



Beating the Pain of Aging: New Understandings & Innovations

Amber K. Brooks, MD, MS, Professor Anesthesiology



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Disclosures

Mobile Health Behavior Intervention to Reduce Pain and Improve Health-III
(MORPH-III): 1R01AG082777-01A1



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Our Roadmap for Today

Utility of Digital
Technologies

02

01

Prevalence & Impact

03

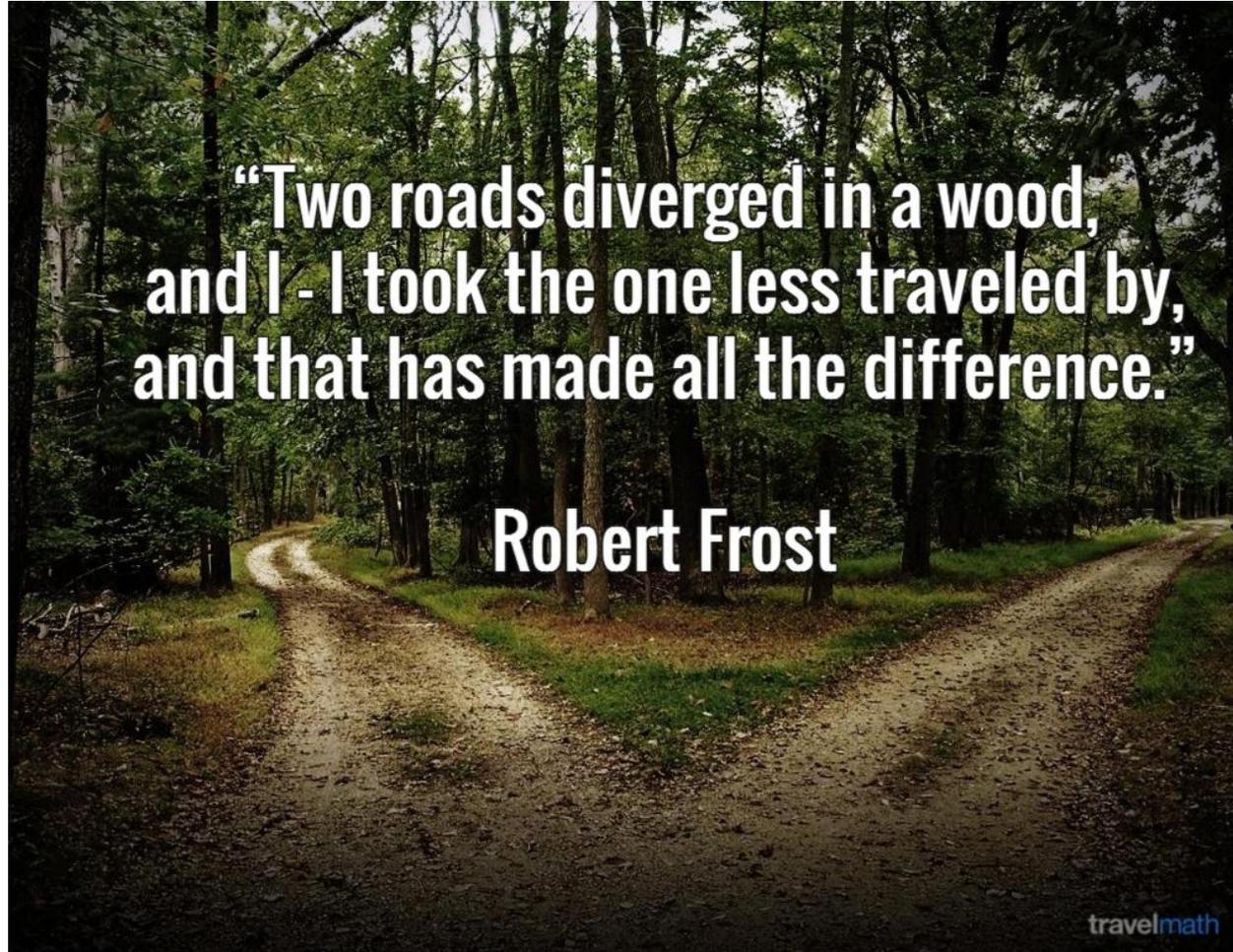
Bridging the gap with
mHealth technologies



