. National Institutes of Health

National Institute on Aging
R01AG062520

Coordinating Center

NYU Langone Health (NYULH)



Study Sites

NYULH-Tisch
NYULH-Long Island
Bellevue Hospital
Yale University
University of Massachusetts

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Trial population

Inclusion

- Age ≥65 years
- Hospital visit for acute myocardial infarction and/or coronary revascularization (elective or emergent PCI or CABG)
- English or Spanish-speaking

Exclusion

- Use of walker or non-ambulatory
- Moderate or severe cognitive impairment
- Severe osteoarthritis, or recent joint replacement
- Progressive movement disorder
- Life expectancy <3 months
- Clinical judgment concerning other safety issues
- Adverse event during initial 6 MWT (hypotension, severe angina, ventricular arrhythmia, syncope)

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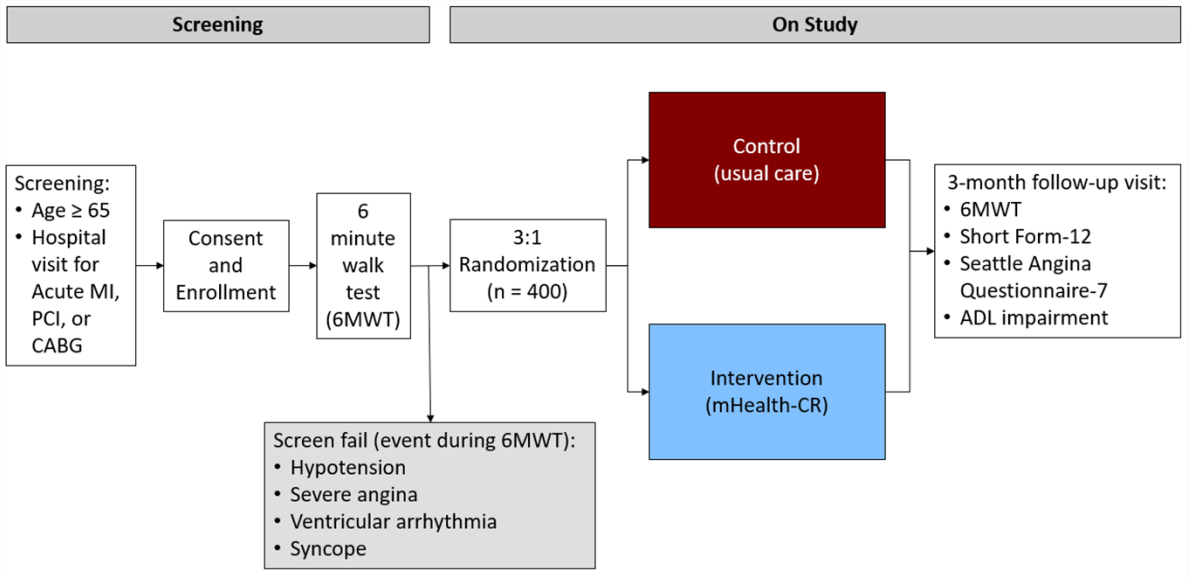
Study flow diagram



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Study intervention

- **mHealth-CR program consisted of 3 components:**
  - mHealth-CR software: commercially available platform (Moving Analytics), delivered on tablet. Included exercise data entry, videos on CVD prevention, visualization of data (e.g. step count)
  - Counseling by exercise therapist: baseline visit and weekly phone calls. Instructed to exercise 5 out of 7 days, at least 150 minutes/week, moderate intensity (Borg scale 11-14)
  - Remote physiologic monitoring: Step count (Fitbit Inspire) and blood pressure (Omron HEM-9200T)

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Outcomes

Primary Outcome:

- **Change in functional capacity (6 minute walk distance), baseline to 3 months**

Secondary Outcomes:

