WAYNE STATE UNIVERSITY

Institute of Gerontology

REGISTER TODAY
SCAN ME

Issues in Aging 2024

Monday April 29, 8:00 am - 3:45 pm

Navigating Challenges in Aging

6 CREDITS for Social Workers, Nurses, Physical Therapists, Occupational Therapists, Case Managers, OTAs, PTAs

COST *(Breakfast and lunch are included):*
$65 Professionals
$40 Students (No CEs issued)

LIVE EVENT, JOIN US IN PERSON:
VisTaTech Center at Schoolcraft College
18600 Haggerty Rd, Livonia, MI 48152

AGENDA

8:00 am – Light Breakfast, Visit Vendors

8:30 am – ***Medication Management: One Too Many Prescriptions***

10:00 am – Break, Networking, Visit Vendors

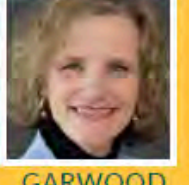
10:30 am – ***Partnering with Families of Hospitalized Persons with Dementia: Lessons Learned***

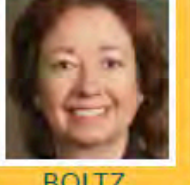
Noon – Lunch

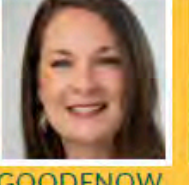
12:45 pm – ***CAPABLE: An Interdisciplinary Approach to Aging in Place***

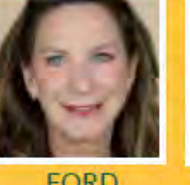
2:15 pm – ***Structural Insights into the Neuropathology of Frontotemporal Dementia and ALS***

3:45 pm – Raffle Drawings, Closing


GARWOOD


BOLTZ


GOODENOW


FORD


BARMADA

Professionals (Earn 6 CEs) REGISTER HERE
Students (No CEs issued) REGISTER HERE

Thank You to Our Supporters

PREMIER PARTNER

ALZHEIMER'S ASSOCIATION

Access

AgeWays (AAA1B)

Angela Hospice

Avalon Senior Living Communities

BrightStar Care

Center for Financial Planning

CorsoCare

Heart to Heart Hospice

Henry Ford Health System C.A.R.E. Program

Hospice of Michigan

Jewish Senior Life

PACE of Southeast Michigan

Pharmacare Drugs

Presbyterian Villages of Michigan

Right at Home

Senior Caregiver Resource Network (SACRN)

Senior Helpers

Team Suzy

The Senior Alliance (AAA1C)

Waltonwood Senior Communities

Medication Management: One Too Many Prescriptions 8:30 AM

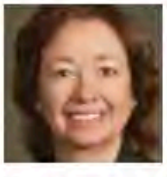
Candice Garwood, PharmD, FCCP, BCPS, BCACP, Clinical Professor College of Pharmacy and Health Sciences, Wayne State University

Polypharmacy in geriatric patients refers to the concurrent use of multiple medications by these individuals. This is a common concern as it can lead to various issues such as increased risk of adverse drug reactions, drug interactions, and medication non-adherence. It is important for healthcare providers to regularly review the medication regimen of older adults to ensure the appropriate and safe use of medications.

Objectives:

- Discuss polypharmacy in geriatric patients.
- Develop strategies to reconcile medication therapies and minimize adverse drug events.
- Identify and list resources to optimize patient safety and medication use.

Partnering with Families of Hospitalized Persons with Dementia: Lessons Learned 10:30 AM



Marie Boltz, PhD, GNP-BC, FGSA, FAAN, Eberly Endowed Professor, College of Nursing, Pennsylvania State University

Partnering with families of hospitalized persons with dementia is crucial for providing comprehensive and person-centered care. Through our experience, we have learned that open communication, education, and involving families in decision-making can greatly improve the well-being of the patient and enhance their overall hospital experience.

Objectives

- Discuss the critical role of family in the life of the person living with dementia.
- Describe challenges and rewards for family carers.
- Describe the state of the science related to interventions for family carers of persons living with dementia.
- Discuss the family carers' relationship with the health care system, including acute care.
- Discuss emerging issues in research, practice, and policy affecting the family living with dementia.

CAPABLE: An Interdisciplinary Approach to Aging in Place 12:45 PM

GOODENOW FORD

Amanda Goodenow, MS, OTR/L, Strategic Partnership Coordinator, and **Tricia Ford,** BA, VP of Operations, CAPABLE National Center, CO

CAPABLE is an interdisciplinary program aimed at supporting older adults to comfortably stay in their homes. It combines expertise in occupational therapy, nursing, and home repair services to address the unique needs and challenges faced by older adults. By providing holistic support, CAPABLE promotes independence and enhances the overall quality of life for older adults aging in place.

Objectives:

- Describe the evidence that supports CAPABLE.
- Describe the program components and the team.
- Describe how CAPABLE addresses equity and promotes self-efficacy.

Structural Insights into the Neuropathology of Frontotemporal Dementia & ALS 2:15 PM

Sami Barmada, MD, PhD –Welch Research Professor and Associate Professor of Neurology, University of Michigan; Director of Michigan Brain Bank

Studies have shown that in frontotemporal dementia (FTD) and amyotrophic lateral sclerosis (ALS), there is a common pattern of cortical atrophy, particularly in the frontal and temporal lobes. Imaging techniques have detected abnormal protein aggregates in specific brain regions, further linking the structural changes to the neuropathology of these diseases. Understanding the structural aspects of FTD and ALS provides insights into their pathogenesis and has potential to guide the development of targeted therapies.

Objectives

- To describe the unique neuropathology of frontotemporal dementia (FTD) and amyotrophic lateral sclerosis (ALS), and the clues this provides to disease pathogenesis.
- To Ilustrate how this pathology can be recapitulated in a laboratory environment, and what this tells us about the origins of disease.
- Clarify mechanisms contributing to FTD/ALS, and new approaches to blocking neurodegeneration.

Professionals (Earn 6 CEs) REGISTER HERE | Students (No CEs issued) REGISTER HERE

WHEN ALZHEIMER'S TOUCHES YOUR LIFE, WE ARE HERE TO HELP

24/7 Helpline | Care Consultations | Support Groups
Community Connect Social Engagement | Local Education Programs

alzheimer's association®

Michigan Chapter

800.272.3900 | alz.org/gmc

TEAM Suzy™

Our mission is to continue to grow the numbers of families and caregivers that we guide and support in 2024. We need your help to achieve our goals this year and for years to come through your continued support of Team Suzy.

email: hello@teamsuzy.org
mailing: PO Box 215047 Auburn Hills, MI 48326

Senior & Caregiver
RESOURCE NETWORK

Ethical and respectful senior services and resources

Whether you are a senior looking to create a better quality of life or a caregiver wanting to improve the life of your loved one, trust us to provide a wide array of services and resources to help you achieve your goals.

Call us: 866-642-4772
Email: resources@sacrn.org
www.sacrn.org

PROUD TO SUPPORT THE 2023 ALZHEIMER'S ASSOCIATION FALL CONFERENCE

A member of the northstar Care Community

Memory may fade. But love and care shine on.

At BrightStar Care®, we combine expertise with compassion and understanding to enhance the lives of people with memory loss.

- Our RN-led Alzheimer's and dementia care approach puts your loved one's safety, comfort and well-being first.
- Whether your loved one's dementia is early or late-stage, we help them maintain meaningful connections to the world around them.

Learn more at **brightstarcare.com**.

©BrightStar Care Independently Owned and Operated

BrightStar Care of Howard County, Maryland
410-910-9425

BrightStar Care®
HOME CARE | MEDICAL STAFFING
A Higher Standard

Call for your free in-home assessment.

BrightStar Care Ann Arbor
734-302-4215

BrightStar Care of Birmingham
248-952-9944

BrightStar Care East Lansing
517-679-1700

BrightStar Care of Grosse Pointe-SE Macomb County
586-279-3610

BrightStar Care of Brighton-Howell
810-225-4000

BrightStar Care of Novi
248-449-5110

BrightStar Care of Rochester
248-952-9944

BrightStar Care of Sterling Heights
586-825-9797

BrightStar of Northern Michigan
231-929-7827

BrightStar Care of Troy-Royal Oak
248-422-3600

Give yourself peace of mind while we care for you or your loved ones at home

Why Choose Relevar Home Care?

- Reliable staff with on going training
- 90% client satisfaction rating
- Personalized care plans
- Care management services to help navigate care issues
- Ongoing communication with family and healthcare providers
- Nursing oversight and supervision

"Michigan Best Small Business" Award Recipient as seen in Detroit Free Press & Macomb Daily

relevar.com

Personalized In-home Care Services:

Senior Home Care
Parkinson's Care
Hospice Care
Accident Recovery
Alzheimer's/Dementia Care
Transitional Care
Care Management
Home Nursing Care

MiGen Michigan LGBTQ+ Elders Network | *Authenticity is Ageless.*

MiGen is Michigan's LGBTQ+ Elders Network.

We are the only community based organization in the State exclusively focused on LGBTQ+ adults ages 45+ and those who love and care for them.

What we do?

Training and Education: *Instructor-led (live or virtual) culturally responsive training and facility credentialing to care providers throughout Michigan.*

Programs: *Food delivery, social connections, and Community Navigation.*

We provide friendly, step-by-step support with needed resources and information. Contact us to learn more:

info@migenconnect.org
(313) 241-8994
migenconnect.org

Pharmacare Drugs

Free Delivery * Medication Management * Lowest Price

Your Neighborhood Pharmacy * Locally Owned & Operated

Flint (810) 391-2020 * Howell (517) 518-8940

Belleville (734) 340-2604 or (734) 391-8284

ACCESS

For over 50 years ACCESS has been

ASSISTING
those in need

IMPROVING
the economic, health, social and cultural well-being of communities

EMPOWERING
through philanthropy, civic engagements and the arts

As the most comprehensive Arab American nonprofit in the U.S., we are grounded in a grassroots commitment to serving our communities.

To learn more about ACCESS, please call 313.842.7010
or visit www.accesscommunity.org

ALLEGRIA VILLAGE

Age 55+ Lifestyle
A Great New Value and Price

AMENITIES...
- All-Season Swimming Pool
- Fitness Center
- Pickleball Court
- Golf Simulator
- 9-Hole Putting Green
- Bocce Ball Court
- Woodshop
- Creative Arts Studio
- 250 Seat Chapel
- Three Dining Venues
- Liquor License
- Dog Park

AFFORDABILITY...
- Monthly Leases
- Rents Starting at $1,500
- Utilities Included
- No Buy-Ins

PEACE OF MIND...
- Gated Community
- Maintenance Free
- Snow Removal
- Lawn Care

100+ CLUBS & CLASSES, INCLUDING...
- Travel
- Golf
- Photography

Age 55+ Apartments | Independent Living | Assisted Living | Memory Support
Skilled Nursing | Rehabilitation

Schedule a tour and see for yourself,
Call 313-584-1000.

allegriavillage.com
15101 Ford Rd., Dearborn, MI 48126

Support for caregivers like you

Contact the Henry Ford C.A.R.E. Program℠

(Caregiver Assistance Resources and Education Program)

Support groups and classes are being offered virtually with the option to join by phone, tablet, iPad, or computer.

Contact us by:
henryford.com/familycaregivers
Toll free number: 866.574.7530
Email: CaregiverResources@hfhs.org

HENRY FORD HEALTH

Feel the warmth of worry-free senior living at *The Avalon.*

When seeking support, The Avalon's assisted living and memory care communities are here for you and your family. Discover maintenance-free living; a variety of enriching social activities; easy friendships; and healthy, chef-created meals, all of which are provided to accommodate your specialized needs and unique personality.

Call your nearest Avalon community today to get a free copy of our assisted living guidebook and to learn more.

THE AVALON

Auburn Hills | (248) 940-3921
TheAvalonOfAuburnHills.com

Bloomfield Township | (248) 460-9668
TheAvalonOfBloomfieldTownship.com

Commerce Township | (248) 265-3187
TheAvalonOfCommerceTownship.com

Assisted Living | Memory Care | Short-Term Respite Stays

Managed by Life Care Services®

CENTER FOR FINANCIAL PLANNING, INC.
Independent Registered Investment Advisor

At the Center,
our company values are more
than words; they serve as
guides in our everyday actions.
Everything we do is about
our clients and our team,
with values leading the way.

CONGRUENCE Between Words and Deeds
Compassionate and Effective LEADERSHIP
PASSION for Excellence
Strong Work ETHIC

248.948.7900 | 800.621.1338
centerfinplan.com

St Joseph's HELPERS

Examples of Projects

- Repairing a leaky faucet
- Garbage disposals
- Repair to exterior steps
- Exterior railings
- Grab bars in bath/shower
- Generalized chore service
- Minor electrical repair
- Changing light bulbs
- Smoke detectors
- Spring/Fall yard clean ups
- Other odd jobs

Mission Statement

St Joseph's Helpers is an organization founded on Christian values, made up of men and women who Volunteer their time and talents to help those in need
to feel safe and secure in their homes

Who we serve

- Our Seniors
- Our Veterans
- Those with Physical Challenges
- Those Who Just Need a Helping Hand

Contact Us

1-800-303-5075
313-900-5235
Email: SJH@SJHelpers.org
Web: SJHelpers.org

Discover Friendships
THAT ENRICH YOUR LIFE

Jewish Senior Life is a vibrant community where the bonds of friendship are built, and passions are pursued. It's a place where older adults can embrace life and community, staying connected to the relationships and places they enjoy.

CALL Tracey at (248) 592-5048, TTY# 711
or EMAIL tproghovnick@jslmi.org
to schedule your personal tour.

People of all faiths and beliefs are welcome.

Jewish Senior LIFE

Explore our community at jslmi.org

Supported by The Jewish Federation of Metropolitan Detroit

CAMPUSES IN OAK PARK AND WEST BLOOMFIELD

The Senior Alliance
LIVE YOUR WAY

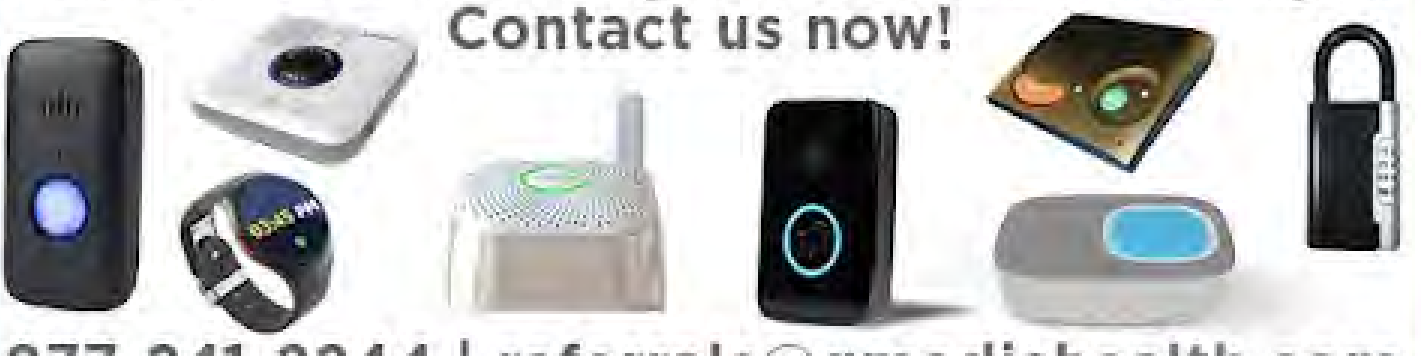
The Senior Alliance provides their clients the freedom and independence to continue living life their way, with dignity and respect.

The Senior Alliance exists for one reason – **to improve the lives of aging adults and adults with disabilities. Older adults deserve to live life on their terms, and as an Area Agency on Aging for western Wayne County and Downriver, we are here to make that happen.**

The Senior Alliance 5454 Venoy Rd. Wayne, MI 48184
734-722-2830 | www.thesenioralliance.org

QMedic™

Many different medical alert devices and free features to suit your member's lifestyle. Contact us now!



877-241-2244 | referrals@qmedichealth.com

Eisai

CREATING HOPE THROUGH INNOVATION

At Eisai, everything we do is guided by a simple principle: patients and their families come first. We spend time with them. We listen and we learn about their lives, their desires and their greatest needs. We call this *human health care or hhc,* giving first thoughts to patients and their families and helping increase the benefits health care provides.

Our *hhc* mission is what drives us to discover innovative solutions and therapies that help address unmet needs within the communities that we seek to serve.

hhc
human health care

TO LEARN MORE, PLEASE VISIT US.EISAI.COM

Do You Need Assistance Caring For a Loved One?

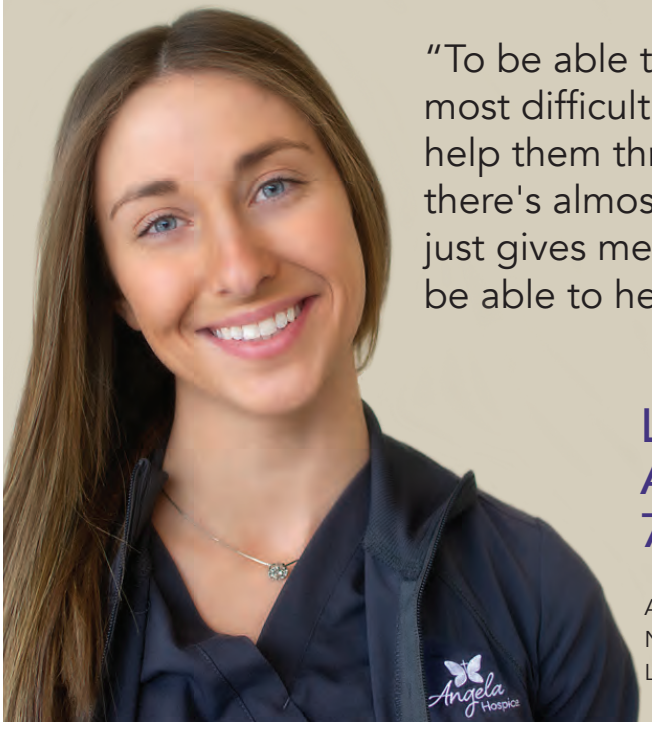
Our Services

- Dressing/Bathing Assistance
- Medication Reminders
- Meal Preparation
- Specialized Care (Dememtia, Parkinson, etc)
- Hospice Support

(313)203-3076 | Wayne County
rightathomewayneco.com

Right at Home
In Home Care & Assistance

Compassion at work.



"To be able to be with patients and the families during the most difficult moments of an individual's life...to be able to help them through something as difficult as passing away, there's almost nothing more rewarding than that. I think it just gives me a sense that *I am truly living my life purpose* to be able to help people do something so difficult."
– Talar, RN

LEARN MORE:
AskForAngela.com
734.464.7810

A Felician-sponsored ministry
Non-profit organization
Livonia, Michigan

Angela Hospice®

Join us at the Michigan Alzheimer's Disease Research Center

The Michigan Alzheimer's Disease Research Center is committed to memory and aging research, clinical care, education, and wellness.

The center collaborates with other research institutions across the state including Wayne State University and Michigan State University, as well as local outreach organizations including the Alzheimer's Association to enhance groundbreaking research efforts and community education. The center is also one of 33 other National Institutes of Health-funded Alzheimer's Disease Research Centers across the country.

Michigan ADRC

alzheimers.med.umich.edu
UM-Ask-MADC@med.umich.edu
734-936-8803
@umichalzheimers

Interested in getting involved in research studies?

Please call Kate Hanson at 734-936-8332 or visit alzheimers.med.umich.edu/research for a list of currently enrolling studies.

Interested in learning about upcoming educational events?

To stay informed of upcoming events, please email Erin Fox at eefox@med.umich.edu to subscribe to our monthly e-newsletters.

Interested in learning more about our wellness programs?

Please call Ashley Miller at 734-615-8293 or visit alzheimers.med.umich.edu/wellness-initiative.

Interested in learning about our Lewy body dementia programs?

Please contact Renee Gadwa at 734-764-5137 or visit alzheimers.med.umich.edu/lbd.

Waltonwood is Welcoming New Residents

Locations in Canton, Novi, Rochester Hills, Royal Oak and Sterling Heights

We cater to seniors who desire social opportunities and a carefree lifestyle. With great locations and caring staff, you'll feel right at home as soon as you step inside.

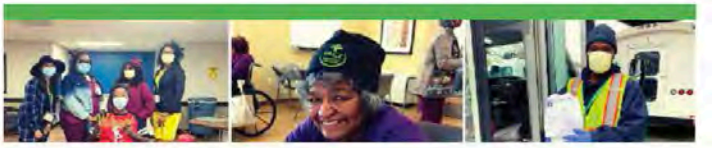
WALTONWOOD
Redefining Retirement Living

Tours are available by appointment

Contact a Waltonwood community near you today!

www.Waltonwood.com

Independent Living, Licensed Assisted Living & Memory Care



PACE Southeast Michigan provides comprehensive, integrated care for seniors with multiple chronic illnesses helping them to be independent in the community, and their home, for as long as possible.

PACE SOUTHEAST MICHIGAN

- Medical Care
- Day Health Center
- Transportation Servies
- Physical and Occupational Therapy
- Behavioral Health Services
- Home Care and much more!

Surrounding you with the care your need to stay in the home you love

Serving seniors in six centers across Southeast Michigan

Eastpointe • Detroit • Sterling Heights
Dearborn • Pontiac • Southfield

www.pacesemi.org

855-445-4554 TDD:711

As a PACE Southeast Michigan participant, all health care services are provided and arranged by your personal health care team. PACE participants may be fully liable for the costs of medical services from an out of network provider or without prior authorization with the exception of emergency services.

DISCOVER THE POSITIVE APPROACH TO ALZHEIMER'S AND DEMENTIA CARE

Senior Helpers offers personalized in-home care solutions that truly set us apart, like our Senior Gems program. We focus on what your loved one can do instead of what they cannot do.

Take a step in a positive direction by contacting us today.

SENIOR Helpers®

Senior Care, Only Better.

FARMINGTON HILLS
248.865.1000

ROCHESTER
248.795.1500

seniorhelpersmi.com

All rights reserved. Senior Helpers locations are independently owned and operated. ©2024 SH Franchising, LLC.

Villages*

PACE Southeast Michigan**

PACE Central Michigan***

* Some villages and programs are in collaboration with other organizations

** In collaboration with Henry Ford Health

*** In collaboration with Michigan Masonic Home

Presbyterian Villages OF MICHIGAN

SERVING SENIORS & COMMUNITIES

Embrace the possibilities

Presbyterian Villages of Michigan creates opportunities for seniors of all faiths. Connecting seniors to resources and their community for a vibrant life.

www.pvm.org | (248) 281-2020

Presbyterian Villages of Michigan (PVM) *Programs and Partners include*:

PACE PROVIDER

PACE Locations
Offer the Program of All-Inclusive Care for the Elderly (PACE). Provides care and services in the home, community and the Day Health Center.

PACE Southeast Michigan
www.pacesemi.org
(855) 445-4554

PACE Central Michigan
www.pacecmi.org
(833) 532-6981

There are many PVM Communities throughout Michigan:

Perry Farm Village, Harbor Springs	**231.526.1500**
The Village of Hillside, Harbor Springs	**231.526.7108**
Alpena Pines, Alpena	**989.278.4250**
The Village of Rosebush Manor, Rosebush	**989.433.0150**
The Village of Hampton Meadows, Bay City	**989.892.1912**
The Village of Lake Huron Woods, Fort Gratiot Township	**810.385.9516**
The Village of East Harbor, Chesterfield Township	**586.725.6030**
The Village of Holly Woodlands, Holly	**248.634.0592**
The Village of Sage Grove, Kalamazoo	**269.567.3300**
The Village of Mill Creek, Battle Creek	**269.962.0605**
The Village of Spring Meadows, Jackson	**517.788.6679**
The Village of Oakland Woods, Pontiac	**248.334.4379**
The Village of Peace Manor, Clinton Township	**586.790.4500**
The Village of Warren Glenn, Warren	**586.751.5090**
The Village of Redford	**313.541.6000**
The Village of Our Saviour's Manor, Westland	**734.595.4663**
The Village of Westland, Westland	**734.728.5222**

Detroit:

Delta Manor	**313.259.5140**
Hartford Village	**313.270.9700**
The Thome Rivertown Neighborhood	**313.259.9000**
The Village of Bethany Manor	**313.894.0430**
The Village of Brush Park Manor Paradise Valley	**313.832.9922**
The Village of Harmony Manor	**313.934.4000**
The Village of Oakman Manor	**313.957.0210**
The Village of St. Martha's	**313.582.8088**
The Village of University Meadows	**313. 831.6440**
The Village of Woodbridge Manor	**313.494.9000**

The Village of Gibraltar Manor, Gibraltar	**734.676.4802**
Lynn Street Manor, Onaway	**989.733.2661**
McFarlan Villages, Flint	**810.235.3077**

Area Agency on Aging 1-B

AgeWays

Nonprofit Senior Services

Helping Seniors and Their Families

AgeWays Nonprofit Senior Services helps older adults live safely and independently in whatever setting they call home. Whether you're looking for assistance caring for yourself or an older loved one, we can help you access the programs, services and supports you need.

Serving Livingston, Macomb, Monroe, Oakland, St. Clair and Washtenaw counties.

The Area Agency on Aging 1-B is now AgeWays.

800.852.7795 **AgeWays.org**

POLYPHARMACY: ONE TOO MANY PRESCRIPTIONS

Candice Garwood, Pharm.D., FCCP, BCPS, BCACP

Clinical Professor, Wayne State University

Clinical Pharmacy Specialist, Harper University Hospital

Disclosures

- I have no actual or potential conflicts to disclose.

Audience Poll

What is your healthcare profession?

a. Physical therapist
b. Occupational therapist
c. Nurse
d. Social worker
e. Pharmacist
f. Case worker

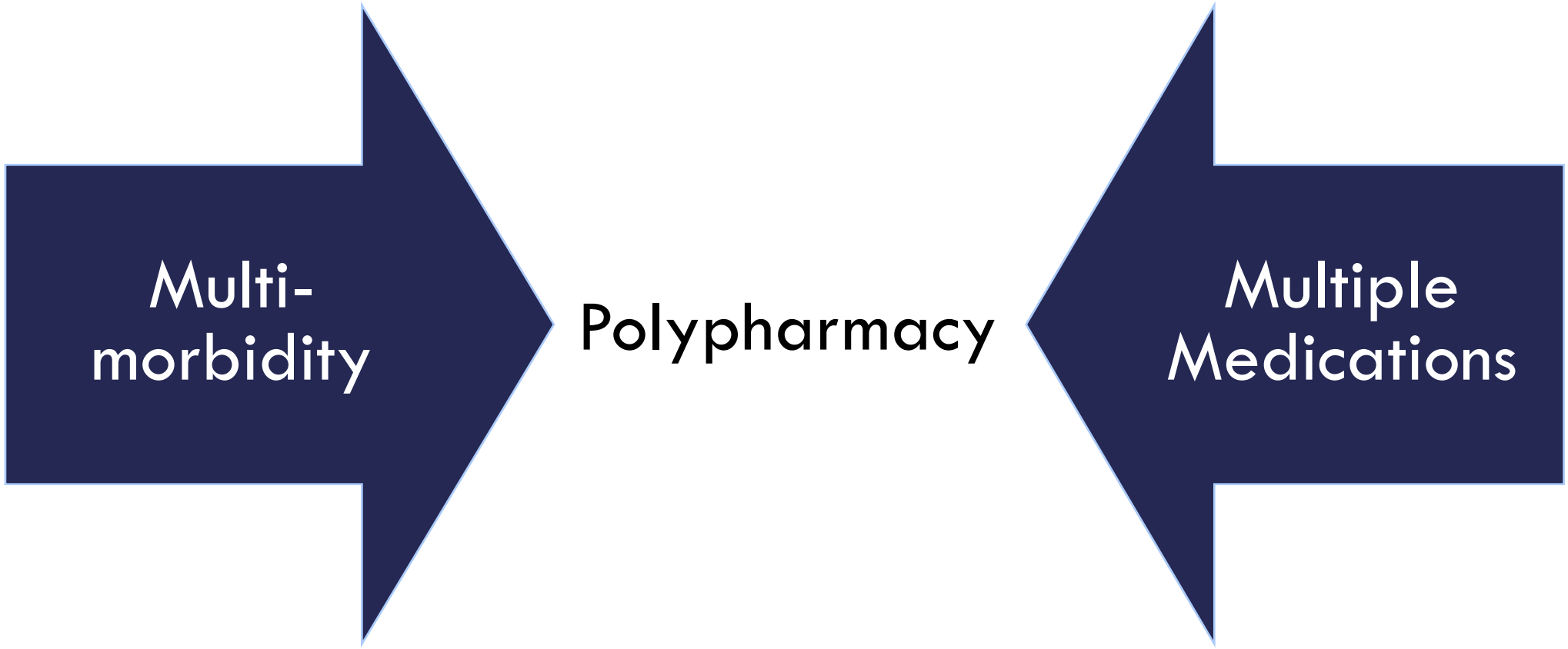
Question

How often do you encounter polypharmacy with your patients?

a. Many patients, daily
b. Sometimes
c. Not often
d. I’m not really sure, what is polypharmacy?

Objectives

- Discuss polypharmacy in older adults
- Develop strategies to minimize adverse drug events in older adults
- Identify and list resources to optimize patient safety and medication use in older adults


Multi-
morbidity
Polypharmacy
Multiple
Medications

Polypharmacy is Prevalent

Approximately 36% of people over age 65 take ≥ 5 prescription medications.

Nearly 50% of nursing home residents take ≥ 5 medications, and 24% use ≥ 10 medications.

Ruscin. Aging and Medications. Nov 2022 Merckmanuals.com. Accessed March 7, 2024.
Onder G. J Gerontol A Biol Sci Med Sci. 2012; 67(6):698-704.

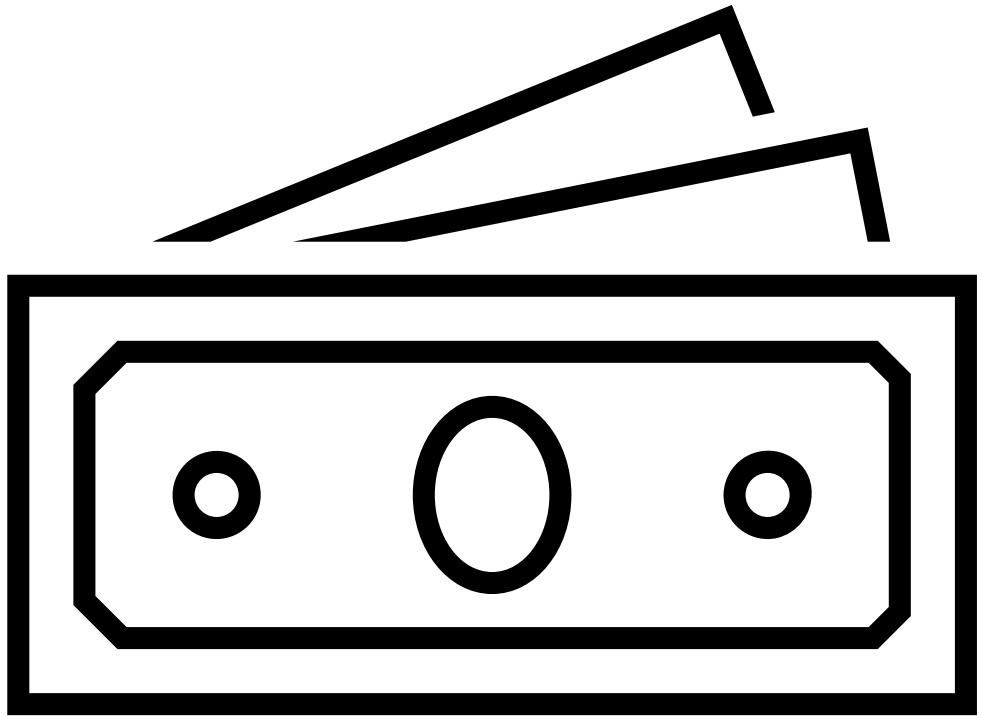
Polypharmacy

- Mortality
- Falls
- Adverse Drug Events
- Increase Length of Stay
- Hospital Readmission
- Medication Non-adherence

Masnoon. BMC Geriatrics (2017) 17:230

Polypharmacy is Costly

- An estimated **$8.7 billion** could be avoided by appropriate polypharmacy management.



Aitken M. IMS Institute for Healthcare Informatics; 2012. https://ssrn.com/abstract=2222541 Accessed March 21, 2024.

Polypharmacy Defined

World Health Organization

- "The concurrent use of multiple medications"

Multiple definitions exist

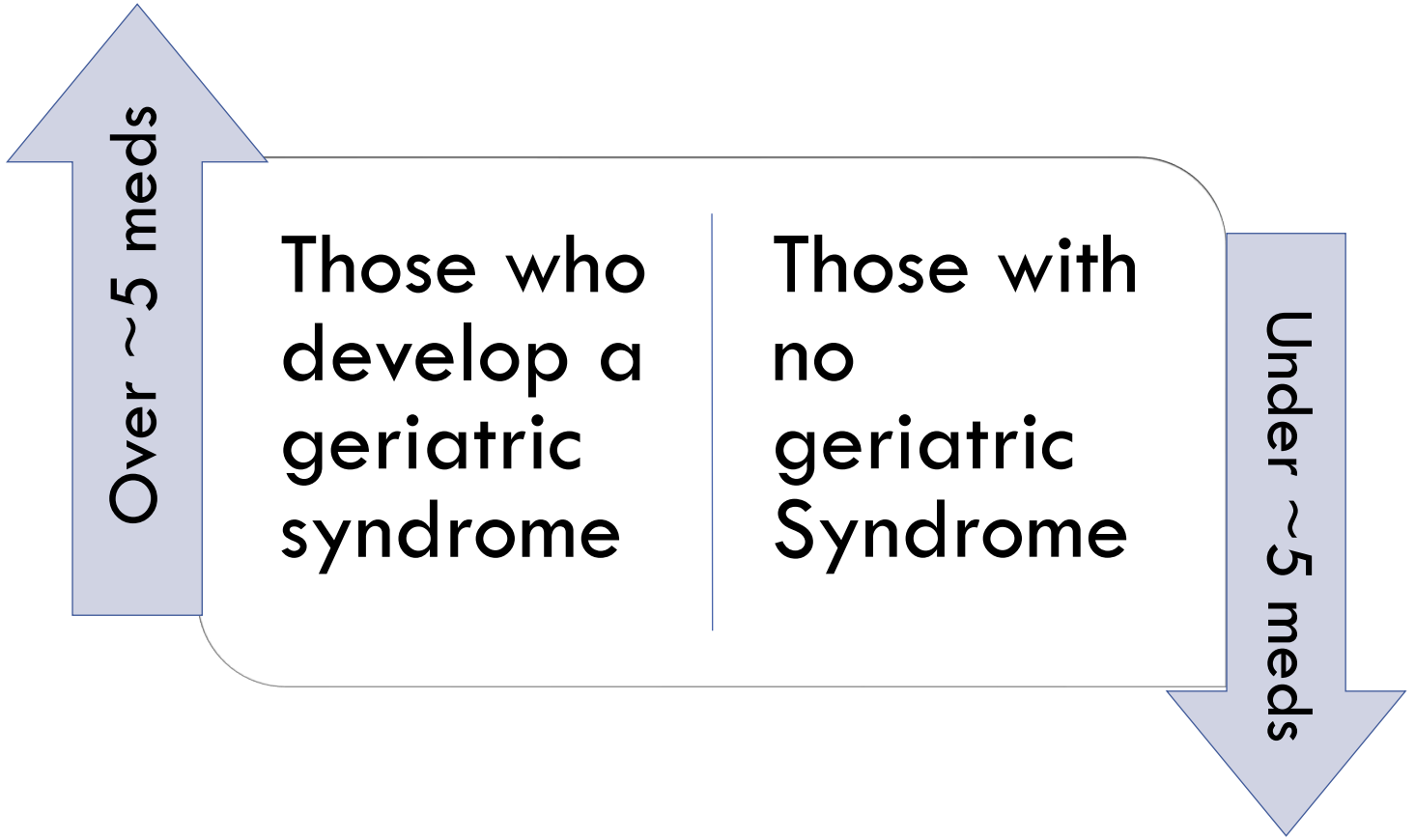
- Number; number + healthcare setting; descriptive

Most common definition

- ≥5 concurrent medications daily

Masnoon. BMC Geriatrics. 2017:17;230
Medication Safety in Polypharmacy: Technical Report. World Health Organization, 2019.

Polypharmacy Defined as ≥5 Meds?



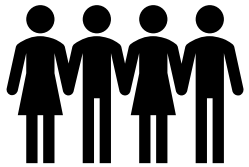
Langeard A. Front. Pharmacol. 2016;7:296.
Gnjidic D. Clin. Geriatr. Med. 2012;28:237–53.

Hyper-polypharmacy

≥ 10 concurrent medications

Mehta RS. Nature Aging. 2021;1:347-56
Doherty AS. Br J Gen Pract 2023; 73(728):e211-e219.

Doherty, et al. Adverse Drug Reactions and Associated Patient Characteristics in Older Community-Dwelling Adults



- Prospective cohort, Ireland
- N = 592, age ≥70 yrs
- Community dwelling
- ADR occurrence & severity

Design

ADR Outcomes, 6-yr follow up

- 1 in 4 people had ≥ 1 ADR
- ADR associated with polypharmacy

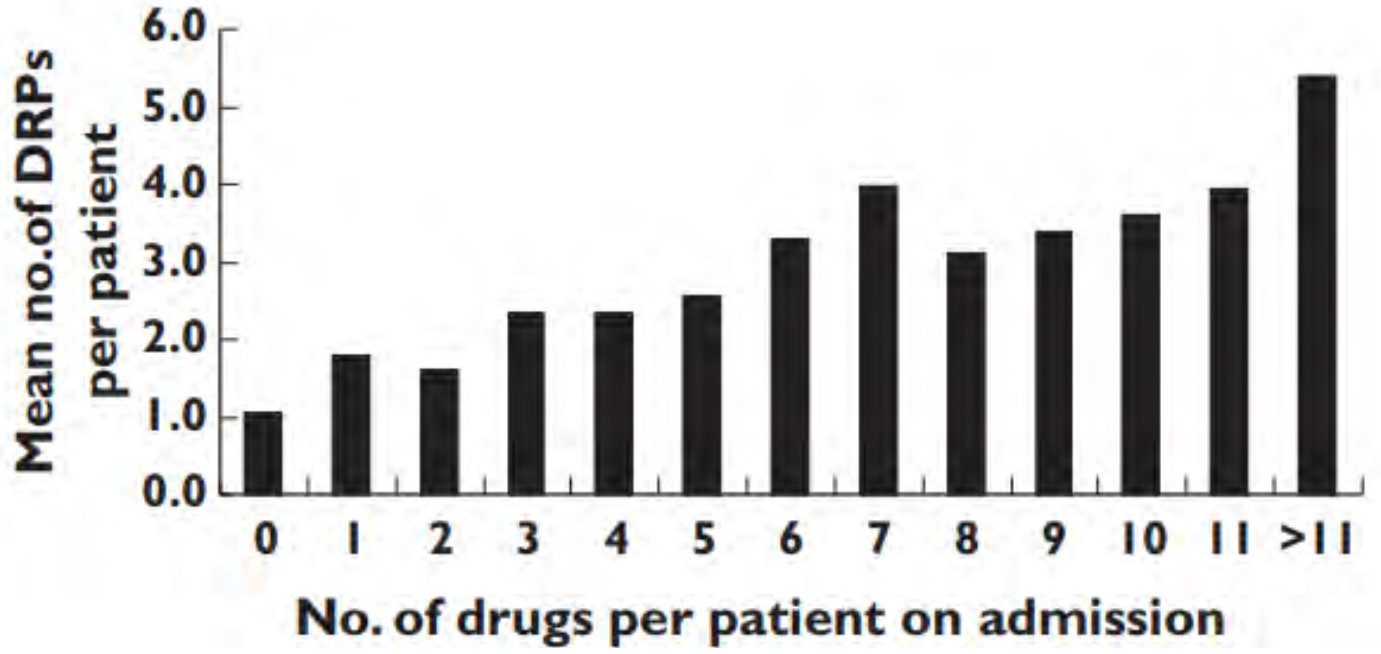
- 5-9 meds: ~2x as likely to have ADR
- ≥10 meds: over 3x as likely ADR

Polypharmacy independently associate with ADR risk

Doherty AS. Br J Gen Pract 2023; 73(728):e211-e219.

Adverse Events Increase with No. of Meds

- A hospital-based study noted increased approximately linearly with an increase in number of drugs used.
- Each per-unit increase in medication use yielded an additional 8.6% risk for the number of adverse drug events.



Viktil K. Br J Clin Pharm. 2007;63:187-95.

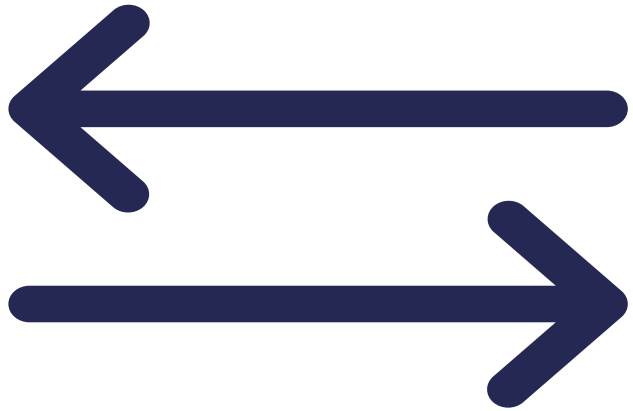
Polypharmacy: Redefined

Use of multiple drugs or more than are medically necessary

Tija. Drugs Aging. 2013;30:285–307

Terminology Shift

Appropriate Polypharmacy vs.
Inappropriate Polypharmacy



Viktil. Br J Clin Pharmacol. 2007;63(2):187–95.

Inappropriate Polypharmacy

- Nearly 50% of older adults take one or more medications that are not medically necessary.
- Increases risk of adverse reactions.
  - Patients taking 5-9 medications have >50% chance of adverse reaction
  - Patients taking ≥20 medications have 100% chance of adverse reaction

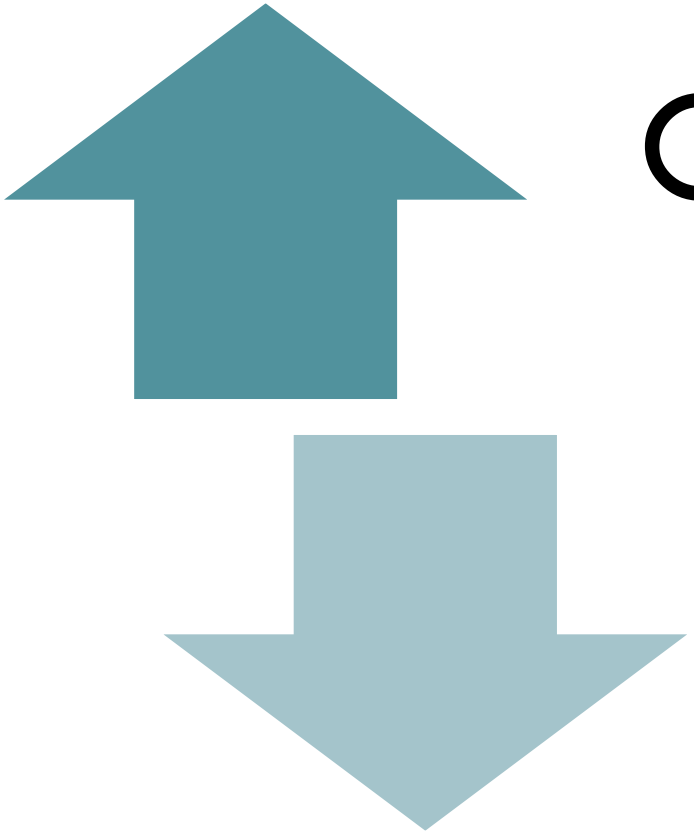
US Pharmacist. 2017;42(6):13-14.