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The Road Less Traveled

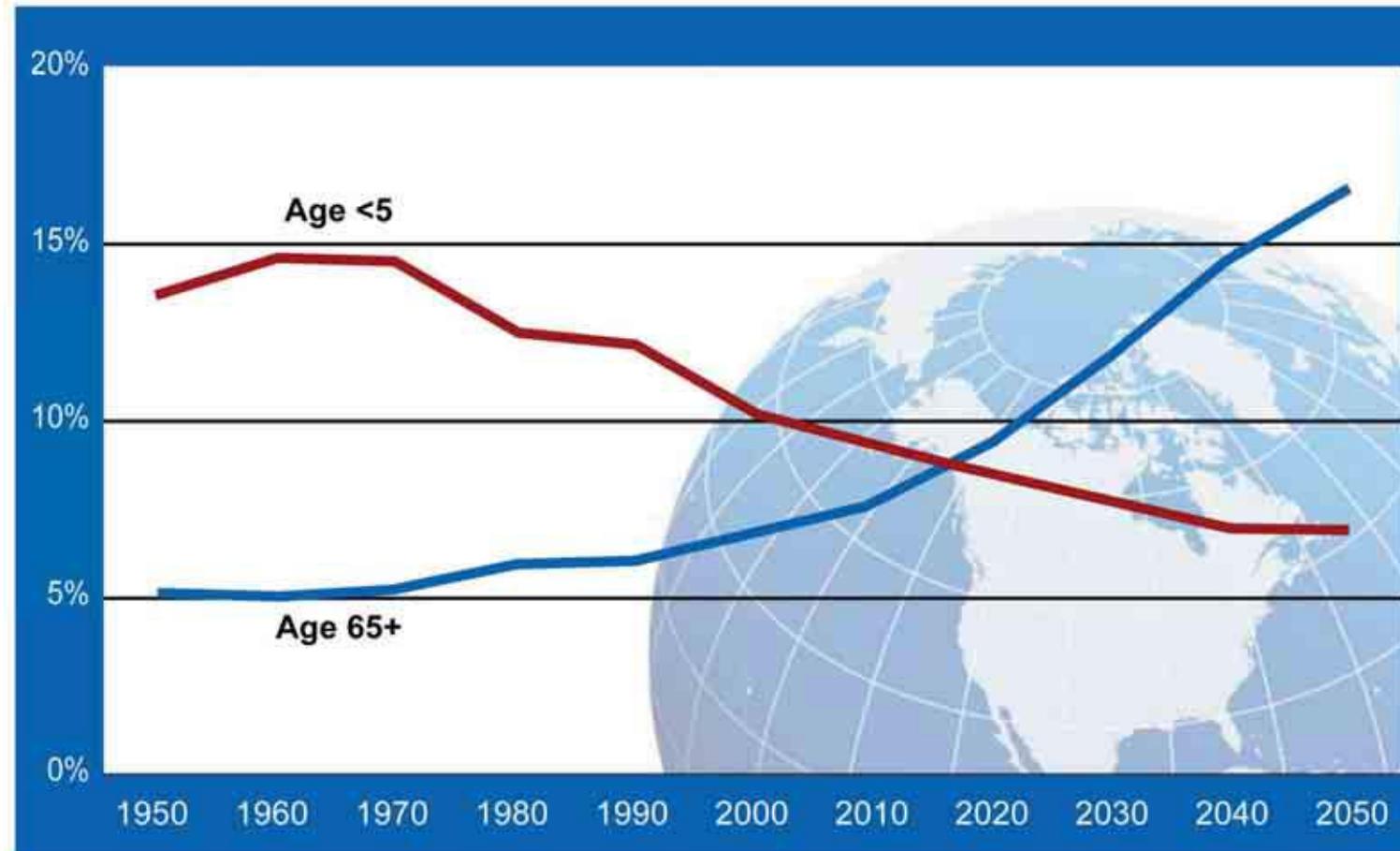


Helen J. Keller, 93 years young



Young Children and Older Adults

As a Percentage of Global Population: 1950-2050



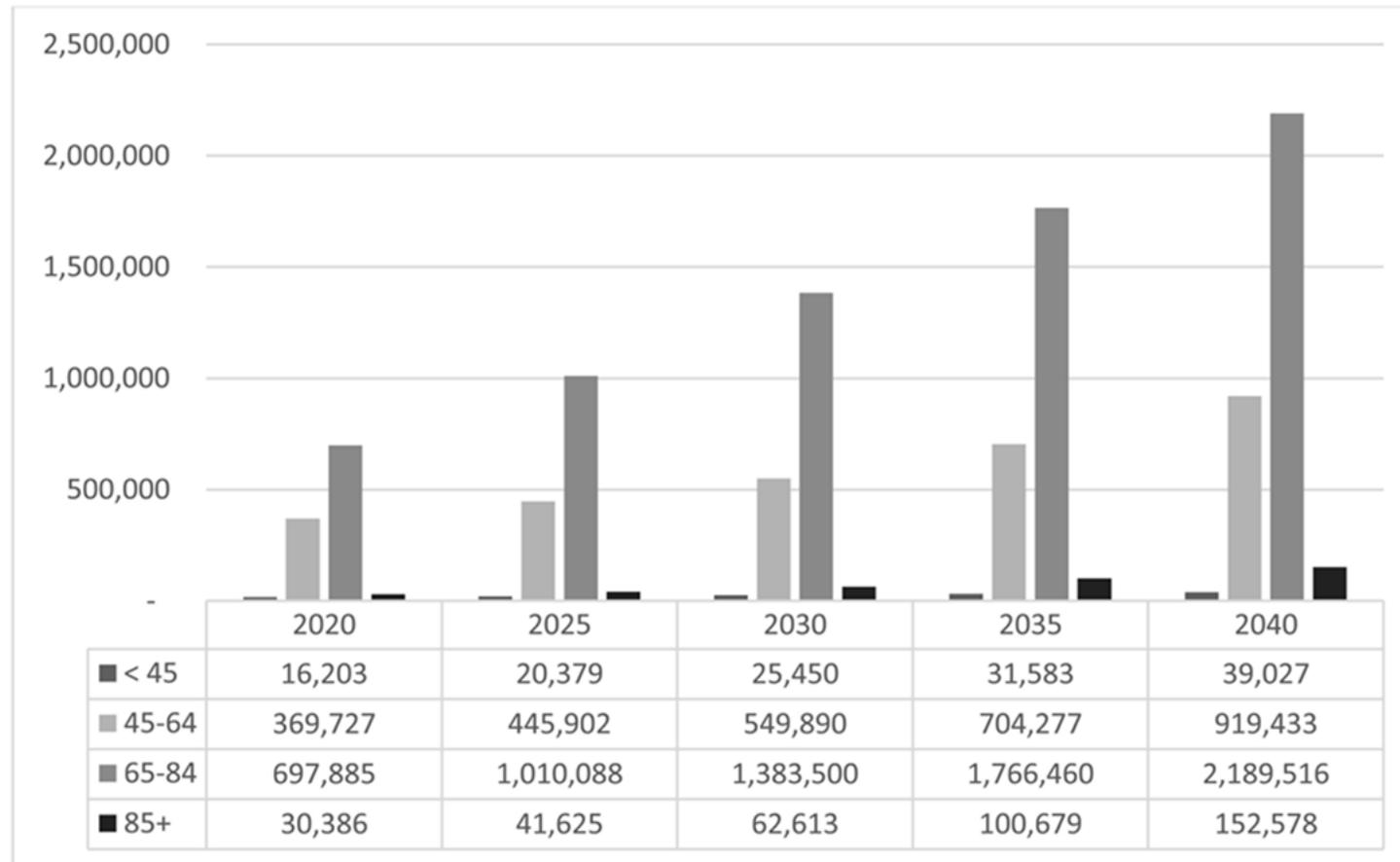
Source: United Nations. *World Population Prospects: The 2010 Revision*
Available at: <http://esa.un.org/unpd/wpp>