- **General health status (Short Form-12 MCS and PCS)**

- **Residual angina (Seattle Angina Questionnaire-7 <100)**

- **Disability (any ADL/IADL impairment)**

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RESULTS

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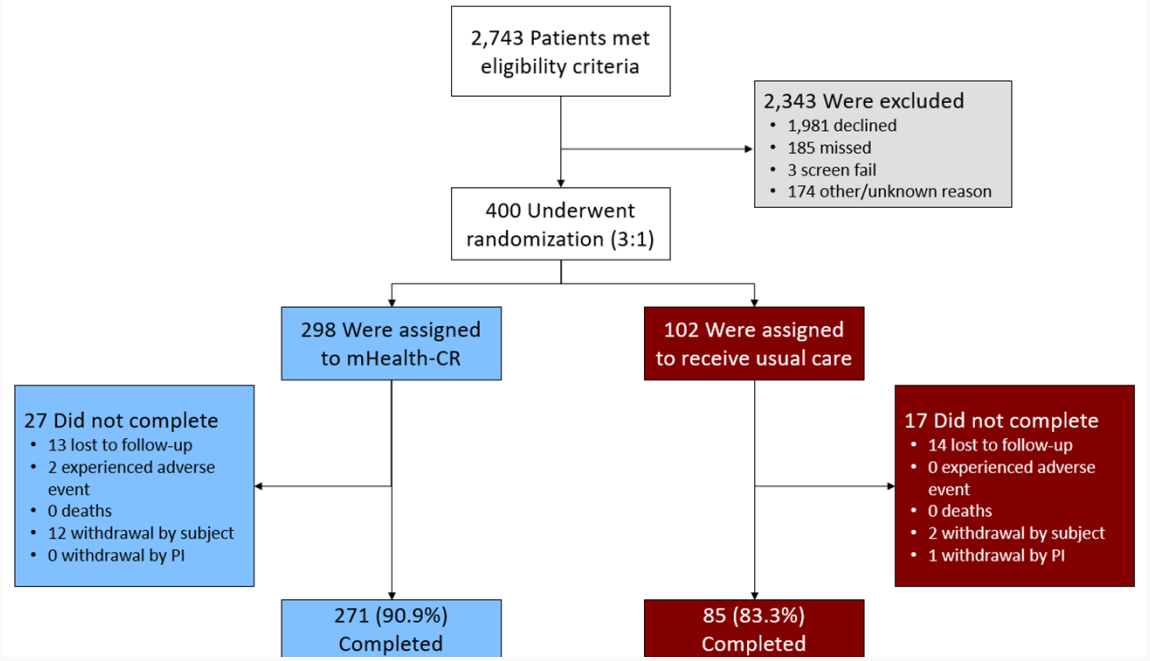
Enrollment and follow-up



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Baseline demographics and clinical characteristics

Characteristic	mHealth-CR (N=298)	Usual care (N=102)
Median age, range (yr)	71.0 [65.0, 91.0]	71.0 [65.0, 89.0]
Female sex – no. (%)	82 (27.5%)	27 (26.4%)
Race: Asian, no. (%) Black, no. (%) Multiple races or other, no. (%) White, no. (%)	11 (3.7%) 27 (9.1%) 31 (10.4%) 229 (76.8%)	6 (5.9%) 9 (8.8%) 13 (12.7%) 74 (72.5%)
Hypertension – no. (%)	254 (85.2%)	83 (81.4%)
Heart failure - no. (%)	34 (11.4%)	13 (12.7%)
Diabetes – no. (%)	94 (31.5%)	42 (41.2%)
Chronic lung disease – no. (%)	40 (13.4%)	13 (12.7%)
Median BMI, range (kg/m2)	27.3 [14.7, 46.8]	27.7 [18.4, 44.4]
eGFR <60 ml/min/1.73m2, no. (%)	47 (15.8%)	21 (20.6%)
Frailty category: Frail, no. (%) Prefrail, no. (%) Robust, no. (%)	37 (12.4%) 154 (51.7%) 82 (27.5%)	6 (5.9%) 64 (62.7%) 25 (24.5%)
Enrollment criteria: Acute MI with PCI, no. (%) Acute MI without PCI, no. (%) Unstable angina with PCI, no. (%) Elective PCI, no. (%) CABG, no. (%)	74 (24.8%) 7 (2.3%) 18 (6.0%) 186 (62.4%) 13 (4.4%)	22 (21.6%) 2 (2.0%) 5 (4.9%) 68 (66.7%) 5 (4.9%)
Received traditional ambulatory CR, no. (%)	38 (12.8%)	26 (25.5%)