Appropriate Polypharmacy

- At times, many drugs may be clinically appropriate

Indication	Medication	Number
Diabetes	1-2 antihyperglycemic agents Ace inhibitor Statin	3-4
Hypertension	1-3 antihypertensive agents	1-3
Heart failure	ACE-I or ARNI Beta Blocker SGLT2 inhibitor Aldosterone antagonist +/- loop diuretic	4-5
STEMI with stents	Aspirin P2Y12 inhibitor Statin Beta Blocker ACE-I	5

Inappropriate Prescribing



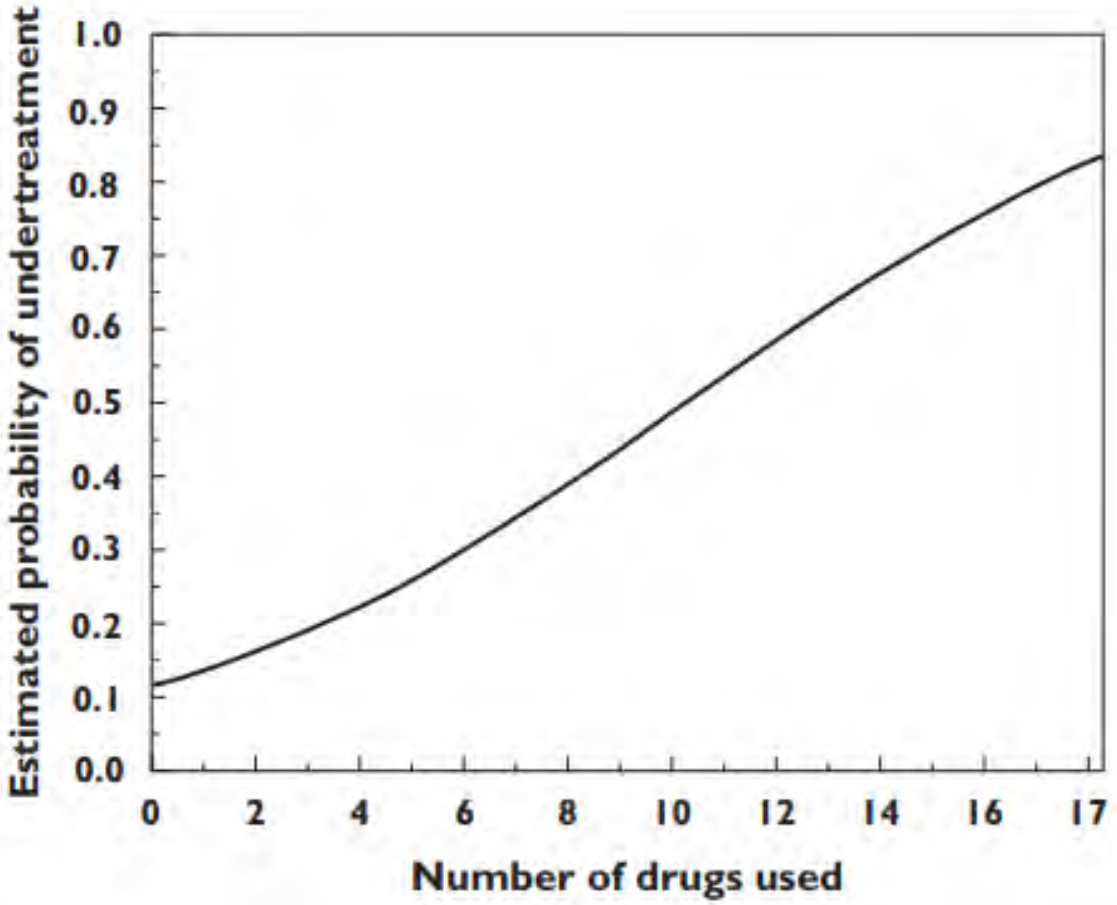
Overprescribing

Under-prescribing

Polypharmacy is also associated with under-prescribing in older people.

Kuijpers. Br J Clin Pharmacol. 2008;65(1):130–133.
Galvin. Eur J Clin Pharmacol. 2014;70(5):599–606.

Probability of Under-prescribing Related to Number of Drugs Used



Of patients with polypharmacy, those who were undertreated:

≥ 5 drugs	≤ 4 drugs	Adj. OR (95% CI)
42.9%	13.5%	4.8 (2.0, 11.2)

Kuijpers. *Br J Clin Pharmacol.* 2008;65(1):130–133.

Evaluating Polypharmacy

- Number of medications – a starting point
- Assess medications by indication, efficacy, potential for harm
- Combination = risk vs. benefits

More robust methods for evaluating influence of polypharmacy are needed

The following are potential impacts of polypharmacy EXCEPT:

a. Reduced mortality

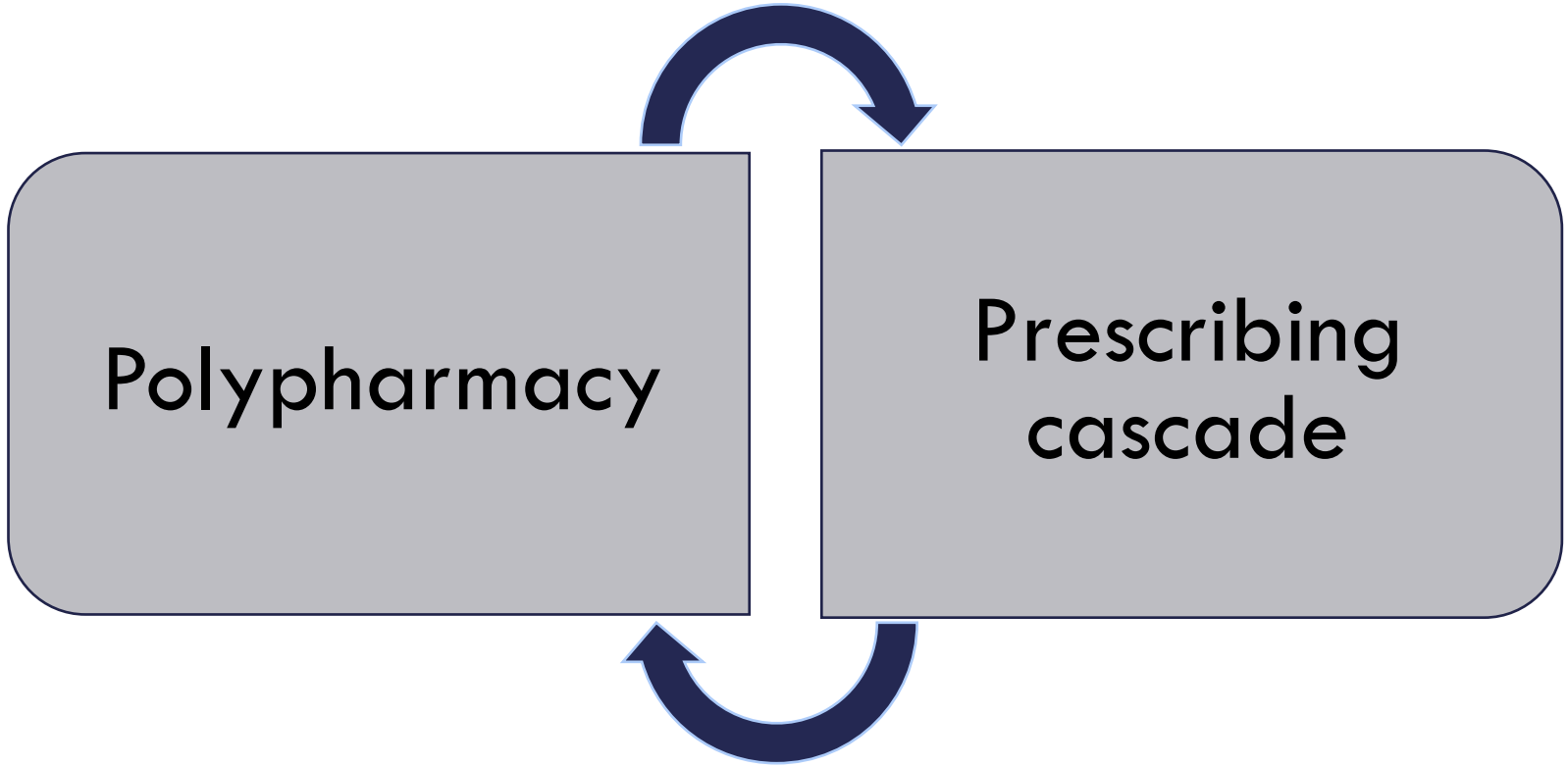
b. Adverse drug events

c. Increased healthcare costs

d. Medication non-adherence

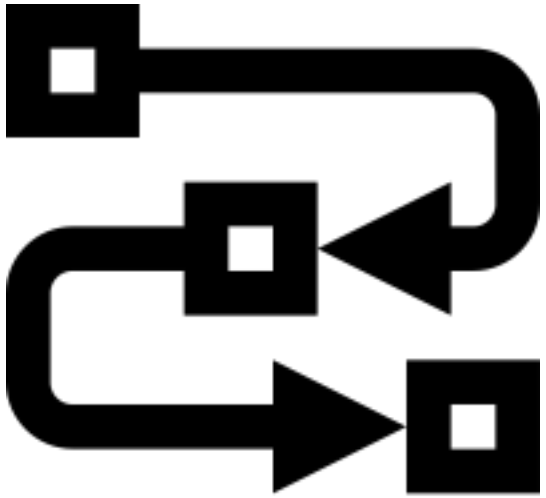
HOW DOES INAPPROPRIATE POLYPHARMACY OCCUR?

How Does Inappropriate Polypharmacy Occur?

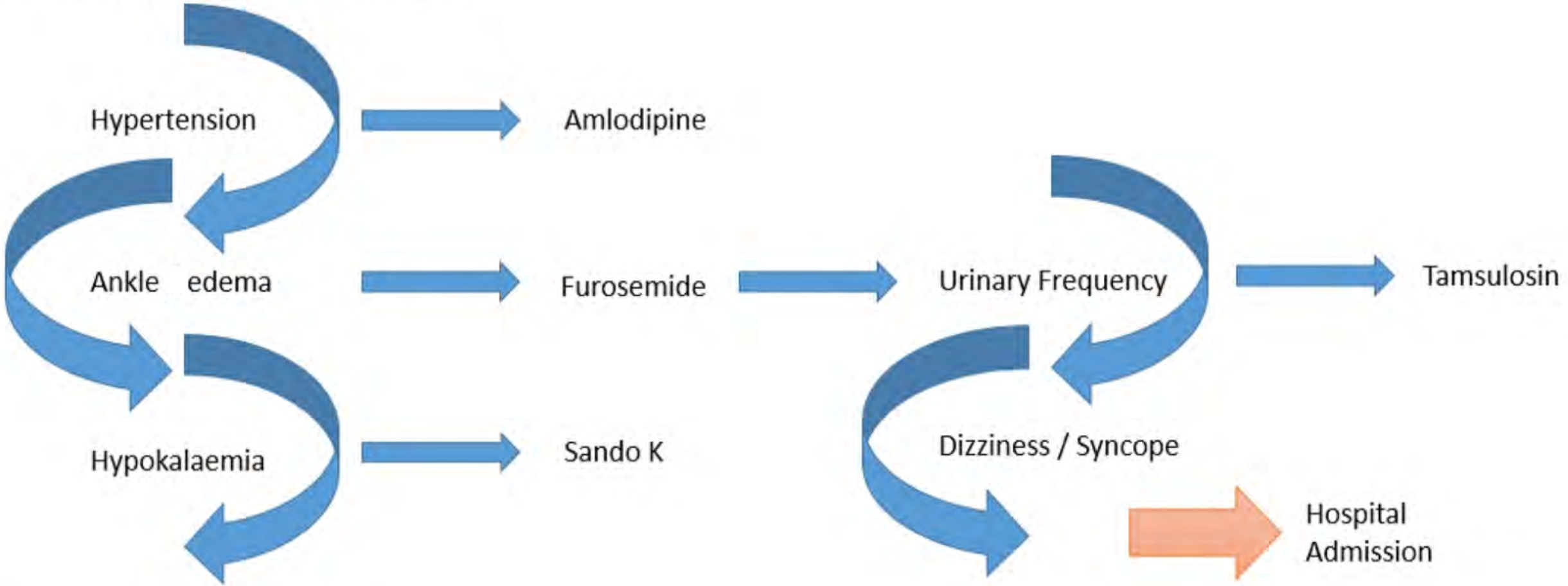


Prescribing Cascade

A new medicine is prescribed to “treat” and adverse reaction caused by another medicine.



From: Deprescribing, Polypharmacy and Prescribing Cascades in Older People with Type 2 Diabetes: A Focused Review



Diagrammatic example of a prescribing cascade.

Managing prescribing cascades

1) Identify a prescribing cascade

2) Deprescribe medications

Evaluation of the Prescribing Cascade

Defining Prescribing Cascade	Score
Existence of ADR, either expected or unknown	
Doubtful	0
Yes	1
Yes, but misunderstood	2
Action followed against the ADR	
Treatment discontinuation	0
Continued with dose reduction	1
Continued unchanged or with another drug of the same group	2
Existence of a second drug treatment for the ADR	
No	0
Yes	1
Overall result of this new treatment	
Patient improves	0
Patient worsens or unchanged	1
New ADR appears	2
New ADR requires a third drug treatment	3

Sum of ≥4 associated with prescribing cascade

Ponte ML. Medicina (B Aires) 2017;77:13–16.

ThinkCascades Tool

Drug A	Side effect	Drug B
Cardiovascular System (n=2)		
Calcium Channel Blocker →	Peripheral edema →	Diuretic
Diuretic →	Urinary incontinence →	Overactive bladder medication
Central Nervous System (n=4)		
Antipsychotic →	Extrapyramidal symptoms →	Antiparkinsonian agent
Benzodiazepine →	Cognitive impairment →	Cholinesterase Inhibitor or memantine
Benzodiazepine →	Paradoxical agitation or agitation secondary to withdrawal →	Antipsychotic
Selective Serotonin Reuptake Inhibitor (SSRI) / Serotonin-norepinephrine Reuptake Inhibitor (SNRI) →	Insomnia →	Sleep agent (e.g., Benzodiazepines, Benzodiazepine Receptor Agonists, Sedating antidepressant, Melatonin)
Musculoskeletal System (n=1)		
NSAID →	Hypertension →	Antihypertensive
Urogenital System (n=2)		
Urinary Anticholinergics →	Cognitive impairment →	Cholinesterase inhibitor or memantine
Alpha-1 Receptor Blocker →	Orthostatic hypotension, dizziness →	Vestibular sedative (e.g., betahistine, Antihistamines, Benzodiazepines)

McCarthy. Drugs & Aging (2022) 39:829–840.

Patient Case

A 71-year-old, woman with HTN, type 2 diabetes, depression, osteoarthritis and Meniere's disease presented to the ER following a fall.

- **4 months prior:** Her family physician prescribed clonidine 0.1 mg BID for her blood pressure.
- **3 weeks later:** Her psychiatrist prescribed sertraline 50 mg daily for worsening depression. Simultaneously the patient began using her meclizine 25 mg TID for increased dizziness attributed to Meniere's disease.
- **3 more weeks passed:** She was prescribed a hypnotic, zolpidem 5 mg at bedtime for insomnia.
- **1 month later:** She lost her balance in the bathroom, fell, hit her head against the bathtub, leading her to present to the emergency department.

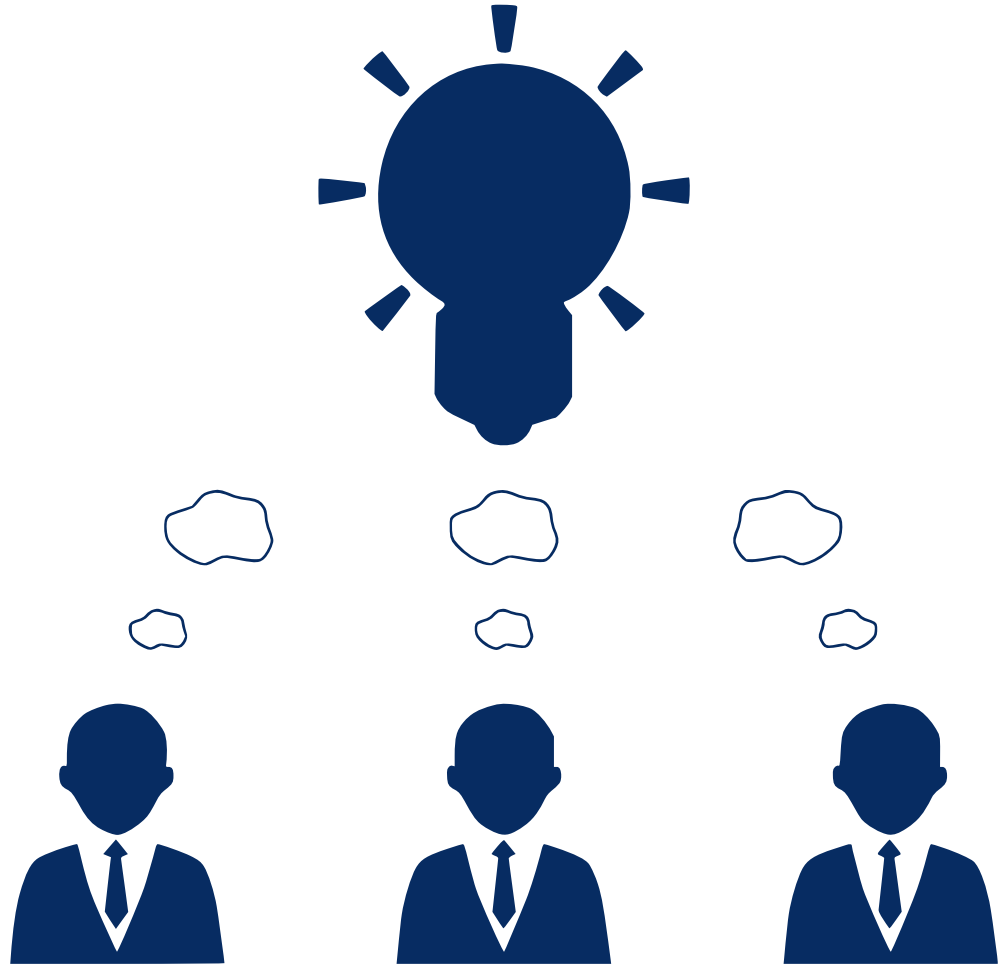
Medications

Drug	Indication
Metformin 1000 mg BID	diabetes
Lisinopril 40 mg daily	Blood pressure
Hydrochlorothiazide 25 mg daily	Blood pressure
Clonidine 0.1 mg BID	Blood pressure
Sertraline 50 mg daily	Depression
Zolpidem 5 mg every night	Sleep
Meclizine 25 mg TID as needed	Dizziness related to Meniere's
Tramadol 50 mg BID	Arthritis pain
Aspirin 81 mg daily	Stroke prevention

Activity

Think-Share-Pair:

Using tools we have discussed, identify a prescribing cascade



Avoiding Inappropriate Polypharmacy – Key Tips

- Avoid “A pill for every ill”
  - Consider non-pharmacologic approaches
- When prescribing, “start low and go slow”
- Optimize the dose of one drug before adding another
- Avoid starting two medications at the same time
- Thoroughly review medications regularly
  - Carry an updated medication list
- Eliminate duplicate medications, medications without therapeutic benefit, and those at high risk of harm

ASSESSMENT TOOLS & CRITERIA

Potentially Inappropriate Medications (PIMs)

- More than 50% of older adults in the US report taking a drug deemed potentially inappropriate

Maher. Expert Opin Drug Saf. 2014;13:57-65.

American Geriatrics Society

American Geriatrics Society 2023 updated AGS Beers Criteria® for potentially inappropriate medication use in older adults

- **What:** List of potentially inappropriate medications for use in older adults
- **Purpose:** to identify medication for which potential harm outweighs the expected benefit.
- **Admin Time:** Operator dependent - 5 mins for an expert, up to 20-30 mins
- **Target:** Practicing clinicians, pharmacists, regulators
- **Intent:** 1) improve patient safety; 2) Serve as a tool to evaluate drug use and quality of care.

J Am Geriatr Soc. 2023; 71:2052-81.

Beer's is Composed of 5 Criteria

1. Potentially Inappropriate Medications (PIM) list
2. PIMs due to Drug – Disease/Syndrome Interaction
3. Medications to be used with caution
4. Potentially Clinically Important Drug–Drug Interactions
5. Medications that should be avoided or have dosage reduced with varying levels of kidney function

J Am Geriatr Soc. 2023; 71:2052-81.

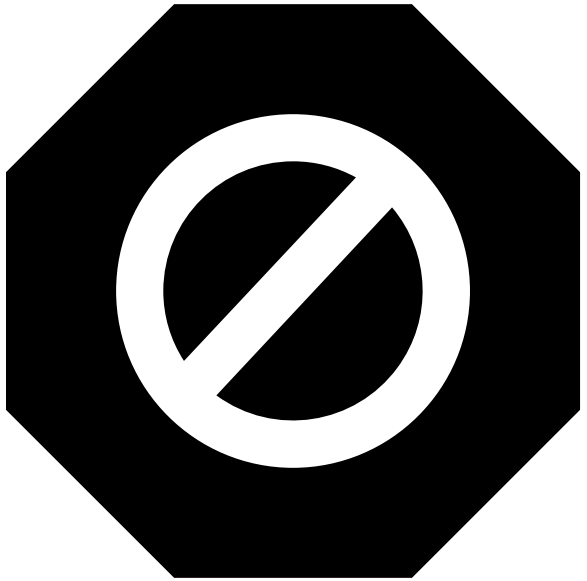
Beer's Criteria Utilized by:

- Practicing Clinicians
- Healthcare consumers
- Researchers
- Pharmacy benefits managers
- Regulators
- Policy makers

J Am Geriatr Soc. 2023; 71:2052-81.

What is Not Included in Beer's Criteria?

- Drugs with risks not unique to elderly
- Not intended to be used for people in hospice or end of life
- Drugs considered to be low-usage



BEER'S CRITERIA HIGHLIGHTS

A more detailed pocket guide can be found at: [AGS-2023-BEERS-POCKET-PRINTABLE.PDF (USC.EDU)]

Note: The recommendations listed are a selection of recommendations from the 2023 criteria and are not an exhaustive list. These medications are commonly prescribed to older adults, or are medications whose harms are of greatest concern.

J Am Geriatr Soc. 2023; 71:2052-81.

Potentially Inappropriate Medications

Drug	Recommendation
Antihistamines (First Generation) Ex: diphenhydramine/Benadryl	**Avoid**. Highly anticholinergic.
Cardiovascular Drugs	
Aspirin - primary CV disease prevention	**Avoid** initiating for primary prevention of cardiovascular disease. Consider deprescribing.
Warfarin for Afib or VTE	**Avoid** as initial therapy for Afib or VTE unless alternative options are contraindicated/substantial barriers to their use
Rivaroxaban for Afib or VTE	**Avoid** as treatment over other anticoagulants for Afib or VTE
Alpha-1 blockers Ex: doxazosin, prazosin, terazosin	**Avoid** as treatment for hypertension
Central alpha-2 blockers Ex: clonidine	**Avoid** as first line or routine treatment for hypertension
Nifedipine immediate-release	**Avoid** as treatment for hypertension

J Am Geriatr Soc. 2023; 71:2052-81.

Potentially Inappropriate Medications

Drug	Recommendation
Cardiovascular drugs	
Amiodarone	**Avoid** as first-line unless patient has heart failure
Dronedarone	**Avoid** in patients with Afib and heart failure
Digoxin	**Avoid** for rate control in Afib or for heart failure
Central nervous system	
Antidepressants with strong anticholinergic effects Ex: Tricyclics and paroxetine	**Avoid** and instead use antidepressants with lower anticholinergic burden.
Antipsychotics (conventional or atypical)	**Avoid** except in FDA labelled indications such as schizophrenia, bipolar disorder, Parkinson's psychosis. Increase CVA risk; cognitive decline and mortality in dementia.
Benzodiazepines and non-benzo hypnotics (aka "Z-drugs")	**Avoid** due to cognitive effects and injury; avoid in combo with opioids.

J Am Geriatr Soc. 2023; 71:2052-81.

Potentially Inappropriate Medications

Drug	Recommendation
Endocrine drugs	
Androgens	**Avoid** unless confirmed hypogonadism
Estrogens	**Do not initiate** systemic estrogens. Consider deprescribing. Vaginal cream or tablets acceptable for vaginal symptoms.
Insulin sliding scale	**Avoid** regimens that include only short acting insulin dosed according to current blood glucose readings without a concurrent basal insulin.
Sulfonylureas Ex: glyburide, glipizide, glimepiride	**Avoid** as first or second line therapy unless there is substantial barrier to use of safer agents.
Megestrol	**Avoid.** Has minimal effect on weight, increase thrombosis

Potentially Inappropriate Medications

Drug	Recommendation
Gastrointestinal drugs	
Proton pump inhibitors	**Avoid** as scheduled use for > 8 weeks unless high-risk (eg Barrett's esophagitis, pathologic hypersecretory states). Risk of pneumonia, GI malignancy, *C. difficile*, bone loss, factures.
Metoclopramide	**Avoid** unless for gastroparesis with duration less than 12 weeks
GI antispasmotics	**Avoid** due to high anticholinergic effects
Mineral oil used daily	**Avoid** due to aspiration risk and safer alternatives
Pain medication	
NSAIDs Ex: ibuprofen, naproxen, etc.	**Avoid** chronic use unless other alternatives not effective. Avoid short term combination with antiplatelet, anticoagulants, steroids.
Indomethacin	**Avoid** due to increase GI bleed and potential kidney injury
Skeletal muscle relaxants	**Avoid** due to anticholinergic effects. This criterion does not apply to agents used for spasticity – baclofen and tizanidine.

J Am Geriatr Soc. 2023; 71:2052-81.

What adverse outcomes support the 2023 Beers Criteria rationale to avoid the use of proton pump inhibitors in older adults?

a. *Clostridioides difficile* infection
b. GI malignancy
c. Bone loss and fracture
d. Pneumonia
e. All of the above

RESEARCH PAPER

STOPP/START criteria for potentially inappropriate prescribing in older people: version 3

Denis O'Mahony[1,2] · Antonio Cherubini[3] · Anna Renom Guiteras[4] · Michael Denkinger[5] · Jean-Baptiste Beuscart[6] · Graziano Onder[7] · Adalsteinn Gudmundsson[8] · Alfonso J. Cruz-Jentoft[9] · Wilma Knol[10] · Gülistan Bahat[11] · Nathalie van der Velde[12] · Mirko Petrovic[13] · Denis Curtin[2]

Purpose: Decision aid for supporting medication review. Reducing medication burden (STOPP) and adding in potentially beneficial therapy (START)
Admin time: Highly operator dependent - 5 mins for an expert, up to 20-30 mins
User Friendly: Moderate
Administered by: GP, Physician, Community Pharmacist

Criteria: total of 190 criteria (version 3)

- 133 STOPP criteria
- 57 START criteria

O'Mahony D. European Geriatric Medicine (2023) 14:625–32.

STOPP/START Criteria Version 3

The latest version of the START/STOPP tool can be found at:

https://static-content.springer.com/esm/art%3A10.1007%2Fs41999-023-00777-y/MediaObjects/41999_2023_777_MOESM1_ESM.pdf

STOPP: Screening Tool of Older Peoples potentially inappropriate Prescriptions - Example

Cardiovascular system	
Digoxin	Long-term use >125 µg/day in patients with renal dysfunction
Loop diuretic	For dependent ankle edema only (no signs of heart failure); compression hosiery usually more appropriate
Thiazide diuretic	With history of gout (may exacerbate gout)
Noncardioselective β-blocker	With COPD (risk for increased bronchospasm)
Diltiazem or verapamil	With NYHA class III or IV heart failure (may worsen heart failure)
Calcium channel blocker	With chronic constipation (may exacerbate constipation)
Warfarin	For first uncomplicated DVT >6 months For first uncomplicated pulmonary embolus >12 months (no proven benefit)
Central nervous system and psychotropic drugs	
TCAs	With dementia (risk for worsening cognitive impairment)
SSRIs	With hyponatremia
Gastrointestinal system	
PPIs	For peptic ulcer disease at full therapeutic doses for >8 weeks
NSAIDs	With moderate to severe hypertension or heart failure

COPD, chronic obstructive pulmonary disease; DVT, deep venous thrombosis; NYHA, New York Heart Association; PPI, proton pump inhibitor; NSAID, nonsteroidal anti-inflammatory drug; SSRI, selective serotonin reuptake inhibitor; STOPP, Screening Tool of Older Person's Prescriptions; TCA, tricyclic antidepressant.

Adapted from Gallagher P et al. *Int J Clin Pharmacol Ther.* 2008;46(2):72-83.[36]

START: Screening Tool to Alert to Right Treatment - Example

Medication	Recommendation
Warfarin	In chronic atrial fibrillation
Aspirin	In chronic atrial fibrillation when warfarin is contraindicated
Antihypertensive therapy	Systolic blood pressure consistently >160 mm Hg
Statin	History of coronary, cerebral, or peripheral vascular disease, when patient is functionally independent for activities of daily living and life expectancy >5 years
ACEI	With chronic heart failure Following acute myocardial infarction
β-Blocker	With chronic stable angina
Bisphosphonate	With maintenance corticosteroid therapy
Calcium and vitamin D	Osteoporosis (fragility fracture, acquired dorsal kyphosis)
Antiplatelet agent	In diabetes mellitus with major cardiovascular risk factors (hypertension, hypercholesterolemia, smoking history)

ACEI, angiotensin-converting enzyme inhibitor; START, Screening Tool to Alert Doctors to Right Treatment.

Adapted from Gallagher P et al. *Int J Clin Pharmacol Ther.* 2008;46(2):72-83.[36]

Beer's and STOPP Criteria Predict Adverse Drug Events

- 174,275 insured people ≥65 yrs in US
- Retrospective cohort evaluated with use of Beer's Criteria and STOPP criteria to identify PIM exposure.
- ICD 9 codes evaluated for:
  - Adverse drug events
  - All-cause ED visits
  - All-cause hospitalizations

Beer's and STOPP were modestly prognostic for:

- Adverse Drug Events
- ED Visits
- Hospitalizations

STOPP slightly outperformed Beer's in predictability. Criteria can be used in complimentary fashion to enhance sensitivity.

Brown JD. J Am Geriatr Soc. 2016;64(1):22-30.

Patient Case

A 67-year-old, woman presents to the primary care clinic with a racing heart and shortness of breath. She also has HTN, Type 2 diabetes and osteoarthritis. Her blood pressure is elevated at 145/78 mmHg, heart rate is 110 bpm. An EKG in office identifies atrial fibrillation. Her current medications include:

Drug	Indication
Metformin 500 mg BID	Diabetes
Glipizide 10 mg BID	Diabetes
Ibuprofen 400 mg BID	Arthritis pain
Aspirin 81 mg daily	CV risk prevention
Amlodipine 10 mg daily	Blood pressure

Based on the Beer’s Criteria, are there any medications that should be discontinued/deprescribed?

Combining Info from the Beer's Criteria and the STOPP/START Criteria, what is the best anticoagulant therapy for this patient?

a. Warfarin (Coumadin®)
b. Apixaban (Eliquis®)
c. Rivaroxaban (Xarelto®)
d. Aspirin

MEDICATION-RELATED FALL ASSESSMENT

Polypharmacy

- Mortality
- Falls
- Adverse Drug Events
- Increase Length of Stay
- Hospital Readmission
- Medication Non-adherence

Masnoon. BMC Geriatrics (2017) 17:230

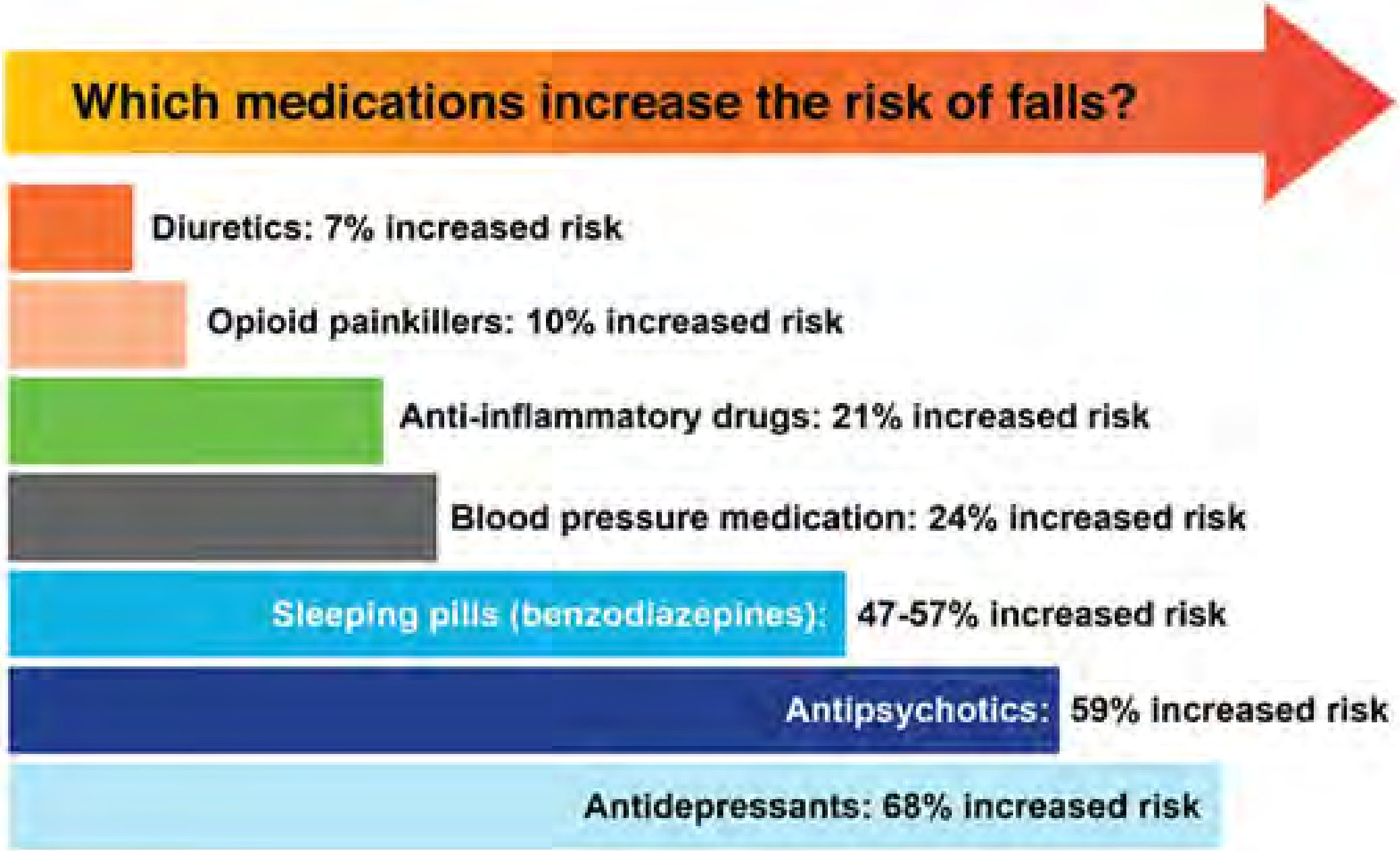


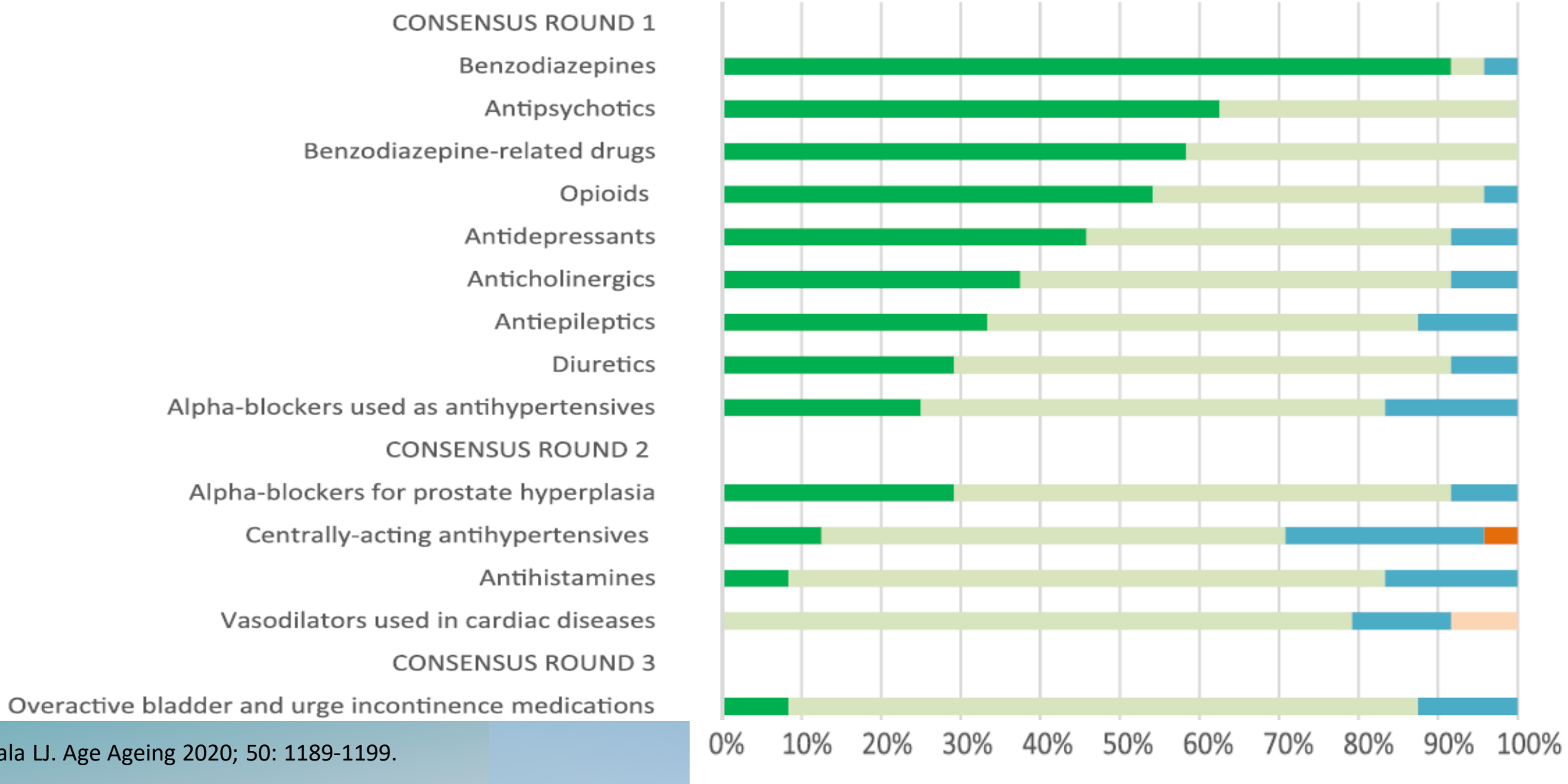
Chart courtesy of Canadian Deprescribing Network

STOPPFall

- The STOPPFall is formally part of the STOPP/START series and the results were incorporated into STOPP/START version 3.
- A screening tool to identify and facilitate the deprescribing of drug known to increase fall risk.
  - The STOPPFall has been combined with a practical deprescribing tool designed to assist in clinical decision-making.
- Decision tool found at:
  - kik.amc.nl/falls/decision-tree/

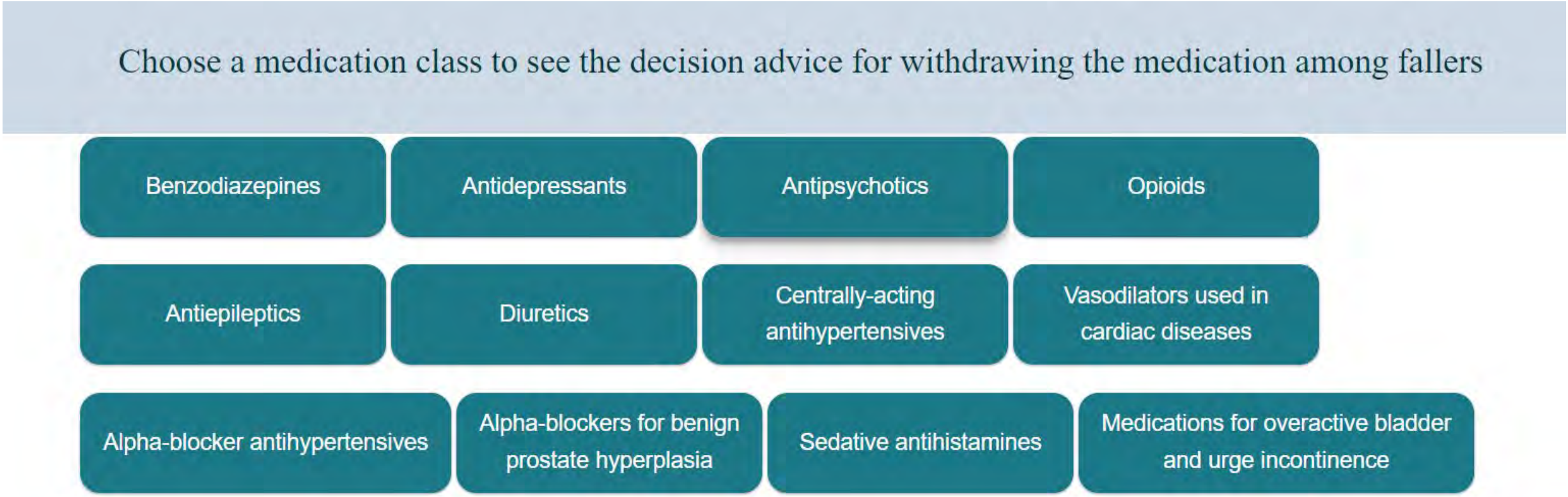
Medications Included in STOPPFall

by Level of Consensus Agreement



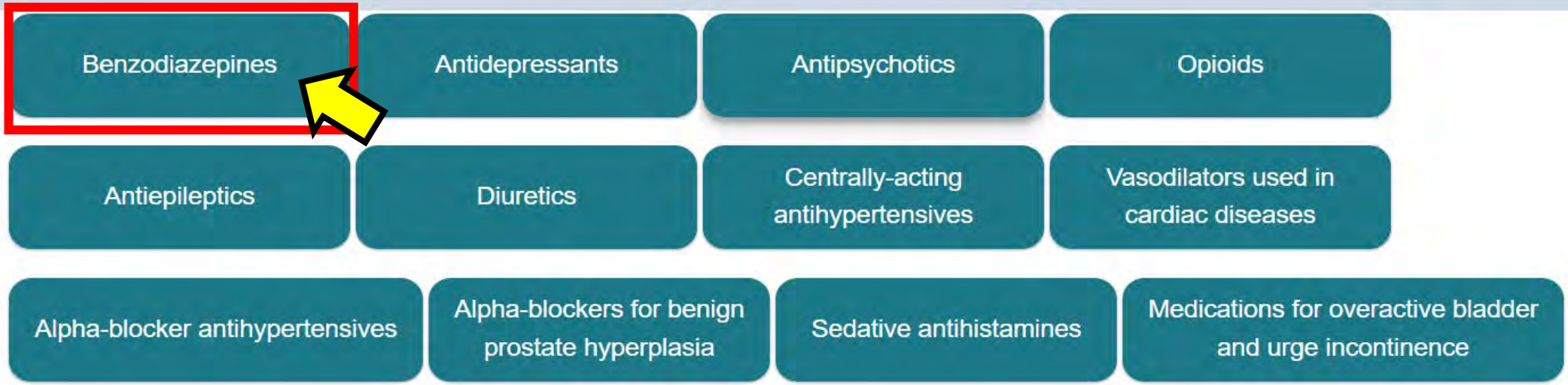
Seppala LJ. Age Ageing 2020; 50: 1189-1199.