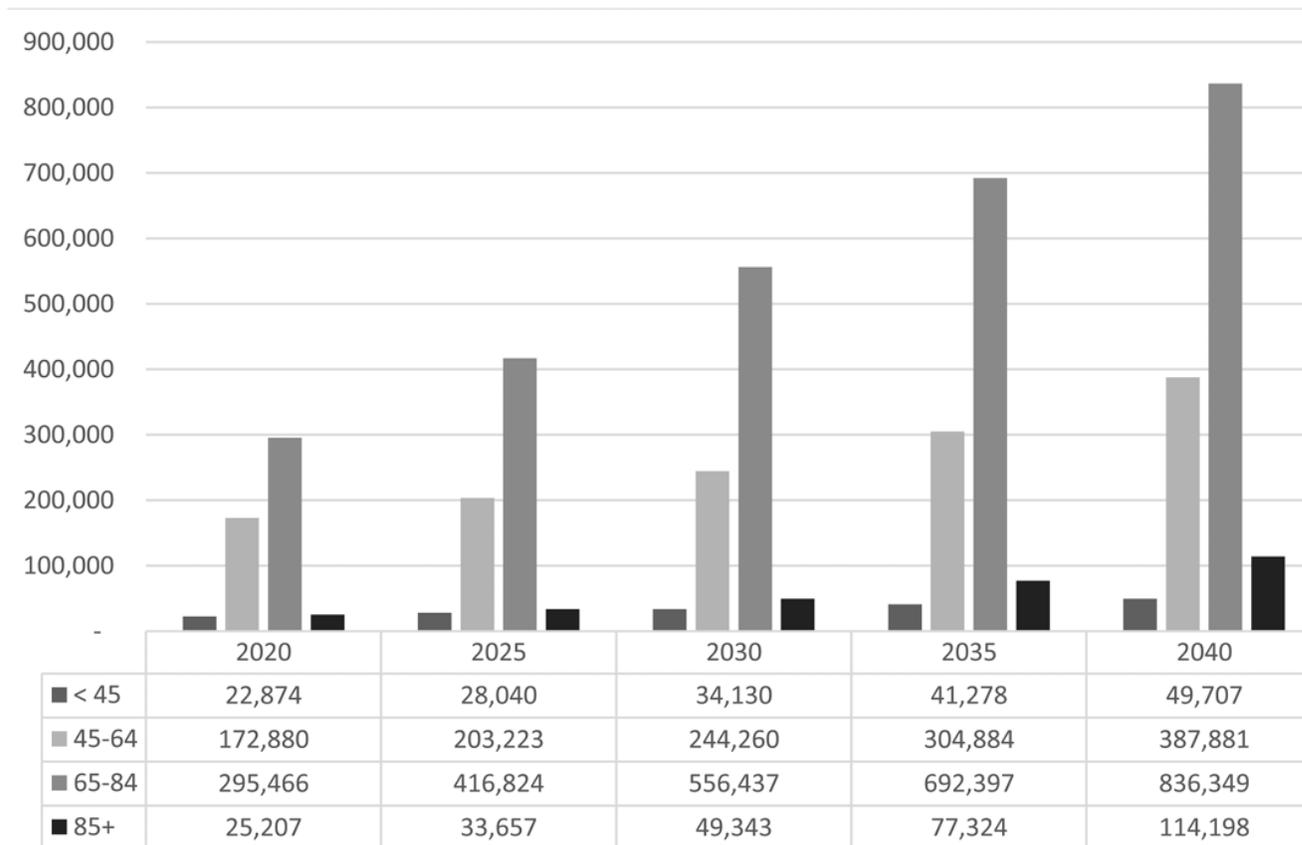
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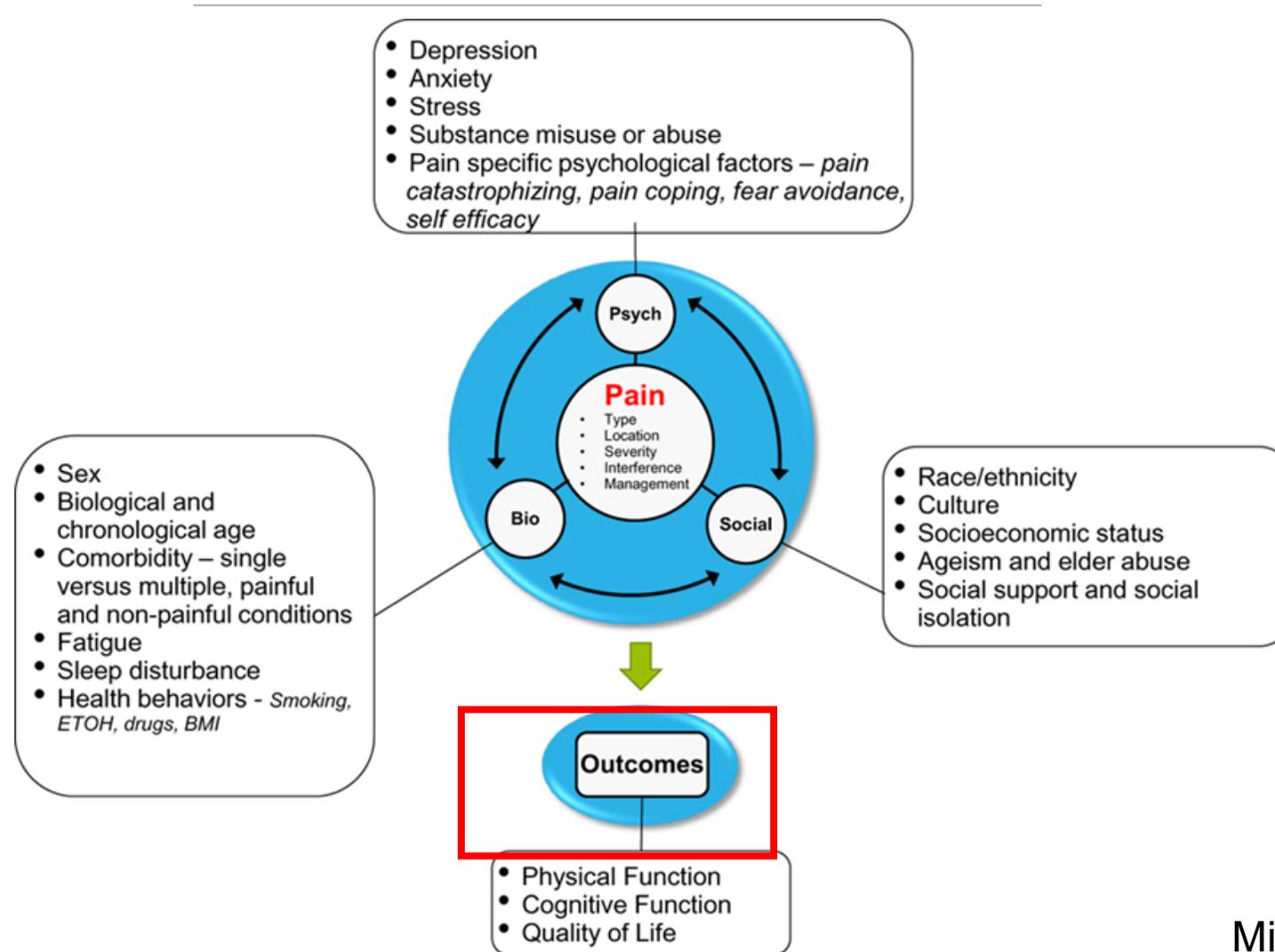
The projected annual use of TKA procedures in the US from 2020-2040



The projected annual use of THA procedures in the US from 2020-2040



Biopsychosocial Model of Chronic Pain in Older Adults



Miaskowski C et al, 2020





Disparities in older adults with osteoarthritis pain

- Black Americans and Hispanics:
 - Greater pain severity
 - Greater disability
 - Poorer functional outcomes
 - Pain is underdiagnosed and undertreated

Other disparities:

- Social determinants of health widen disparities gap: socioeconomic status, education, and employment

Chronic Pain & Obesity

- Obesity prevalence: 45% among adults 40-59 years old and 43% among adults aged 60 and older
- Abdominal obesity nearly doubles the risk for chronic pain in older adults
- Stronger opioid medications
- Increased pain severity
- Multisite pain



<https://www.cdc.gov/obesity/data/adult.html>; Hitt et al, 2007; Thomazeau et al, 2014; Ray et al, 2011