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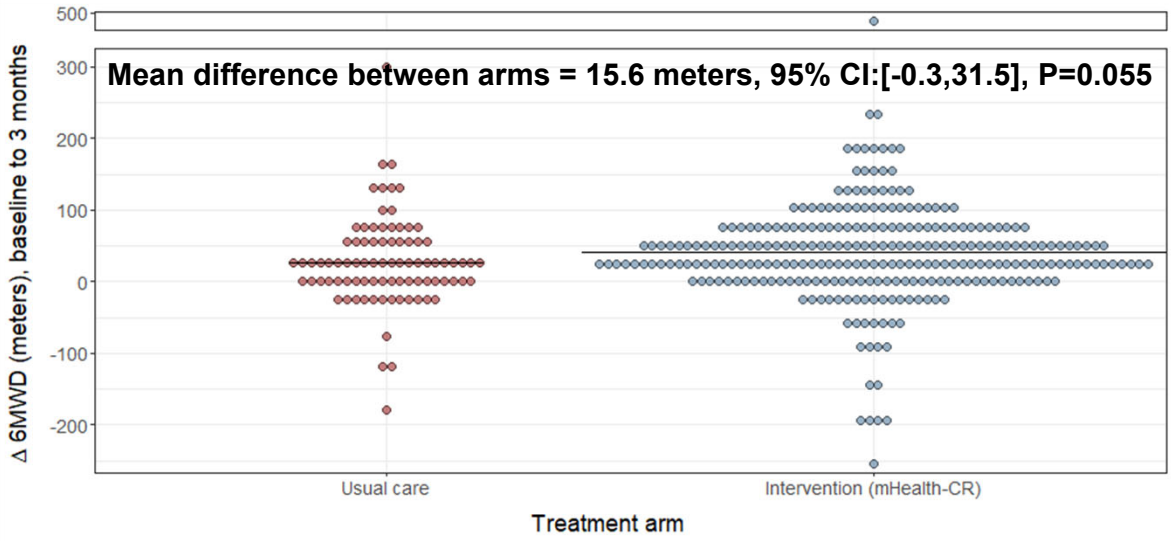
Primary endpoint: change in functional capacity



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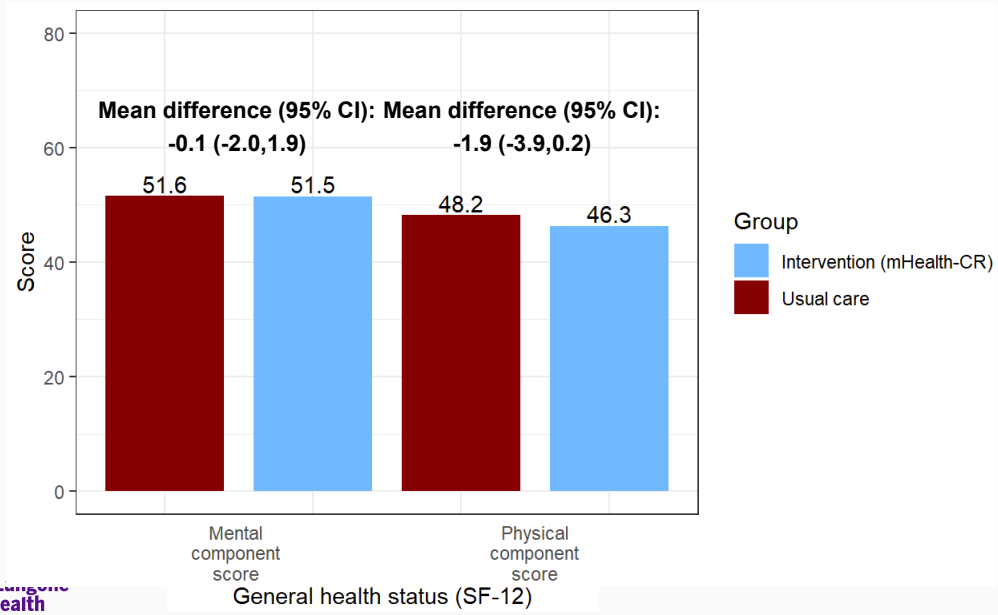
Secondary endpoint: general health status