STOPPFall Deprescribing Tool



kik.amc.nl/falls/decision-tree/

Choose a medication class to see the decision advice for withdrawing the medication among fallers



Advice:

Stop the BZD in a stepwise manner: e.g., approximately 25% every two weeks, near the end 12.5%.
After withdrawal or dose reduction monitor for change in symptoms e.g., dizziness, and sedation, fall incidents and anxiety, insomnia, and agitation.
Also, consider monitoring: delirium, seizures, confusion.
Organize follow-ups based on an individual basis e.g., based on occurrence of withdrawal symptoms.

kik.amc.nl/falls/decision-tree/

Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

STEADI—Older Adult Fall Prevention

STEADI Stopping Elderly Accidents, Deaths & Injuries

- CDC's STEADI initiative - resources to integrate fall prevention into routine clinical practice.

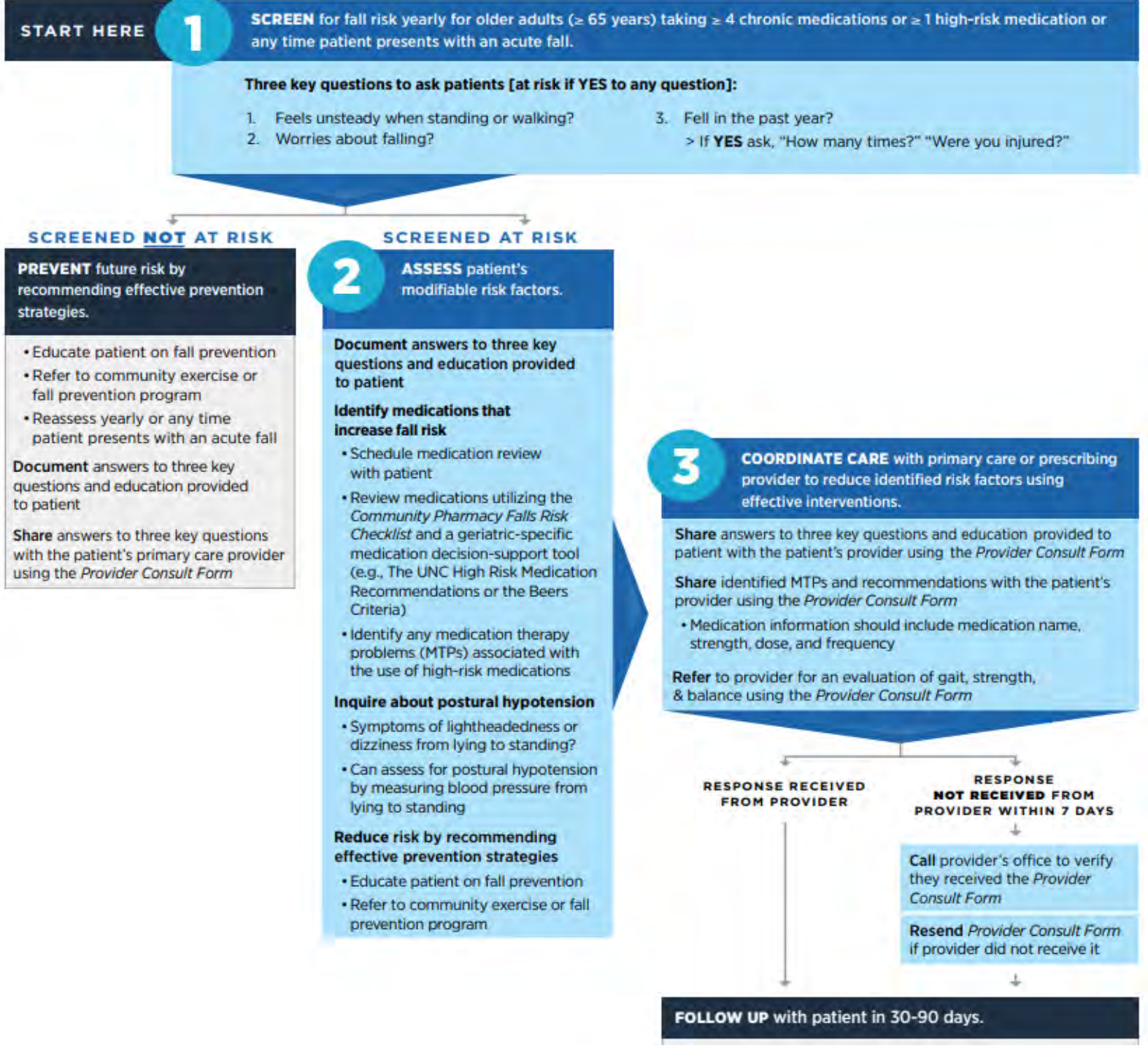
https://www.cdc.gov/steadi/index.html

STEADI-Rx

How STEADI-R_x works:

1. Screen patient for fall risk at the pharmacy.
2. Perform a medication review.
3. Share information with the patient and provider.
4. Provider responds to shared information.

STEADI-Rx: Community Pharmacy Algorithm for Fall Risk Screening, Assessment, and Care Coordination



https://www.cdc.gov/steadi/index.html

Medication Fall Risk Checklist

Patient:	
Date of Birth:	**Date:**

Fall Risk Factor(s) Identified

FALL HISTORY	PRESENT?		NOTES
Any falls in the past year?	☐ Yes	☐ No	
Worries about falling?	☐ Yes	☐ No	
Feels unsteady when standing or walking?	☐ Yes	☐ No	
POSTURAL HYPOTENSION			
Patient-reported symptoms of lightheadedness or dizziness from lying to standing?	☐ Yes	☐ No	

MEDICATION CLASSES WITH FALL RISK	MEDICATION(S) Include medication name, dosage prescribed, and administration directions.
Anticonvulsants	
Antidepressants	
Antihypertensives	
Antipsychotics	
Antispasmodics	
Benzodiazepines	
Opioids	
Sedative hypnotics	
Tricyclic antidepressants	
Other (e.g., OTC agents)	

https://www.cdc.gov/steadi/index.html

Patient Case

Mr. Parker is an 85-year-old African American man. He is generally well but complains of back pain, recent gout attacks, and insomnia related to pain. He takes the city bus to the pharmacy to pick up his medications. He experience a fall when getting off the bus yesterday.

Blood pressure: 150/70, HR 80; denies symptoms of dizziness

Medications (upon medication review)

Drug	Indication
Lisinopril 40 mg daily	Blood pressure
Indomethacin 50 mg three times daily	Gout
Tylenol #3 with codeine three times daily as needed	Foot pain
Gabapentin 300mg three times daily	Back pain
Tylenol PM 1 tablet at night	Sleep

Audience Activity

Use the Medication Fall Checklist to evaluate and identify medications placing Mr. Parker at risk for adverse drug events, especially for falls.

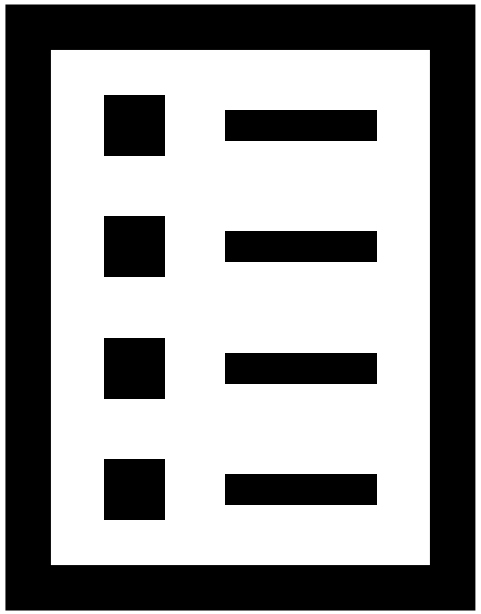
INTERVENTIONS: POLYPHARMACY AND PRESCRIBING CASCADES

Deprescribing

A systematic process of identifying and discontinuing medications based on an assessment that the risks of a given medication may outweigh the benefits.

Deprescribing is NOT denying medication that will provide benefit.

Reeve E. Br J Clin Pharm.2015;80:1254–68



Deprescribing Goals

- Decreasing pill burden
- Increase quality of life
- Reduction in falls
- Improve cognition

Mehta RS. Nature Aging. 2021;1:347-56.

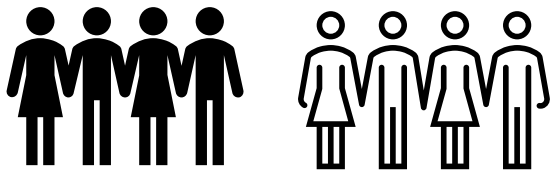
Evidence Supporting Deprescribing

- Reduced costs
- Reduced number of medications
- Reduced mortality (data more scant)

Deprescribing is feasible in clinical practice.

Mehta RS. Nature Aging. 2021;1:347-56.

Potter, et al. Deprescribing in Frail Older People: A Randomized Controlled Trial



- Residential facility living
- N = 95 randomized to:

Intervention: planned deprescribing of non-beneficial meds n=47

vs.

Usual Care n=48

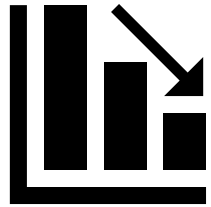
Design

12-month follow up

- **Primary outcome:** Change in # medications
- **Secondary outcome:** Survival

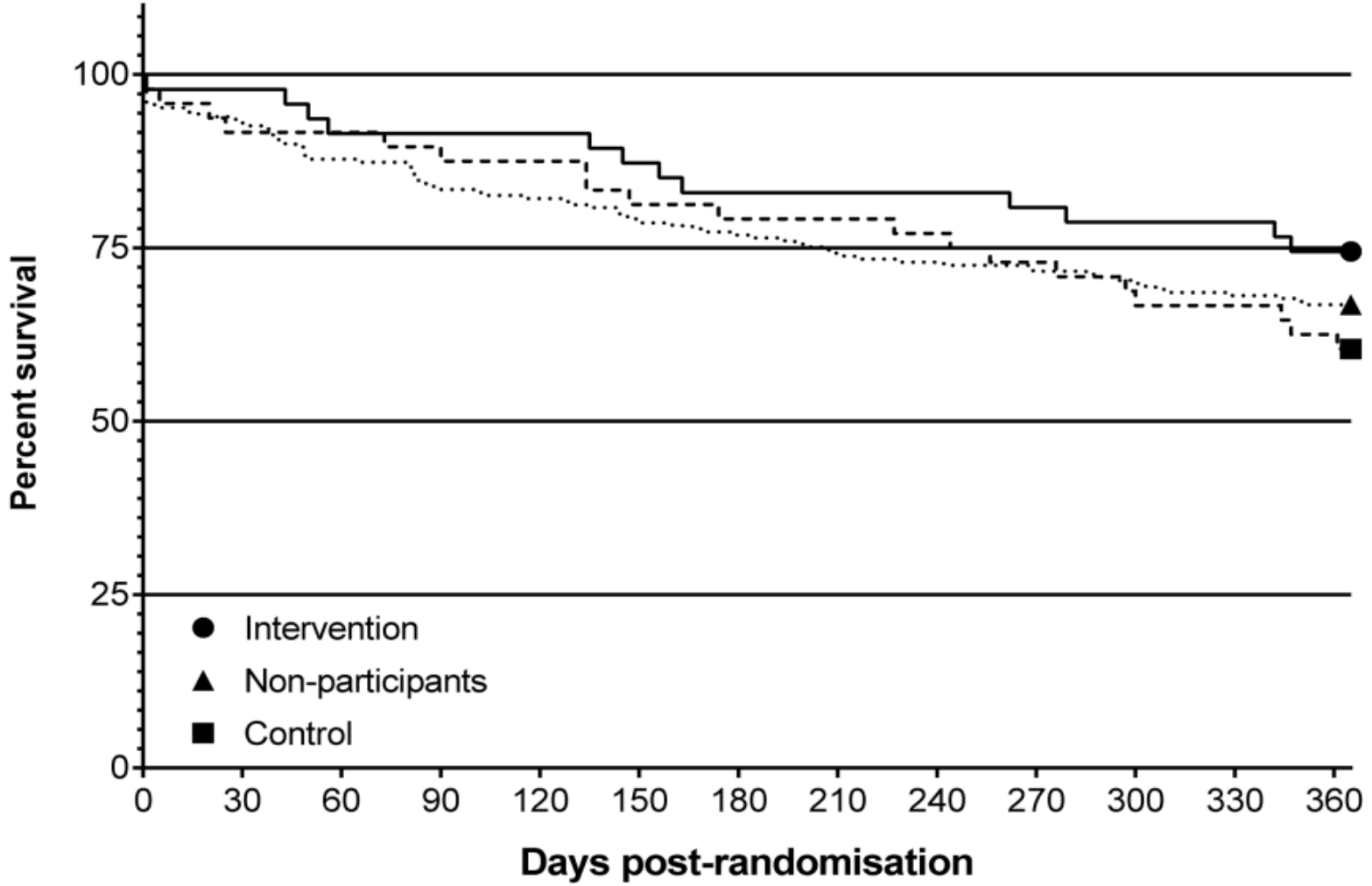
- Mean Δ in # meds: -1.9 ± 1.4 intervention v. +0.1 ± 3.5 control

Difference 2.0 ± 0.9
95% CI 0.8-3.8; p=0.04



Potter K. PLOS One. E 11(3): e0149984.

Deprescribing Outcomes: Survival Plot 12 Months Post-Randomization



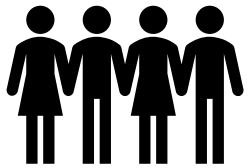
p = 0.16, HR 0.60, 95%CI 0.30 to 1.22

Deprescribing reduced the number of medicines taken with no significant adverse effects on survival [or other clinical outcomes].

Potter K. PLOS One. E 11(3): e0149984.

TARGETED DEPRESCRIBING INTERVENTIONS

Kutner, et al. Safety and Benefit of Discontinuing Statin Therapy in the Setting of Advanced, Life-Limiting Illness



- Multicenter, RCT
- N = 592, age ≥70 yrs
- Adults, life expectancy less than 1 yr
- Taking statin

Design

Intervention

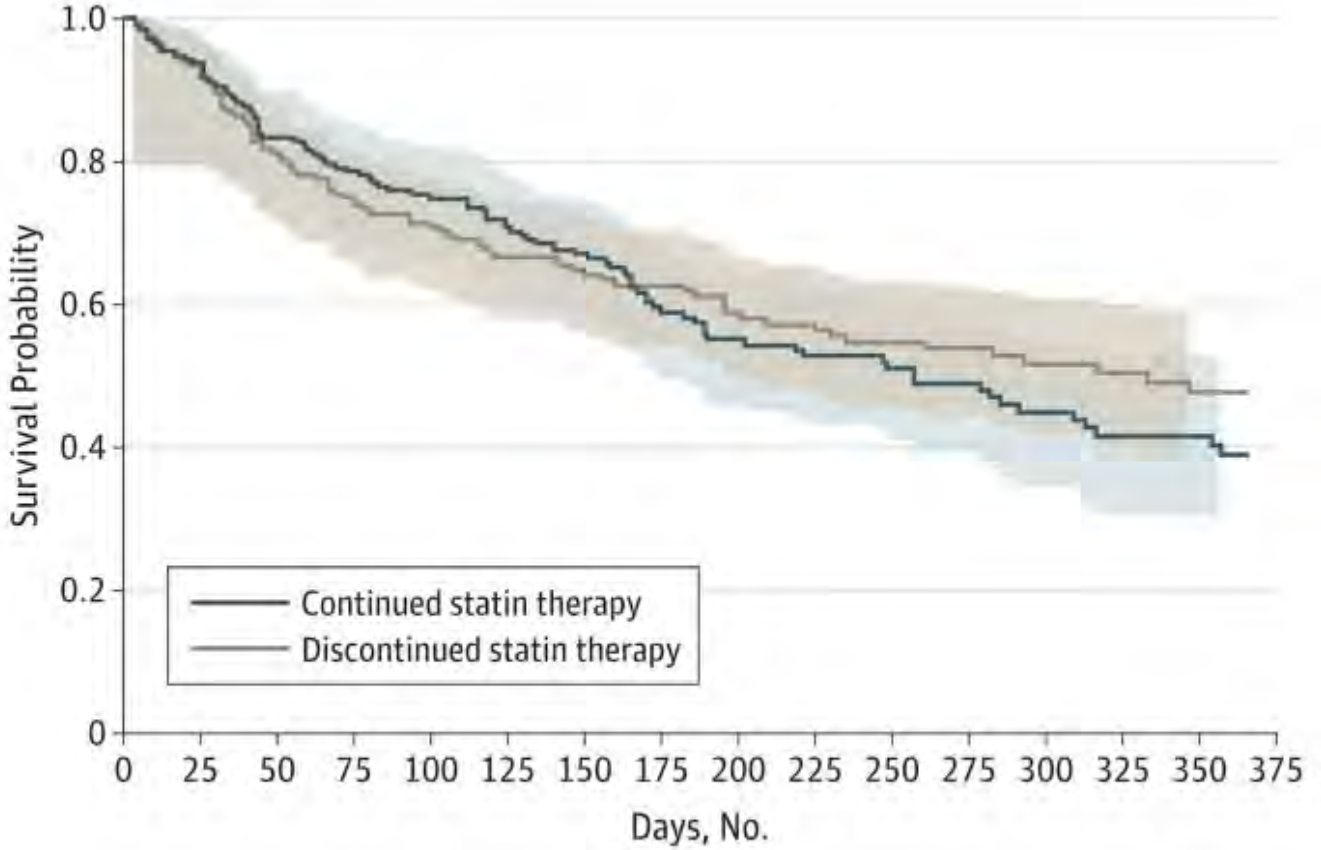
- Randomized to
  - Discontinue statin
  - Continue statin

- Death
- CV events
- QOL
- Symptoms
- No. non-statin meds
- Cost savings

Outcomes

Kutner JS. JAMA Intern Med. 2015;175:691-700.

Benefit of Discontinuing Statin Therapy in Advanced Age and Illness



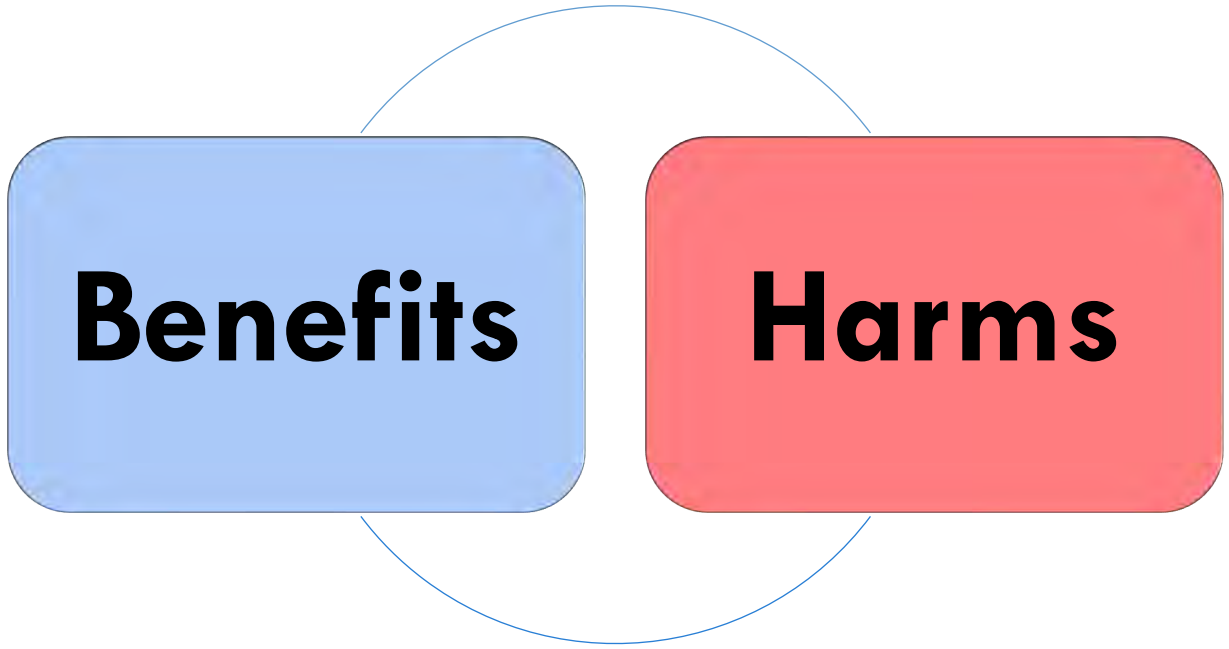
No. at risk							
Continued statin therapy	192	149	105	64	47	32	21
Discontinued statin therapy	189	135	93	68	52	36	26

- No difference between survival between statin discontinuation vs continuation groups. 23.8% vs 20.3% (90% CI -3.5% - 10.5%, p=0.36)
- QOL was greater for statin discontinuation. (McGill QOL score 7.11 vs 6.85, p=0.04)

Kutner JS. JAMA Intern Med. 2015;175:691-700.

Aspirin for Primary Prevention of Cardiovascular Disease

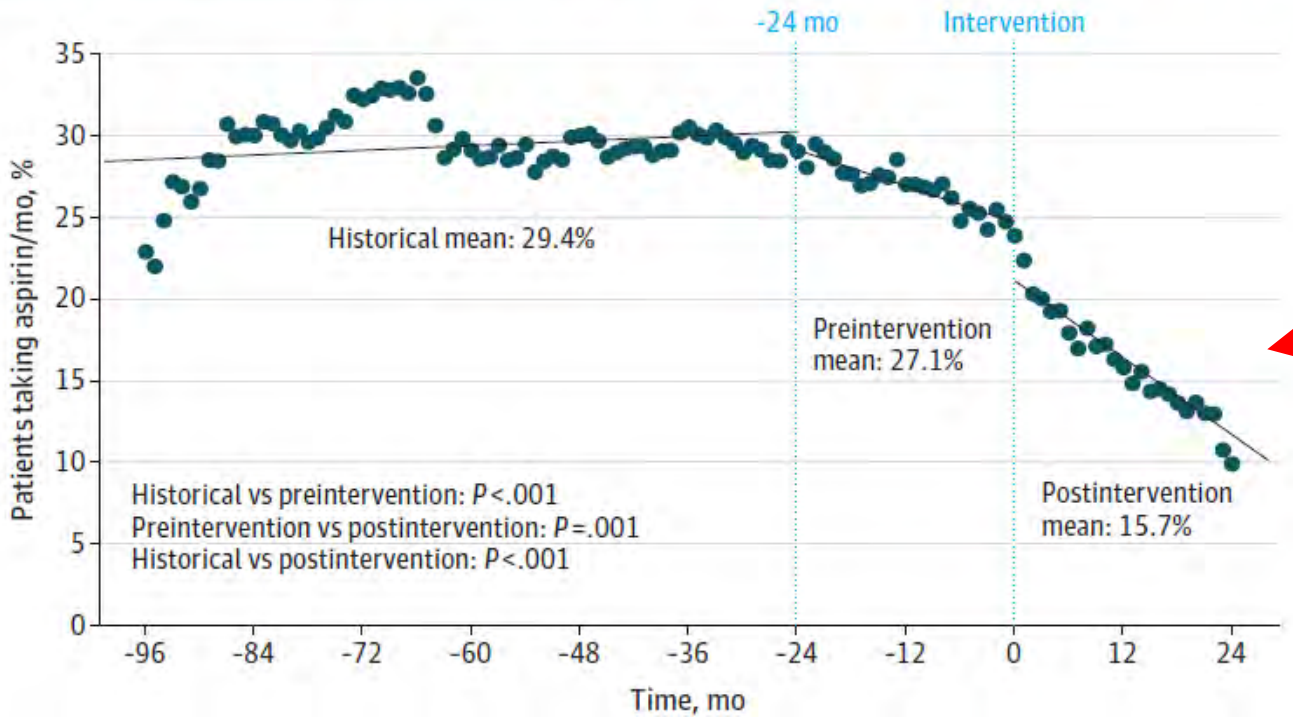
- Reduces risk of CVD



- Increases risk of GI bleed
- Increases risk of hemorrhagic stroke

Aspirin Deprescribing Can Reduce Bleeding

Figure 1. Percentage of Warfarin-Treated Patients Taking Aspirin Without an Apparent Indication by Month



Aspirin deprescribing was associated with reduction in major bleeding, any bleeding & ED visits for bleeding

ED= emergency department

JAMA Network Open 2022;5(9):e2231973

Challenges of Deprescribing

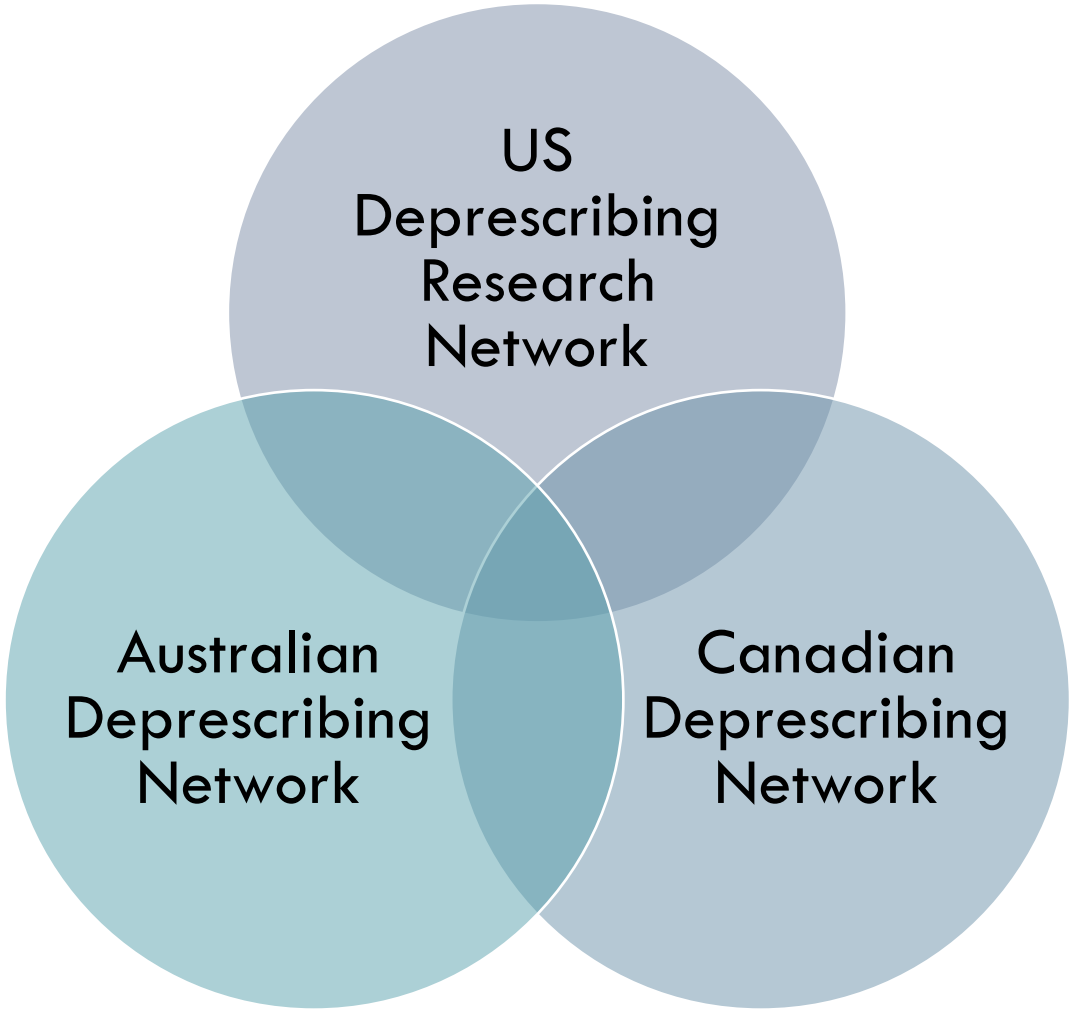
- Communication gaps & misunderstandings
- Patient reluctance/fear of stopping
- Coordination among clinicians
- Dosage tapering
- Withdrawal symptoms
- Conveying stop orders to pharmacies

…..And more!

Assistance in deprescribing:

- https://deprescribing.org/resources/
- https://www.deprescribingnetwork.ca/professionals

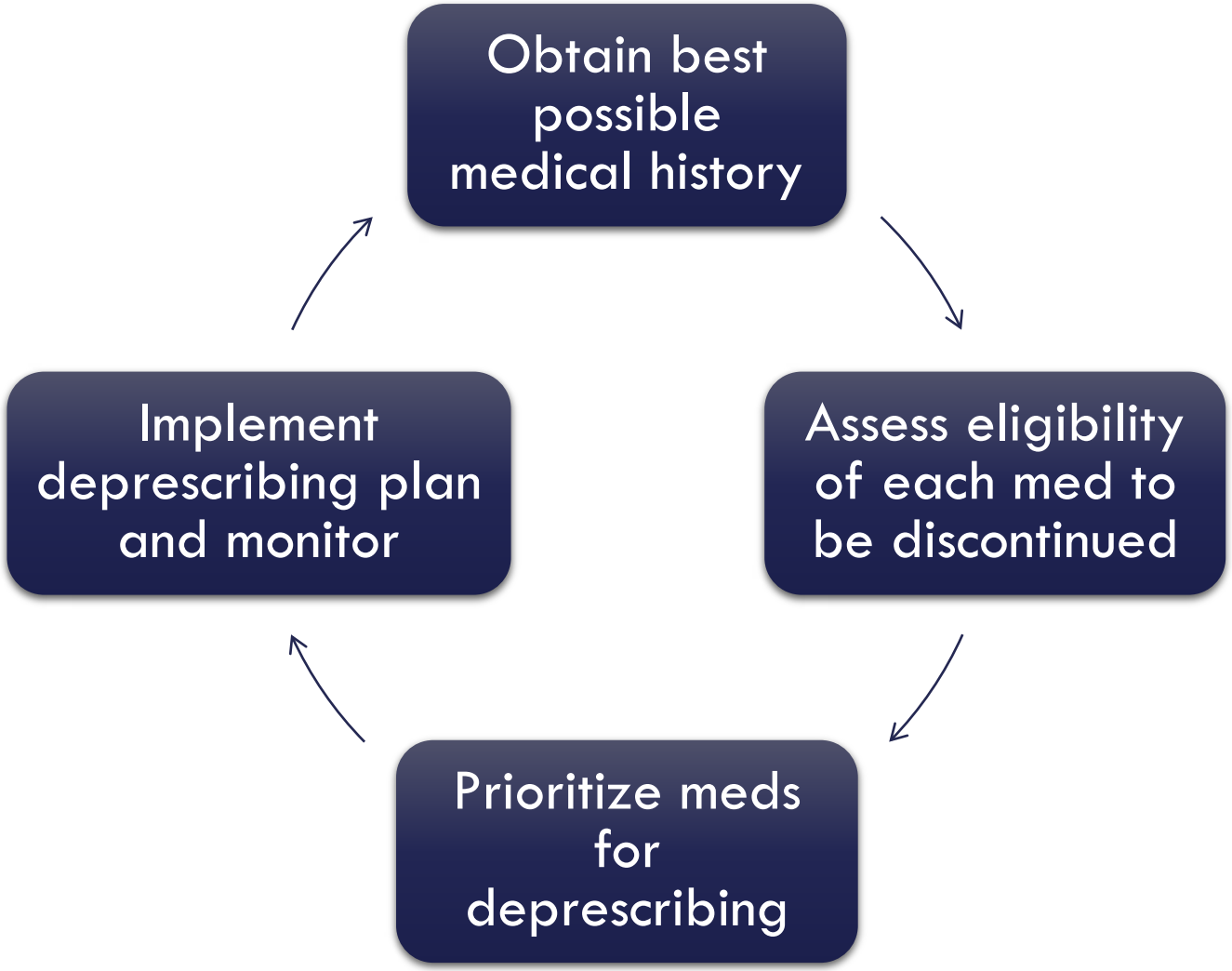
Deprescribing Research Expansion



Mehta RS. Nature Aging. 2021;1:347-56.

IMPLEMENTING DEPRESCRIBING INTERVENTIONS

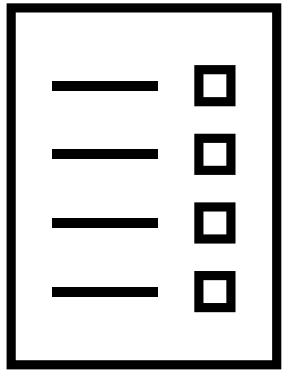
Deprescribing Implementation



Mehta RS. Nature Aging. 2021;1:347-56.

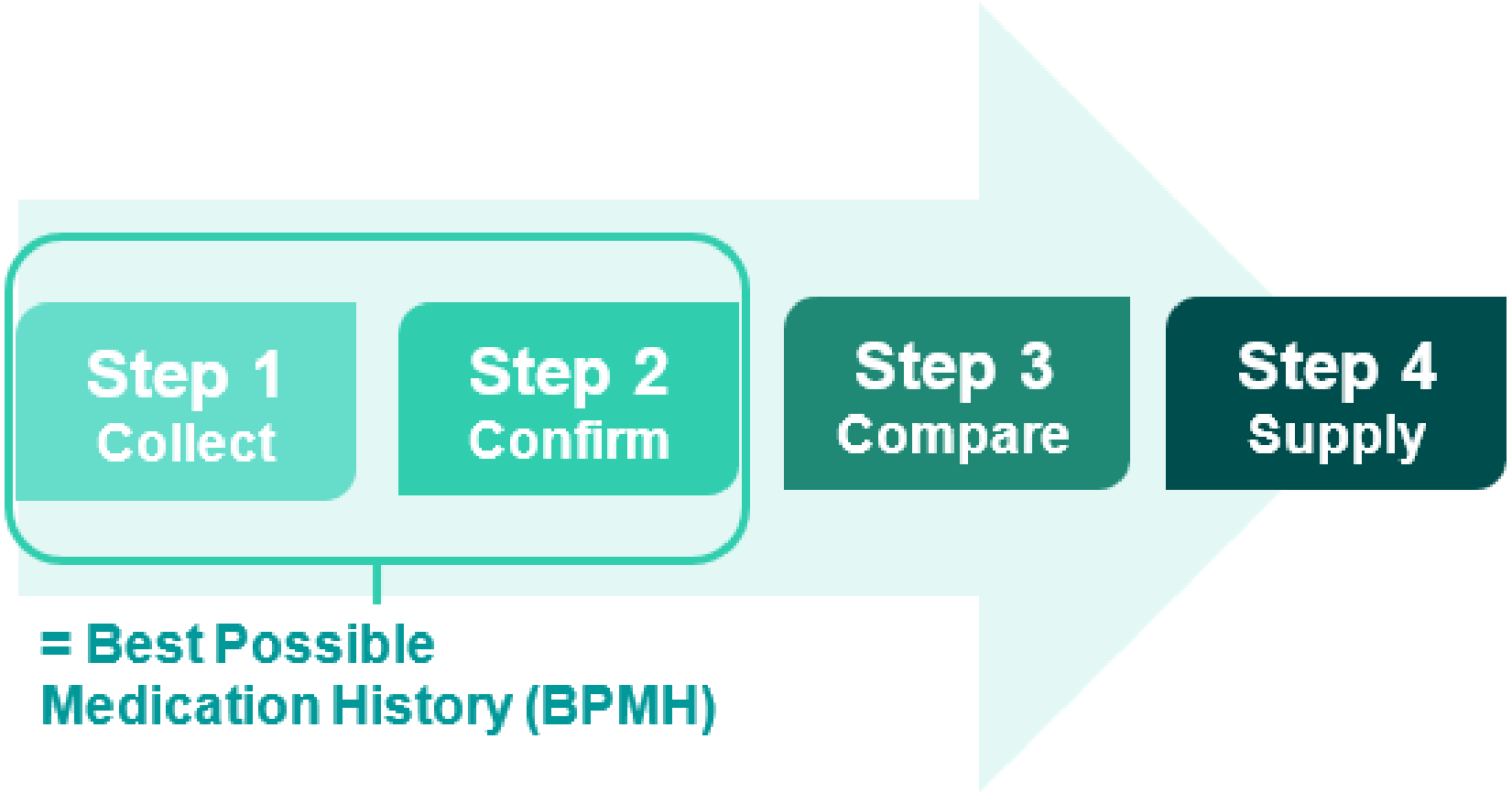
Best Possible Medication History

- A thorough history of ALL regular medication use (prescribed ***and*** non-prescribed), using a number of sources of information
  - Systematic approach
  - Include prescription medications, OTC and herbal supplements
  - Include dose, frequency, indication, allergies
  - Obtain from multiple sources: patient, family, caregivers, pharmacy records
  - Reconcile between medical records

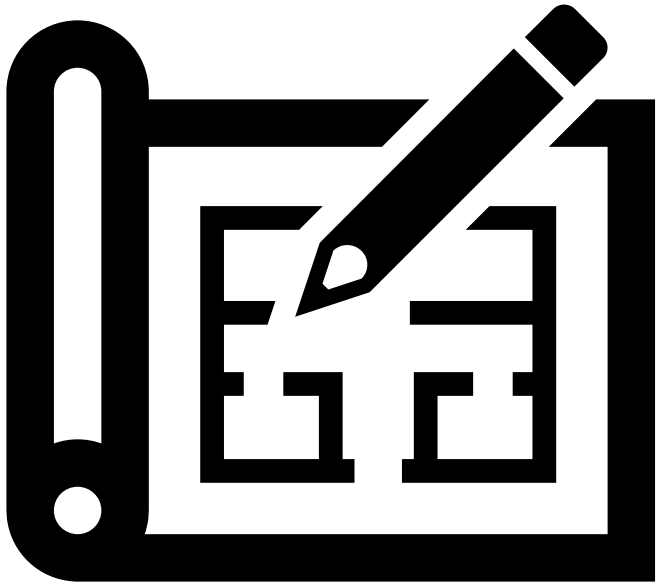


Mehta RS. Nature Aging. 2021;1:347-56.

Steps in Best Possible Medication History



https://www.cec.health.nsw.gov.au/__data/assets/pdf_file/0006/429927/BPMH-Interview-Guide-PDF.pdf



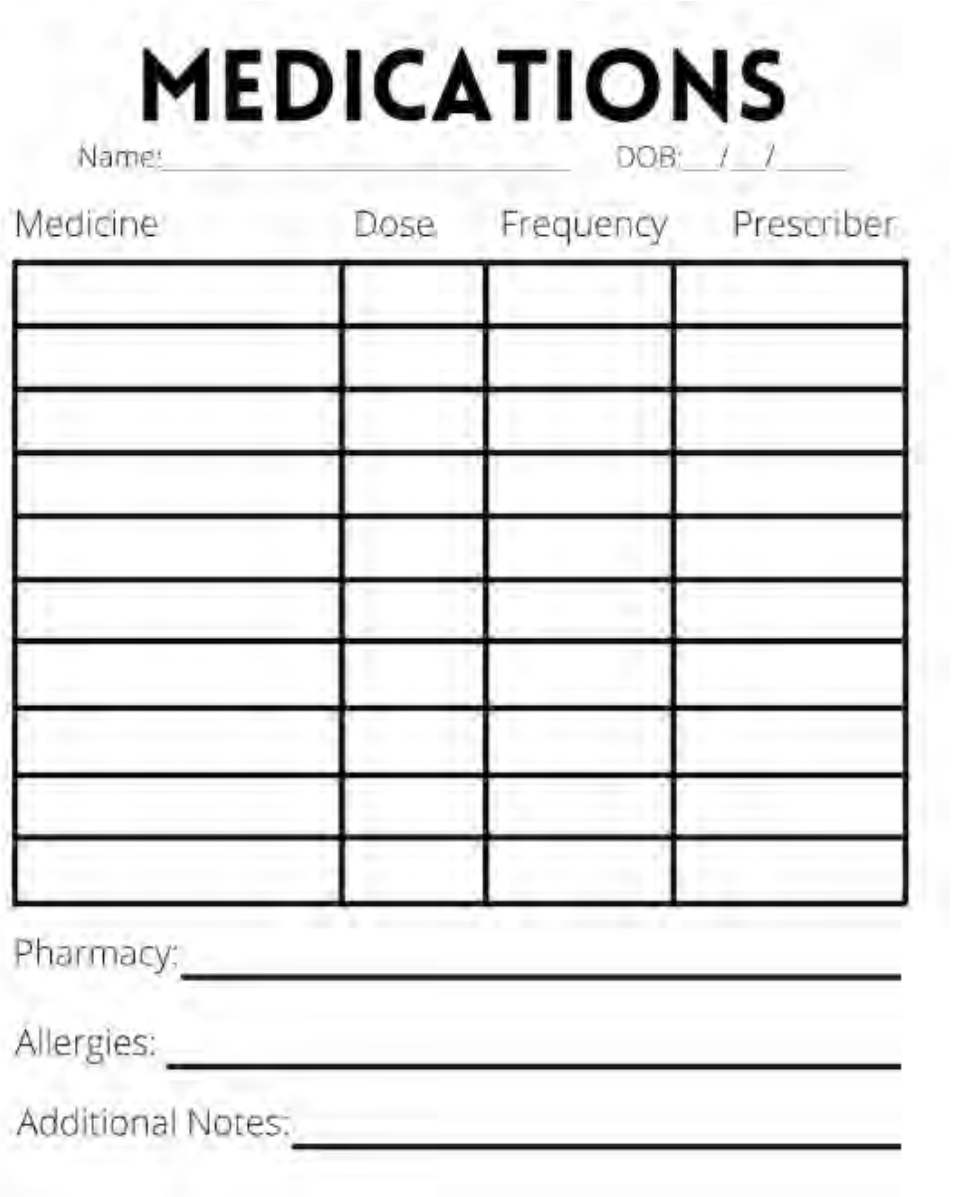
Medication Discontinuation Plan

- Tapering schedule when necessary
- Recommendation for alternative therapies or approaches
- Patient/family education on withdrawal symptoms and follow up
- Monitoring plan

Deprescribing Barriers and Facilitators

Barriers	Facilitators
• Fragmented health care • Lack of evidence-based guidance • Provider or patient past negative deprescribing experiences • Provider's competing priorities • Uncertainty about which meds to prioritize • Patient unwillingness	• Availability of non-pharmacologic alternatives • Shared decision-making • Integration of a pharmacist in healthcare team • Educational programs

Mehta RS. Nature Aging. 2021;1:347-56.