Physical Activity & Aging

- Preserve Mobility
- Reduce Falls
- Improve Cognition

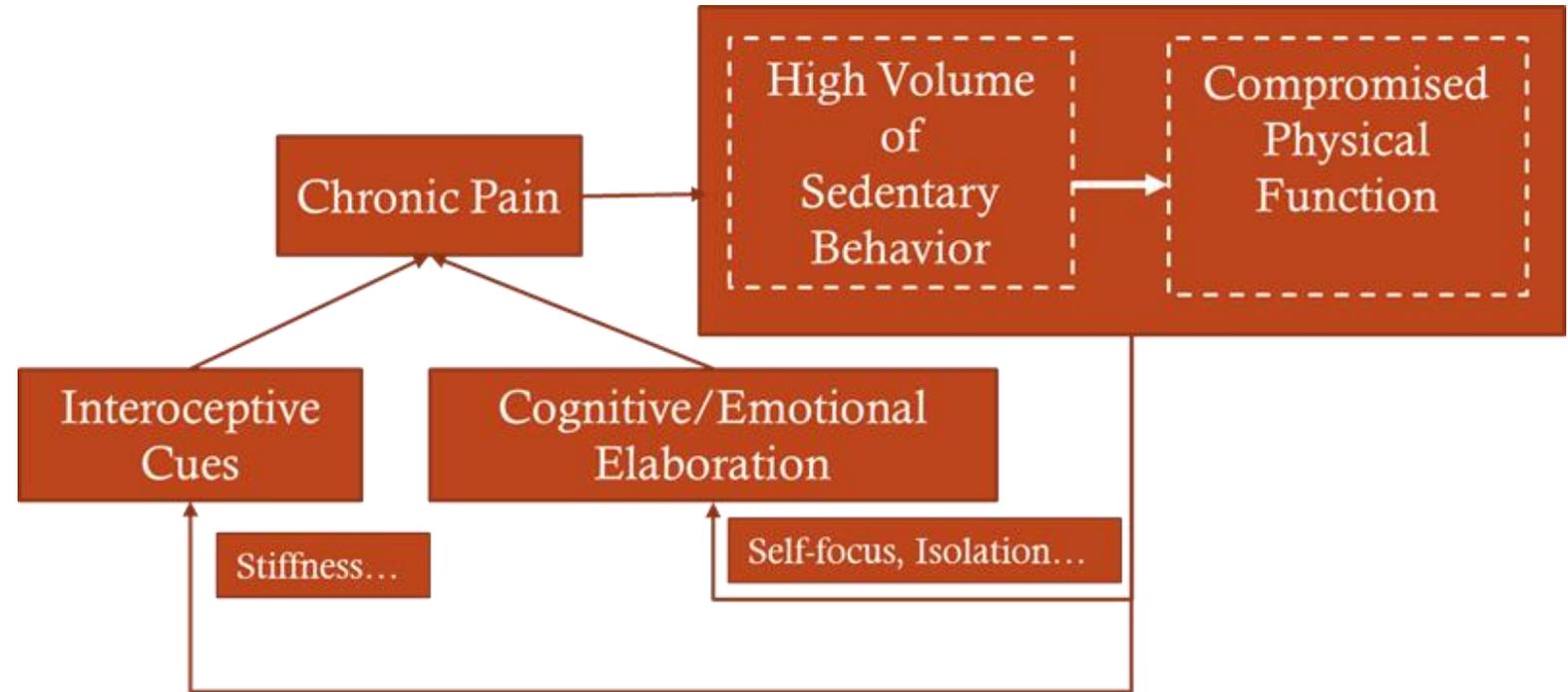


Movement is Medicine

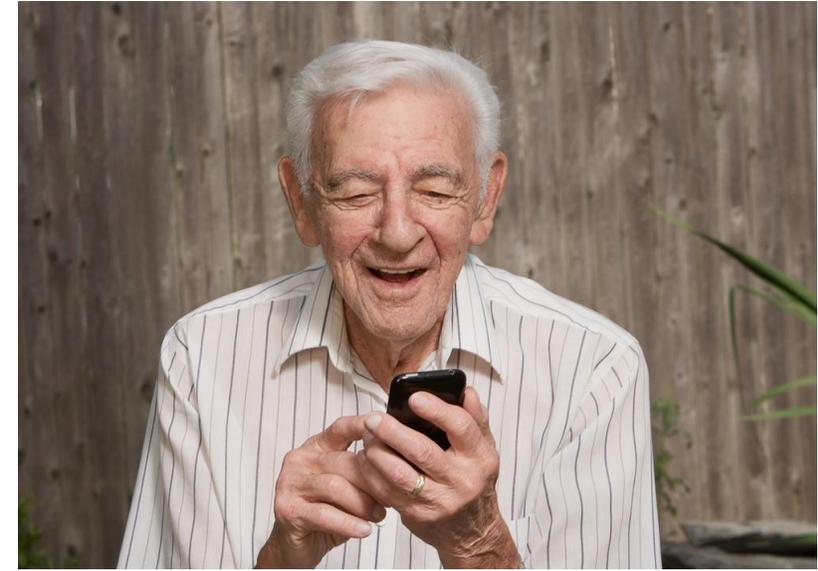
- Stretches in the morning
- Move for 10 mins every hour while awake
- Warm water therapy
- Small, doable goals
- Senior sneaker programs (YMCA, community centers)



Pain & Aging



Bridging the Gap with Digital Health Technologies



In US, digital health startup investment increased to **\$38 billion in 2020**, up from \$22 billion in 2020

<https://www.fiercehealthcare.com/digital-health/digital-health-startups-around-world-raked-57-2b-2021-up-79-from-2020>