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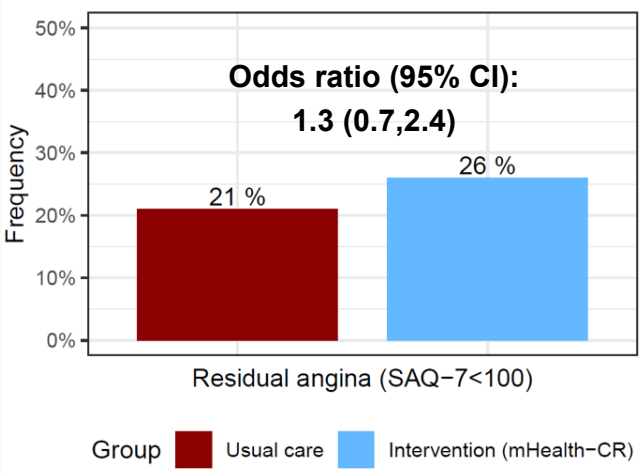
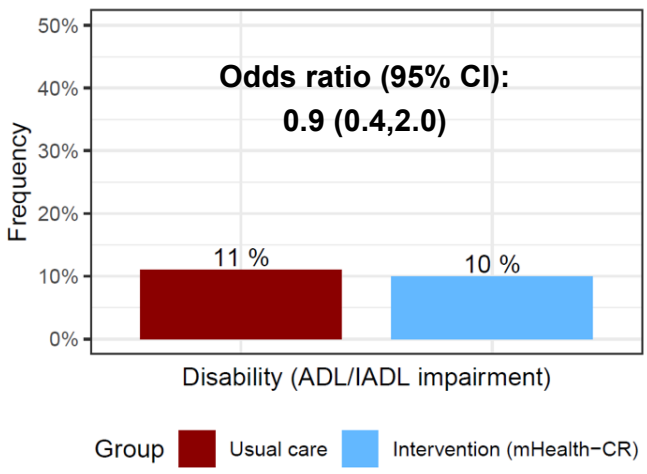
Secondary endpoints: residual angina, disability