MEDICATIONS

Name:_____ DOB:__/__/____

Medicine	Dose	Frequency	Prescriber

Pharmacy:_____

Allergies:_____

Additional Notes:_____

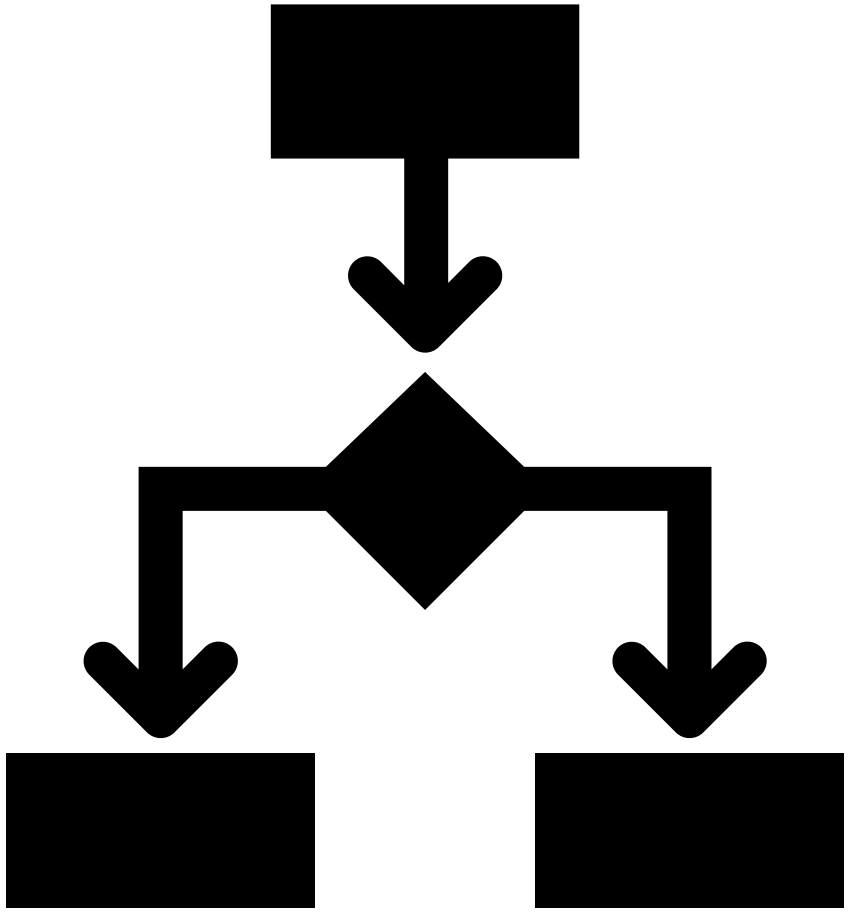
Have an Up-to-Date Medication List

- Include all medications: oral, topical, injectable, ophthalmic
- Include supplements, OTC meds
- Update with every healthcare encounter

MANAGING POLYPHARMACY IN THE FUTURE

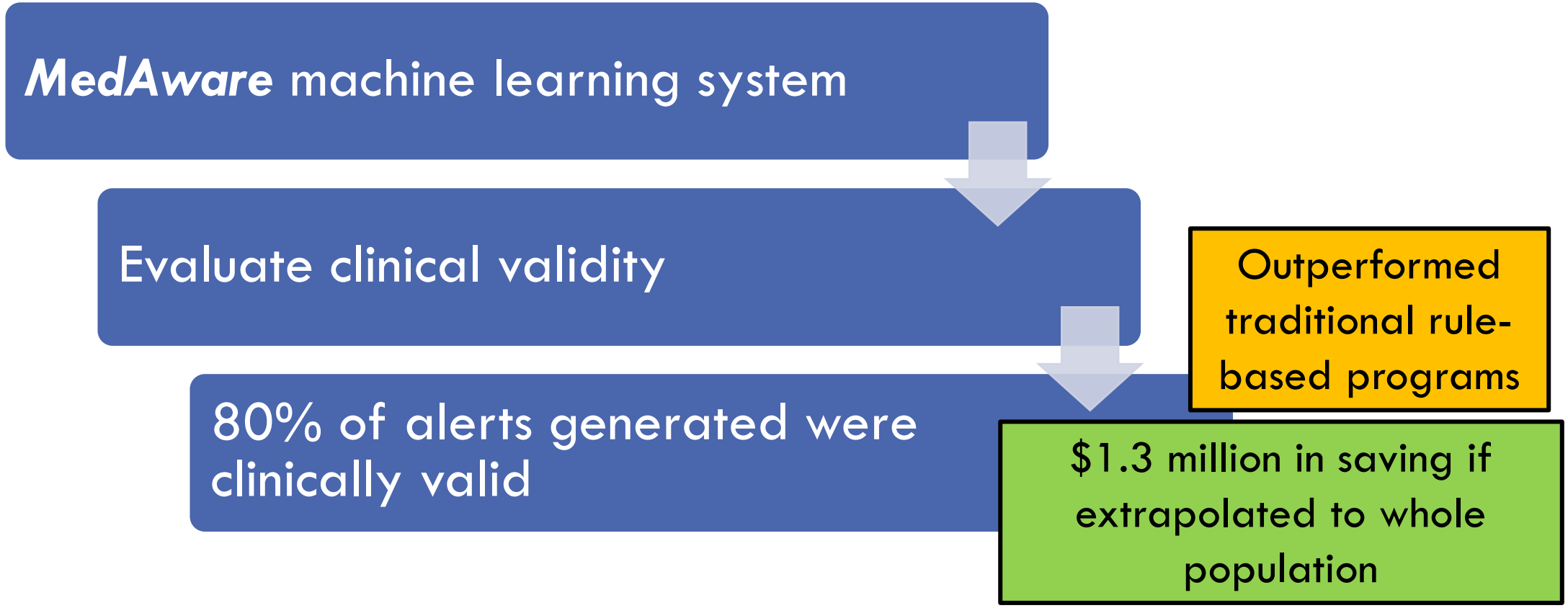
Needs for Deprescribing Practice

- Evidence based algorithms for deprescribing
- Algorithms should include monitoring



Technology and Precision Management of Polypharmacy

- Enhancement of drug data analysis and pattern identification with polypharmacy.



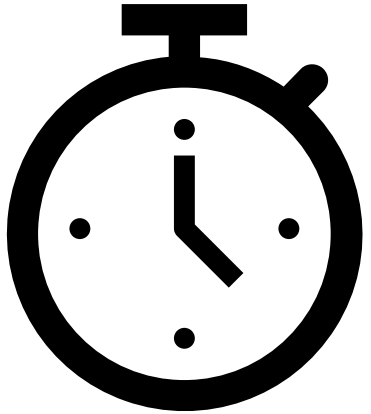
Rozenblum R. Jt Comm J Qual Patient Saf. 2020;46(1):3-10.

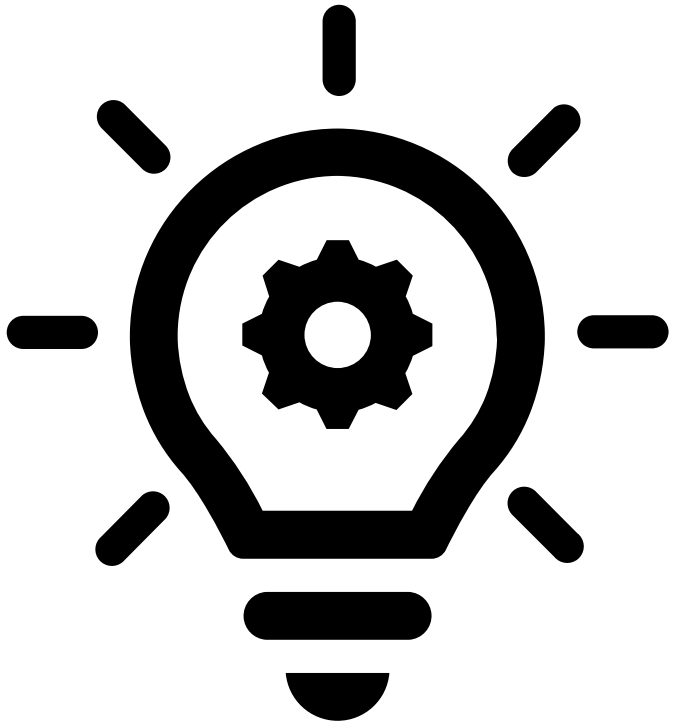
AI Supported Web Application Used to Reduce Adverse Effects of Polypharmacy

- Web-based application took into consideration PIMs from 6 criteria tools.
- AI web-based application saved significant time.
- Identification of drug interactions:

  2278 seconds for practitioner vs

  33.8 seconds for web-based application; $p<0.001$



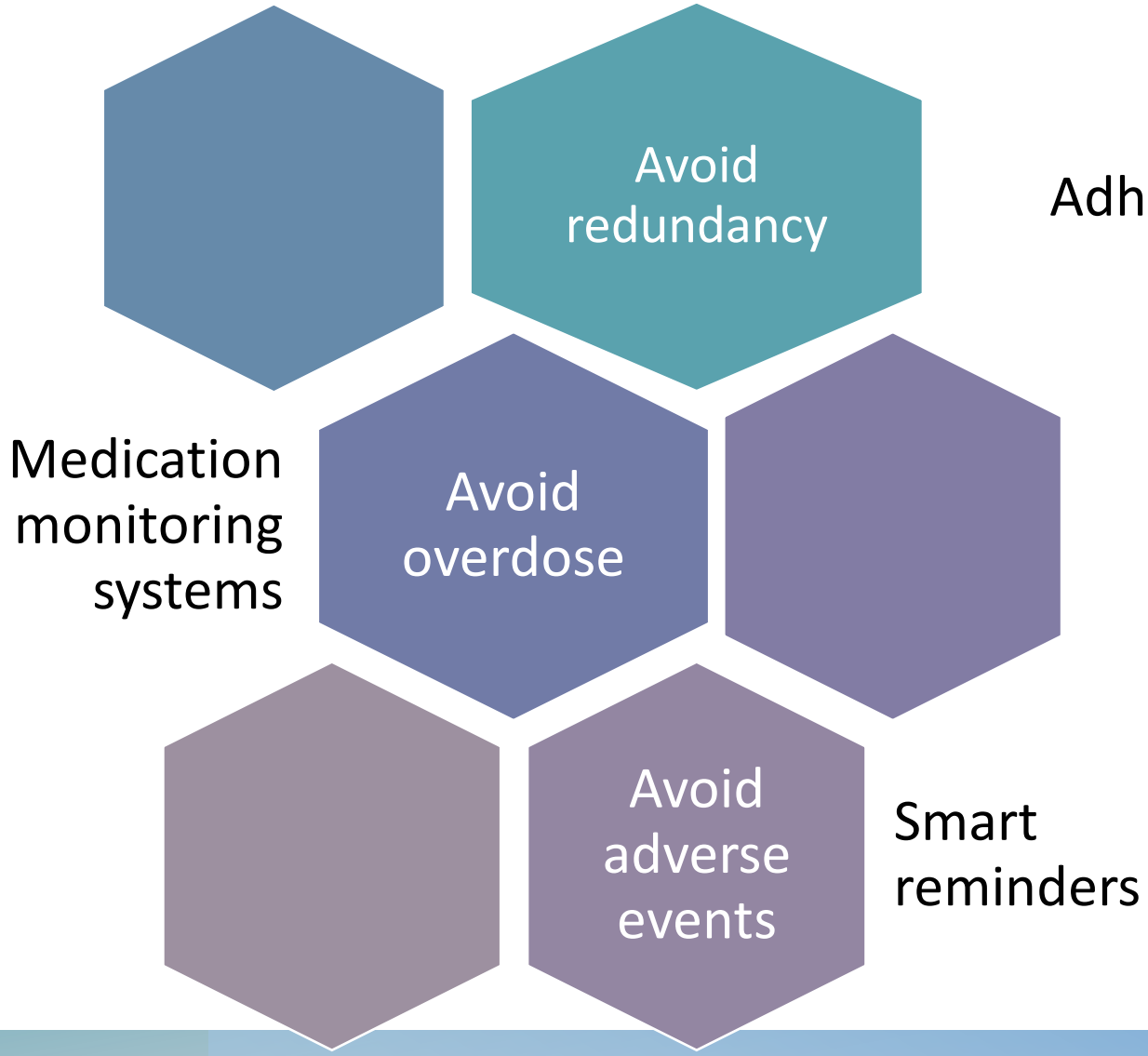


Patient Identification & Precision Dosing

- Future models should predict:
  - Risk for polypharmacy based upon patient and system characteristics.
  - Medication dose adjustments as to avoid adverse drug interactions.
- Research needed to engineer and validate effective machine-learning tool.

Mehta RS. Nature Aging. 2021;1:347-56.

Digital Health Tools



Mehta RS. Nature Aging. 2021;1:347-56.

Recommendations for Improving Responsible Use of Medication

- Investment in medical audits targeting older patients with multiple medications
- Support for a greater role of pharmacists in medication management and in collaboration with health care professionals for review of therapeutic plans
- Identification of high-risk patients and preparation of targeted medicine management plans for this group
- Establishment of a system for blame-free reporting of medication errors

Aitken M. IMS Institute for Healthcare Informatics; 2012. https://ssrn.com/abstract=2222541 Accessed March 21, 2024.

Summary

Inappropriate polypharmacy poses significant risk to older adults. There is need to better evaluate polypharmacy in older adults.

Identifying inappropriate polypharmacy can include validated tools such as the Beer's Criteria and STOPP/START. Development of deprescribing algorithms and approaches is an opportunity for improved safety.

Research should focus on digital technologies to enhance identification, mitigation of polypharmacy risk and improve patient safety.

PARTNERING WITH FAMILIES OF HOSPITALIZED PERSONS WITH DEMENTIA:

Lessons Learned

Wayne State University
Institute of Gerontology

2024 ISSUES IN AGING CONFERENCE
APRIL 29, 2024

MARIE BOLTZ PhD, GNP-BC, FGSA, FAAN
Elouise Ross Eberly and Robert Eberly
Endowed Chair Professor

Discuss the critical role of family in the life of the person living with dementia and their challenges and rewards

Describe the state of the science related to interventions for family carer partners of persons living with dementia

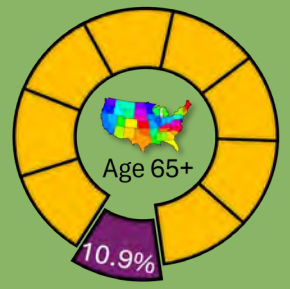
Discuss the family carers' experience and needs when the hospitalized person with dementia is hospitalized.

Discuss emerging issues in research, practice, and policy affecting the family living with dementia

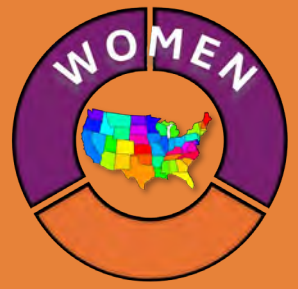
NEARLY 7 MILLION AMERICANS HAVE ALZHEIMER'S

An estimated **6.9 million Americans age 65 and older are living with Alzheimer's in 2024.** Seventy-three percent are age 75 or older.

About **1 in 9** people **aged 65** and older (10.9%) **has Alzheimer's.**



Almost **two-thirds of Americans with Alzheimer's** are **women.**



Deaths from Alzheimer's have more than doubled between 2000 and 2021.

2000-2021

ONE IN 3 OLDER ADULTS DIES WITH ALZHEIMER'S OR ANOTHER DEMENTIA

OVERVIEW: DEFINITIONS

FAMILY CAREGIVER (CG) – CARE PARTNER

(THE PREFERRED TERM)

Any relative, partner, friend or neighbor who has a significant personal relationship with, and provides a broad range of assistance for, an older person or an adult with a chronic or disabling condition

CARE RECIPIENT (CR)

An adult with a chronic illness or disabling condition or an older person who needs ongoing assistance with everyday tasks to function on a daily basis

75-80% OF CARE PROVIDED BY FAMILY / FRIENDS

CARE DELIVERY CARE MANAGEMENT

- Approximately 15.5 million caregivers provide estimated 17.7 billion hours of unpaid care
- Higher in African American and Hispanic than White and Asian-American

(Alzheimer's Association, 2024)

MAJORITY OF CAREGIVERS ARE WOMEN (APPROX. 66%)

- 21% are 65 years old and older
- average age 42
- 64% are currently employed, a student or a homemaker
- 71% are married or in a long-term relationship

ABOUT 25% OF DEMENTIA CAREGIVERS CARE FOR AN AGING PARENT AS WELL AS AT LEAST ONE CHILD

REWARDS OF BEING A CARER

RECIPROCITY

EMOTIONAL CLOSENESS

LEARNING AND GROWING

ENACTMENT OF VALUES

(McGillick & Murphy-White, 2016)

THE CHALLENGES EXPERIENCED BY CARERS

- Higher levels of perceived stress
- Greater employment complications
- Less family time
- Disrupted family and social relationships
- Less time for leisure
- Less self-care

- Higher burden, strain, psychological morbidity
- Impaired function
  - Cognitive
  - Immune
- When depression present
  - Increased vascular inflammation and altered clotting profiles

(Rowe et al., 2016)

ADDRESSING NEEDS . . .

RESPITE / BREAKS FROM CAREGIVING ARE ESSENTIAL

Maintain a life outside of caregiving

CAREGIVERS NEED TO KNOW THEIR NEEDS / FEELINGS COUNT

- ❑ They need their efforts to be validated
- ❑ Their feelings are important
- ❑ They must take care of their own health
- ❑ They have a right to say what they can do and can't do

THEY HAVE A RIGHT TO ASK QUESTIONS AND TO BE LISTENED TO

- ❑ Get information about community resources
- ❑ Get medical systems to pay attention to them / their concerns

THEY CAN'T DO IT ALONE

HELP THEM identify sources of support

HELP THEM say "YES" to offers of help

Dementia prevention, intervention, and care: 2020 report of the *Lancet* Commission

Gill Livingston, Jonathan Huntley, Andrew Sommerlad, David Ames, Clive Ballard, Sube Banerjee, Carol Brayne, Alistair Burns, Jiska Cohen-Mansfield, Claudia Cooper, Sergi G Costafreda, Amit Dias, Nick Fox, Laura N Gitlin, Robert Howard, Helen C Kales, Mika Kivimäki, Eric B Larson, Adesola Ogunniyi, Vasiliki Orgeta, Karen Ritchie, Kenneth Rockwood, Elizabeth L Sampson, Quincy Samus, Lon S Schneider, Geir Selbæk, Linda Teri, Naaheed Mukadam

"Triangulation framework"—consistency of evidence from different research lines

Perform systematic literature reviews and meta-analyses where needed

Summarize best evidence using quality systematic reviews, meta-analyses, or individual studies

Present a synthesis of evidence … balance, strengths, and limitations"

SOME KEY TAKEAWAYS FROM 2020 LANCET REPORT

- **WELL-BEING** is the goal of much dementia care: How well do we measure this or set this as our goal –in caring and in research?
- People with dementia have **COMPLEX** problems and symptoms in many domains.
- Interventions should be **INDIVIDUALIZED, WHOLE PERSON,** and **INCLUDE FAMILY CARERS.**
- Evidence supports **PSYCHOSOCIAL INTERVENTIONS** tailored to individual needs to manage neuropsychiatric symptoms.

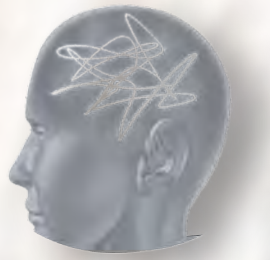
- Evidence-based **INTERVENTIONS FOR CARERS** can reduce depressive and anxiety symptoms over years and are cost effective.
- Keeping people with dementia **PHYSICALLY HEALTHY** is important for their cognition and well being.
- **AVOIDING HOSPITALIZATIONS** is worthwhile as is **PREVENTION OF DELIRIUM.** There is much opportunity for improvement, especially post-COVID
- **ADVANCE CARE PLANNING** including possibly establishing preferences before dementia impairs judgement and decision making should be promoted.

STIGMA INFLUENCES PERSON LIVING WITH DEMENTIA AND FAMILY CARERS, SUPERIMPOSED UPON AGEISM

- IGNORANCE
- "WAR" METAPHORS FOR CONFRONTING THIS "EPIDEMIC"
- THE "ALZHEIMERIZATION" OF THE DIALOGUE TO SUPPORT EUTHANASIA
- DEFINING "SELF" IN RELATION TO COGNITIVE FUNCTION ("I THINK THEREFORE I AM")

(Desai & Desai, 2016; Johannessen & Moller, 2011)

"GETTING DEMENTIA, YOU FEEL THAT YOU HAVE SUDDENLY BECOME A LUNATIC."



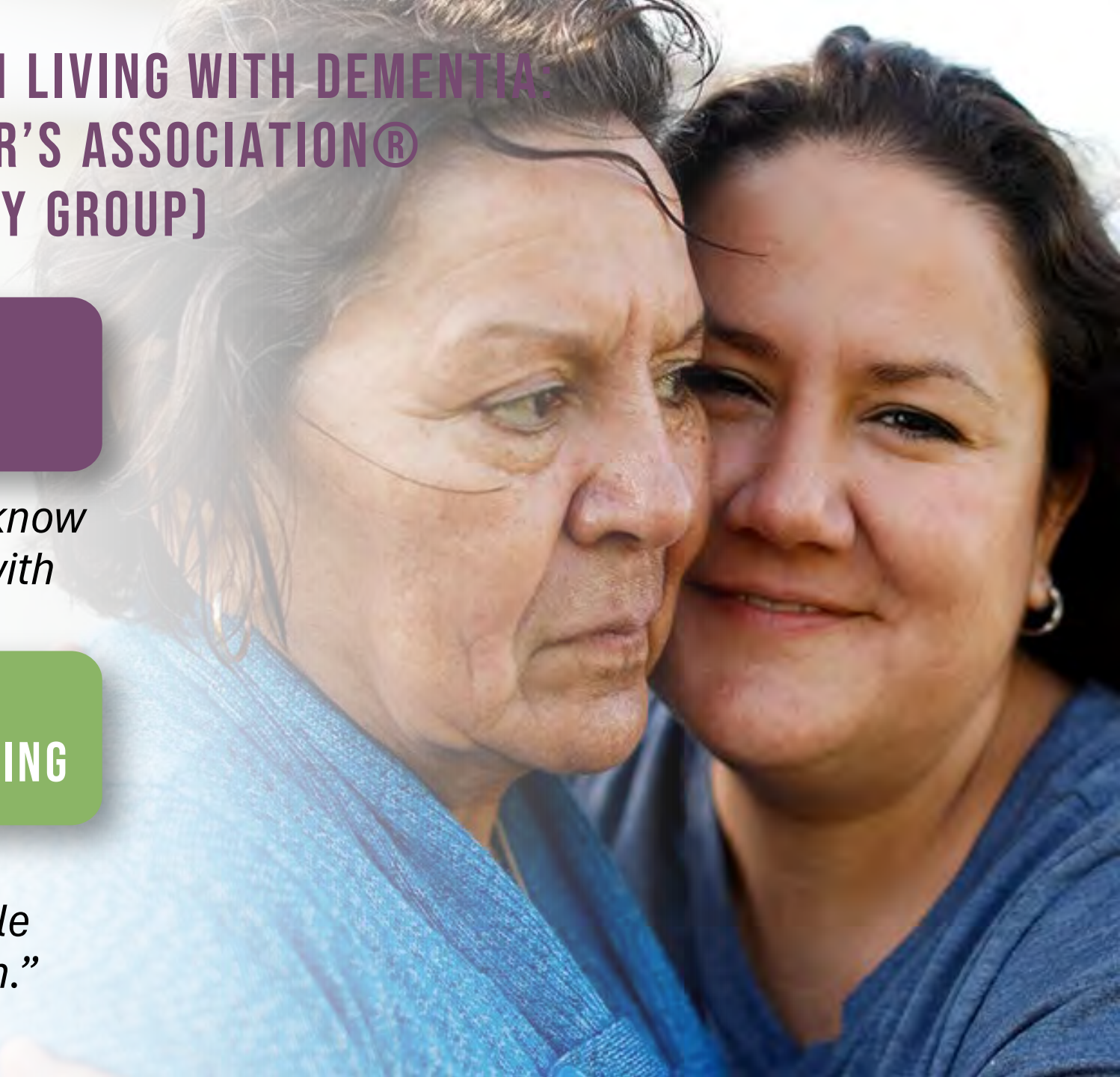
THE PERSPECTIVE OF THE PERSON LIVING WITH DEMENTIA: FAMILY ENGAGEMENT (ALZHEIMER'S ASSOCIATION® NATIONAL EARLY-STAGE ADVISORY GROUP)

EXPECT THAT WE (CLINICIANS) GET INFORMATION FROM FAMILY

"Make contact with persons who know me from their direct experience with me such as my adult children..."

WANT US TO INCLUDE FAMILY IN EVALUATION AND DECISION-MAKING

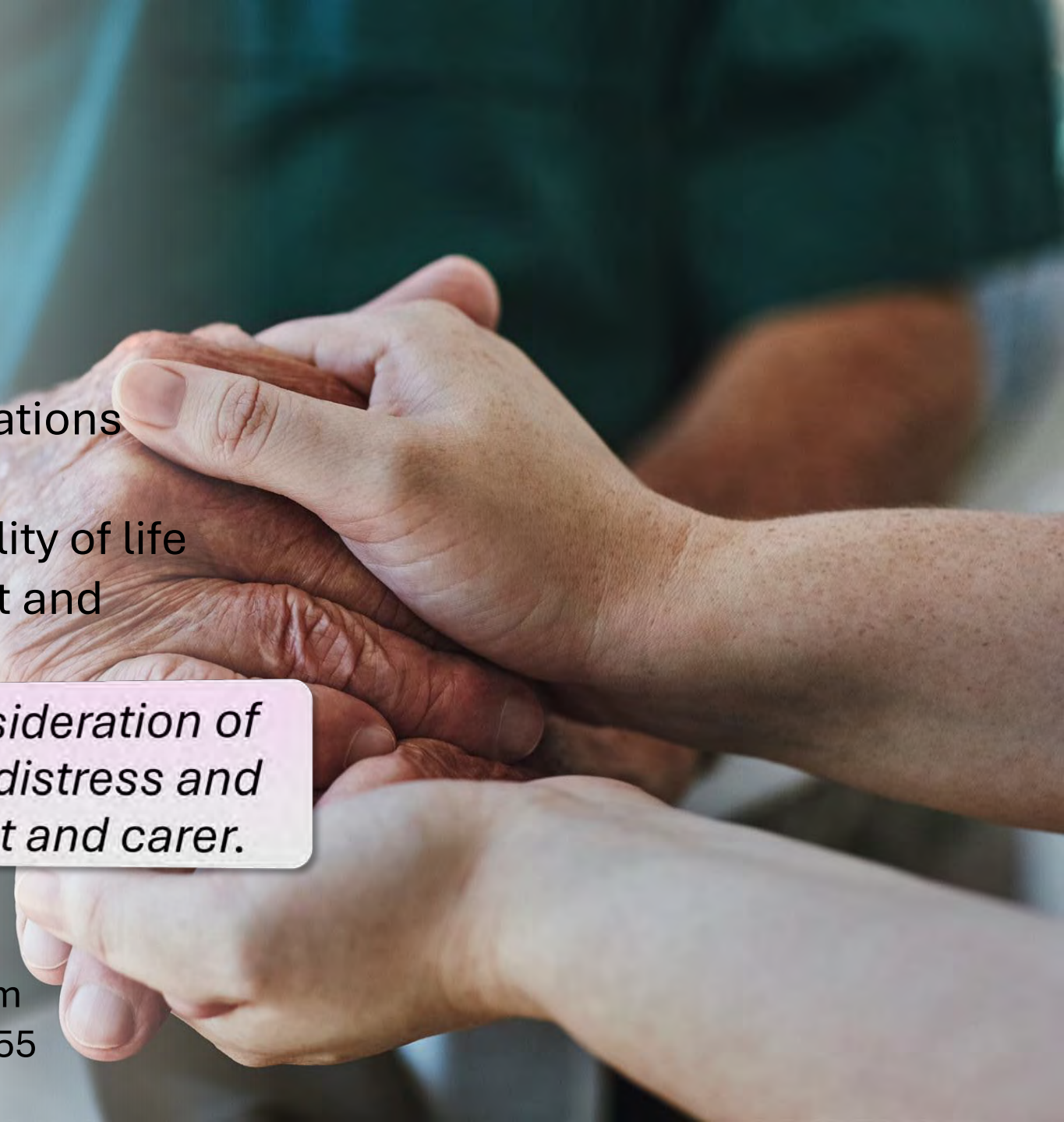
"Keep in close contact with my caregiver to ensure knowledgeable parties are included in discussion."



EVIDENCE-BASED DEMENTIA CARE:

- Includes early detection of dementia
- Prevents, detects, manages complications while managing co-morbidity
- Focuses on patient function and quality of life
- Is family-centered- addresses patient and family needs

Supporting the patient without due consideration of the family can result in increased carer distress and poorer overall outcomes for both patient and carer.



Burns R et al. Primary Care Interventions for Dementia Caregivers: 2-Year Outcomes From the REACH Study. *Gerontologist* 43(4):547–555

WHY A DYADIC APPROACH?

PATIENT FACTORS INFLUENCE CAREGIVER STATUS

(Rowe et al., 2016)

MECHANISMS INFLUENCING PHYSIOLOGIC CHANGES IN CAREGIVERS:

- Poor sleep, sustained vigilance, and interference with caregivers' health promoting behaviors

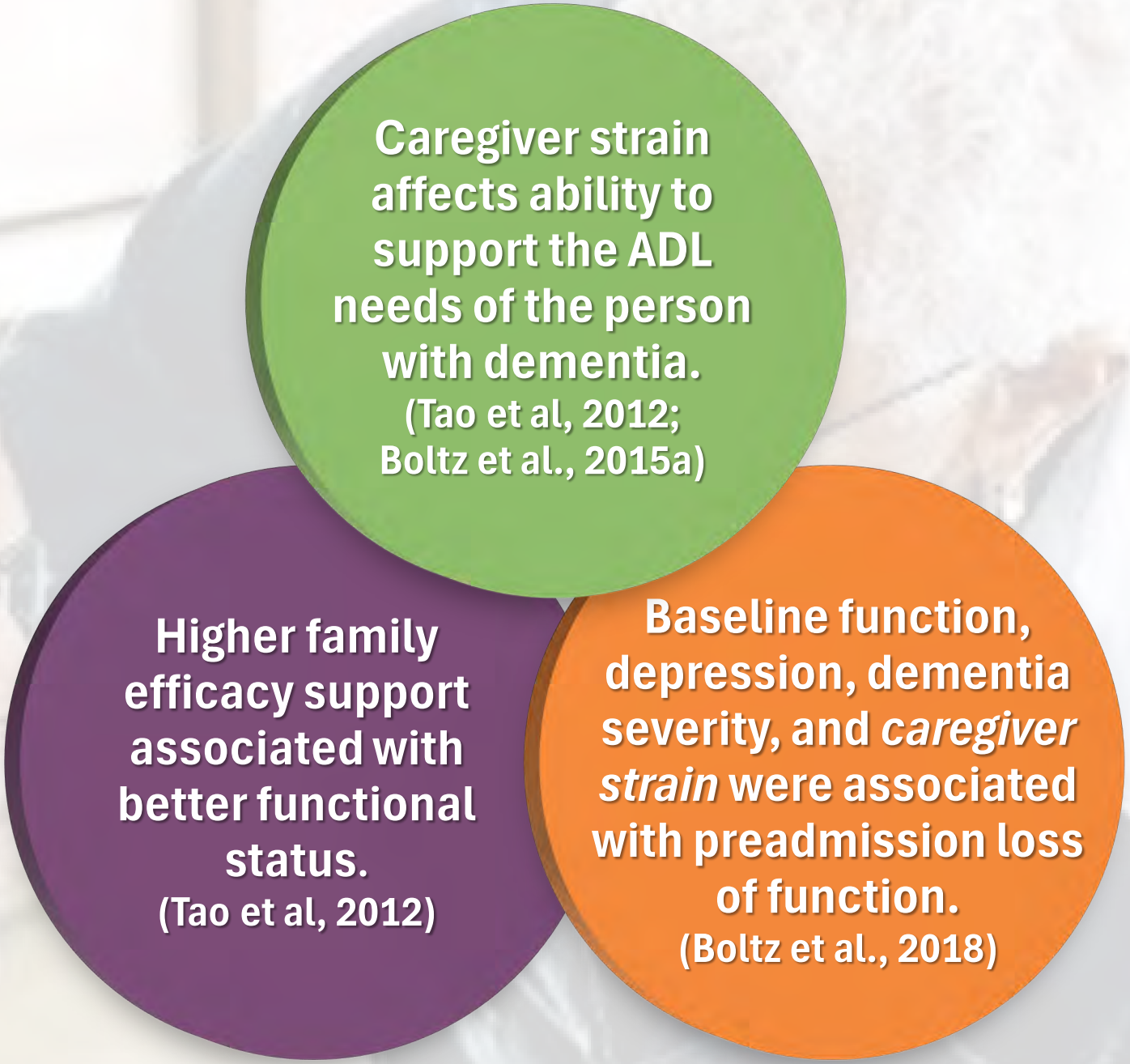
MECHANISMS INFLUENCING PSYCHOLOGICAL CHANGES IN CAREGIVERS:

- Being a spouse, female, with poorer perceived health, smaller social network
- Role overload, captivity, or burden associated with depression

CARE RECIPIENT CHARACTERISTICS THAT ARE ASSOCIATED WITH CAREGIVER DEPRESSION AND BURDEN INCLUDE:

- poorer cognitive function
- higher dependence in activities of daily living
- behavioral manifestations of distress

FAMILY CAREGIVER FACTORS INFLUENCE PATIENT OUTCOMES



THE FAMILY CARE PARTNER (CAREGIVER) AS THE UNIT OF CARE

NEED TO CONSIDER THE INTERRELATIONSHIP OF CARE-RECEIVER AND CAREGIVER NEEDS AND RESPONSES WHEN PLANNING, PROVIDING, AND EVALUATING CARE . . . AND REFLECT ON

- OUR PERSONAL VIEW OF PATIENTS AND FAMILIES
- THEIR EXPOSURE TO OTHERS' VIEWS
- OUR RELATIONSHIP WITH THEM

OLDER PERSONS WITH ALZHEIMER'S DISEASE AND RELATED DEMENTIAS (ADRD) ARE 2-3 X'S MORE LIKELY TO BE HOSPITALIZED AS THEIR PEERS WHO ARE COGNITIVELY HEALTHY (ALZHEIMER'S ASSOCIATION, 2024)

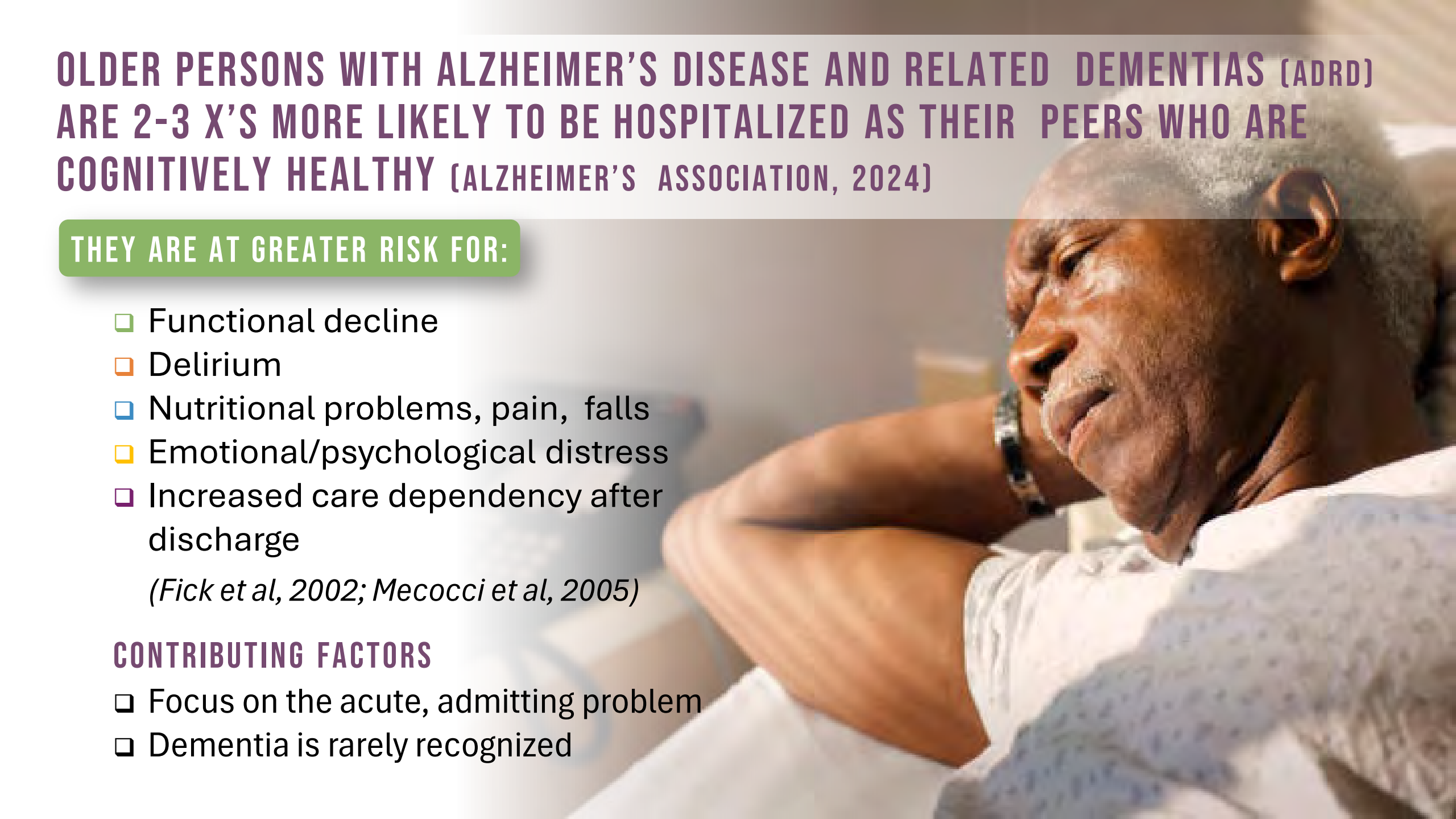
THEY ARE AT GREATER RISK FOR:

- Functional decline
- Delirium
- Nutritional problems, pain, falls
- Emotional/psychological distress
- Increased care dependency after discharge

(Fick et al, 2002; Mecocci et al, 2005)

CONTRIBUTING FACTORS

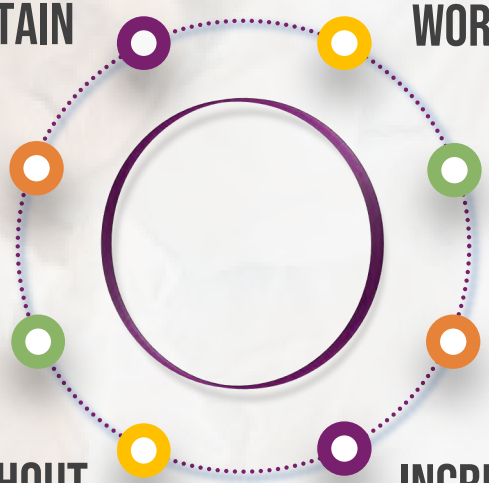
- Focus on the acute, admitting problem
- Dementia is rarely recognized



EXPERIENCES OF HOSPITALIZATION

PERSONS LIVING WITH DEMENTIA

- FEELING IGNORED, DISTRESSED, OR UNCERTAIN
- RARELY ENGAGED IN DECISIONS ABOUT CARE AND TREATMENT
- NEGATIVE ENCOUNTERS
- NOT RECEIVING THE SAME SERVICES AS PEOPLE WITHOUT AD/ADRD, INCLUDING ATTENTION TO MOBILITY, COGNITION, PRIVACY, HYGIENE, AND COMFORT



FAMILY CARERS

- WORRY, STRESS, AND VULNERABILITY DURING ACUTE ILLNESS
- INCREASED BURDEN DURING AND AFTER THE HOSPITAL STAY
- LIMITED INFORMATION AND ENGAGEMENT WITH CARE DECISIONS
- INCREASED ANXIETY RELATED TO PATIENT'S CONDITION AND LACK OF PREPAREDNESS

(Boltz et al, 2015; Goldberg & Harwood, 2013; Innes, Kelly, Scerri, Abela, 2016; Hung et al, 2017)

WHY ENGAGE CARE PARTNERS IN ACUTE CARE ?

OFTEN HAVE BASELINE PHYSICAL AND PSYCHOLOGICAL MORBIDITY

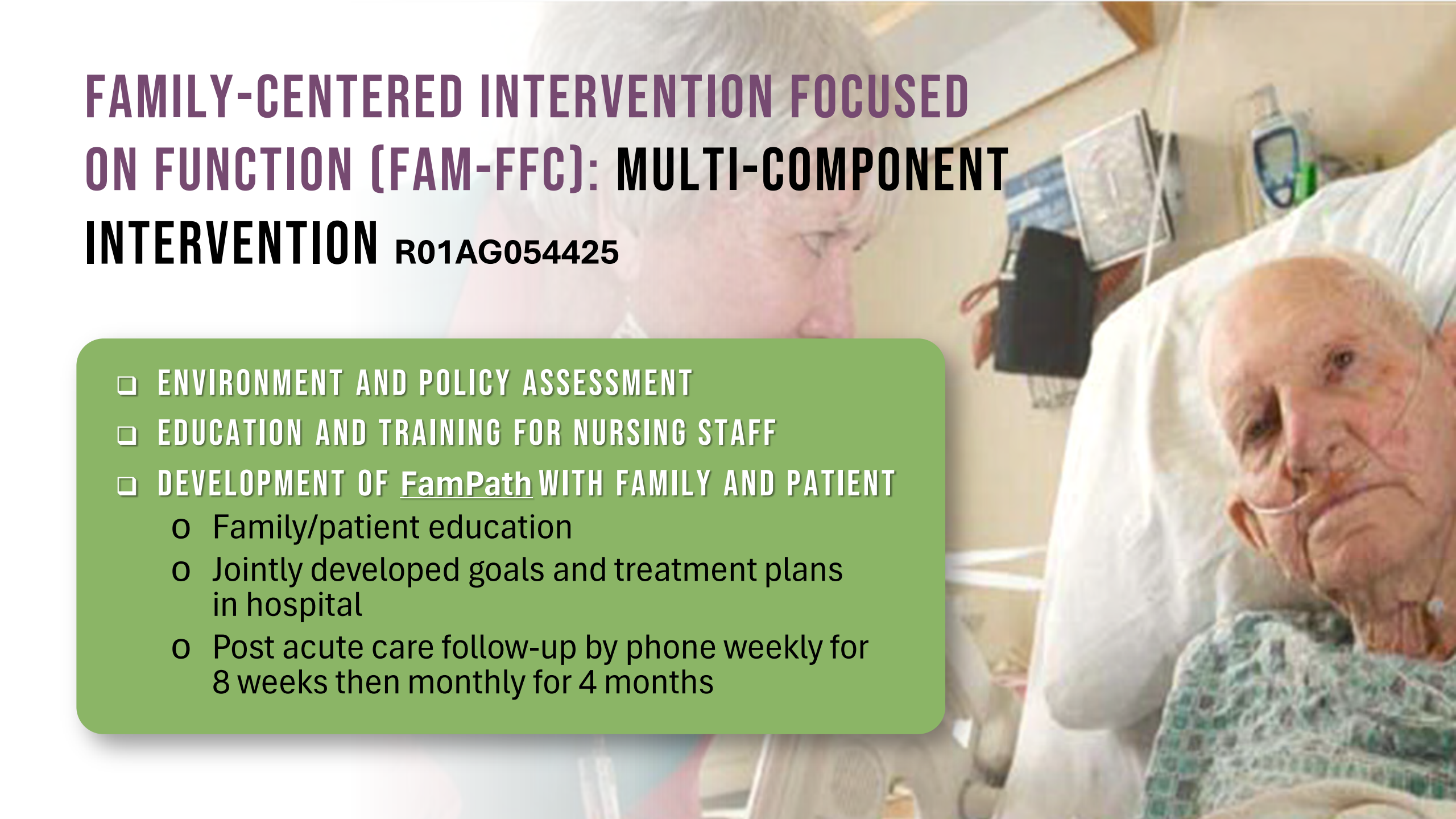
PROVIDE 75-80% OF CARE TO PERSONS LIVING WITH DEMENTIA

CAN PROVIDE VITAL INFORMATION, EMOTIONAL SUPPORT, MOTIVATION, AND ASSUME RESPONSIBILITY IN VARYING DEGREES FOR POST-ACUTE CARE DELIVERY AND COORDINATION.