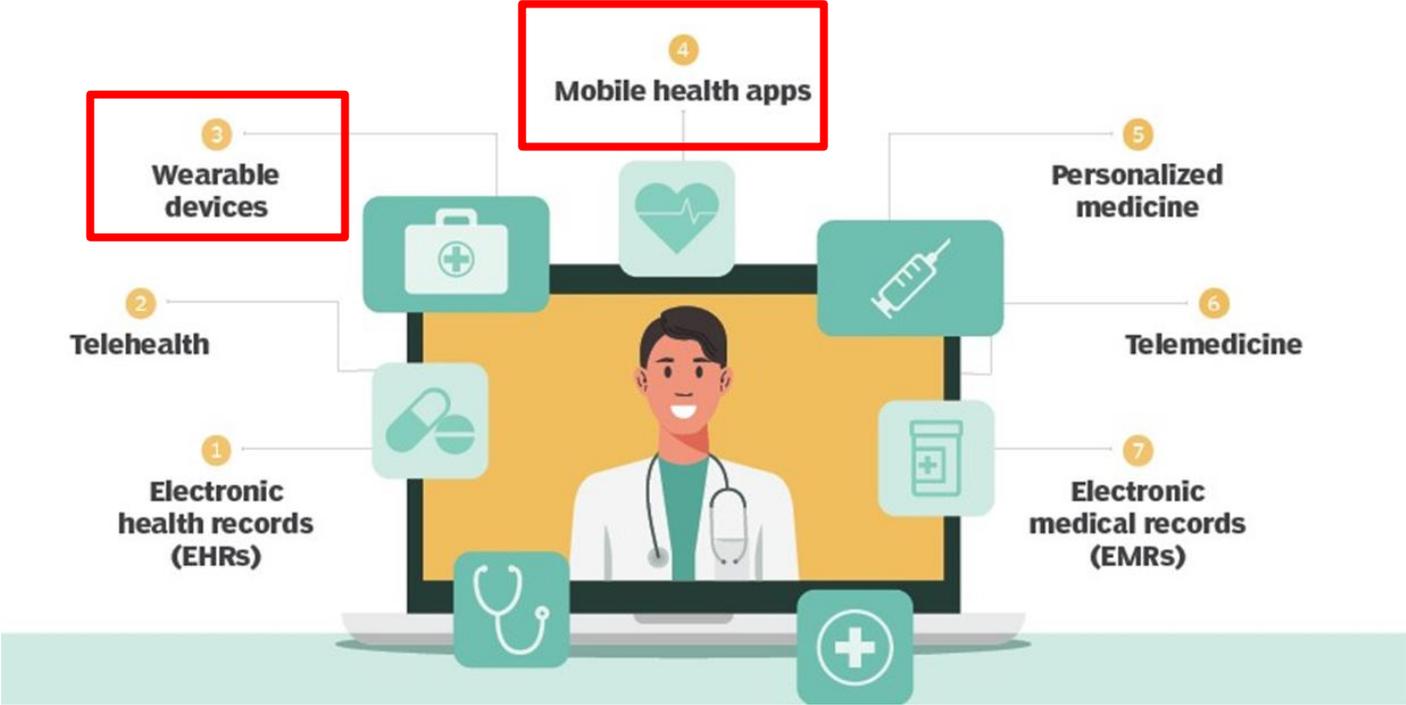
Gupta et al, 2017



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Digital Health Technologies



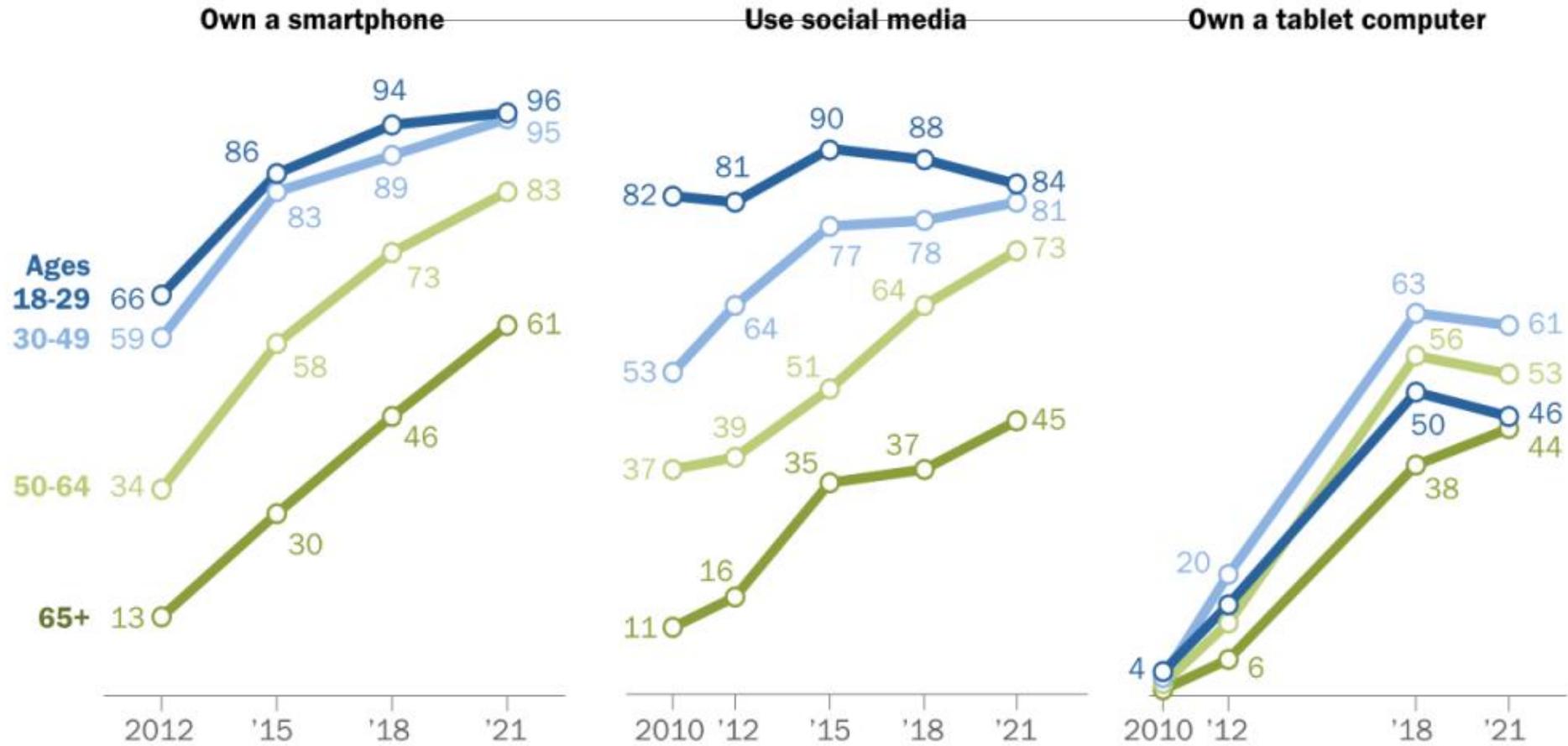
MOBILE HEALTH (mHealth)

WHO definition: medical and public health practice supported by mobile devices (smart phones, tablets)



Smartphone ownership and social media use among older adults continue to grow

% of U.S. adults who say they ...



Note: Respondents who did not give an answer are not shown.
 Source: Survey of U.S. adults conducted Jan. 25-Feb. 8, 2021.