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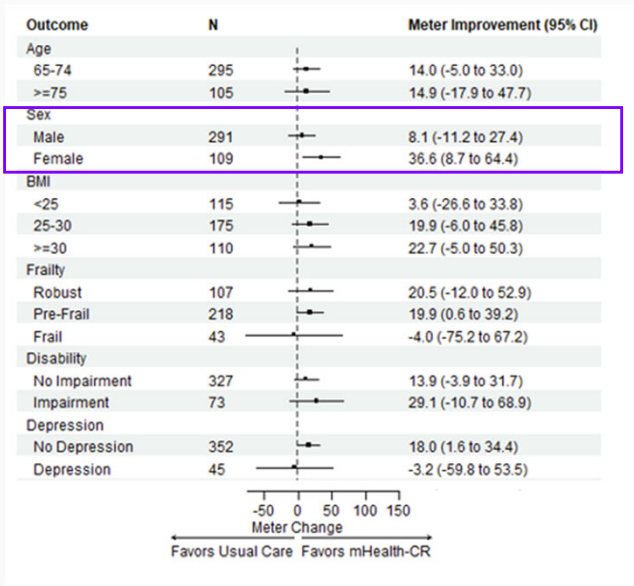
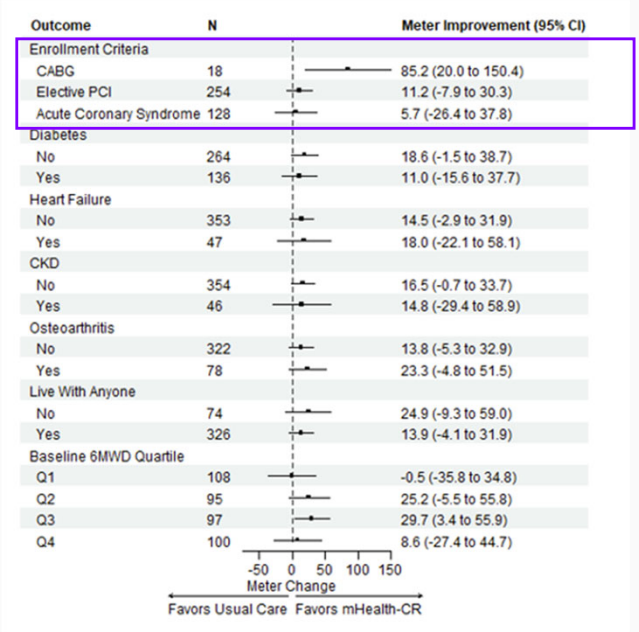
Pre-specified subgroup analyses for the primary endpoint





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Safety

Event	mHealth-CR (N=298)	Usual care (N=102)
Serious Adverse Event (Any)	19 (6.4%)	4 (3.9%)
Death	0 (0%)	0 (0%)
Hospitalization	19 (6.4%)	4 (3.9%)
Cardiac*	9 (3.0%)	2 (2.0%)
Non-cardiac	10 (3.4%)	2 (2.0%)
Mechanical fall**	2 (0.6%)	0 (0%)
Other non-cardiac	8 (2.7%)	2 (2.0%)

*Cardiac hospitalizations include acute coronary syndrome, heart failure, arrythmia, or planned procedure
**One mechanical fall in mHealth-CR arm occurred during study-related exercise, and was attributable to the intervention

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Limitations

- Pragmatic trial; participants could still receive traditional ambulatory CR at cardiologist discretion
- 72% of eligible participants declined informed consent

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Key take-home points

- Compared with usual care, mHealth-CR increased 6MWD but did not achieve a clinically significant 25 meter improvement in functional capacity among older adults.
- Secondary outcomes (health status, residual angina, disability) were also similar between arms.
- Adverse events were very rare.
- Several findings, including improvement in functional capacity with mHealth-CR among women, deserve further study.

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Geriatric cardiology research: moving forward

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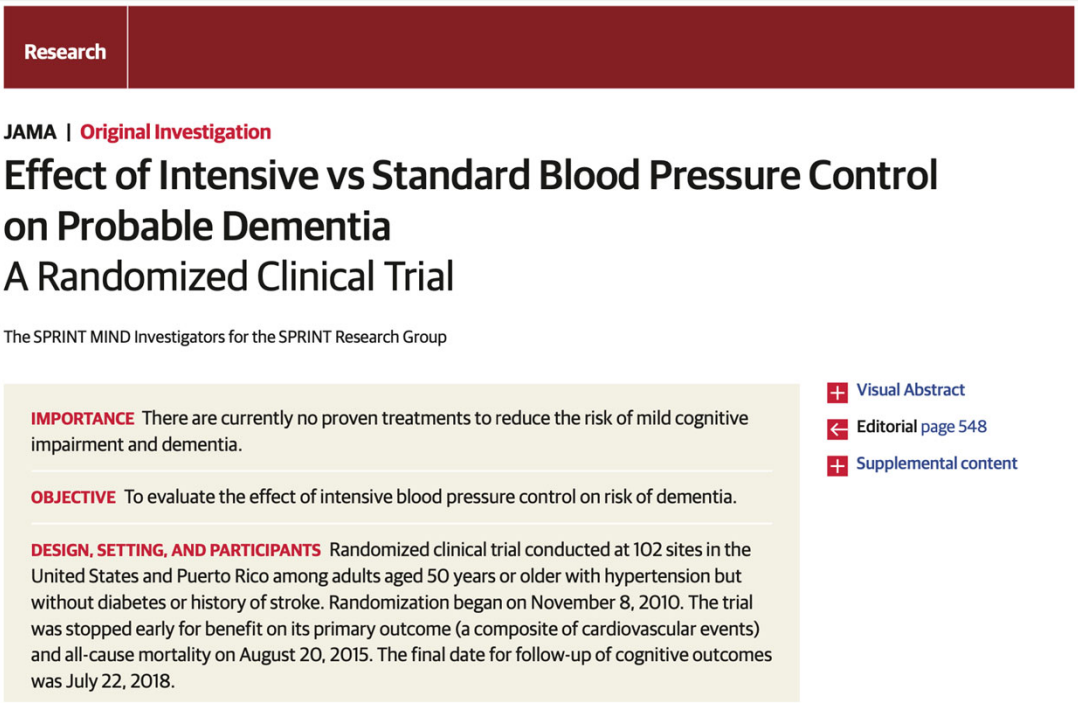
Mean age in selected newer pivotal randomized trials