(Li, 2005; Boltz et al, 2015, 2016)

Can goals of promoting functional recovery (cognitive and physical) align with improving family caregiver preparedness and sense of well-being?

FAMILY-CENTERED INTERVENTION FOCUSED ON FUNCTION (FAM-FFC): MULTI-COMPONENT INTERVENTION R01AG054425



- ENVIRONMENT AND POLICY ASSESSMENT
- EDUCATION AND TRAINING FOR NURSING STAFF
- DEVELOPMENT OF FamPath WITH FAMILY AND PATIENT
  - Family/patient education
  - Jointly developed goals and treatment plans in hospital
  - Post acute care follow-up by phone weekly for 8 weeks then monthly for 4 months

FAMILY ENGAGEMENT WITHIN A PREPARED PHYSICAL AND SOCIAL ENVIRONMENT

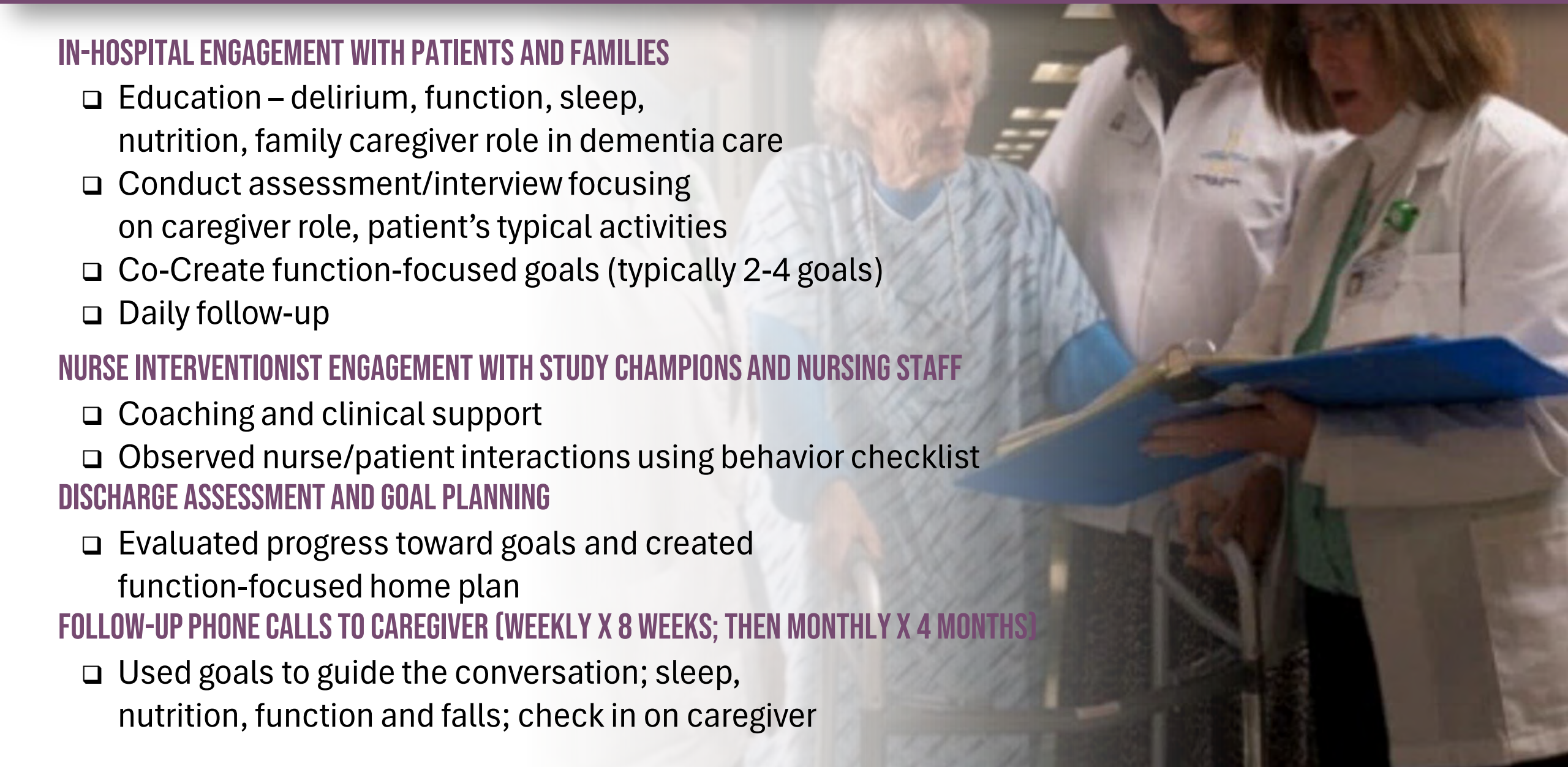
ENVIRONMENTAL / POLICY ASSESSMENT

- ❑ Safety of environment
- ❑ Access to supplies: sensory, mobility, nutrition
- ❑ Bed height/toilet height
- ❑ Policy regarding visitation
- ❑ Inclusion of patient/family in rounds

STAFF EDUCATION

- ❑ Experience of patient /family
- ❑ Communication
- ❑ Cognitive and functional assessment
- ❑ Evidence-based approaches to prevent functional decline, delirium and complications
- ❑ Function-focused care
- ❑ Partnership with families

IMPLEMENTING FamPath



IN-HOSPITAL ENGAGEMENT WITH PATIENTS AND FAMILIES

- Education – delirium, function, sleep, nutrition, family caregiver role in dementia care
- Conduct assessment/interview focusing on caregiver role, patient's typical activities
- Co-Create function-focused goals (typically 2-4 goals)
- Daily follow-up

NURSE INTERVENTIONIST ENGAGEMENT WITH STUDY CHAMPIONS AND NURSING STAFF

- Coaching and clinical support
- Observed nurse/patient interactions using behavior checklist

DISCHARGE ASSESSMENT AND GOAL PLANNING

- Evaluated progress toward goals and created function-focused home plan

FOLLOW-UP PHONE CALLS TO CAREGIVER (WEEKLY X 8 WEEKS; THEN MONTHLY X 4 MONTHS)

- Used goals to guide the conversation; sleep, nutrition, function and falls; check in on caregiver

PARTNERING WITH FAMILY CARE PARTNERS

FamPath Information for Patients and Families

Patients and Families guide the decision-making and play an active role!

INFORMATION | SLEEP & REST | NUTRITION | FUNCTION, STRENGTH, ABILITY | SKIN CONDITION | WHAT YOU CAN DO | DELIRIUM | FALLS | DISCHARGE PLANNING

INFORMATION to share with the health care team:

- Medical and surgical history
- Normal abilities (examples include: transferring, ambulating, feeding, toileting, bathing, dressing, shopping, preparing food, doing laundry, medication administration)
- History of memory or thinking problems
- Daily routine at home
- Signs of stress (including behaviors and functioning)
- Ways to prevent or help cope with stress
- Use of health care or support services
- Living situation and plan for assistance at discharge

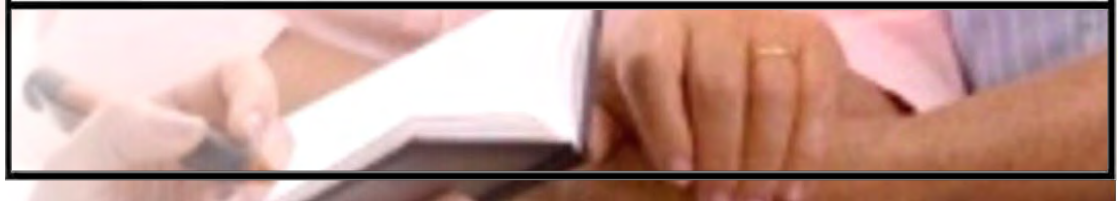
WHAT YOU CAN DO as the Family Career while in the hospital:

- Find out who the physician and nurse are and introduce yourself
- Always have paper/pen to write down information and any questions
- Arrange to meet (in person or on the phone) with patient and members of the healthcare team on a regular basis
- Have a friend or family member with you during conversations as support
- The bedside FamPath is a guide to prevent complications and discharge the patient in the best possible condition – please review, provide feedback, and keep current!
- Use the “Family Caregiver Report” with the FamPath to document any changes
- Provide as much information as you can about your loved one!

FamPath Assessment and Plan

Name:

FAMILY ROLES	
The family member or friend who is designated by the patient and /or legally authorized status to help make decisions and guide care planning is:	
Name Relationship:	
Telephone number:	___ ___ ____
Email:	
Other family members who will be involved in care: if the patient is upset, this is the person to call:	
Name:	
Telephone number:	___ ___ ____
Email:	
Advanced directive information:	



FAM-FFC OUTCOMES

Family care partners showed increased preparedness

Goal attainment was associated with delirium abatement and less hospital readmissions

Patients exposed to Fam-FFC were more likely to **RETURN TO BASELINE FUNCTION** over time when compared to those exposed to routine care.

- Results are consistent with goals set by FCPs which focused on mobility and self-care (Boltz et al., 2023)

Fam-FFC patients showed **FEWER BEHAVIORAL SYMPTOMS OF DISTRESS** as compared to the control group at 6 months.

- FCPs were helped to provide function-focused care, provided in tandem with a structured daily routine and meaningful activities post-hospitalization

WHAT DO FAMILIES SAY THEY NEED AFTER CARE RECEIVERS' HOSPITALIZATION?

PSYCHOSOCIAL SUPPORT

E.g., staying connected to others, managing behaviors

MANAGING SYMPTOMS

- ❑ Delirium Detection
- ❑ Sleep hygiene

PHYSICAL ACTIVITY/ COGNITIVE STIMULATION

E.g., helping activities, sit to stand, walks, leisure activities

ADVOCACY

Get involved in activities, walking, discontinuing an offending medication, getting and giving information

CAREGIVER STRESS

E.g., referral to Aging Services and support programs supportive listening

Boltz, M et al. *Innovation in Aging* 2023. (7):igad083 doi:10.1093/geroni/igad083. eCollection 2023.

CULTURAL APPROPRIATENESS OF THE INTERVENTION

CAREGIVER IDENTITY

- Do not identify as caregivers, did not express need for additional assistance
  - Prefer to be considered just family members
- Expressed joy and privilege
  - Their responsibility as a spouse, child, family member

SPIRITUALITY

- Not typically asked about or discussed (by staff)
- Deemed as important by the care partner / or not important at all
- Spirituality helps get the care partner cope with stress
- Requests for community activities that "engage the spiritual mind"

CARE PARTNER VIEWS

MEASURES

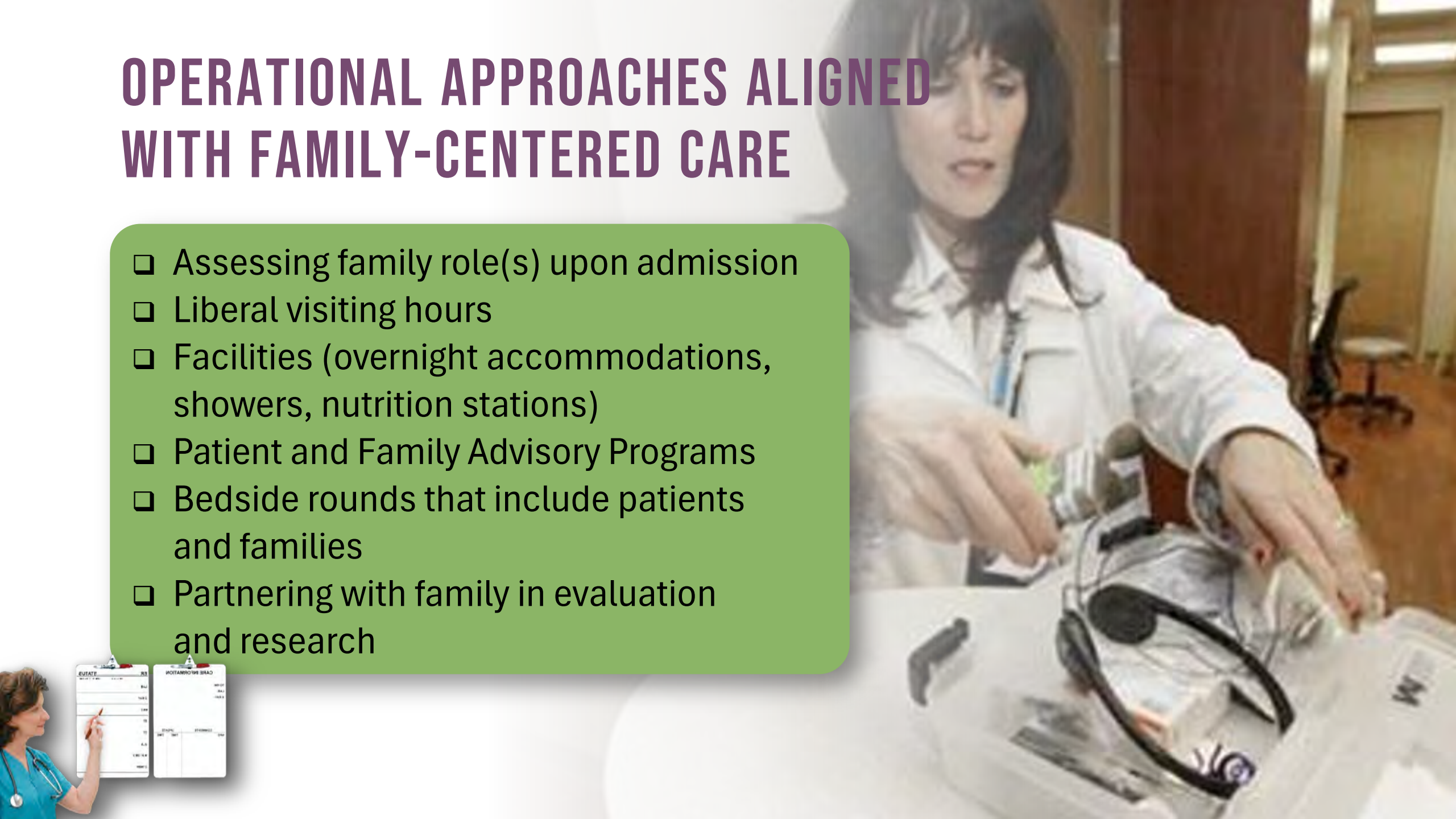
- Need for positive measures

CULTURAL APPROPRIATENESS OF THE INTERVENTION: CAREGIVER VIEWS

- Additional research is needed on care partner identity and the relationship to help-seeking.
- Individualized family-centered care may benefit from supports for family spiritual preferences.
    - How about the non-religious?

OPERATIONAL APPROACHES ALIGNED WITH FAMILY-CENTERED CARE

- Assessing family role(s) upon admission
- Liberal visiting hours
- Facilities (overnight accommodations, showers, nutrition stations)
- Patient and Family Advisory Programs
- Bedside rounds that include patients and families
- Partnering with family in evaluation and research



WORKING WITH PERSONS LIVING WITH DEMENTIA & FAMILIES

Leadership “buy in” is important

Hospitalists are key to promoting function of the patient and family engagement

Role of nursing assistants is critical yet under-recognized

Feedback mechanism promotes staff engagement

Rounds are important to support:

- Family engagement
- Follow-through

WORKING WITH PERSONS WITH DEMENTIA AND FAMILIES: LESSONS SO FAR . . .

INFORMATION ON PREFERRED COMMUNICATION NEEDED TO SUPPORT ON-GOING ENGAGEMENT

- Back-up contacts

CONCEPT OF "CAREGIVING" MAY NOT BE CONCORDANT WITH CARE PARTNERS' VIEWS

ISSUES THAT WE HAVE NOT/SHOULD HAVE CONSIDERED:

- Spirituality as a source of strength /resource
- Food insecurity
- Inclusion of care partner network

MORE WORK NEEDED

- Interventions co-designed with people with dementia and care partners
- Interventions that provide education and support *when care partners need them*
- Address inequities in dementia care - people in rural areas, ethnic minorities, sexual minoritized, people with disabilities, people living alone
- Measuring what is important to family carers
- Additional research is needed on care partner identity and the relationship to help-seeking.
- Individualized family-centered care may benefit from supports for family spiritual preferences.
    - How about the non-religious?

MORE WORK NEEDED

Need for orientation of staff, patients, and families to acknowledge the role of care partners as patient advocate

Need for caregiver assessment across service areas

Policy that goes beyond supporting the needs of the persons with dementia: supporting care partners to flourish *(Beach et al. 2022)*

TAKE HOME POINTS

When working with persons with dementia and care partners language is important

Hospitalization can be a life-changing event for the person with dementia and their care partner

The needs of both need to be addressed in tandem – during and during the post-acute period

- ❑ An under-researched period
- ❑ Simple operational approaches are helpful
- ❑ Goal setting is valuable


THANK YOU

REFERENCES

- Beach B et al. Caring for the caregiver: Why policy must shift from addressing needs to enabling caregivers to flourish. Front Public Health. 2022; 10: 997981.
- Chen C, Zissimopoulos JM. Racial and ethnic differences in trends in dementia prevalence and risk factors in the United States. Alzheimers Dement (N Y). 2018;4:510-520. doi:10.1016/j.trci.2018.08.009
- Babulal GM et al; International Society to Advance Alzheimer's Research and Treatment, Alzheimer's Association. Perspectives on ethnic and racial disparities in Alzheimer's disease and related dementias: update and areas of immediate need. Alzheimers Dement. 2019;15(2):292-312. doi:10.1016/j.jalz.2018.09.009
- Lennon JC et al. Black and White individuals differ in dementia prevalence, risk factors, and symptomatic presentation. Alzheimer's Dement. 2021. doi:10.1002/alz.12509
- Lin PJ, Zhu Y, Olchanski N, et al. Racial and ethnic differences in hospice use and hospitalizations at end-of-life among Medicare beneficiaries with dementia. JAMA Netw Open. 2022;5(6):e2216260. doi:10.1001/ jamanetworkopen.2022.16260
- Lines LM, Wiener JM. Racial and ethnic disparities in Alzheimer's disease: A literature review. US Department of Health and Human Services; Assistant Secretary for Planning and Evaluation. Published January 31, 2014.

- Boltz, M. et al. Testing an Intervention to Improve Post-hospital Outcomes in Persons Living with Dementia and Their Family Care Partners. Innovation in Aging 2023; (7):igad083
- Boltz, M., et al. Testing a family-centered intervention to promote functional and cognitive recovery in hospitalized older adults. Journal of the American Geriatrics Society 2014; 62 (12):2398-2407.
- Boltz, M.et al. (2015). Testing family centered, function-focused care in hospitalized persons with dementia. Neurodegenerative Disease Management 2015; 5 (3) 203-215. doi:10.2217/nmt.15.10.
- Burke L et al. (in press). Trends in observation stays for Medicare beneficiaries with and without Alzheimer's disease and related dementias (AD/ADRD. Journal of the American Geriatrics Society.
- Resnick B, Boltz M et al. Testing Function Focused Care for Acute Care Using the Evidence Integration Triangle: Protocol Description. Research in Nursing & Health 2022
- Sinvani L. et al (2024) Implementing a Real-World Dementia Care Training Program for Nursing Assistants in the Acute Care Setting. Journal of the American Geriatrics Society.

Navigating Challenges in Aging

Monday, April 29

CAPABLE

Community Aging in Place-Advancing Better Living for Elders

*an **evidence-based** program developed by Johns Hopkins School of Nursing*

Tricia Ford

Sr. VP of Operations

Amanda Goodenow MS, OTR/L

Strategic Partnership Specialist

The Facts on Aging

Statistics on AGING in the United States?

CAPABLE

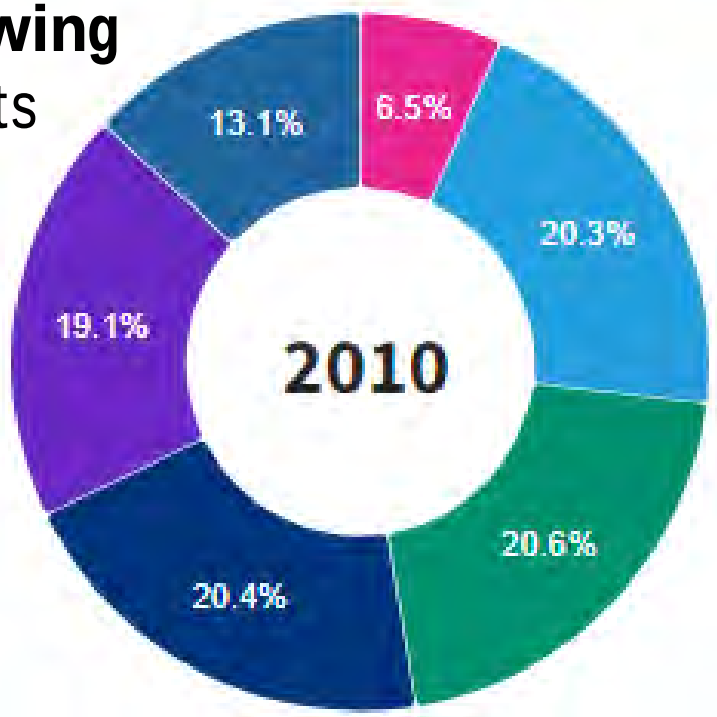
Aging Population

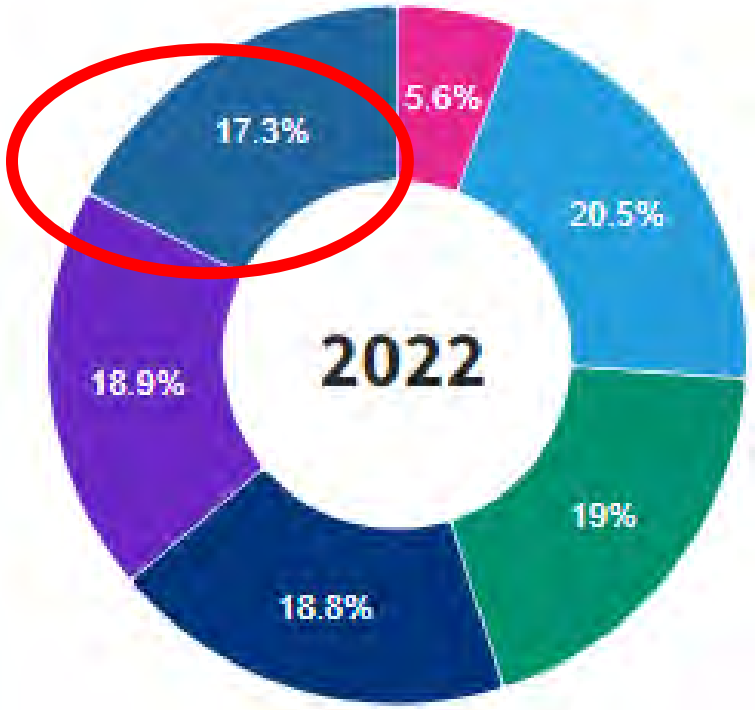
65+ group was the **fastest growing** between 2010 and 2022 with its population increasing 42.8% [1]

65+ population in 2022 in the US was 57,794,852 or **17.3%** of the total population [2]

In 2022, another **62,892,984** in population was attributed to **ages 50-64** [3]

The death rate for people ages 65 or older **declined 24%** between 2000 and 2019 [4]





Total Population 333,287,557

The Facts on Aging

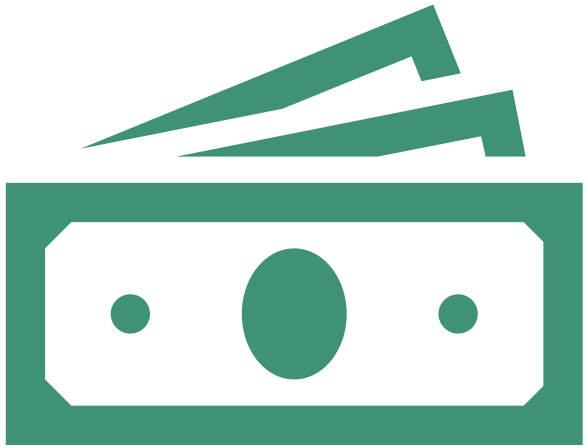
Statistics on AGING in the United States?

CAPABLE

Income and Poverty Levels

Roughly 1 in 3 older adults aged **65+ are economically insecure**, with incomes below 200% of the Federal Poverty Level (FPL). [5]

Among Social Security beneficiaries age 65+, **Social Security represents 50%** or more of their income for 37% of men and 42% of women, and **90% or more of their income** of 12% of men and 15% of women. [6]



Of retirees 65+ surveyed in 2021, **93% said Social Security was a source of income** in the previous 12 months, and 68% said a pension was. [7]

CAPABLE

The Facts on Aging

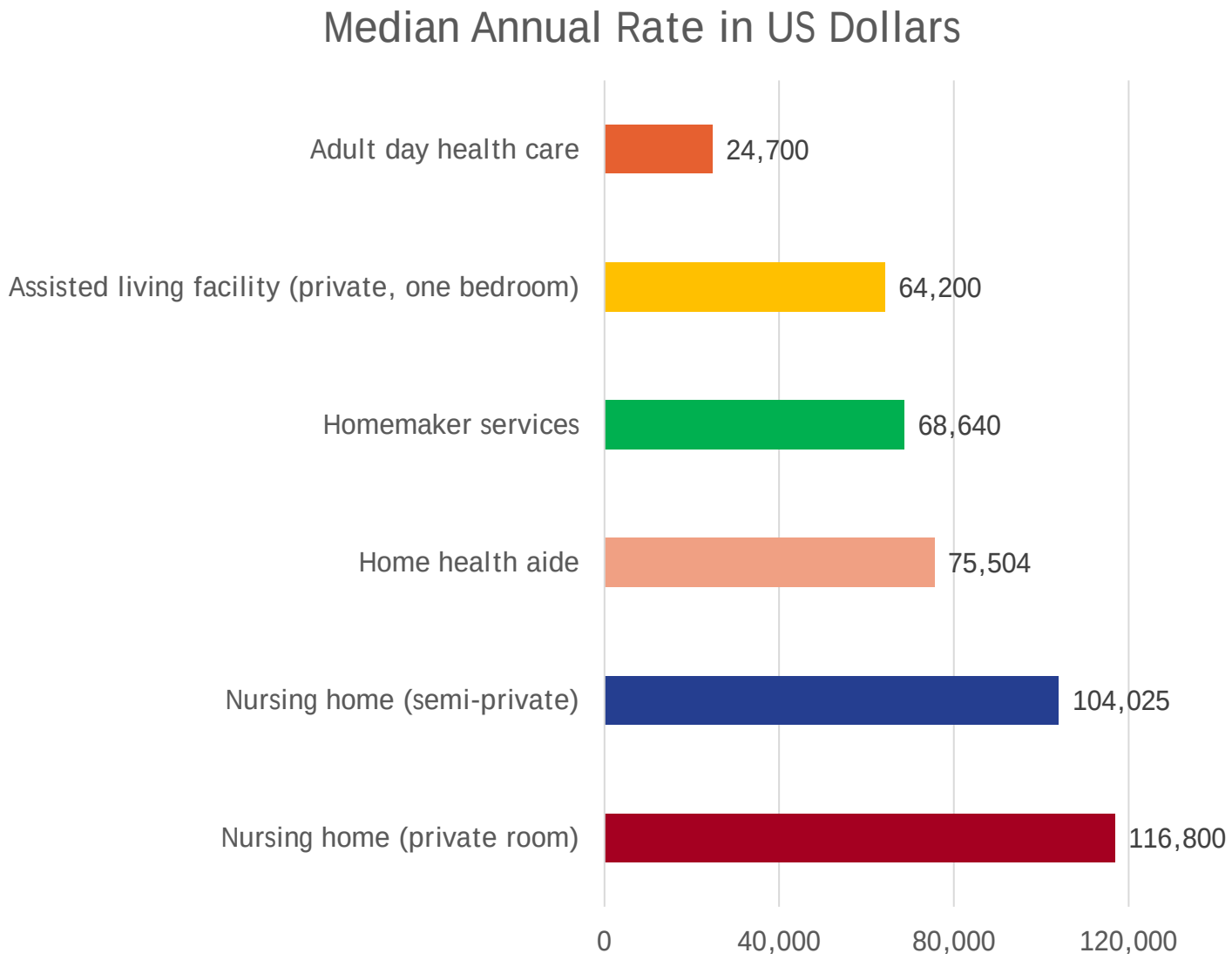
Statistics on AGING in the United States?

CAPABLE

Housing

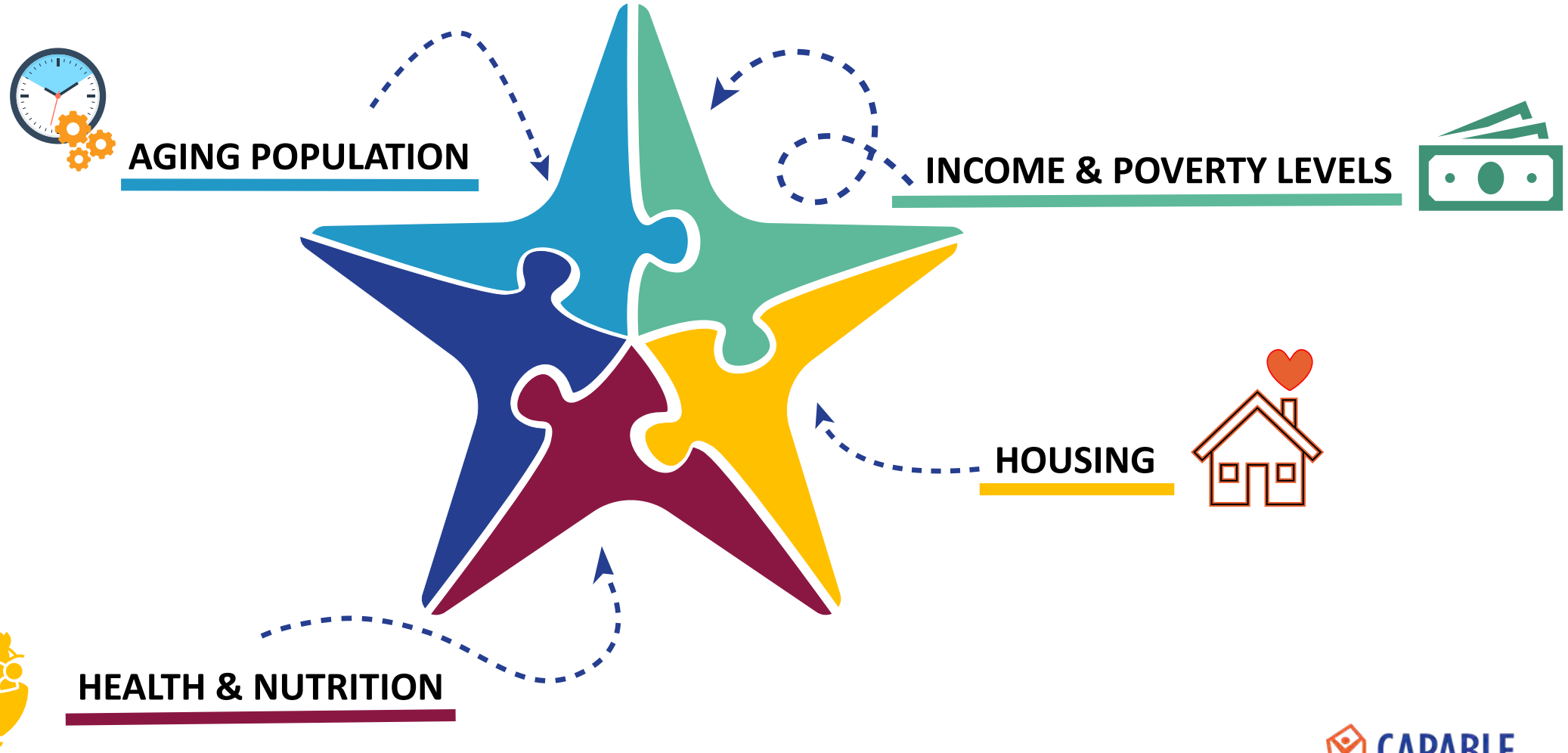
Housing-related expenses cost adults 55+ an average of $16,219 per year, or **33% of their yearly budget.** [8]

About 75 million or **60% of U.S. homes don't have the most basic, aging-ready features** — a step-free entryway into the home and a bedroom and full bathroom on the first floor. [9]



The Facts on Aging

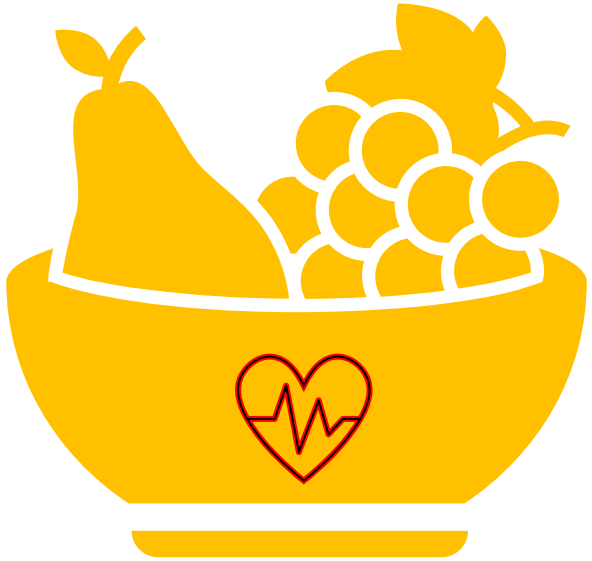
Statistics on AGING in the United States?



CAPABLE

Health and Nutrition

About one in four older adults 65+ **scrimp** on food, utilities, clothing, or medication due to health care costs. In 2022, **37% of older adults were worried about affording health care** in the coming year. [10]



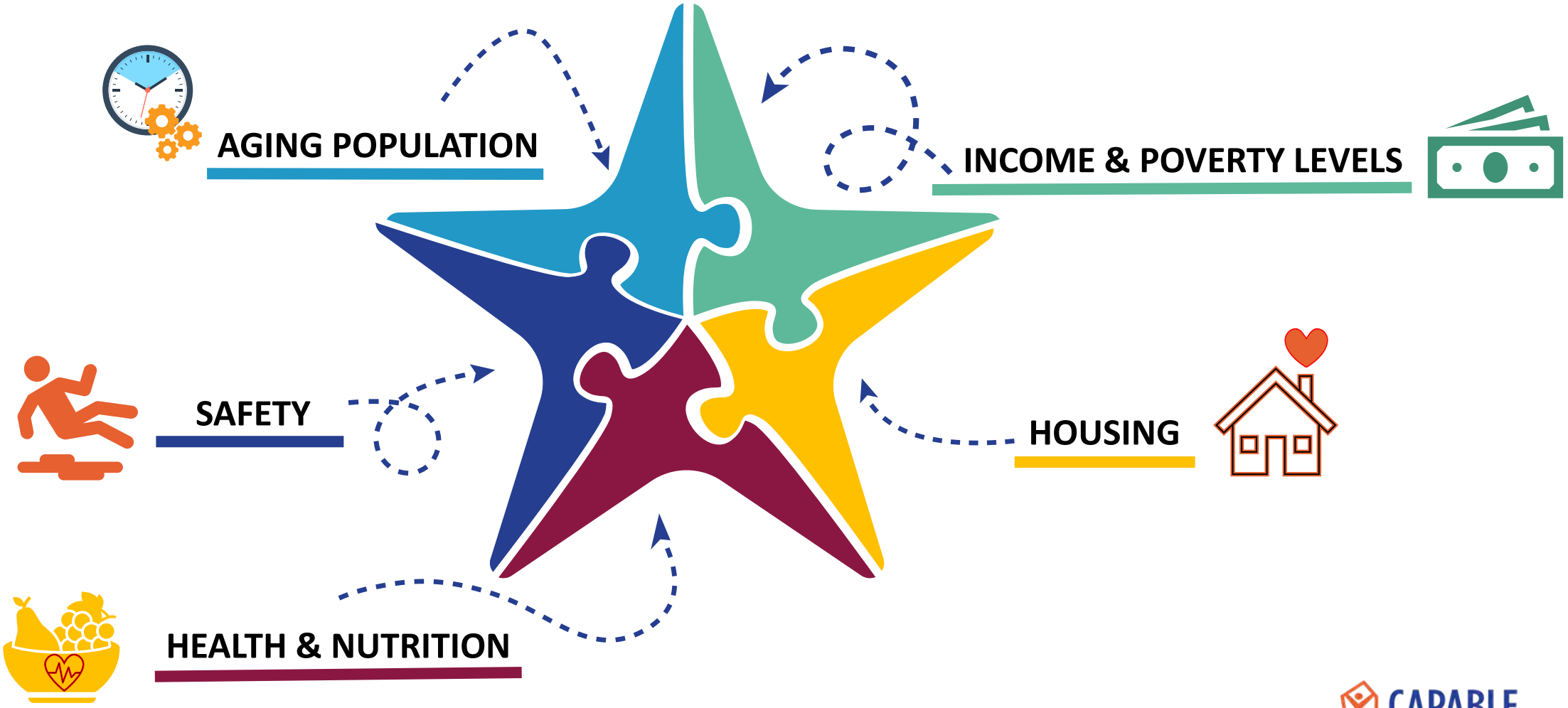
All types of **disabilities increase with age**, and 55% of those age 80 and over report at least one disability. [11]

In 2020, **5.2 million older Americans faced the threat of hunger,** representing 6.8% of adults age 60+ in the U.S. Hunger is more likely for older Americans who are Black, Hispanic, or Native American, who have lower incomes, or who have a disability. [12]

CAPABLE

The Facts on Aging

Statistics on AGING in the United States?



CAPABLE

Safety

More than **one out of four** Americans age 65+ falls each year. [13]

The cost of treating injuries caused by falls is projected to increase to over **$101 billion by 2030.** [14]

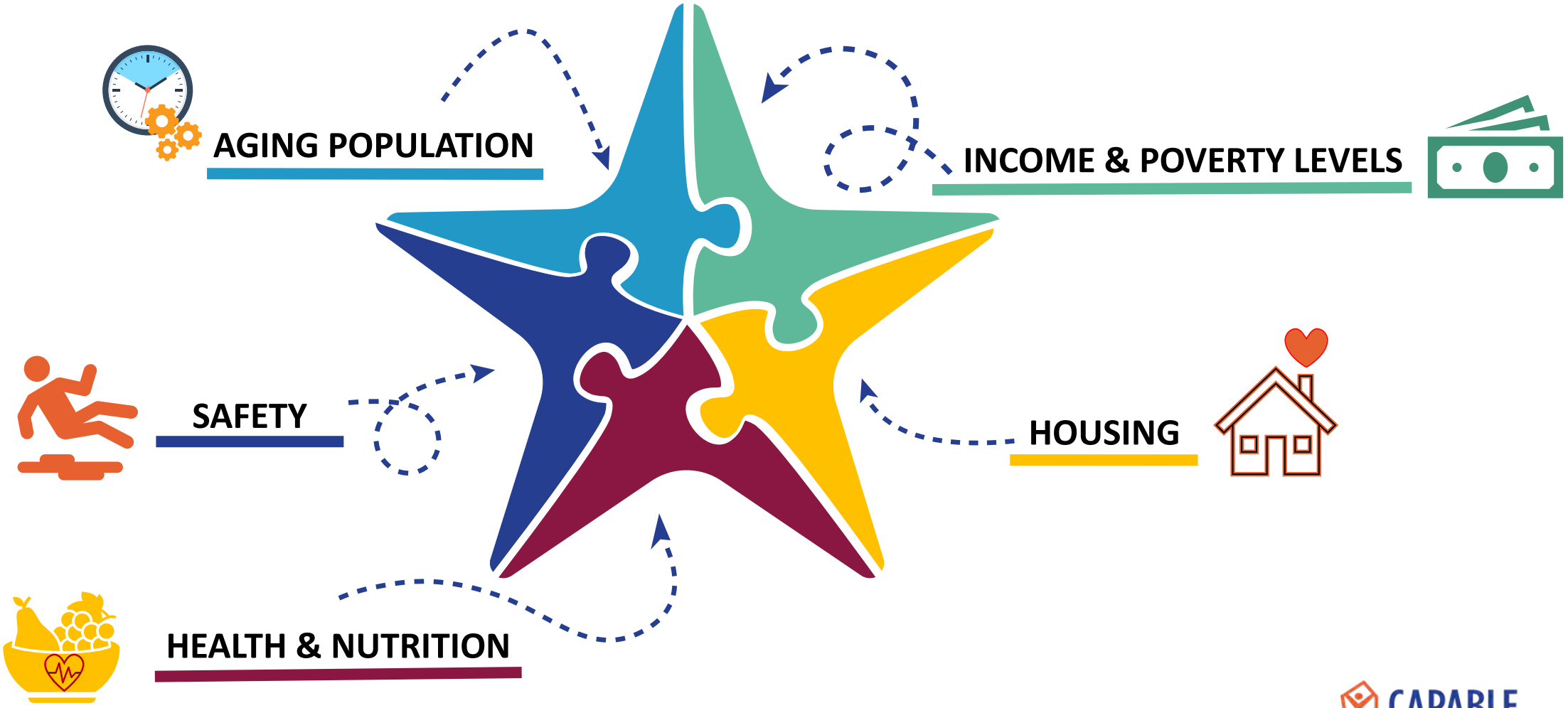
Falls result in more than 3 million injuries treated in emergency departments annually, including over **800,000 hospitalizations.** [15, NIH]

Bedrooms (25% Overall)
Stairs (22.9% Overall)
Bathrooms (22.7% Overall)

CAPABLE

The Facts on Aging

Statistics on AGING in the United States?



CAPABLE

© Cartoonbank.com

"There's no easy way I can tell you this, so I'm sending you to someone who can."

CAPABLE

The View of the Client and the Clinician

Courtesy of St. David's Foundation in Austin, TX

What is CAPABLE?