PEW RESEARCH CENTER

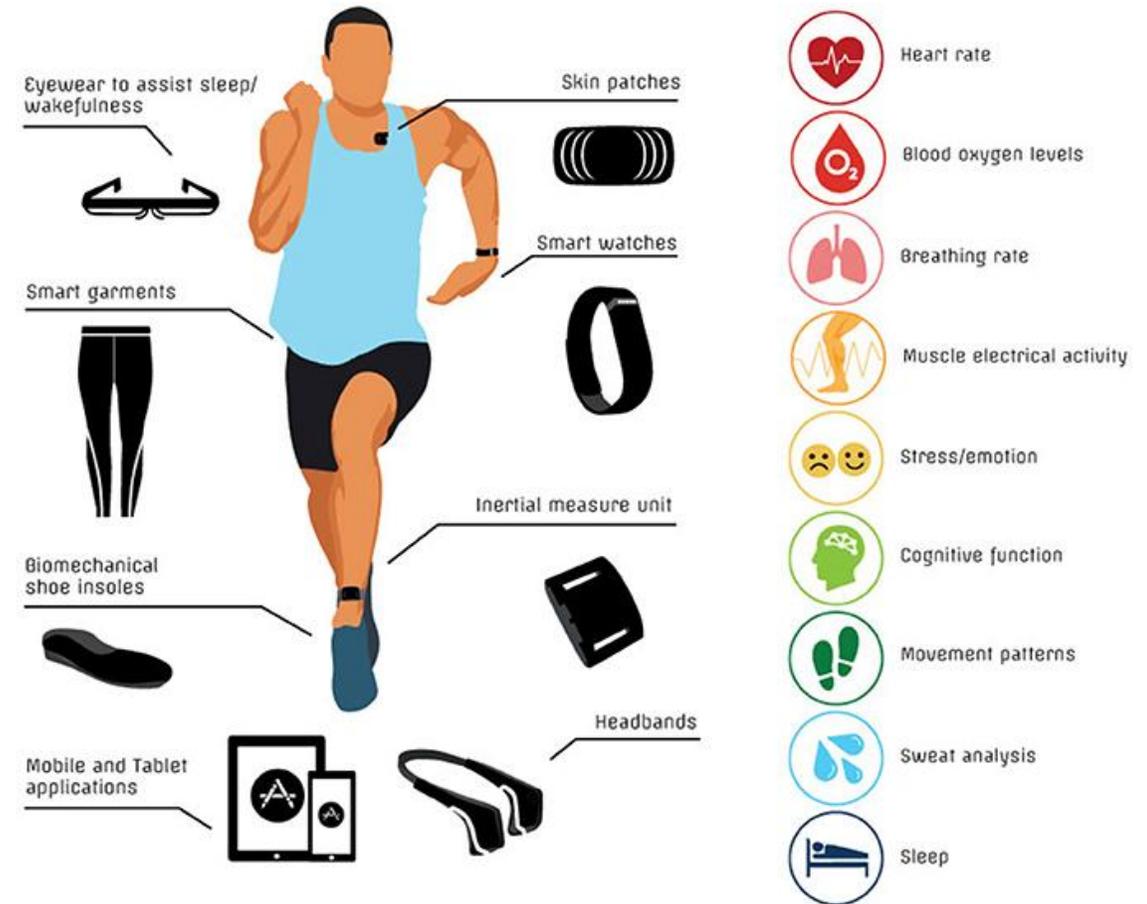


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Wearable Devices: Opportunities

- Provide objective data (performance-based measures)
- Monitor physiologic response e.g., heart rate variability
- Assess health behaviors e.g., sleep



WEARABLE Devices: Challenges

- Older adult willingness
- Limited data/research in the field of pain
- Studies that show improvement in pain and/or physical function most often include a behavioral intervention component
- Performance data needs to be considered along side other pain related data e.g., mood, sleep, environment, medication use to increase meaningfulness

Davergne T et al, Arthritis Care Res, 2019

Leroux A et al, Digit Biomark, 2021



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mHealth App Opportunities

- Track/monitor pain and pain-related symptoms and goals over time
- Deliver health interventions
- Bi-directional communication with interventionist/provider
- Enhance socialization



mHealth App Development Pitfalls

EDITORIAL

Developing mHealth Applications for Older Adults with Pain: Seek Out the Stakeholders! Kozlov E and Reid CM, Pain Medicine, 2018

- Stakeholders not involved in development
- Lack user center design
- Dearth of knowledge re: benefits/risks



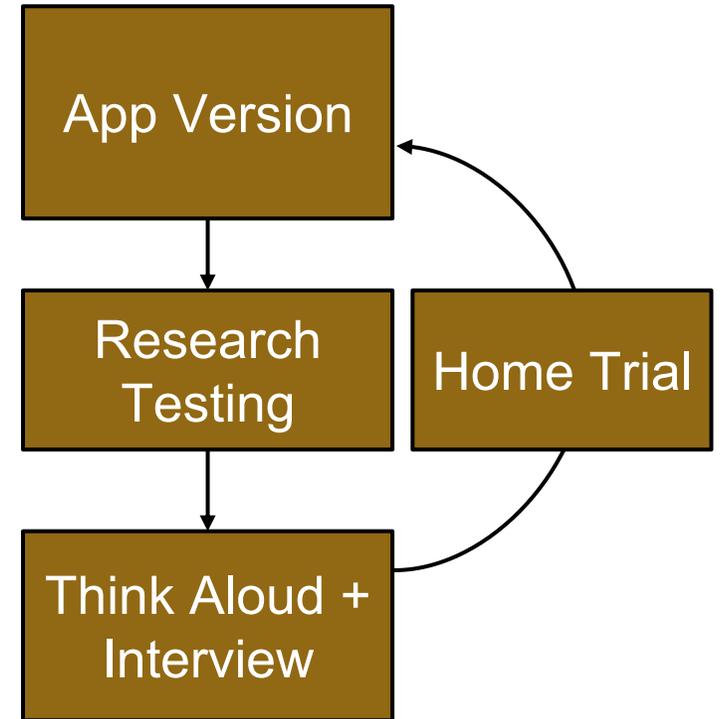
A Mobile Intervention to Reduce Pain and Improve Health (MORPH)

- MORPH targets weight loss and movement
- Study population: low-active 55-85 year olds with chronic multisite pain
- MORPH I: Two-phase development study (n=28)
 - Phase 1: Intensive iterative development
 - Phase II: 12-week RCT
- MORPH II: delivered 100% virtually with emphasis on movement throughout the day (n=40)



User Center Design

- Individual participants attend a Think aloud + interview session
- Sent home with mHealth suite, and asked to use for one week to identify usability issues
- Report system usability after one week of use



MORPH Intervention Components



Companion App



Activity Monitor

Scale



Weekly Group Telecoaching Sessions



Weekly Knowledge Videos



MORPH I Results: Lessons Learned

Phase I (development): technological and user interface modifications

Phase II (RCT):

- **Physical Function:** Improvement in short physical performance battery scores (0.63 points), moderate effect on sedentary time, moderate improvement in self-efficacy for walking, large improvements in satisfaction for physical functioning, improvement of physical functioning subscales of the SF-36
- **Pain:** moderate-to-large improvement in pre-post PROMIS pain intensity scores
- **Weight loss:** large difference in pre-post body weight (2.90 kg)

Fanning J et al, Front Digit Health, 2020

Fanning J et al, Int J Behav Med, 2022



MORPH I & II Pilot Work

> JMIR Res Protoc. 2018 May 14;7(5):e128. doi: 10.2196/resprot.9712.