- COAPT (mitraclip): 72 years
- TRILLUMINATE (tricuspid edge to edge repair): 78 years
- SENIOR-RITA (revasc in NSTEMI): 82 years
- After Eighty (revasc in NSTEMI): 85 years
- ELDERCARE-AF (Edoxaban for AF): 87 years

Future directions: prevention of dementia



Research

JAMA | Original Investigation

Effect of Intensive vs Standard Blood Pressure Control on Probable Dementia
A Randomized Clinical Trial

The SPRINT MIND Investigators for the SPRINT Research Group

IMPORTANCE There are currently no proven treatments to reduce the risk of mild cognitive impairment and dementia.

OBJECTIVE To evaluate the effect of intensive blood pressure control on risk of dementia.

DESIGN, SETTING, AND PARTICIPANTS Randomized clinical trial conducted at 102 sites in the United States and Puerto Rico among adults aged 50 years or older with hypertension but without diabetes or history of stroke. Randomization began on November 8, 2010. The trial was stopped early for benefit on its primary outcome (a composite of cardiovascular events) and all-cause mortality on August 20, 2015. The final date for follow-up of cognitive outcomes was July 22, 2018.

Visual Abstract
Editorial page 548
Supplemental content

SPRINT MIND Investigators. *JAMA* 2019;321(6):553-561.

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SPRINT-MIND

- 8563 patients enrolled in SPRINT (RCT of target SBP <120 vs. <140 mmHg)
- Mean age 68 years (28% age ≥75 years)
- Followed median 3.3 years
- Cognition measured with Montreal Cognitive Assessment and other instruments

SPRINT MIND Investigators. *JAMA* 2019;321(6):553-561.

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SPRINT-MIND

- Intensive BP control (target SBP <120 mmHg) significantly reduced incidence of mild cognitive impairment (HR 0.81, 95% CI 0.69-0.95)
- No significant reduction in dementia; however the event rate was low (trial was terminated early)

SPRINT MIND Investigators. *JAMA* 2019;321(6):553-561.