- Evidence-based
- Home-based
- Client-Directed
- Interprofessional
- Long-term impact
- Behavioral change

How CAPABLE works

An interdisciplinary team uses motivational interviewing, active listening, and coaching communication methods to enable the participant to achieve their self-prioritized goals

Participant

- Self-assessment
- Readiness to change
- Drives own goals and priority settings
- Brainstorms options/solutions; Develops Action Plan in own words
- Makes progress between visits; Exercises, reads material, practices within home
- Practices tips for safe, independent living
- Uses new skills and equipment

Occupational Therapist

- Functional/Mobility assessment
- Home risk; modifications & equipment needs
- Fall prevention, equipment guidance

Registered Nurse

- Medical history, current healthcare providers
- Key health issues/risks
- Pain, medication review

Handy Person

- Receives work order; confers with participant
- Obtains and installs equipment
- Makes minor home repairs/modifications

CAPABLE at a Glance

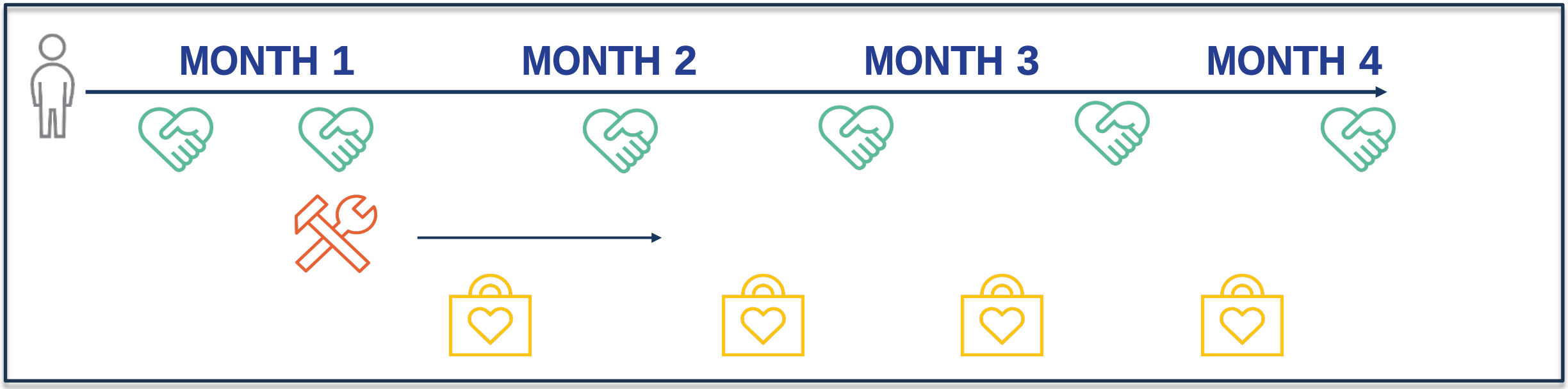
CAPABLE is delivered in the home during **10 visits** over
4 months through an inter-professional **team** including the participant:

Occupational Therapist

Registered Nurse

Handy-worker

Participant



CAPABLE Participants

- Adults – age 50+
- With functional limitations
- Living at home or in an apartment
- Cognitively intact

Participant Learns:

Goal Setting
Brainstorming
Action Planning
Trying
Doing
Achieving

"The single best thing is they do it in a style that is not directive or confrontive. It is collaborative. What it does is gives such room for thought."
Baltimore, MD 2022

CAPABLE

CAPABLE Client: Mrs. R

Daily activities have become harder due to advanced arthritis and lung disease.

She works with her CAPABLE team - an occupational therapist, nurse, and handy worker - to identify goals and address challenges.

CAPABLE

Mrs. R's Goal

Be able to bathe with less effort.

1

The handy worker smooths out the bathroom entry threshold so Mrs. R can push her rolling walker with ease.

CAPABLE

2

The shower doors and frame are removed and a secure shower curtain rod is installed, allowing more room to access the tub area safely.

CAPABLE

3

The new tub transfer bench allows Mrs. R to get in and out of the tub safely and reduces her husband's assistance.

CAPABLE

CAPABLE

GOAL ACHIEVED!

Mrs. R is able to bathe with less effort.

CAPABLE

CAPABLE Client: Mrs. R

Daily activities have become harder due to advanced arthritis and lung disease.

She works with her CAPABLE team - an occupational therapist, nurse, and handy worker - to identify goals and address challenges.

CAPABLE

Mrs. R's Goal

Feel less pain while playing the piano.

1

The handy worker added an extended chain to her light and switched the light bulb to an LED.

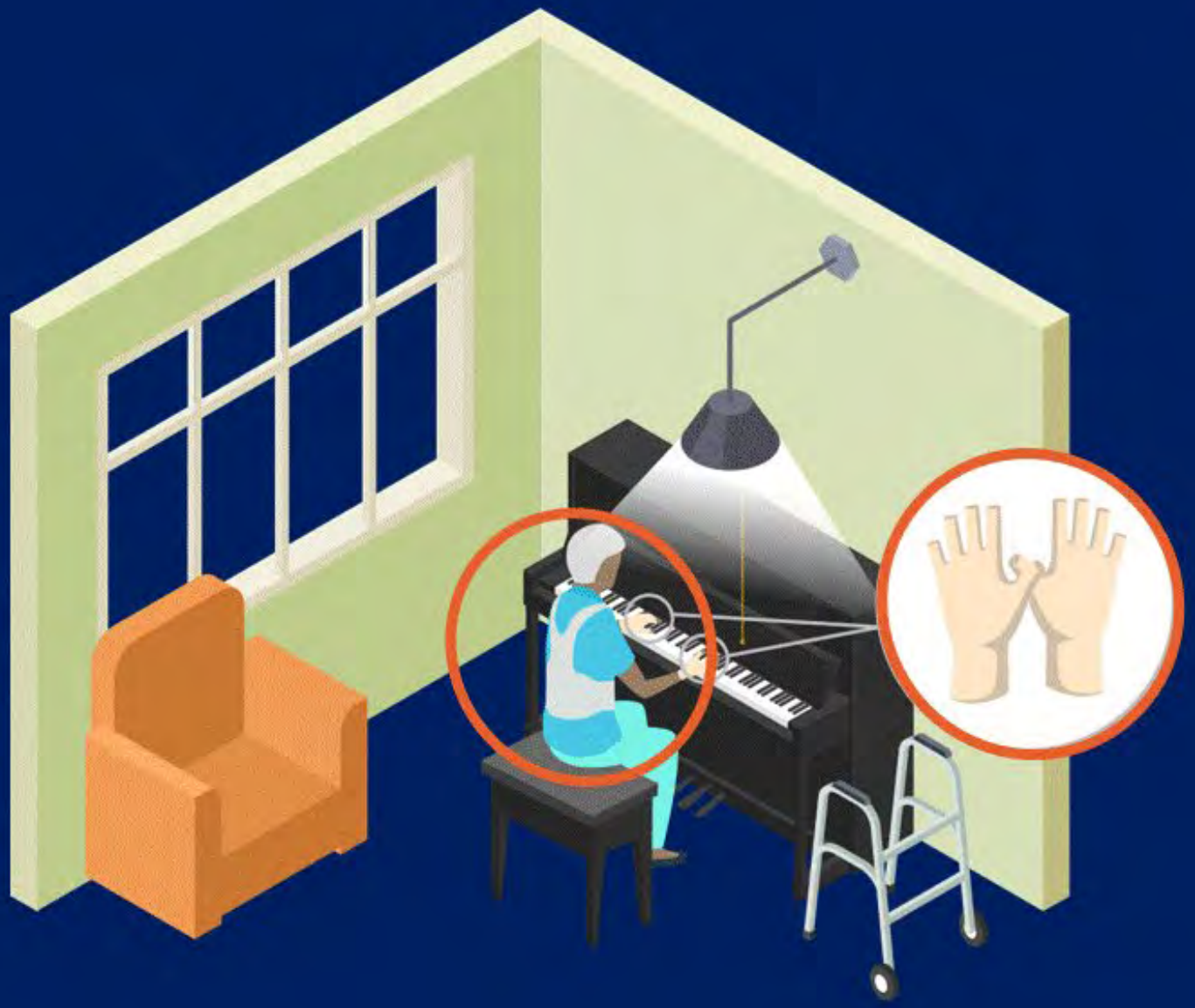
Mrs. R can now operate the light herself and read the sheet music better.

CAPABLE

2

The handy worker constructed a higher bench to prevent back pain when playing the piano.

CAPABLE



3

Wearing arthritis compression gloves and a back brace decreases her pain.

CAPABLE

CAPABLE

GOAL ACHIEVED!

Mrs. R feels less pain while playing the piano.

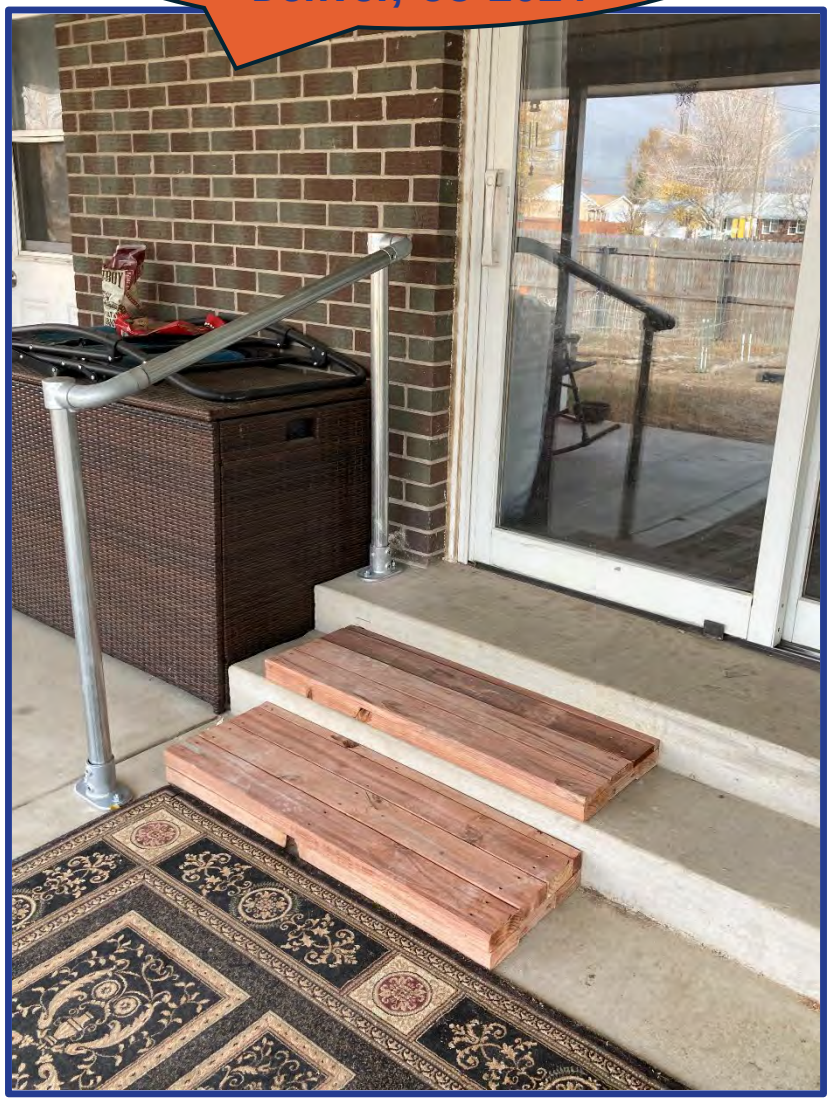
GOALS – Set by the participant

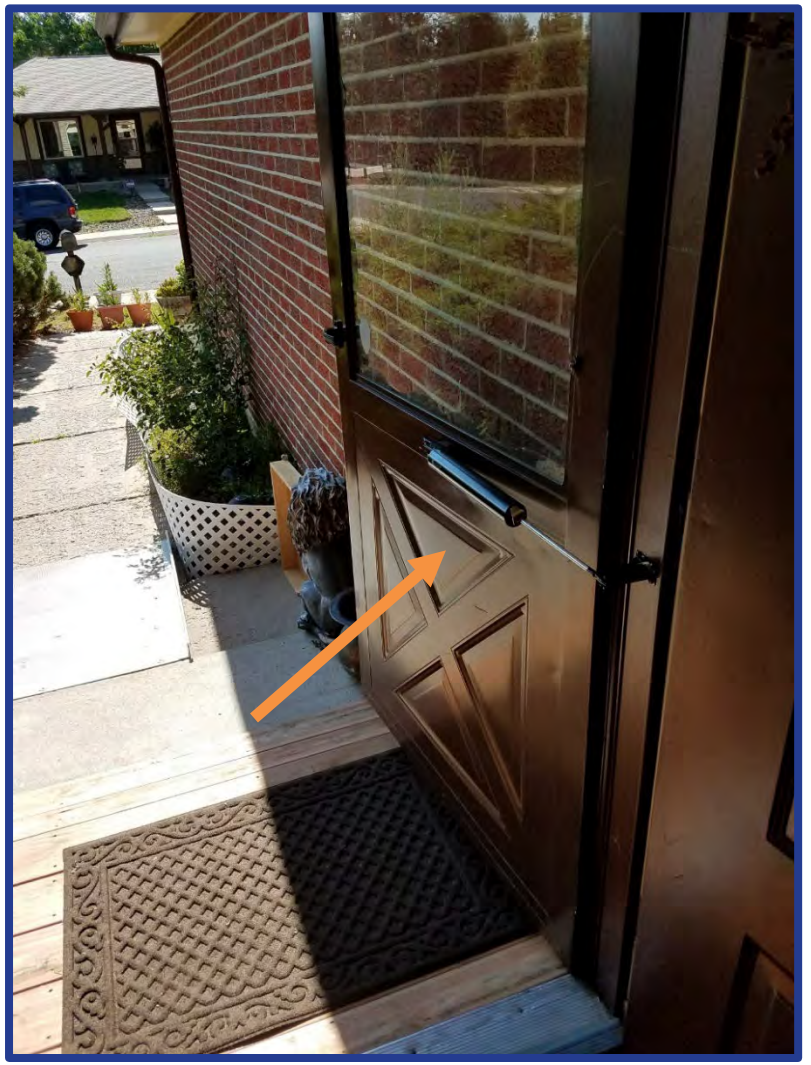
Examples:

- *I want to: make my own meals/cook at stove/oven vs. frozen microwave food*
- *I want to take a shower by myself*
- *I want to: clean better (bathroom, kitchen), make my bed*
- *I want to declutter and reach things in my cabinets*
- *I want to get stronger; avoid falls-especially on stairs and in bathroom*
- *I want to be able to talk with my doctor and get some things changed with my meds*
- *I want to manage my bladder*
- *I want to be less tired all day long*

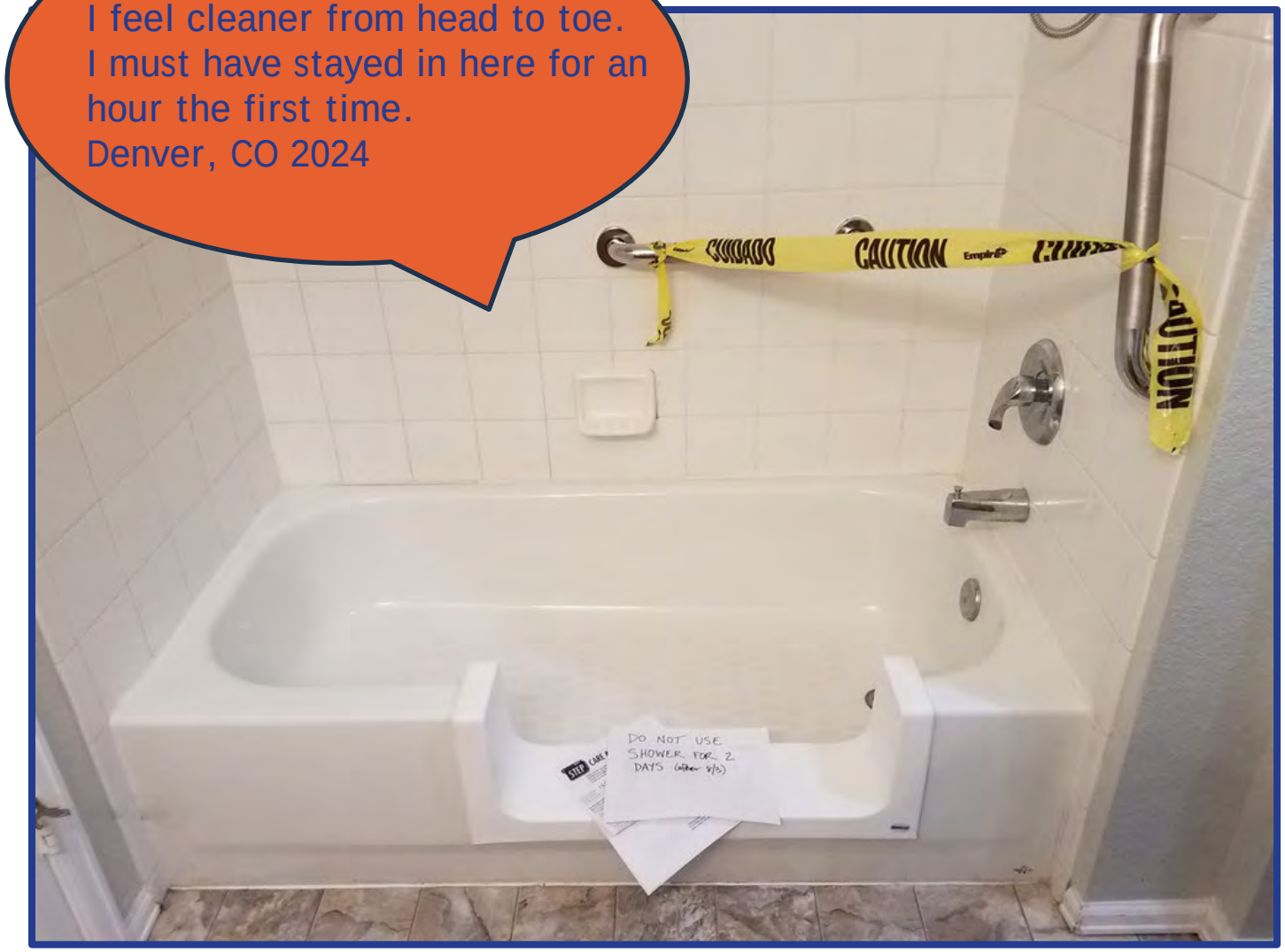
I have been homebound for so long. The program has really helped me get out.

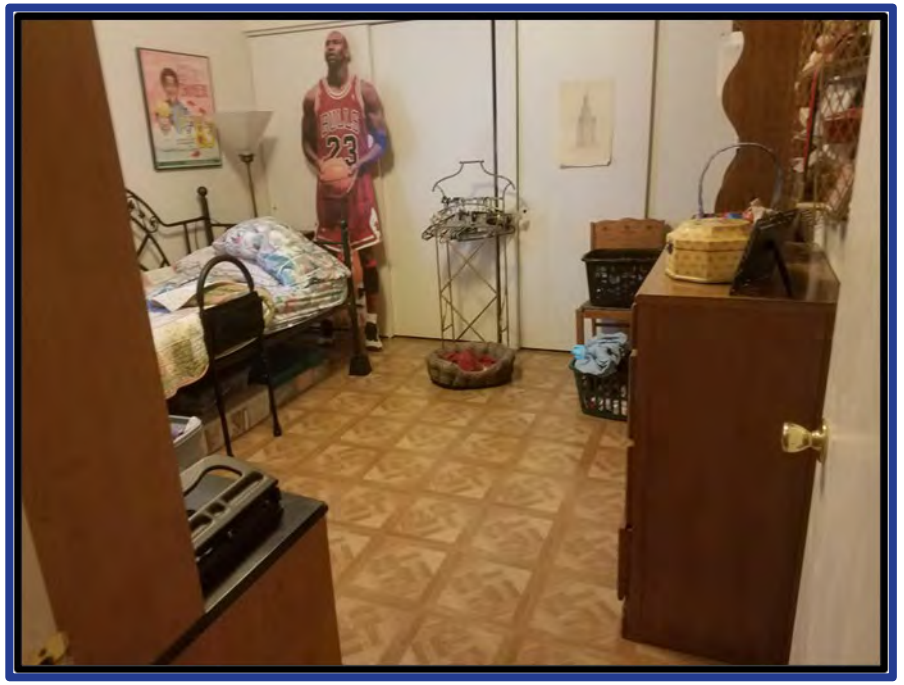
Denver, CO 2024





I feel cleaner from head to toe.
I must have stayed in here for an hour the first time.
Denver, CO 2024





Common Supplies & Installations

DME:

1. Shower chairs
2. Tub transfer benches
3. Rollators
4. Reachers

Non DME supplies:

1. Rubber bathmats
2. Non-sliding rugs (bath and kitchen)
3. Tub safety strips
4. Heating pads
5. Ice packs
6. Knee braces
7. Back braces/sciatica belts
8. Max Freeze (topical pain relief)

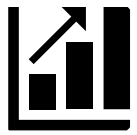
Home Modifications:

1. Interior railings
2. Grab bars
3. Flexible shower hoses
4. Exterior railing
5. Motion sensor lighting and other lighting
6. Door-bells
7. Door lock sets
8. Lever door handles

Program Benefits

6 to 7 x return on investment

Roughly **$3,000 in program costs** yielded more than $30,000 in savings in medical costs driven by **reductions in both inpatient and outpatient expenditures.***



Improved physical function

Participants had difficulty with an average of 3.9 out of 8.0 Activities of Daily Living (ADLs) at baseline, compared to 2.0 after five months. **74.8% participants had less difficulty with ADLS.**

Improved motivation

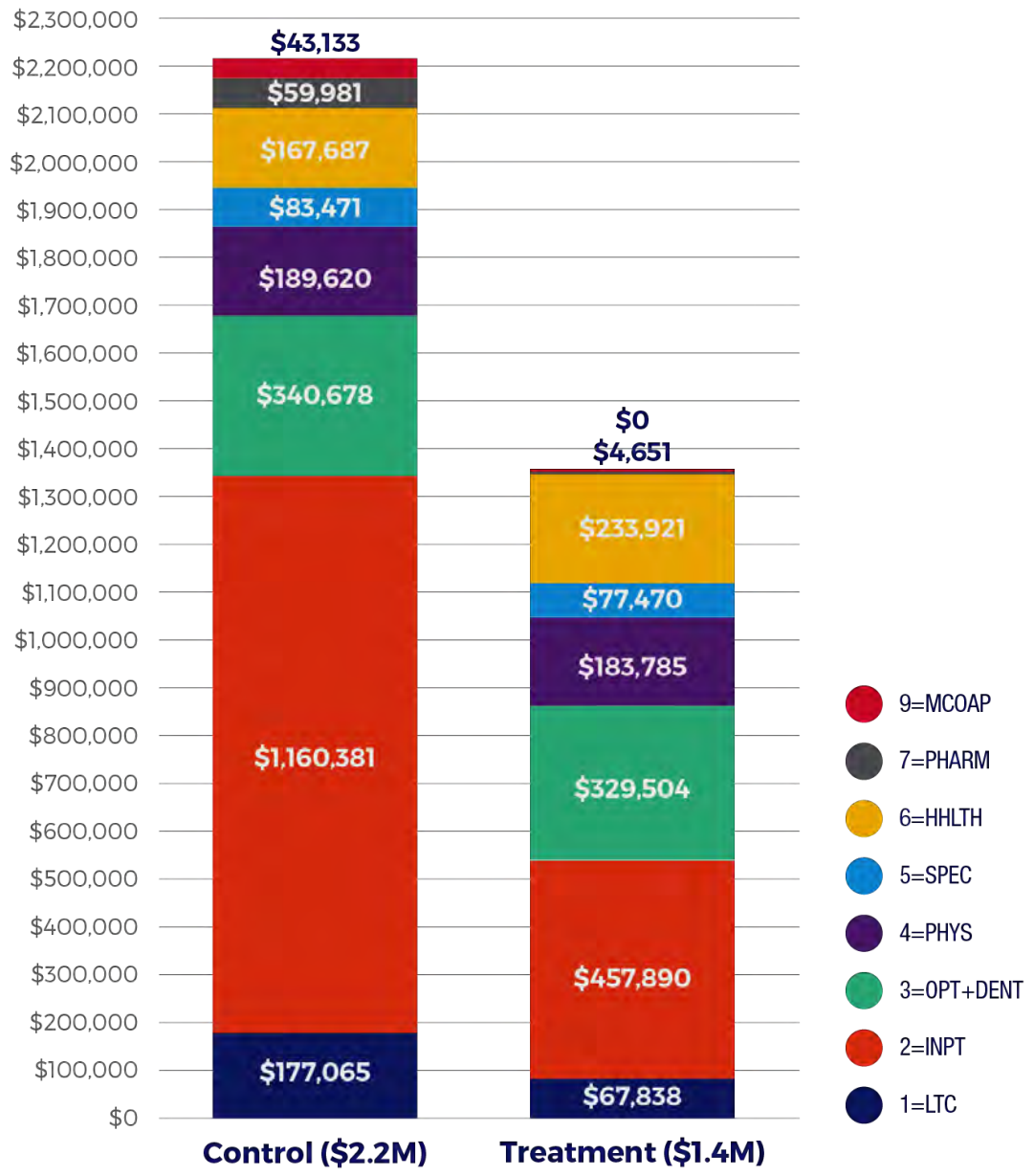
The change in physical environment further motivates the participant. Addressing both the person and the environment in which they live allows the person to thrive. **77.6% of participants had less home hazards.**

Reduced symptoms of depression

52.9% of participants had less depressive symptoms and ability to do important tasks. 65% of participants improved in such tasks as grocery shop and manage medications.

*Ruiz et. al, 2017
*Szanton et al, June 2016

Monthly Medicaid Cost for a Hypothetical Cohort of 1,000 People Per Service Type and Study Arm



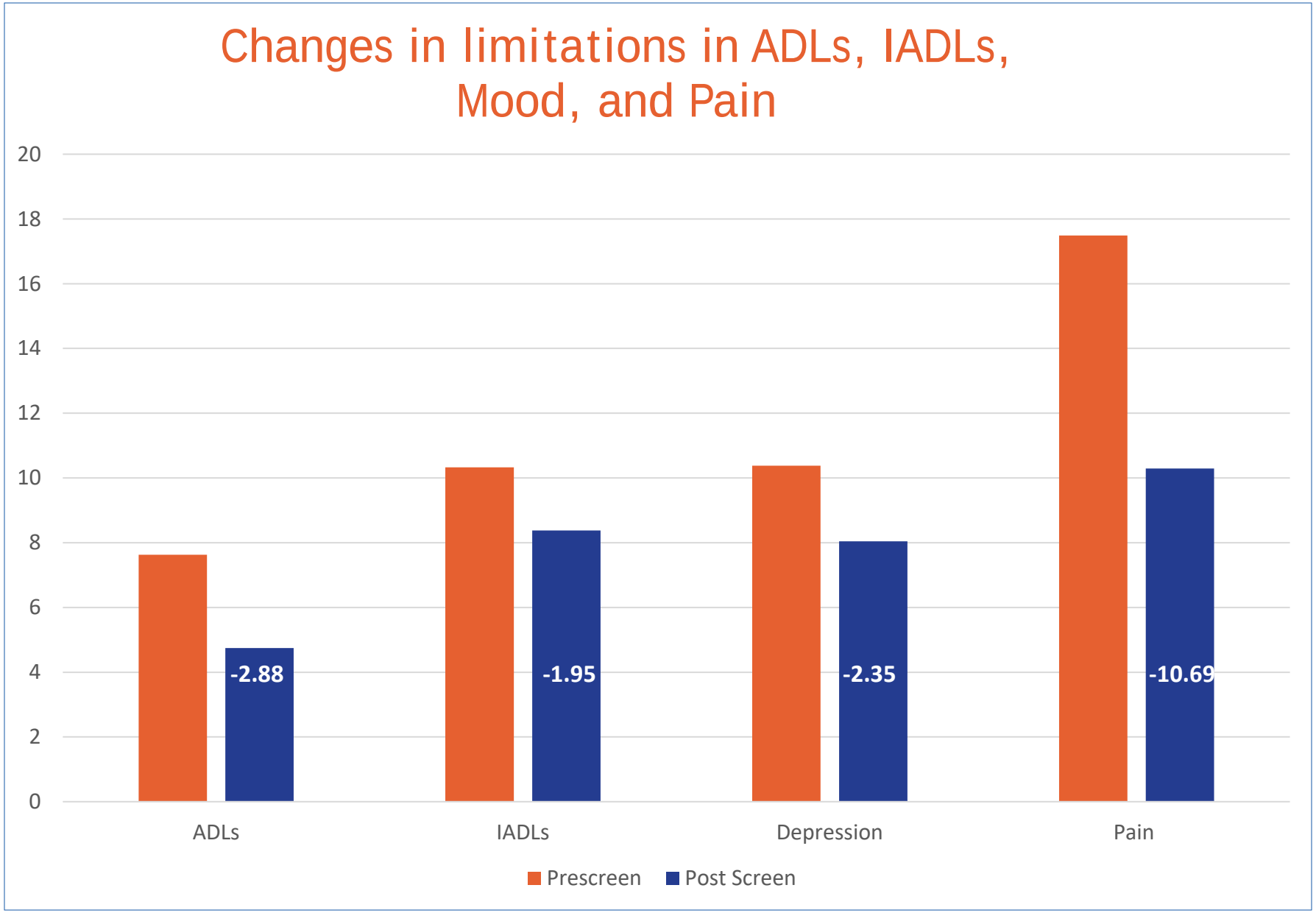
Szanton et al 2017 JAGS

State Example – Colorado Preliminary Data

Two Implementation sites:
Home Health Agency
Housing Organization

A goal of 400 Medicaid members to receive CAPABLE Services for this demonstration pilot

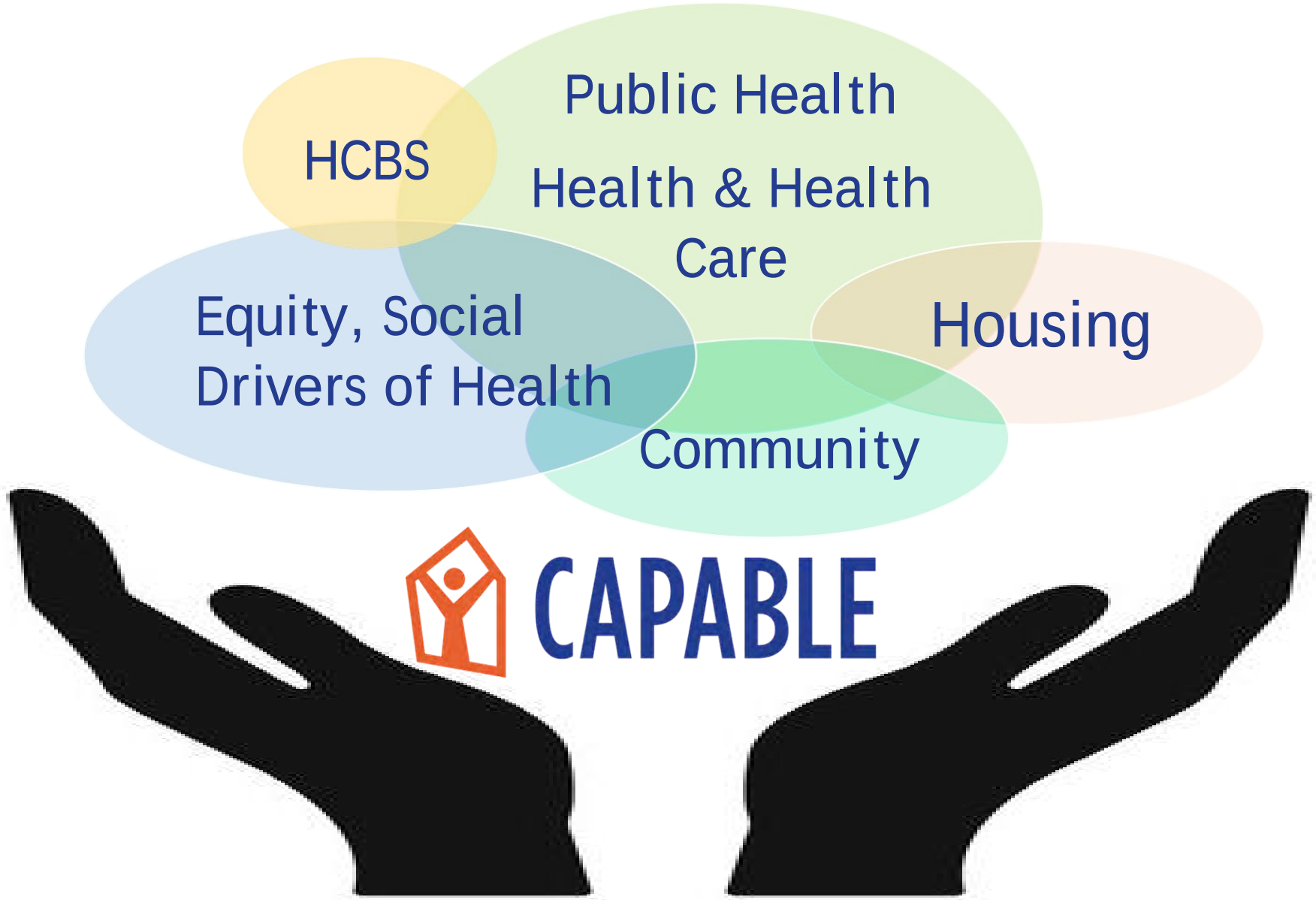
Number of members served, 300 members
and 180 have graduated (through March 2024)



Keys to Success

- Strengths and goals developed by participant
- Clinicians provide resources to achieve those goals
- Unleashes participant's motivation
- Person/environmental fit
- Helps demonstrate that function can be improved/is not lost
- Builds self-efficacy for new challenges

CAPABLE Intersections



Program Costs – $3,500 to $4,500 per participant

Occupational Therapist

Nurse

Handyworker

Supplies, Mileage

Indirect costs also include:

- Program administration
- Marketing and outreach
- Database
- Communications
- Evaluation

Adoption & Implementation Key Considerations

Purpose

Why are we doing this and why now?

Strategy

How does it align with our mission and services?

Will this require partners to implement?

Scope/Scale

How many participants, covering what area, and in what timeframe?

Funding

Do we have a source of funds to test/pilot?

What are our options for ongoing funding?

How will we define and assess our success and impact?

How will we sustain this if it works?

Program Components

Do we have or can we develop the capacity to follow the CAPABLE model?

* Adapted From: *Business Planning Toolkit for Dementia Programs*, ©2015, Deborah Paone; Prepared for U.S. Administration for Community Living. Found at *ACL Business Toolkit, Paone, 2015*

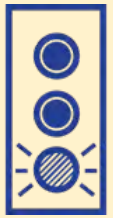
5 Implementation Stages

Based on monitoring CAPABLE sites for several years, at each stage there are different drivers, challenges, and strategies for success to move forward

1
Exploration

2
Pre-Adoption

3
Initial Implementation

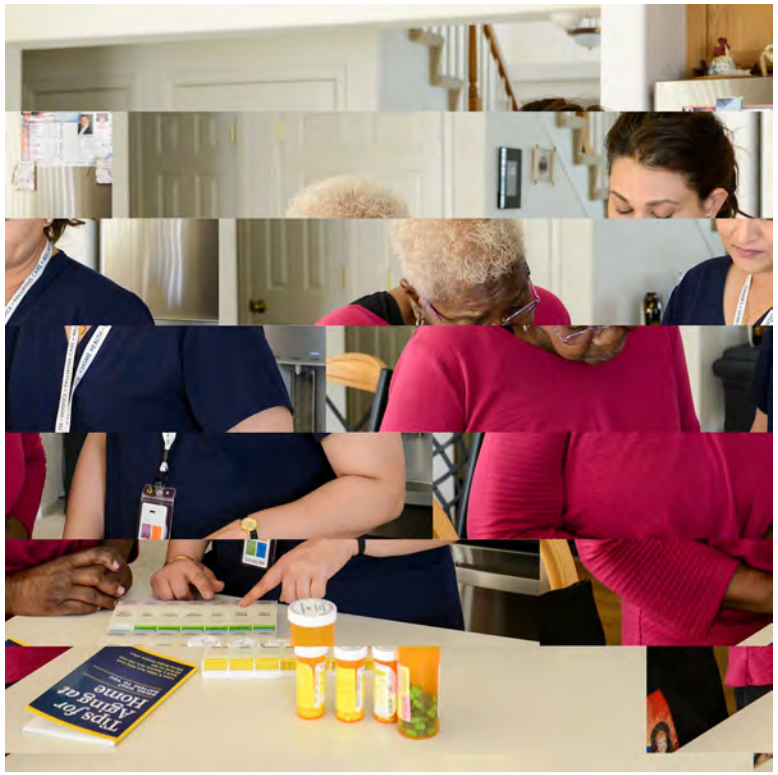


4
Evaluation & Adaptation

5
Implementation & Sustainability

©2022 Dr. Deborah Paone adapted from work by the National Implementation Research Network (NIRN) of University of North Carolina-Chapel Hill

Perspectives on Value Equation



STAKEHOLDER	TOP VALUE of CAPABLE
Potential Participant	*Improved quality of life*
Organization offering CAPABLE Leadership (Board, C-Suite)	*Service, mission, reputation, cover costs, strategic direction*
Partners	*Service, mission, payment, long-term partnership interest/strategic*
OT, RN, and Handy-worker	*Service excellence and satisfaction*
Local senior service providers	*Ability to refer their clients to a proven, effective program*
Private Philanthropist or Foundation	*Proven effectiveness, Health Outcomes & Community impact*

Adapted from Value Equation model ©2015 Dr. Deborah Paone, *Paone & Associates, LLC*

Perspectives on Value Equation

STAKEHOLDER	TOP VALUE of CAPABLE
Primary care providers	*Fewer patient falls/calls; improved patient health and self-care at home*
Hospital & ED (in value-based arrangement)	*Fewer hospital readmissions; fewer ED visits*
Managed care organization	*Reduced hospital/ER costs and improved member satisfaction*
Federal Medicare Program	*Reduced Medicare costs due to avoided hospital/ER costs; better quality outcomes*
State Medicaid Program	*Reduced Medicaid costs due to avoiding early admissions to a nursing home; better quality outcomes*
City/Town Services (EMT, Fire)	*Reduce "pick up from floor calls"*

Adapted from Value Equation model ©2015 Dr. Deborah Paone, *Paone & Associates, LLC*

Variety of Program Funding Options

GRANTS/ PHILANTHROPY

Grants are the most frequent source of funding for CAPABLE; Several programs have sustained foundation funding or special initiatives from private philanthropy

Reserves

Self-funded programs (organizational reserves)

VB Payment

Value-based payments are used by MA & ACOs (St. Louis MA program)

Municipal/Tax

City or other gov't unit funding that comes from taxes (e.g., City of Chicago)

ARPA or Waiver programs

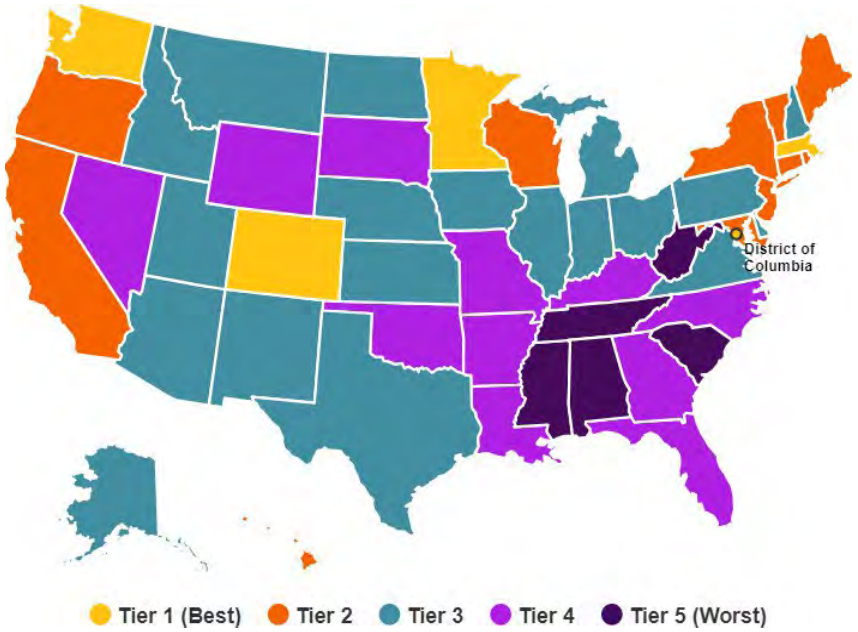
ARPA $ and State waiver or demonstration – (e.g., Colorado; Massachusetts)

State Implementation & Financing Pathways

CAPABLE unique capabilities:

Medicaid agencies
Health departments
Legislature work

} Work together to support adults in their communities.
CAPABLE is a KEY support for adults and **saves Medicaid $$$**



- States pursuing **LTSS rebalancing efforts** look at CAPABLE as a proven home and community-based service for older adults that will reduce the likelihood of nursing home admission.
- States can even be awarded policy innovation points in AARP's LTSS Scorecard for supporting CAPABLE availability as it is an evidence-based program to support "aging in community"

The CAPABLE Difference

What makes CAPABLE *work* - in a population where so much *doesn't*?

Typical disease prevention/management intervention	CAPABLE
Designed to prevent a single event or focuses on a single disease (e.g., a fall, post-hip surgery rehab, CHF)	**Designed to maximize independence, which has positive effects across an individual's daily life, which decreases risk factors for hospitalization.**
Provider-driven (i.e., "you should do this")	**Client-driven (i.e., "I want to do this.")**
Focuses on narrow risk factors or on the equipment ("we put in grab bars")	**Focuses on person-environment fit, addressing physical function, the home environment, and social drivers through a wholistic approach**
Does not last (the effect ends when the intervention ends)	**Self-sustaining for long-term impact**

Questions?