A Mobile Health Intervention to Reduce Pain and Improve Health (MORPH) in Older Adults With Obesity: Protocol for the MORPH Trial

Jason Fanning^{1, 2}, Amber K Brooks³, Edward Ip⁴, Barbara J Nicklas², W Jack Rejeski¹

Affiliations + expand

PMID: 29759957 PMCID: PMC5972205 DOI: 10.2196/resprot.9712

Published on 19.7.2021 in Vol 10, No 7 (2021): July

Preprints (earlier versions) of this paper are available at <https://preprints.jmir.org/preprint/29013>, first published March 22, 2021.



Building on Lessons Learned in a Mobile Intervention to Reduce Pain and Improve Health (MORPH): Protocol for the MORPH-II Trial

Jason Fanning¹, Amber K Brooks², Katherine L Hsieh², Kyle Kershner¹, Joy Furlipa¹, Barbara J Nicklas², W Jack Rejeski¹

Article Authors Cited by (8) Tweetations (2) Metrics

- Abstract
- Introduction
- Methods
- Results
- Discussion
- Abbreviations
- Copyright

Abstract

Background:

Engaging in sufficient levels of physical activity, guarding against sustained sitting, and maintaining a healthy body weight represent important lifestyle strategies for managing older adults' chronic pain. Our first Mobile Health Intervention to Reduce Pain and Improve Health (MORPH) randomized pilot study demonstrated that a partially remote group-mediated diet and daylong activity intervention (ie, a focus on moving often throughout the day) can lead to improved physical function, weight loss, less pain intensity, and fewer minutes of sedentary time. We also identified unique delivery challenges that limited the program's scalability and potential efficacy.

frontiers | Frontiers in Digital Health

TYPE Clinical Trial
PUBLISHED 02 November 2022
DOI 10.3389/fdgth.2022.1040867

Check for updates

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Health
Technology Implementation, a section of the

A remote group-mediated daylong physical activity intervention for older adults with chronic pain: Results of the MORPH-II randomized pilot trial

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A remote group-mediated daylong physical activity intervention for older adults with chronic pain: Results of the MORPH-II randomized pilot trial

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frontiers | Frontiers in Aging

TYPE Original Research
PUBLISHED 29 July 2023
DOI 10.3389/fagi.2023.121642

Check for updates

OPEN ACCESS

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RECEIVED 04 May 2023
ACCEPTED 28 July 2023
PUBLISHED 29 July 2023

CITATION
Fanning J, Brooks AK, Robison JT,
Ford S, Irby MB and Rejeski WJ
(2023) Associations between patterns of
physical activity, pain intensity, and
interference among older adults with
chronic pain: a secondary analysis of two
randomized controlled trials.
Front. Aging 4:1216422.
doi: 10.3389/fagi.2023.1216422

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Associations between patterns of physical activity, pain intensity, and interference among older adults with chronic pain: a secondary analysis of two randomized controlled trials

Jason Fanning^{1*}, Amber K. Brooks², Justin T. Robison¹, Megan B. Irby¹, Sherri Ford¹, Kindia N'Dah¹ and W. Jack Rejeski¹

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Clinical Interventions in Aging

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ORIGINAL RESEARCH

Associations Between Patterns of Daily Stepping Behavior, Health-Related Quality of Life, and Pain Symptoms Among Older Adults with Chronic Pain: A Secondary Analysis of Two Randomized Controlled Trials

Jason Fanning^{1*}, Amber Keller Brooks², Megan Bennett Irby¹, Kindia Williams N'Dah¹, W Jack Rejeski¹

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International Journal of Behavioral Medicine (2022) 29:240–246
<https://doi.org/10.1007/s12529-021-10003-3>

BRIEF REPORT



The Effects of a Pain Management-Focused Mobile Health Behavior Intervention on Older Adults' Self-efficacy, Satisfaction with Functioning, and Quality of Life: a Randomized Pilot Trial

J. Fanning¹, A. K. Brooks², K. L. Hsieh¹, K. Kershner¹, J. Furlipa¹, B. J. Nicklas³, W. J. Rejeski¹

frontiers | Frontiers in Pain Research

TYPE Original Research
PUBLISHED 25 April 2024
DOI 10.3389/fpain.2024.1340400

Check for updates

OPEN ACCESS

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RECEIVED 17 November 2023
ACCEPTED 07 March 2024
PUBLISHED 25 April 2024

Successes and lessons learned from a mobile health behavior intervention to reduce pain and improve health in older adults with obesity and chronic pain: a qualitative study

Amber K. Brooks^{1*}, Abha Athawale¹, Virginia Rush², Abigail Yearout², Sherri Ford¹, W. Jack Rejeski¹, Ashley Strahley¹ and Jason Fanning¹



The Team



Overall Project Leaders

Jason Fanning, PhD
Amber Brooks, MD

Full Team

Meet at Least Monthly

Recruitment Team

Leads

Amber Brooks, MD

Members

Megan Irby, PhD
Research technician
Research technician
Meets Weekly

Community Advisory Board

Lead

Megan Irby, PhD

Members

Local Board: 8-10 Members
Advisory Board: ~14 Members
Quarterly to Annually

Intervention and Assessment Team

Lead

Jason Fanning, PhD

Members

Francis Keefe, PhD*
W. Jack Rejeski, PhD*
Project Manager
Interventionist: Sherri Ford
Research associate
Meets Weekly to Bi-Weekly
**Attends as Needed*