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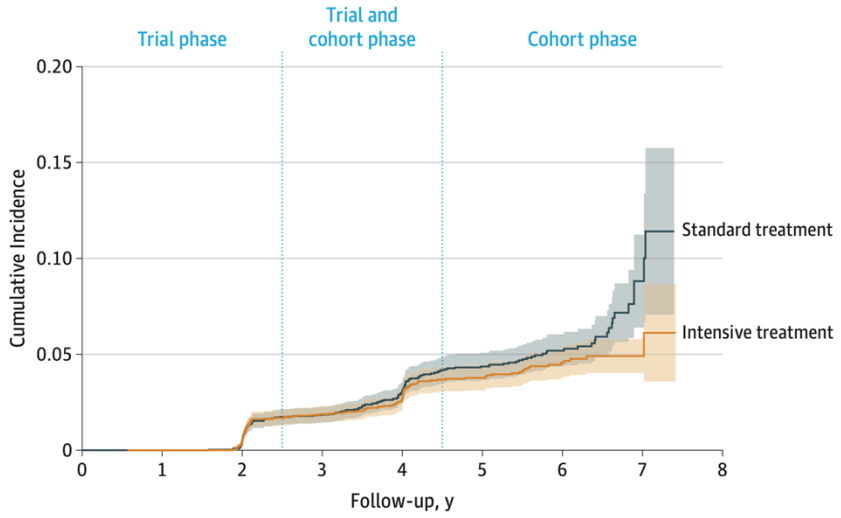
Figure 2. Probable Dementia by Treatment Group



No. at risk									
Standard treatment	4285	4282	4168	3886	2829	2107	989	87	0
Intensive treatment	4278	4277	4171	3917	2893	2189	1027	93	0

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SPRINT MIND Investigators. *JAMA* 2019;321(6):553-561.

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PREVENTABLE
PRagmatic EValuation of evENTs And Benefits of Lipid-lowering in oldEr adults
HOME VOLUNTEER STUDY LOCATIONS FOR CLINICIANS MEET the TEAM IN the NEWS LOGIN
One of the Largest Studies in Adults 75 Years or Older
Starting a statin even after age 75 may lower the risk of developing dementia.
BUT WE DON'T REALLY KNOW.
Results from PREVENTABLE will help us understand.
ON STATINS
70%
NOT ON STATINS
Weekly Zoom meeting!
TUESDAYS
4:00 PM (EASTERN TIME)
Click Now to Register
We will email you a link to join the next scheduled meeting.
MARTES
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Presione aquí para registrarse
Le enviaremos un enlace por correo electrónico para unirse a la próxima reunión.
Encourage friends and family to join, as well, to learn more! Presentation is 15 minutes, followed by Q & A.