Contact Us

CAPABLEinfo@CAPABLEnationalcenter.org

SARAH SZANTON

PhD, ANP, FAAN
CAPABLE Co-Creator
Sarah.Szanton@jhu.edu

TRICIA FORD

VP Operations
CAPABLE National Center
tford@caresynergynetwork.org

ALLYSON EVELYN-GUSTAVE

OTR/L
Clinical Training Specialist
aevelyn1@jhu.edu

AMANDA GOODENOW

MS, OTR/L
Strategic Partnerships
goodenowa@vnacolorado.org

DEBORAH PAONE

DrPH, MHSA
Implementation and Evaluation
dpaone1@jhu.edu

"I have enjoyed the CAPABLE National Center office hour meetings. They have been helpful."
Savannah, GA

References

1,2,3,4,5 U.S. Census Bureau. POV-01. Age and Sex of All People, Family Members, and Unrelated Individuals, 2022. Found on the internet at https://www.census.gov/data/tables/time-series/demo/income-poverty/cps-pov/pov-01.html

6 U.S. Social Security Administration. Fact Sheet: Social Security. Found on the internet at https://www.ssa.gov/news/press/factsheets/basicfact-alt.pdf

7 Board of Governors of the Federal Reserve System. Economic Well-Being of U.S. Households in 2020-May 2021. Found on the internet at https://www.federalreserve.gov/publications/2021-economic-well-being-of-us-households-in-2020-retirement.htm

8 U.S. Bureau of Labor Statistics. A closer look at spending patterns of older Americans. Found on the internet at https://www.bls.gov/opub/btn/volume-5/spending-patterns-of-older-americans.htm

9 www.census.gov/newsroom/press-releases/2023/aging-ready-homes.htm

10 https://news.gallup.com/poll/393494/older-adults-sacrificing-basic-needs-due-%20healthcare-costs.aspx

11 2023 JOINT CENTER FOR HOUSING STUDIES OF HARVARD UNIVERSITY

12 Feeding America. Facts about senior hunger in America. Found on the internet at https://www.feedingamerica.org/hunger-in-america/senior-hunger-facts

13 Older Adult Falls Reported by State. Centers for Disease Control and Prevention. Found on the internet at https://www.cdc.gov/falls/data/falls-by-state.html

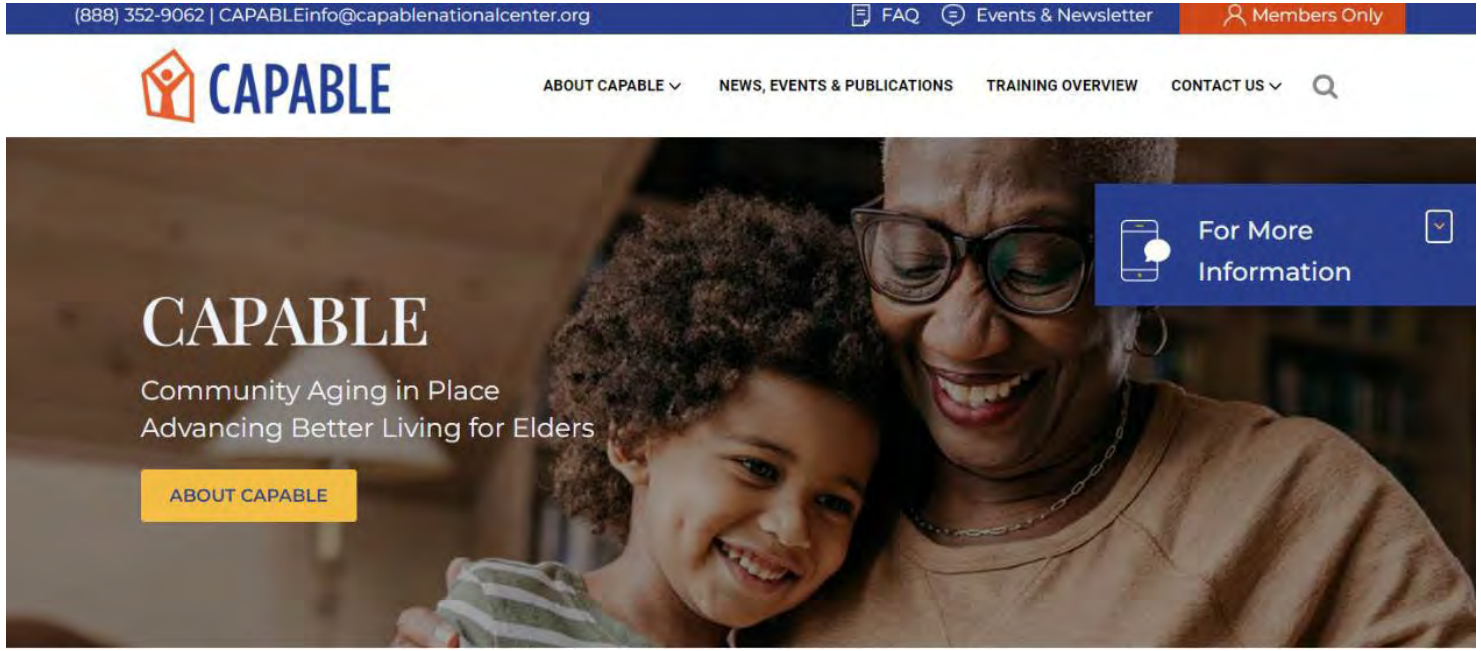
14 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4681302/

15 Facts About Falls. Centers for Disease Control and Prevention. Found on the internet at https://www.cdc.gov/falls/facts.html

Additional References:

https://www.ncoa.org/article/evidence-based-program-capable

https://capablenationalcenter.org/news-events-publications/

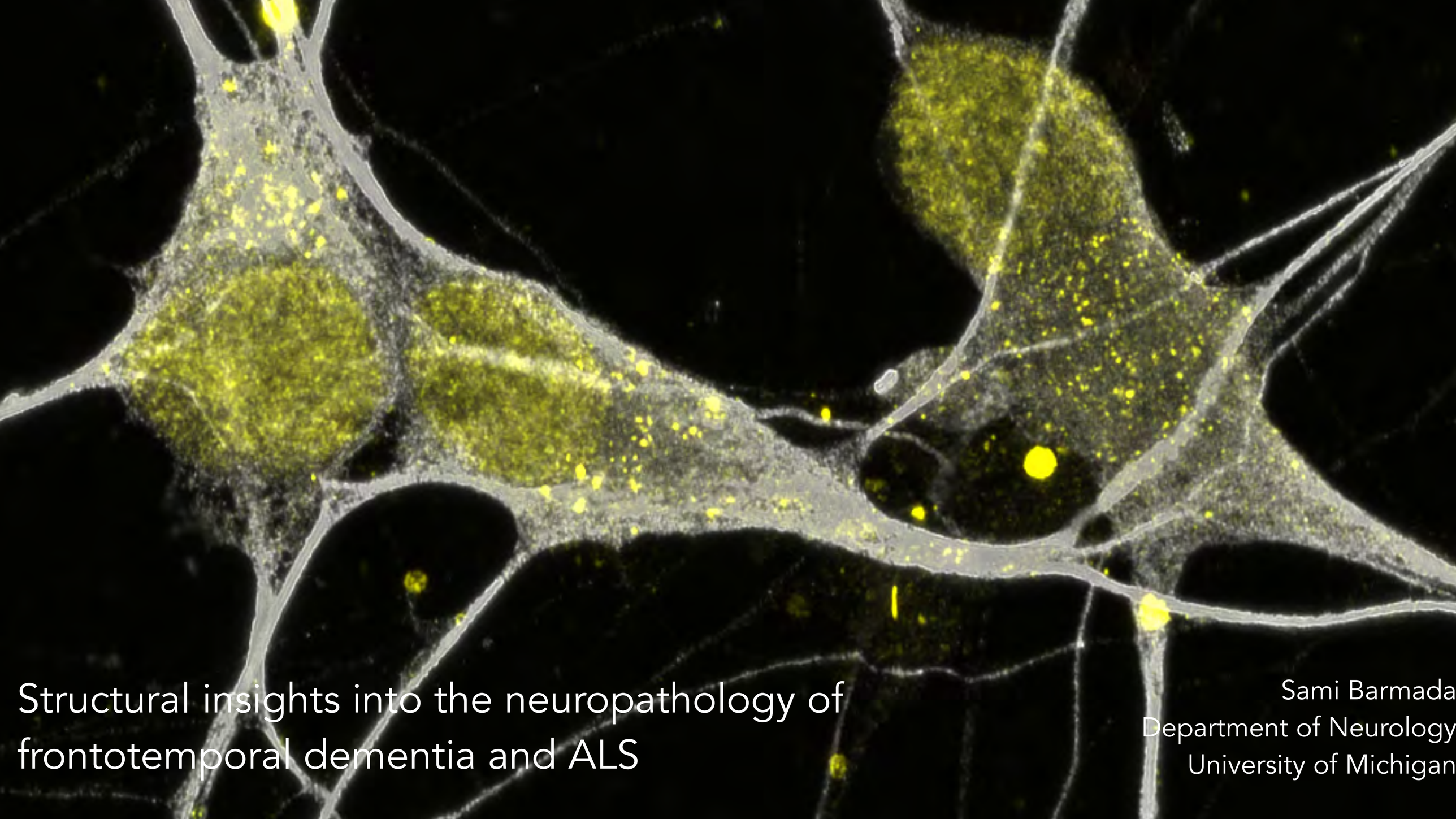


For more information:
(888) 352-9062

CAPABLEinfo@capablenationalcenter.org

https://capablenationalcenter.org/

SCAN ME



Structural insights into the neuropathology of frontotemporal dementia and ALS

Sami Barmada
Department of Neurology
University of Michigan

Amyotrophic lateral sclerosis (ALS)

"Lateral sclerosis"

Upper motor neuron

Weakness

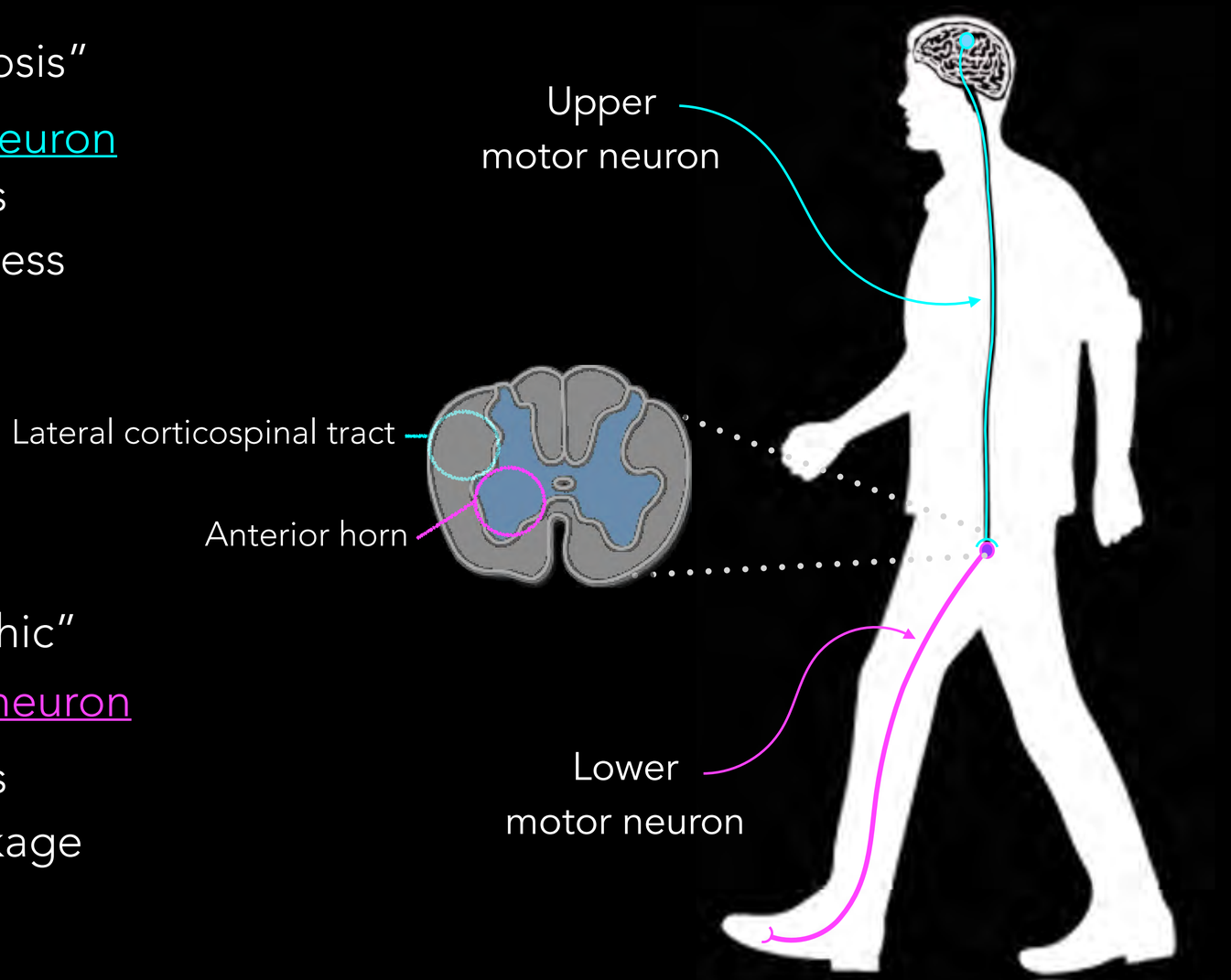
Muscle stiffness

"Amyotrophic"

Lower motor neuron

Weakness

Muscle shrinkage



Amyotrophic lateral sclerosis (ALS)

"Lateral sclerosis"

Upper motor neuron

Spasticity

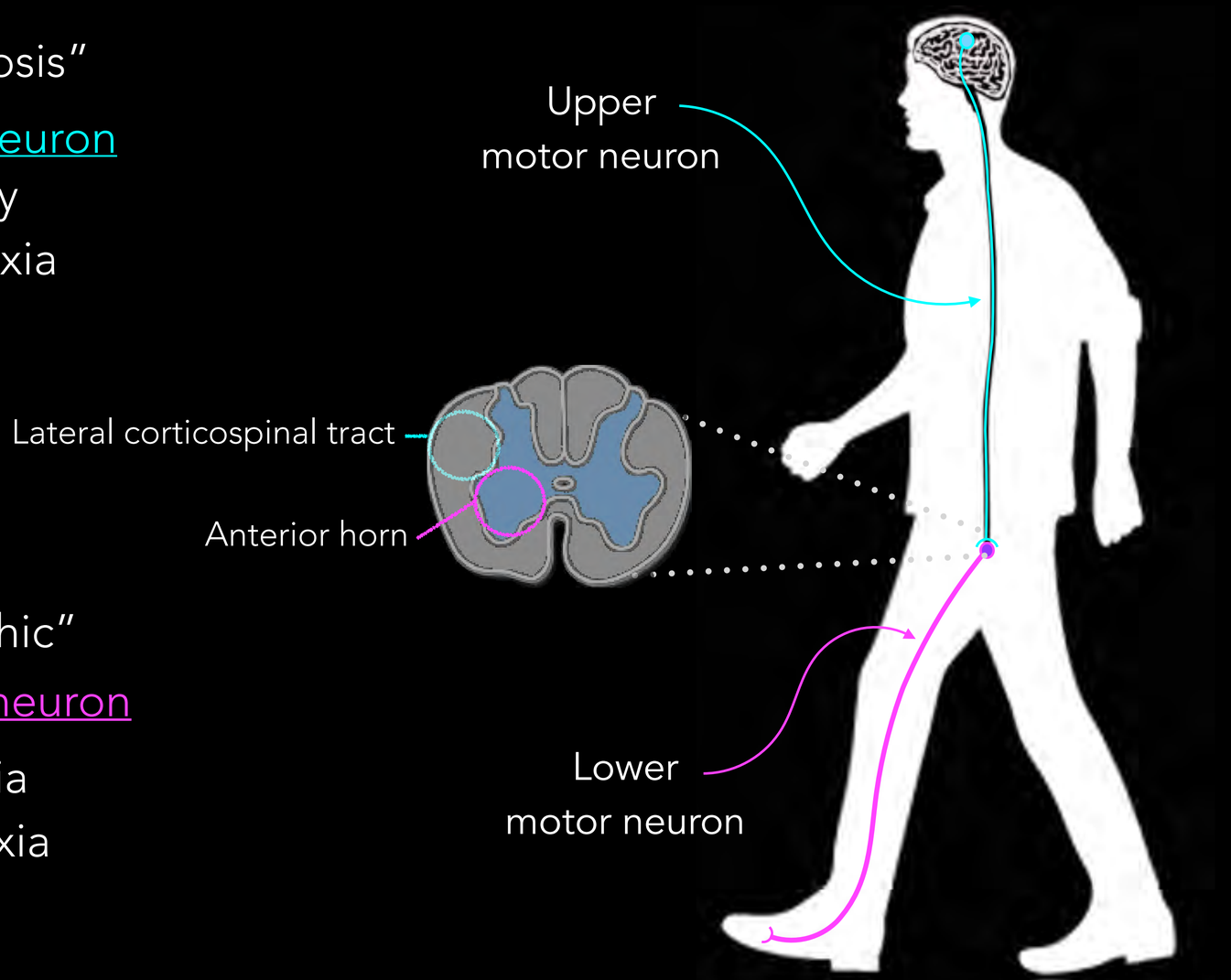
Hyperreflexia

"Amyotrophic"

Lower motor neuron

Hypotonia

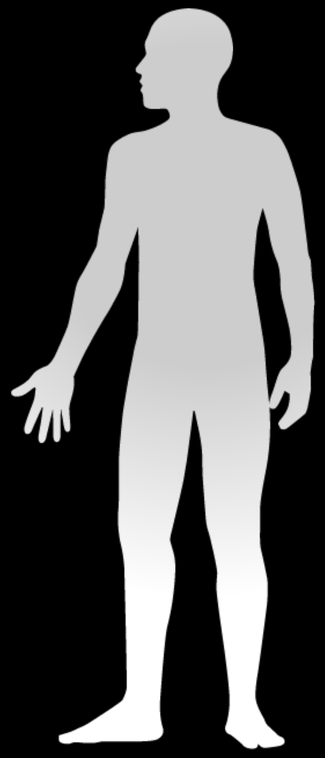
Hyporeflexia



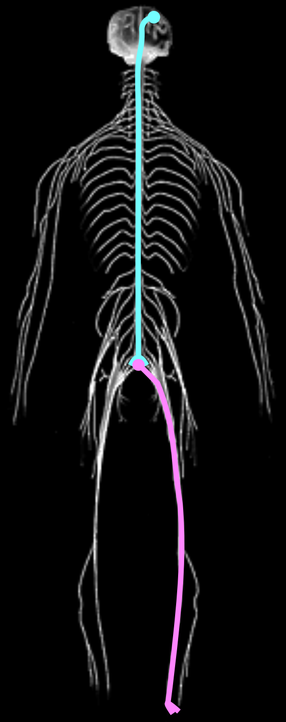
Amyotrophic lateral sclerosis (ALS)

Symptoms | Localization | Diagnosis

Spasticity
Hyperreflexia

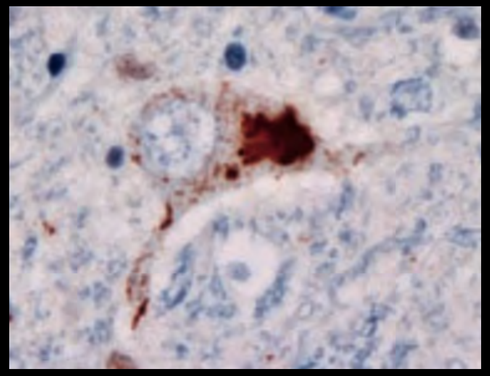


Hypotonia
Hyporeflexia



Amyotrophic
lateral sclerosis

TDP43



Mackenzie, I. R., & Rademakers, R. (2008). Curr Op Neurol, 21(6), 693–700

Frontotemporal dementia (FTD)

Behavioral variant FTD (bvFTD)

Apathy
Social withdrawal
Disinhibition
Lack of empathy
Obsessions / compulsions
Eating disorder
Poor judgment

Frontotemporal dementia (FTD)

Language variants (primary progressive aphasia, PPA)

Reduced output

Reduced vocabulary

Effortful speech

Substitutions / combinations

Perseveration

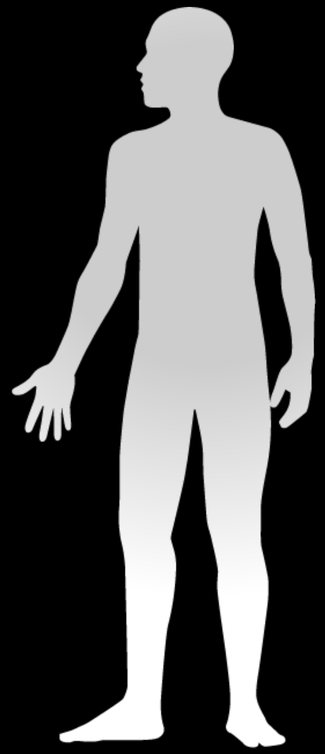
Frontotemporal dementia (FTD)

Symptoms	Localization	Diagnosis

Personality change

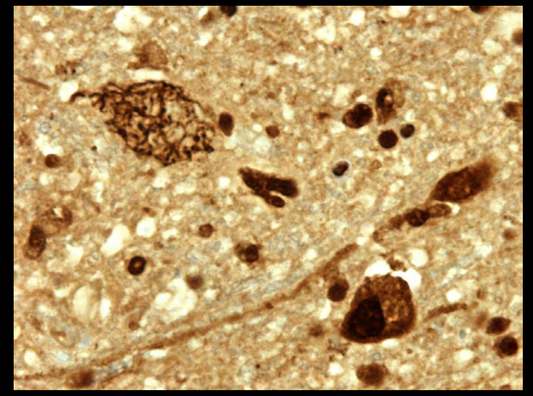
Word-finding difficulties

Lack of motivation

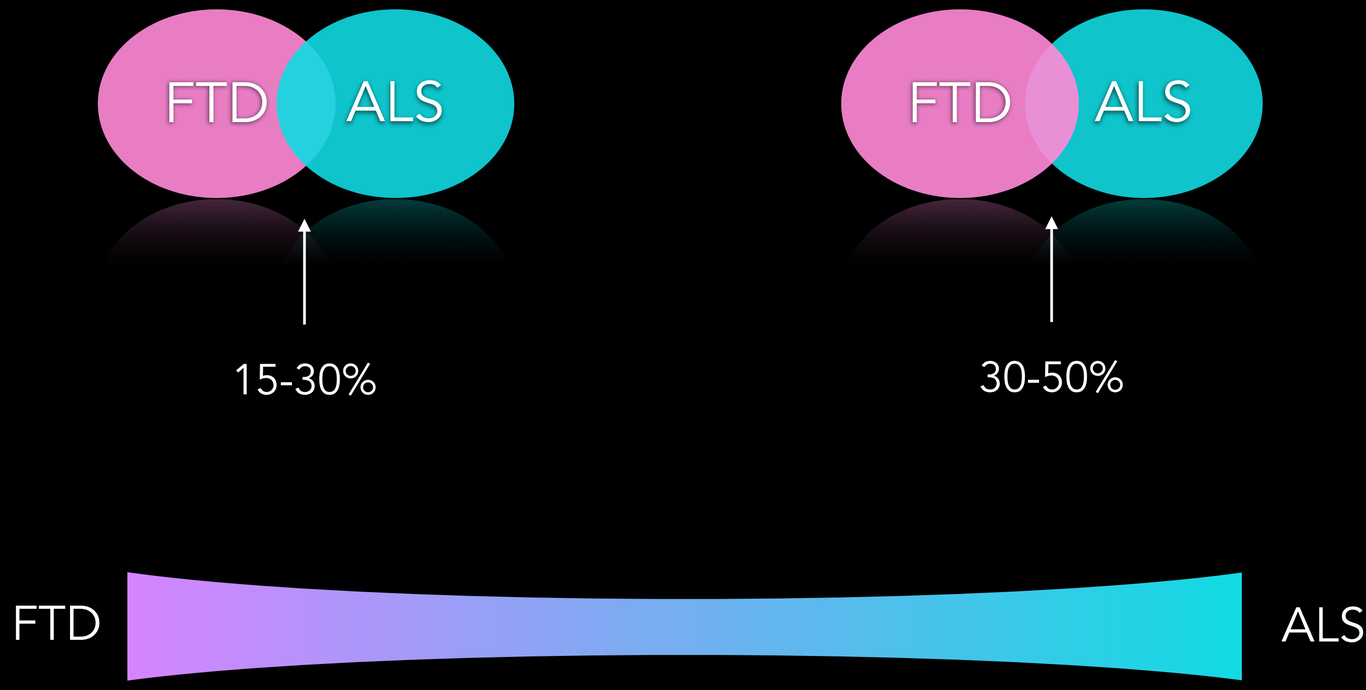


Frontotemporal dementia

TDP43

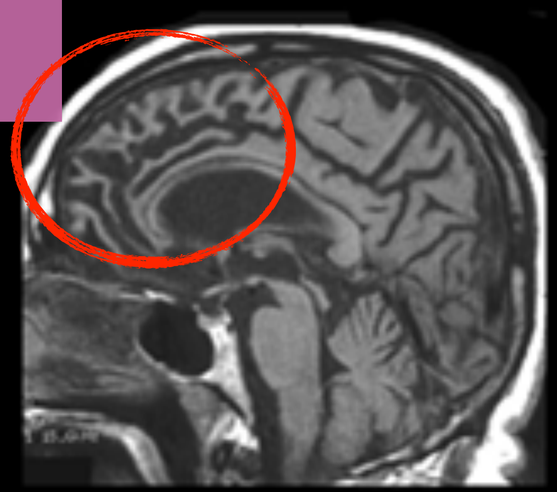


mndresearch.wordpress.com

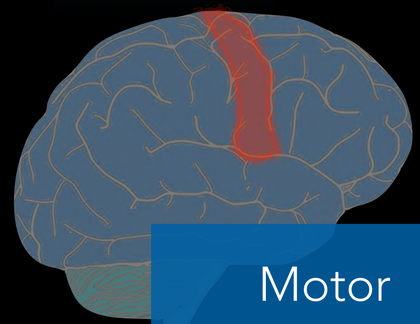

FTD
ALS
15-30%
FTD
ALS
30-50%
FTD
ALS

FTD

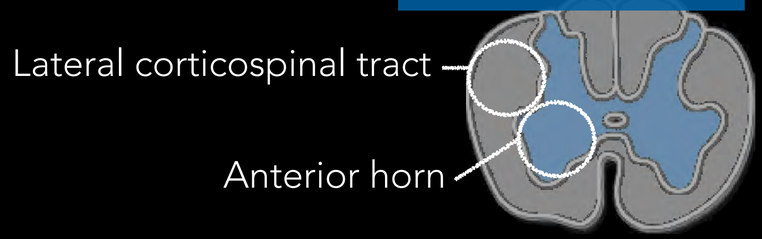
?

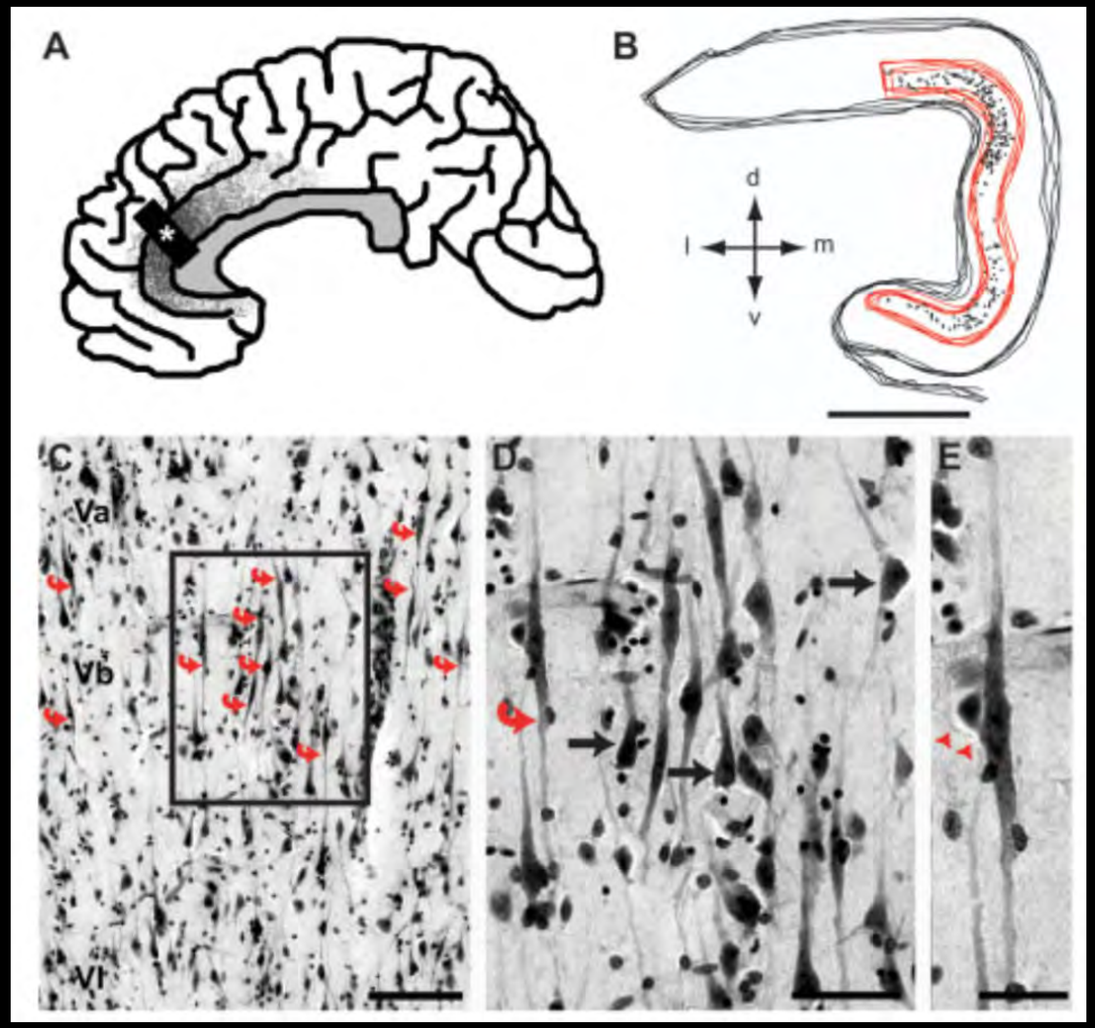


ALS



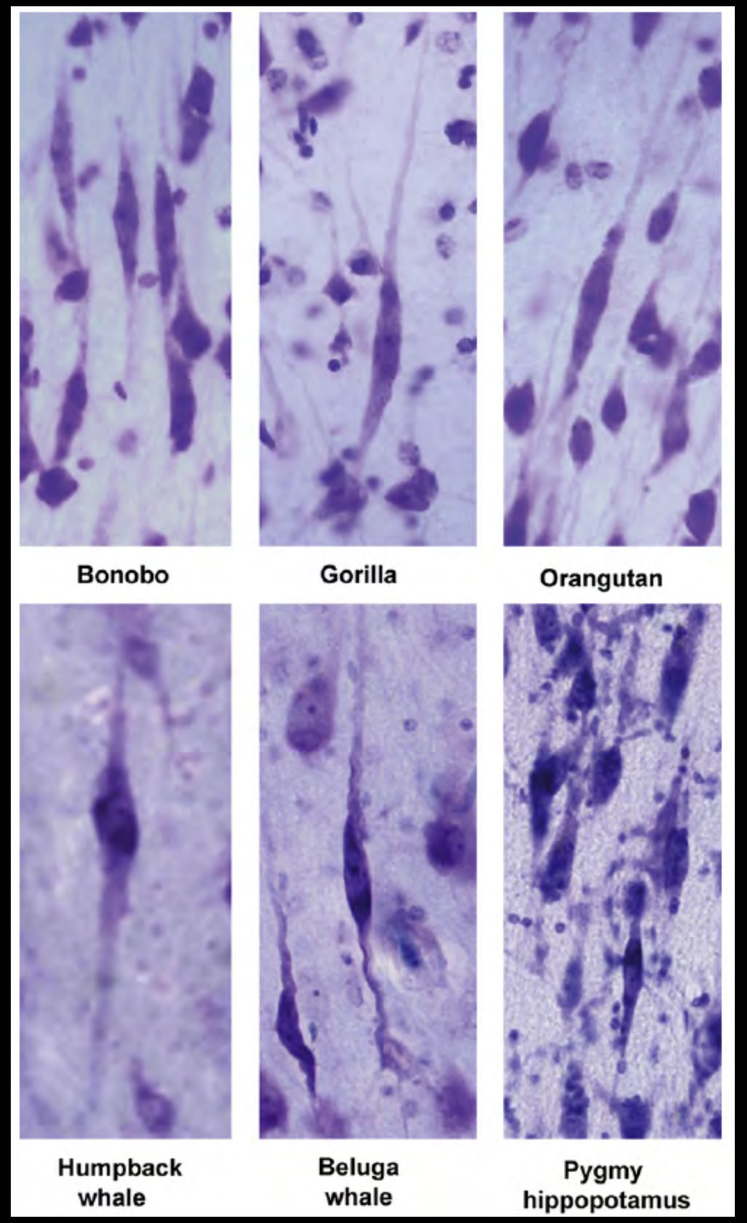
Motor neurons



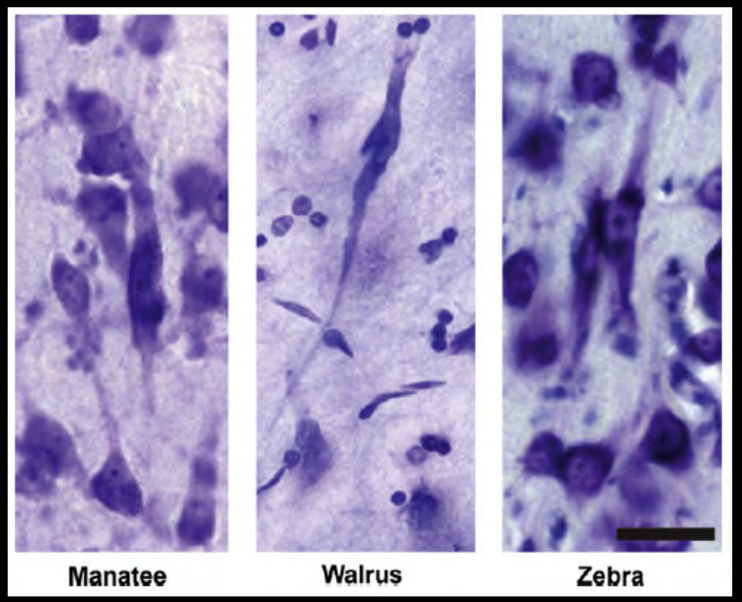


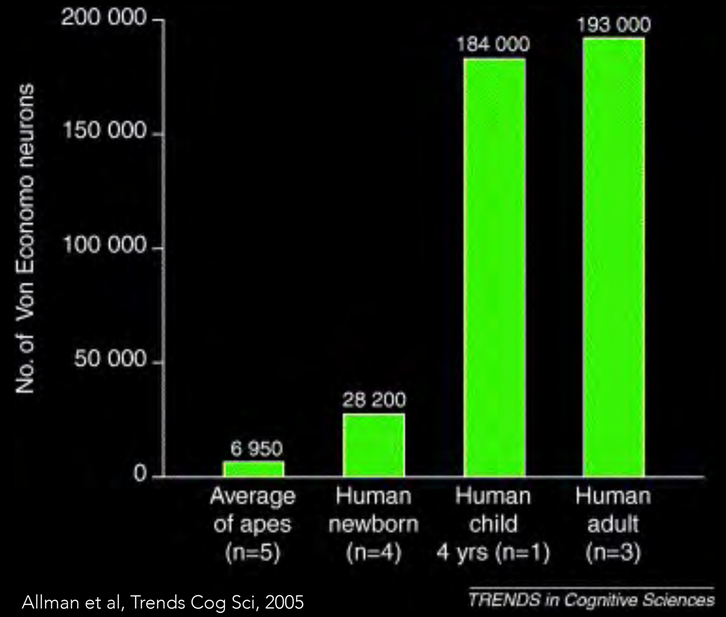
Seeley et al, *Ann Neurol*, 2006

Von Economo neurons
(VENs)



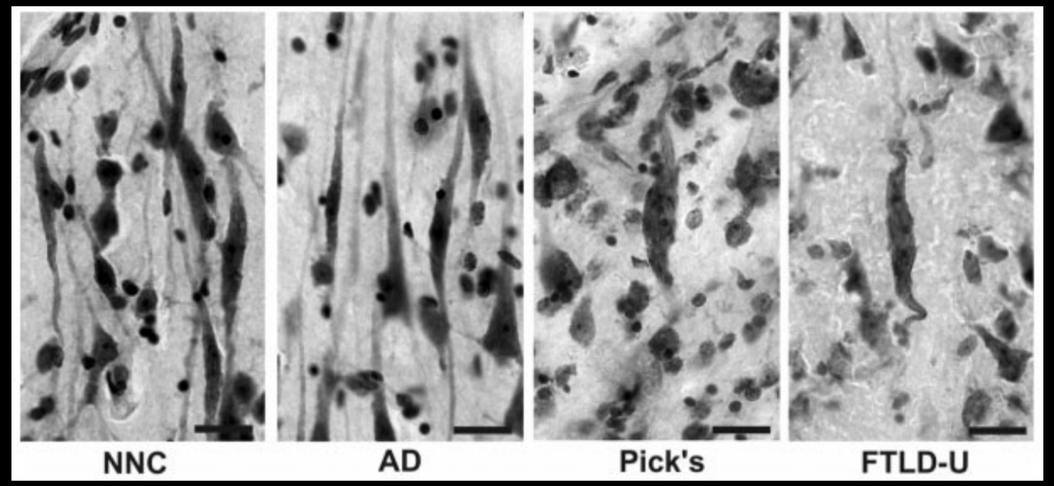
Butti et al, Cortex, 2013



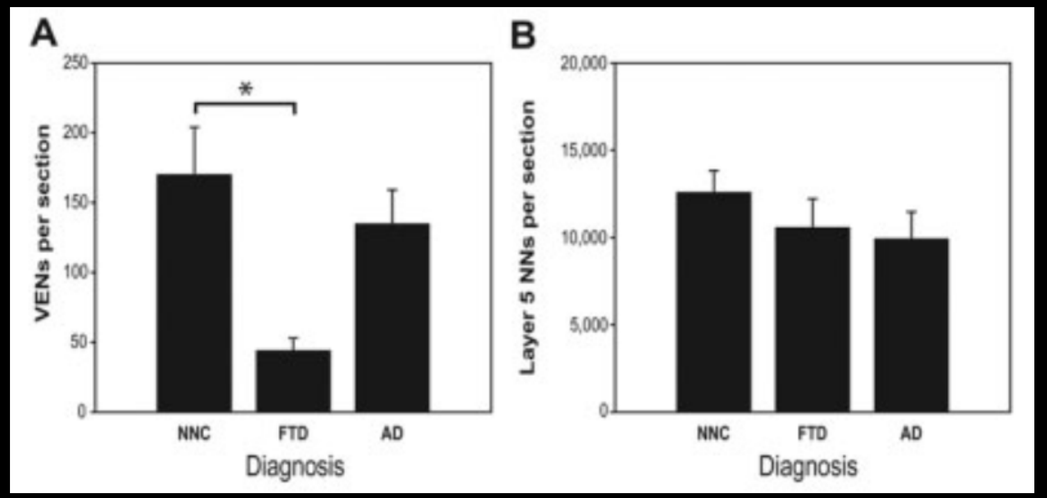


Allman et al, Trends Cog Sci, 2005

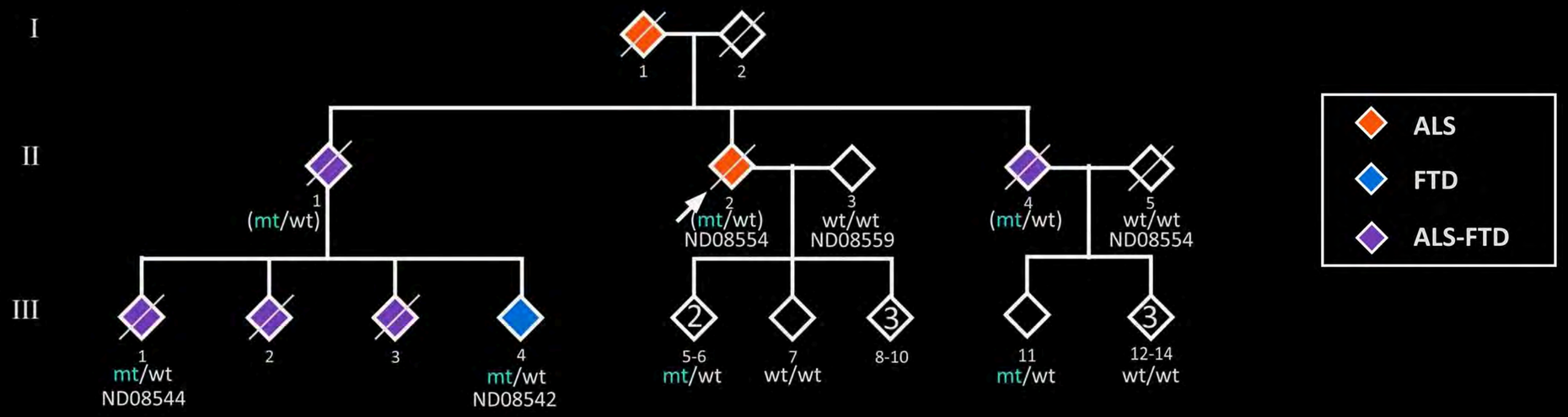
Seeley et al, *Ann Neurol*, 2006



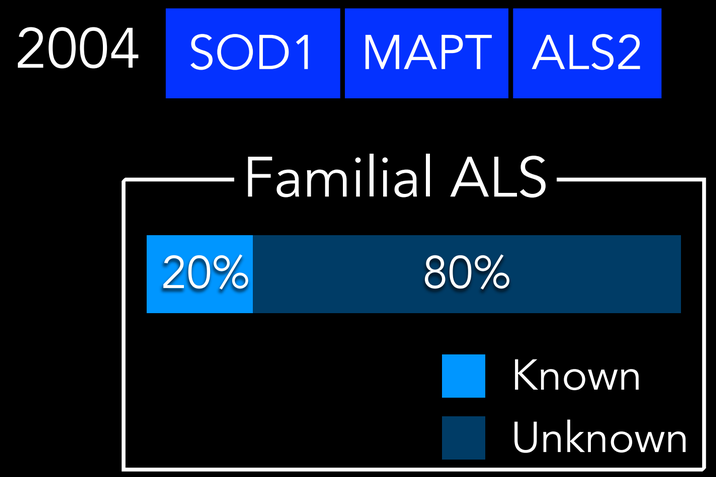
Seeley et al, *Ann Neurol*, 2006



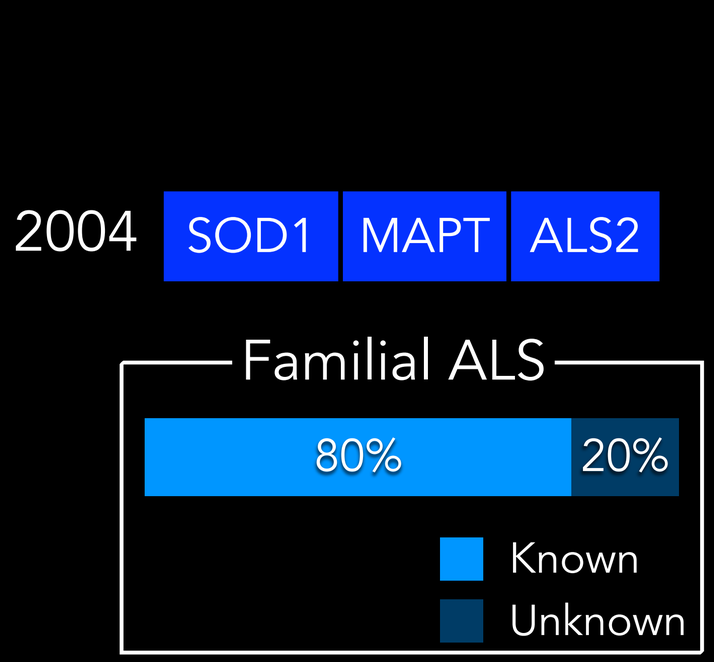
Genetics of ALS and FTD

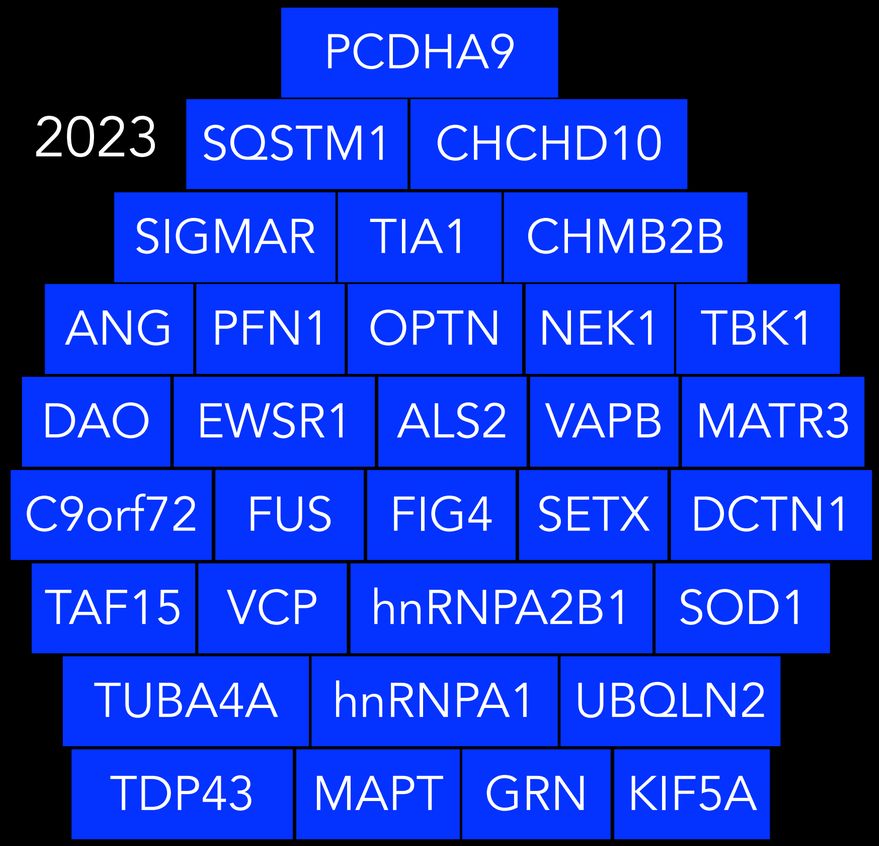


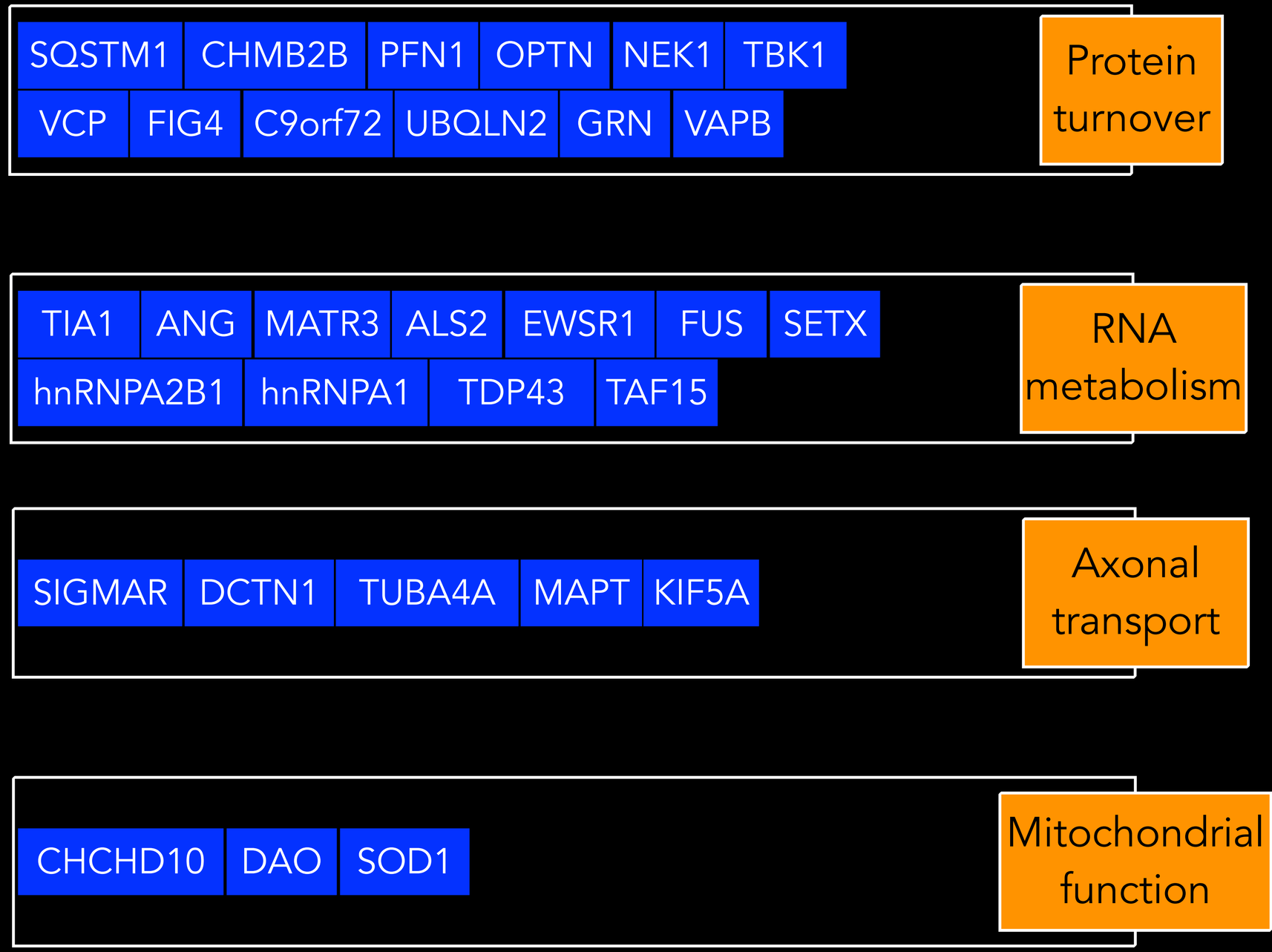
Genetics of ALS and FTD



Genetics of ALS and FTD






SQSTM1
CHMB2B
PFN1
OPTN
NEK1
TBK1
VCP
FIG4
C9orf72
UBQLN2
GRN
VAPB
Protein turnover
TIA1
ANG
MATR3
ALS2
EWSR1
FUS
SETX
hnRNPA2B1
hnRNPA1
TDP43
TAF15
RNA metabolism
SIGMAR
DCTN1
TUBA4A
MAPT
KIF5A
Axonal transport
CHCHD10
DAO
SOD1
Mitochondrial function