Biostatistics Team

Lead

Iris Leng, PhD

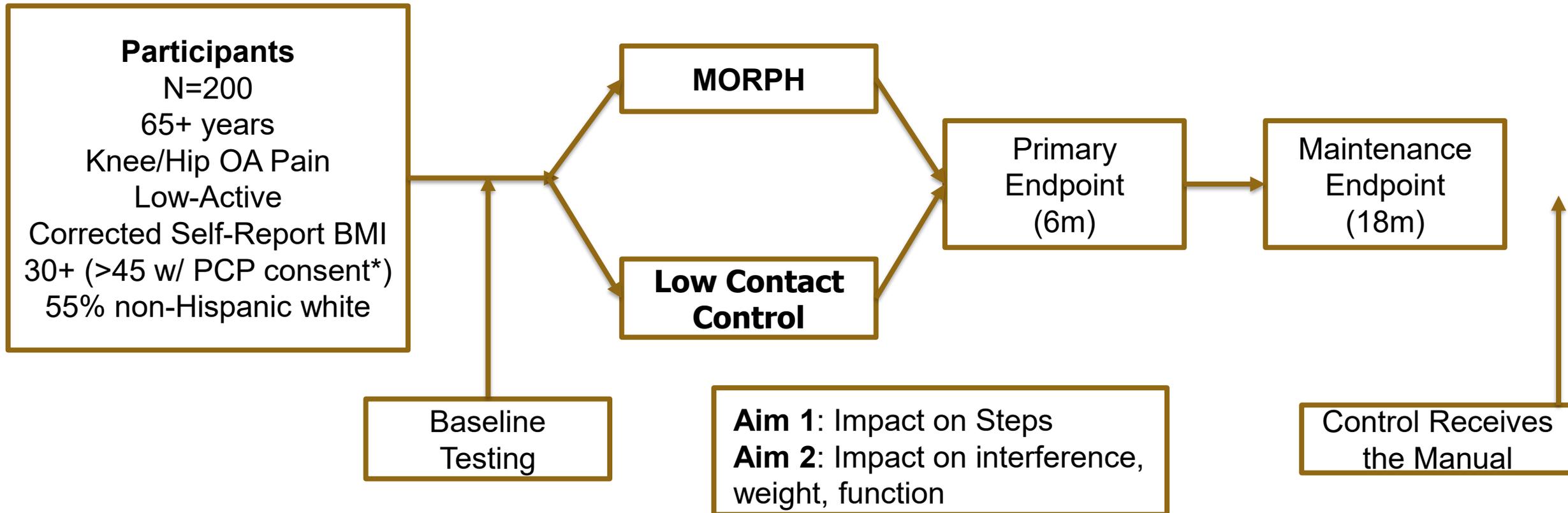
Members

Analyst: Mark Brown, MS
Meets at Least Monthly

Technology Support

Sherri Ford
Emily Potts

MORPH III Study Overview



Study Inclusion Criteria

- At least 65 years of age
- Hip or knee osteoarthritis pain
- Willingness to participate in virtual study with daily use of Fitbit monitor and scale
- Not taking medications for weight loss
- Little or no physical activity for the past 6 months
- Willingness to use smartphone or tablet computer



Scan this QR code or contact us to learn more.

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BE INVOLVED. VOLUNTEER FOR A CLINICAL TRIAL

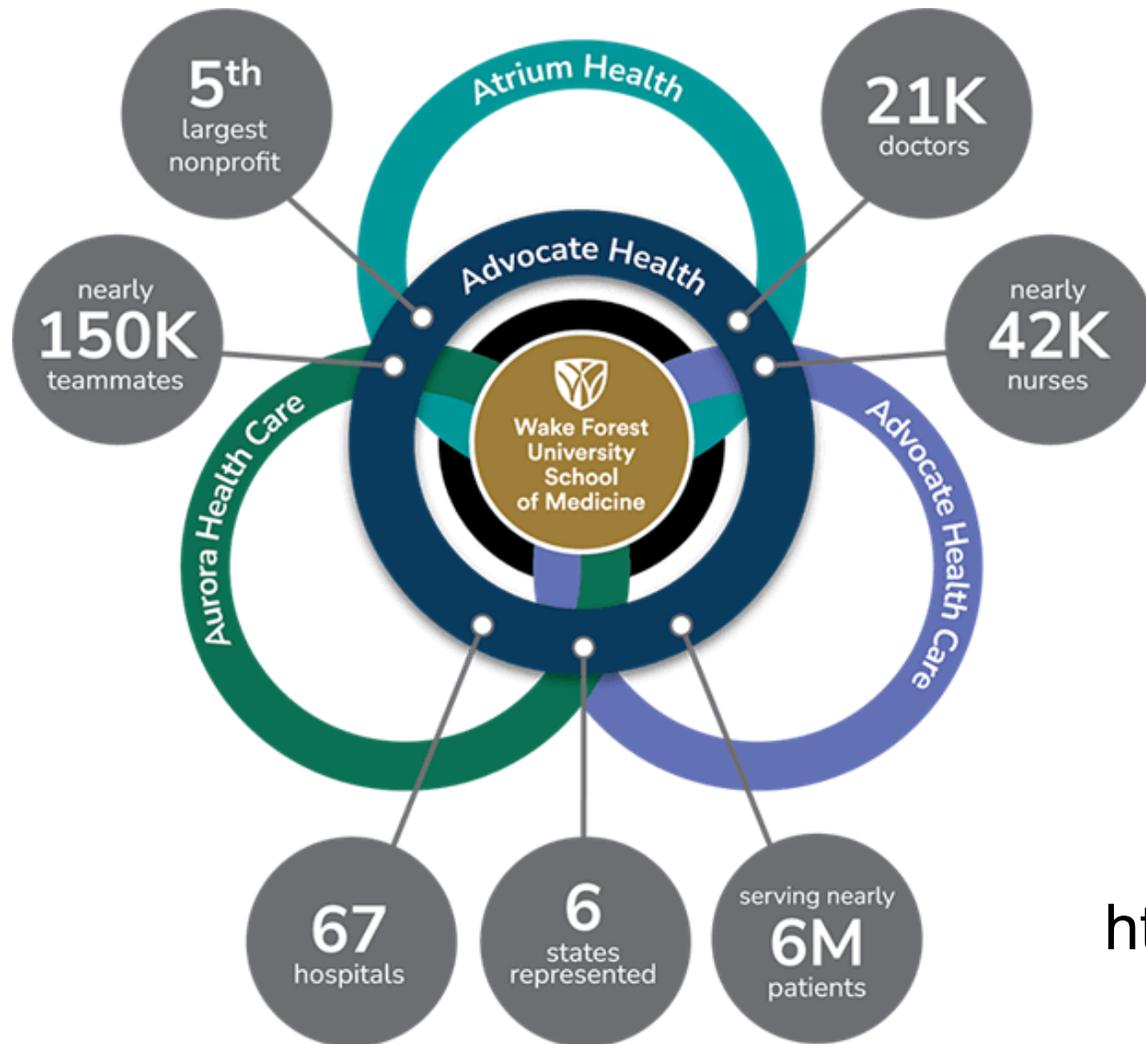


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Wake Forest University School of Medicine is the academic core of Atrium Health.

IRB00025649

Advocate Health National Center for Clinical Trials, powered by Wake Forest University School of Medicine



Eugene A. Woods/jnj.com

**Eugene Woods Announced the
Launch of the Advocate Health
National Center for Clinical Trials**

<https://www.advocatehealth.org/clinical-trials>

Representation in Clinical Trials

Demographic	Clinical Trials	US Population
Black American	8%	13%
Hispanic	11%	18%
Asian	6%	6%
White	75%	60%



Community Advisory Board

- **Enrich Study Design:**
Relevance, Feasibility, Culture Sensitivity
- **Enhance Recruitment:** Trust, Outreach Strategies, Diversity
- **Promote Dissemination:**
Accessibility to results, Increase impact, Sustainability



CONCLUSION

- Chronic pain in older adults is complex and challenging to treat
- Digital technology may help bridge the treatment gap
- Research needed to address gaps:
 - What motivates patients to adopt/continue to use tools?
 - Long term benefits/risks
 - Studies needed that demonstrate value to patients, providers, and payors





*“No research
without action,
no action without
research”*

Kurt Lewin

Social Psychologist



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THANK YOU!



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