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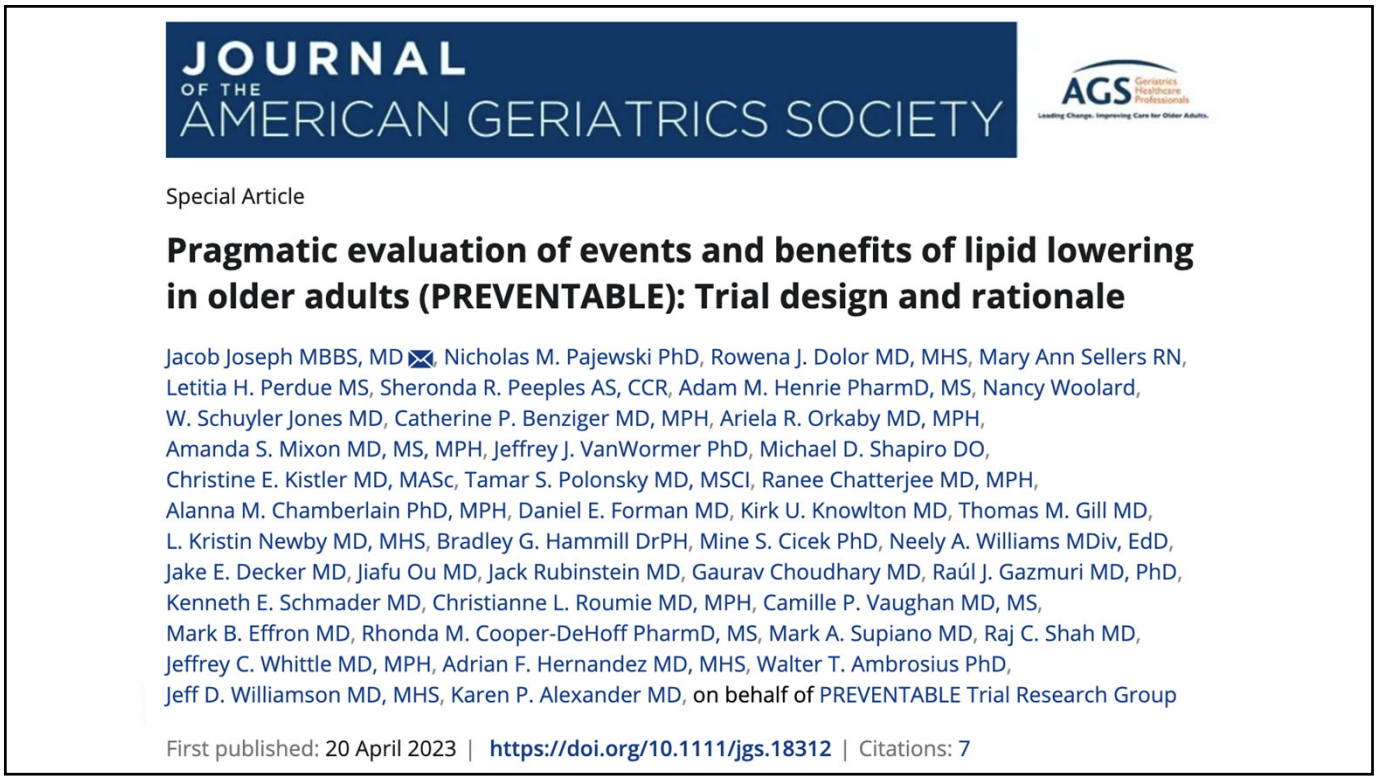
JOURNAL OF THE AMERICAN GERIATRICS SOCIETY
AGS Geriatrics Healthcare Professionals
Leading Change. Improving Care for Older Adults.
Special Article
Pragmatic evaluation of events and benefits of lipid lowering in older adults (PREVENTABLE): Trial design and rationale
Jacob Joseph MBBS, MD, Nicholas M. Pajewski PhD, Rowena J. Dolor MD, MHS, Mary Ann Sellers RN, Letitia H. Perdue MS, Sheronda R. Peeples AS, CCR, Adam M. Henrie PharmD, MS, Nancy Woolard, W. Schuyler Jones MD, Catherine P. Benziger MD, MPH, Ariela R. Orkaby MD, MPH, Amanda S. Mixon MD, MS, MPH, Jeffrey J. VanWormer PhD, Michael D. Shapiro DO, Christine E. Kistler MD, MASc, Tamar S. Polonsky MD, MSCI, Ranee Chatterjee MD, MPH, Alanna M. Chamberlain PhD, MPH, Daniel E. Forman MD, Kirk U. Knowlton MD, Thomas M. Gill MD, L. Kristin Newby MD, MHS, Bradley G. Hammill DrPH, Mine S. Cicek PhD, Neely A. Williams MDiv, EdD, Jake E. Decker MD, Jiafu Ou MD, Jack Rubinstein MD, Gaurav Choudhary MD, Raúl J. Gazmuri MD, PhD, Kenneth E. Schmader MD, Christianne L. Roumie MD, MPH, Camille P. Vaughan MD, MS, Mark B. Effron MD, Rhonda M. Cooper-DeHoff PharmD, MS, Mark A. Supiano MD, Raj C. Shah MD, Jeffrey C. Whittle MD, MPH, Adrian F. Hernandez MD, MHS, Walter T. Ambrosius PhD, Jeff D. Williamson MD, MHS, Karen P. Alexander MD, on behalf of PREVENTABLE Trial Research Group
First published: 20 April 2023 | https://doi.org/10.1111/jgs.18312 | Citations: 7

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Summary: geriatric cardiology

- There is an imperative for this field given aging demographics, in U.S. and elsewhere
- A small number of clinical programs have been launched
- Broader clinical goal of educating general cardiologists on principles of geriatric assessment
- Research agenda: more trials in older patients, with outcomes that matter to them

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Thank you

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