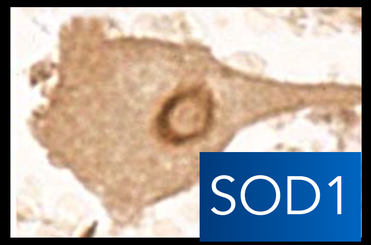
PFN1 FUS TAF15 SETX EWSR1 DCTN1 TUBA4A PCDHA9

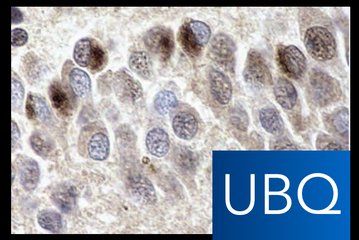
DAO FIG4 ANG SIGMAR SOD1 ALS2 NEK1 KIF5A

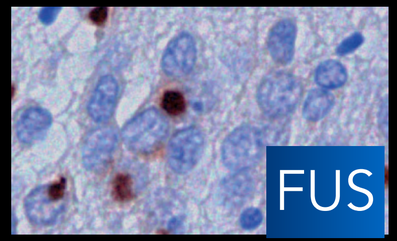
MATR3 VCP OPTN SQSTM1 GRN TIA1

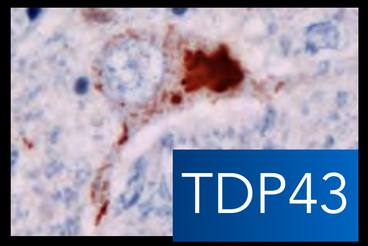
VAPB UBQLN2 CHMB2B C9orf72 TDP43 MAPT

TBK1 hnRNPA2B1 hnRNPA1 CHCHD10









SOD1

CHMB2B
DAO
MATR3
ALS2

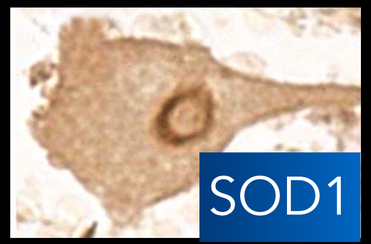
FUS
EWSR1
TAF15

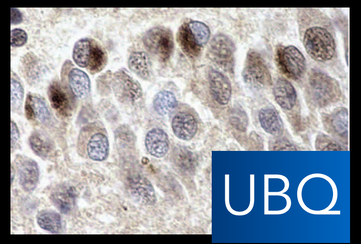
SETX
VAPB
UBQLN2
TDP43
VCP
GRN
C9orf72
OPTN
hnRNPA1
SIGMAR
FIG4
TBK1
SQSTM1
PFN1
TIA1
CHCHD10
KIF5A
ANG
DCTN1
PCDHA9
TUBA4A
hnRNPA2B1

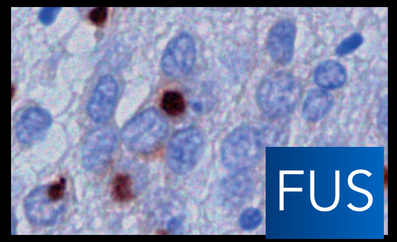
<u>33 genes associated with ALS/FTD</u>

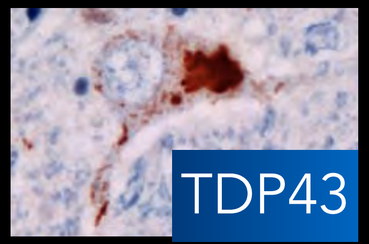
3/4 (25) result in TDP43 pathology

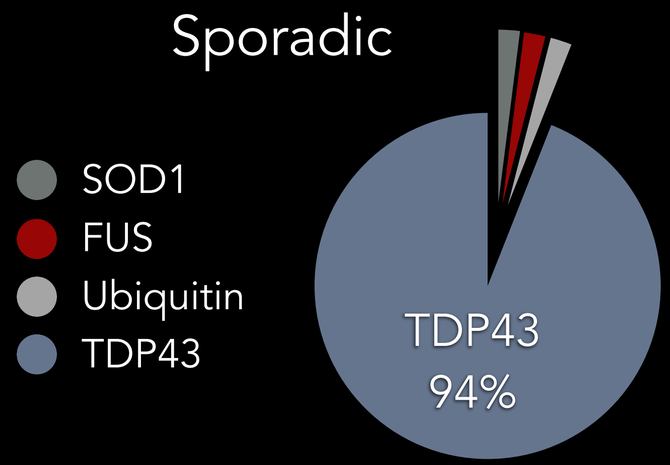
How common is TDP43 pathology in ALS?

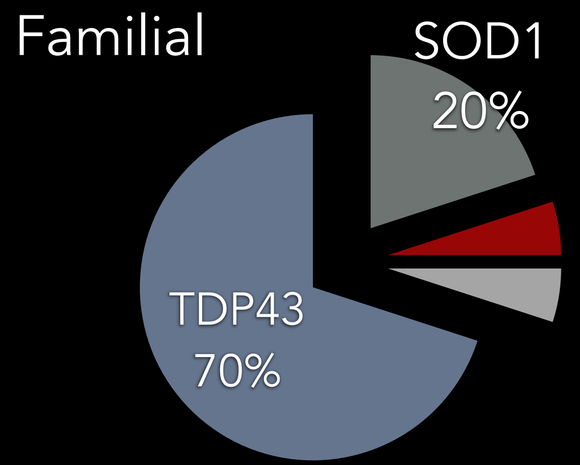




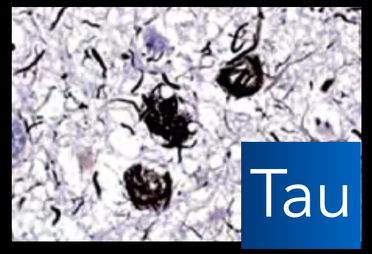


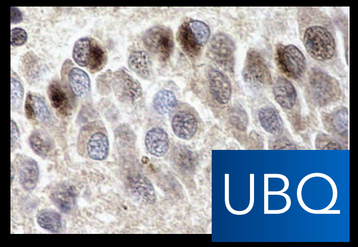


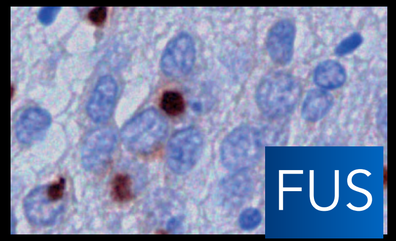


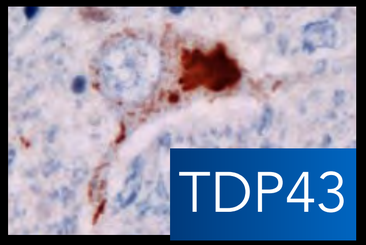


How common is TDP43 pathology in FTD?

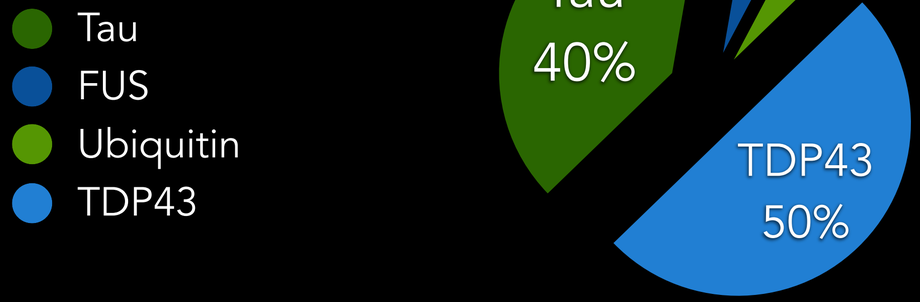




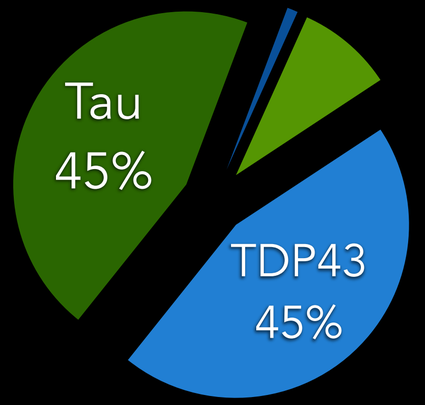




Sporadic



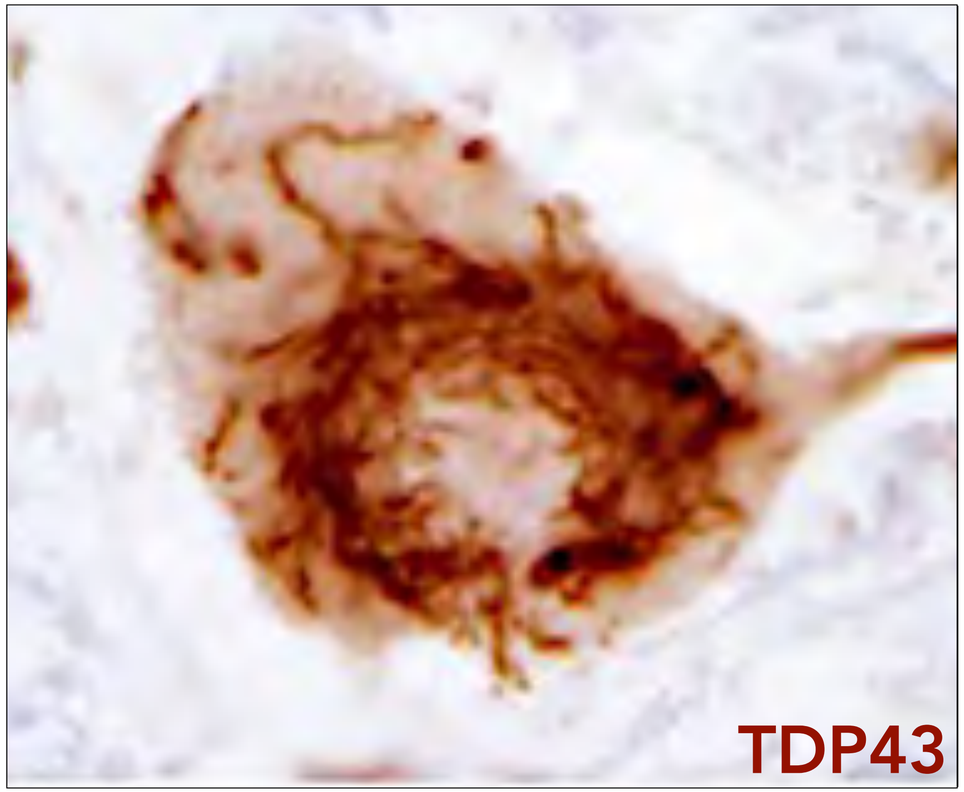
Familial



Summary and next steps (1)

- ALS and FTD are related disorders
  - Clinical overlap
  - Genetic overlap
  - Pathologic overlap (TDP43)

- TDP43-based biomarkers and treatments are *severely* lacking



Amyotrophic lateral sclerosis (ALS)
Frontotemporal dementia (FTD)

What are the triggers for TDP43 pathology?
What are the consequences?

Humans have ~100,000 genes

Approximately 1/3 (**30,000**) are recognized by TDP43

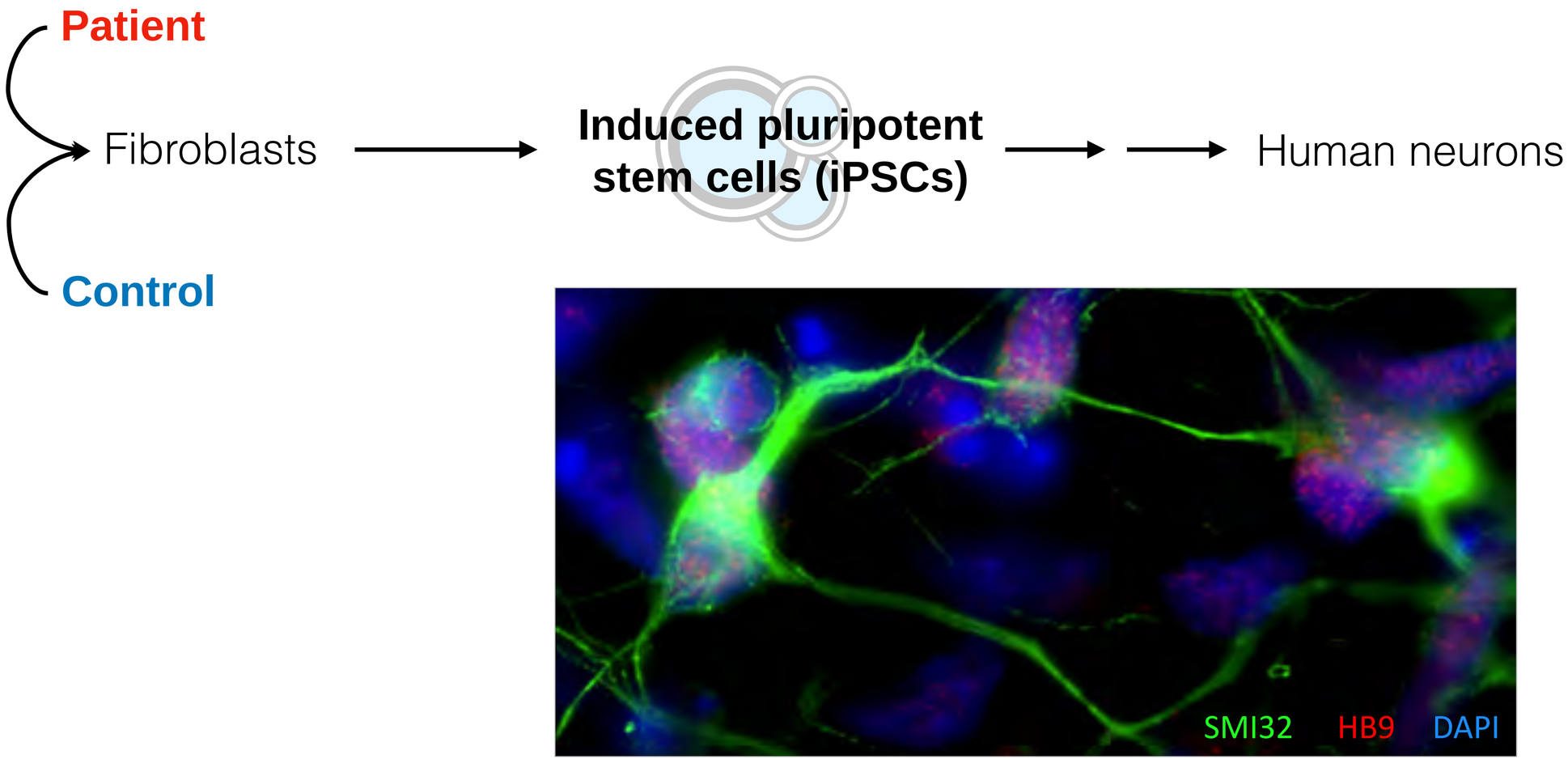
TDP43 pathology → RNA misprocessing

Humans have ~100,000 genes

Approximately 1/3 (**30,000**) are recognized by TDP43

RNA misprocessing  TDP43 pathology

Human neurons

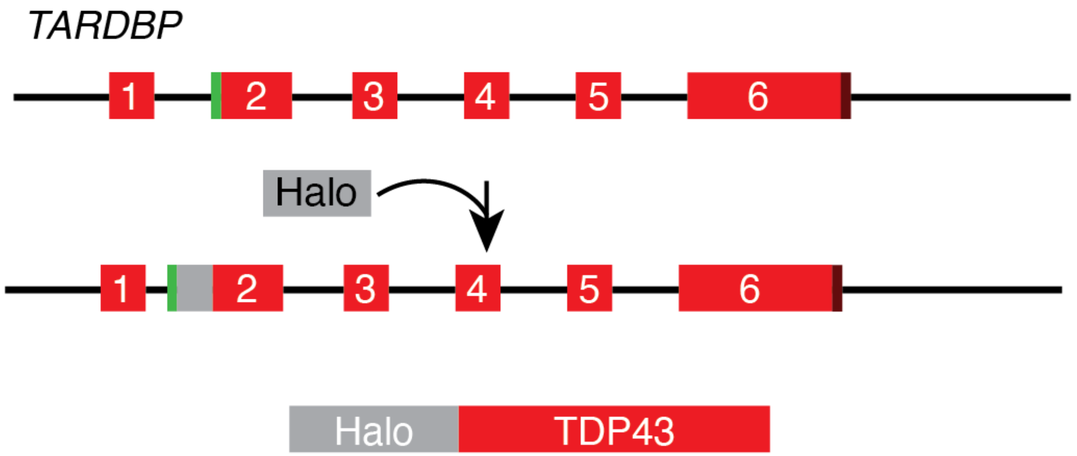


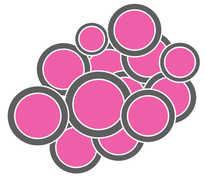
RNA dependent TDP43 mislocalization

Shyamal Mosalaganti

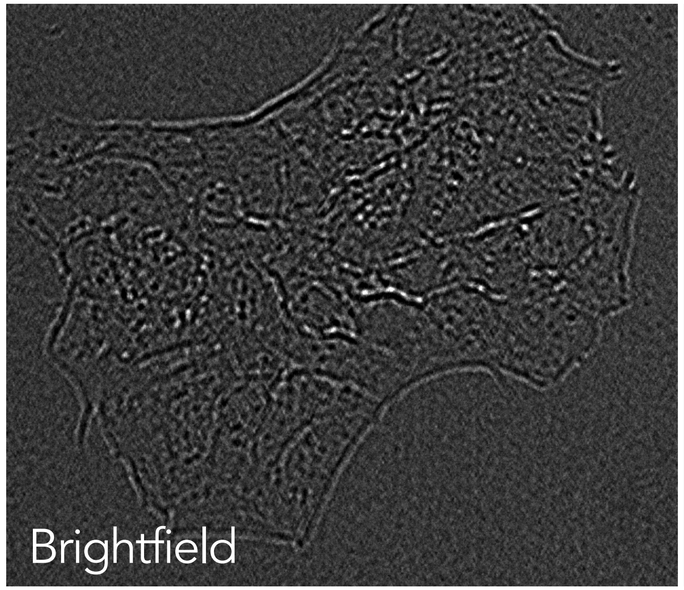
Amanda Erwin

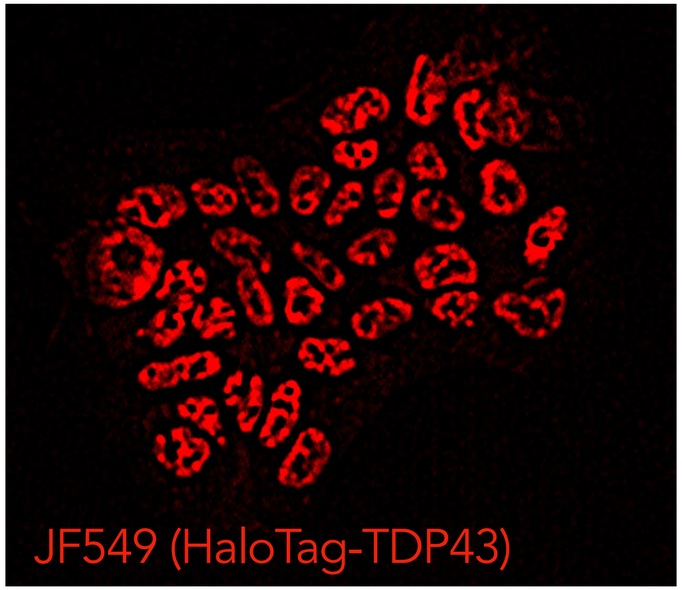
RNA dependent TDP43 mislocalization

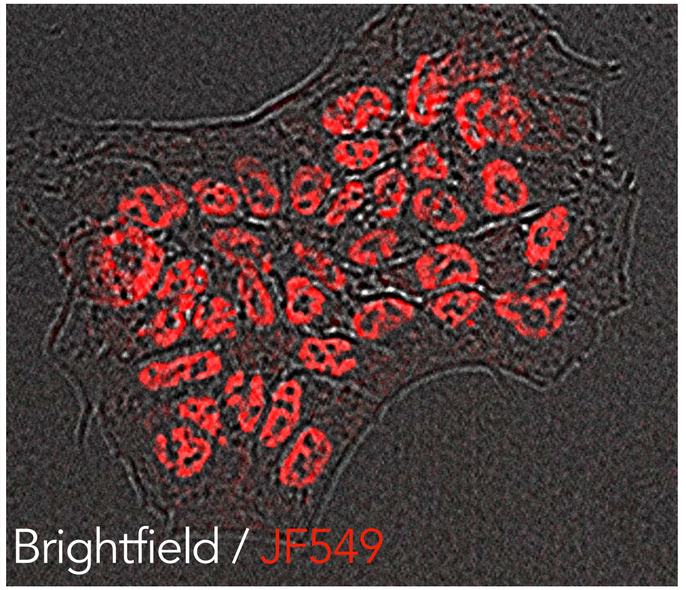




HaloTag-TDP43
iPSCs



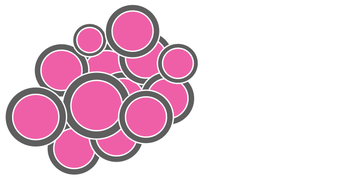


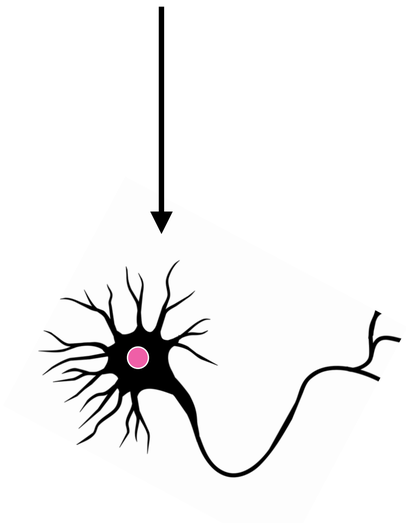


Elizabeth Tank

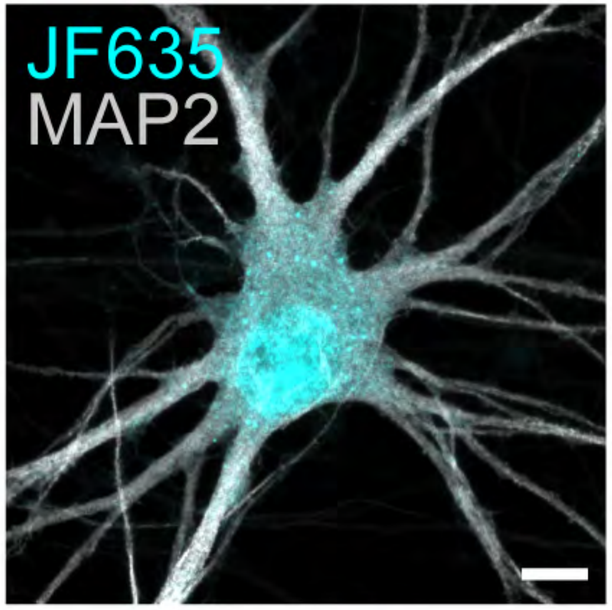
HaloTag-TDP43 iNeurons

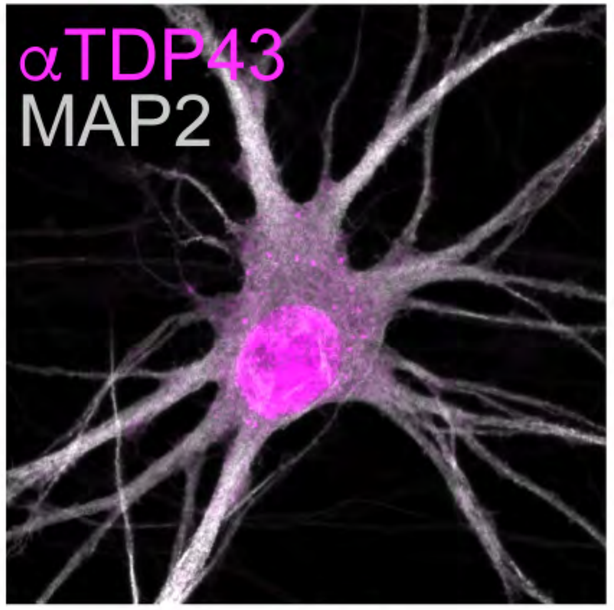
HaloTag-TDP43
iPSCs

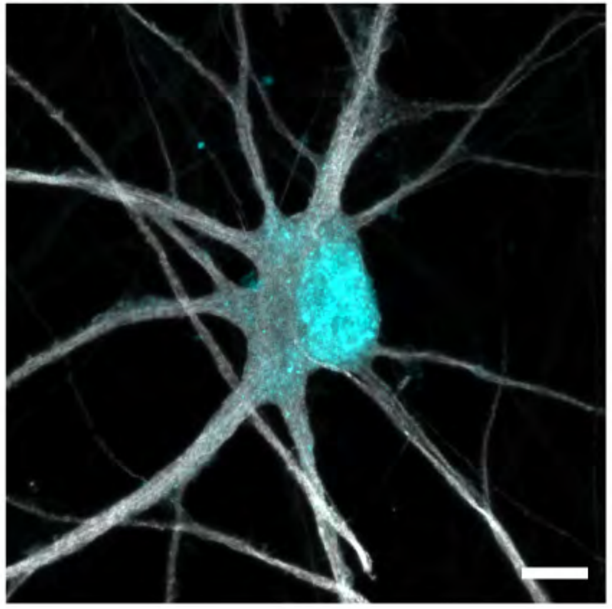


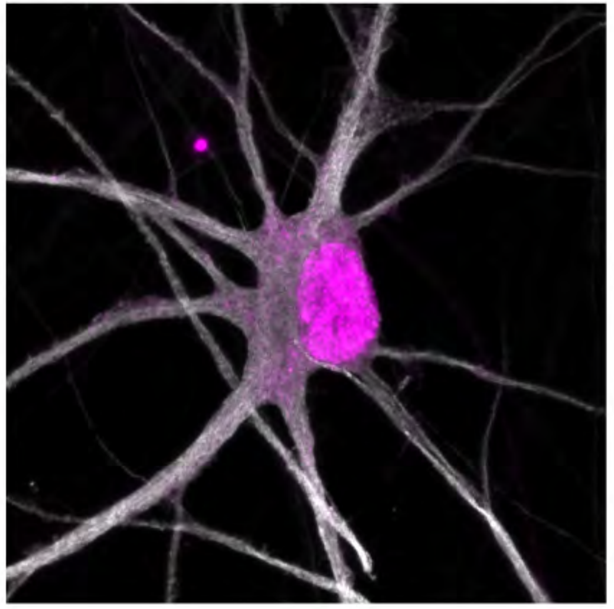


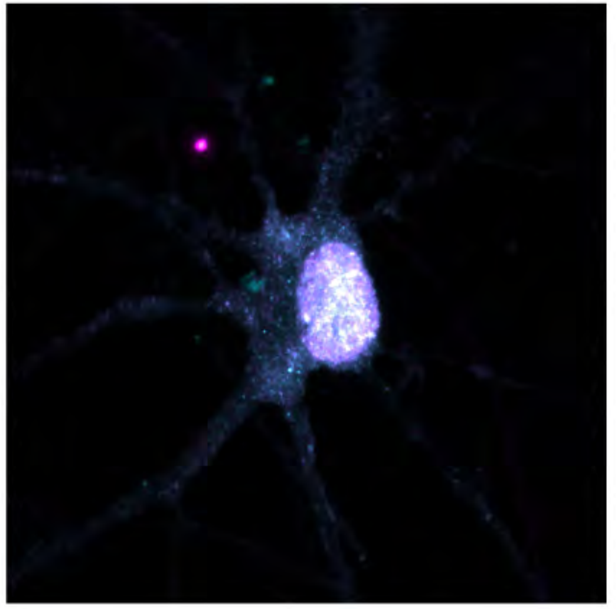
HaloTag-TDP43
iNeurons



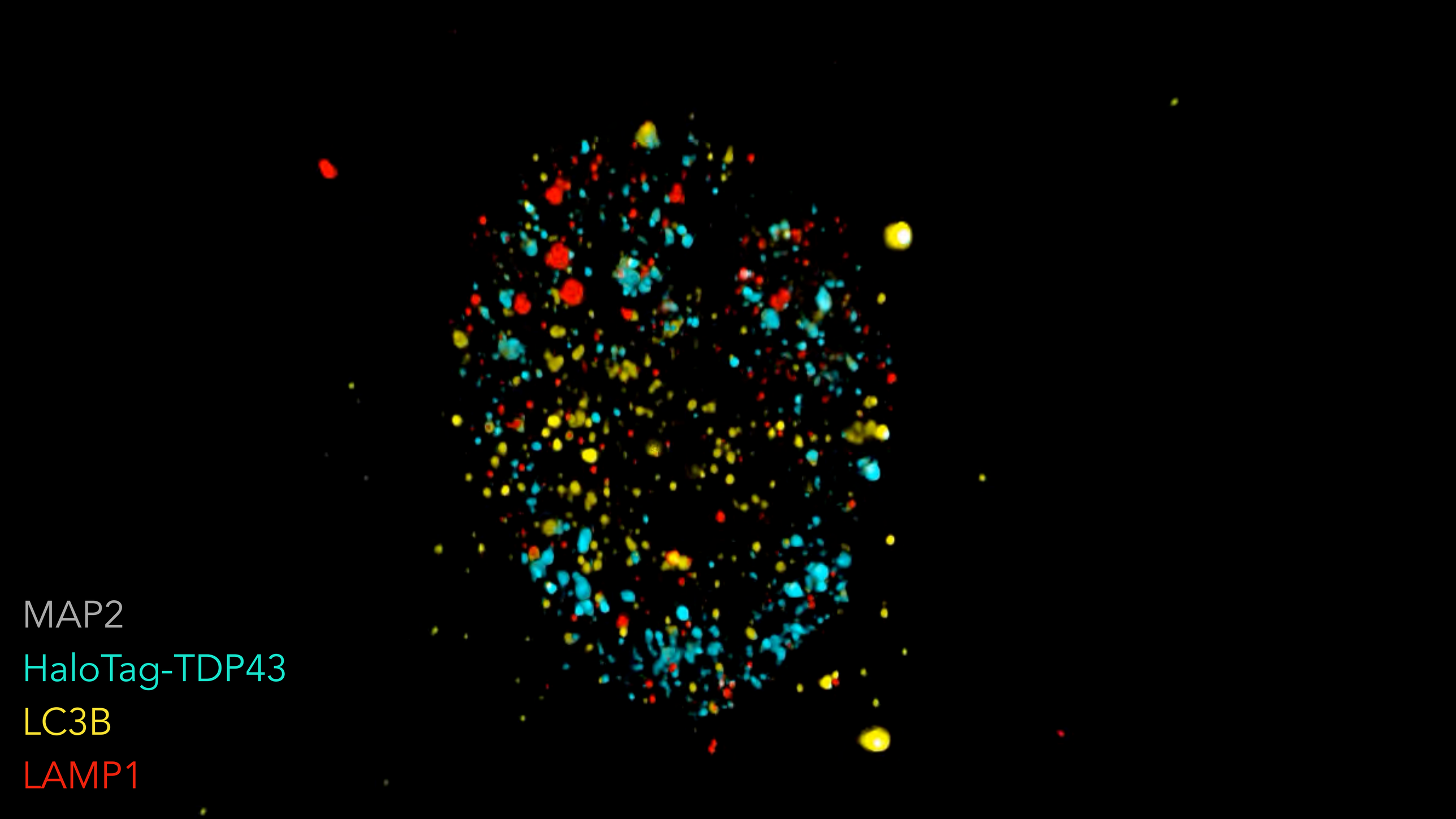








Elizabeth Tank
Michael Bekier


MAP2
HaloTag-TDP43
LC3B
LAMP1

Structure of mislocalized TDP43 - Cryo-scanning electron microscopy (SEM)

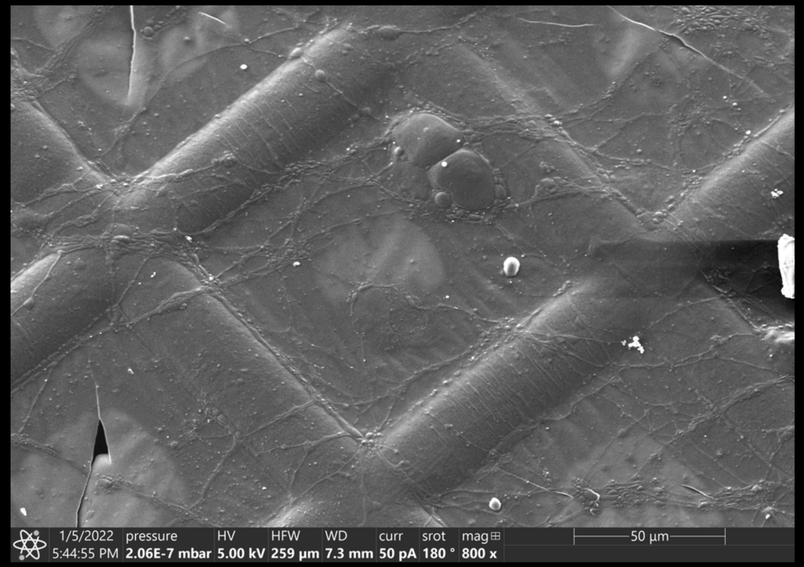
S. Mosalaganti, A. Erwin

Structure of mislocalized TDP43 - focused ion beam (FIB) milling

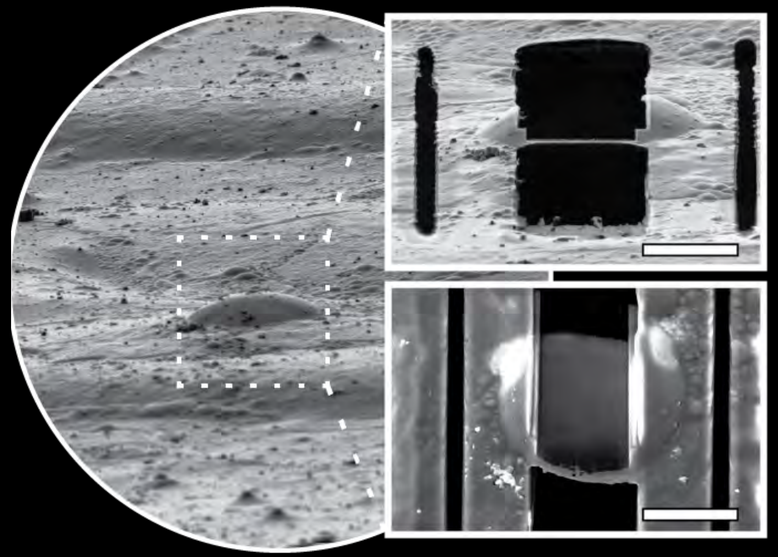
S. Mosalaganti, A. Erwin

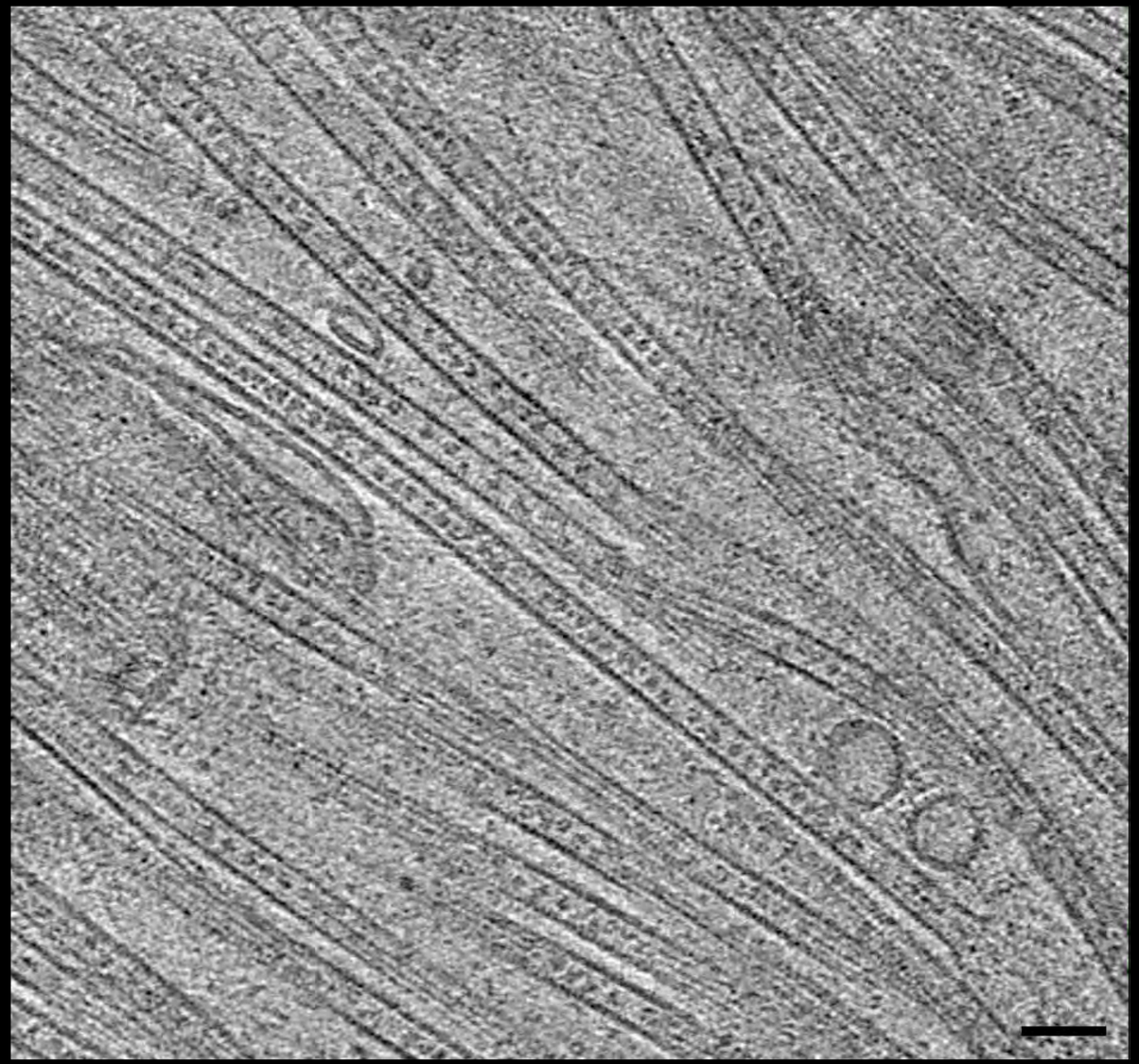
Structure of mislocalized TDP43 - Cryo-transmission electron microscopy (TEM)

Cryo-SEM

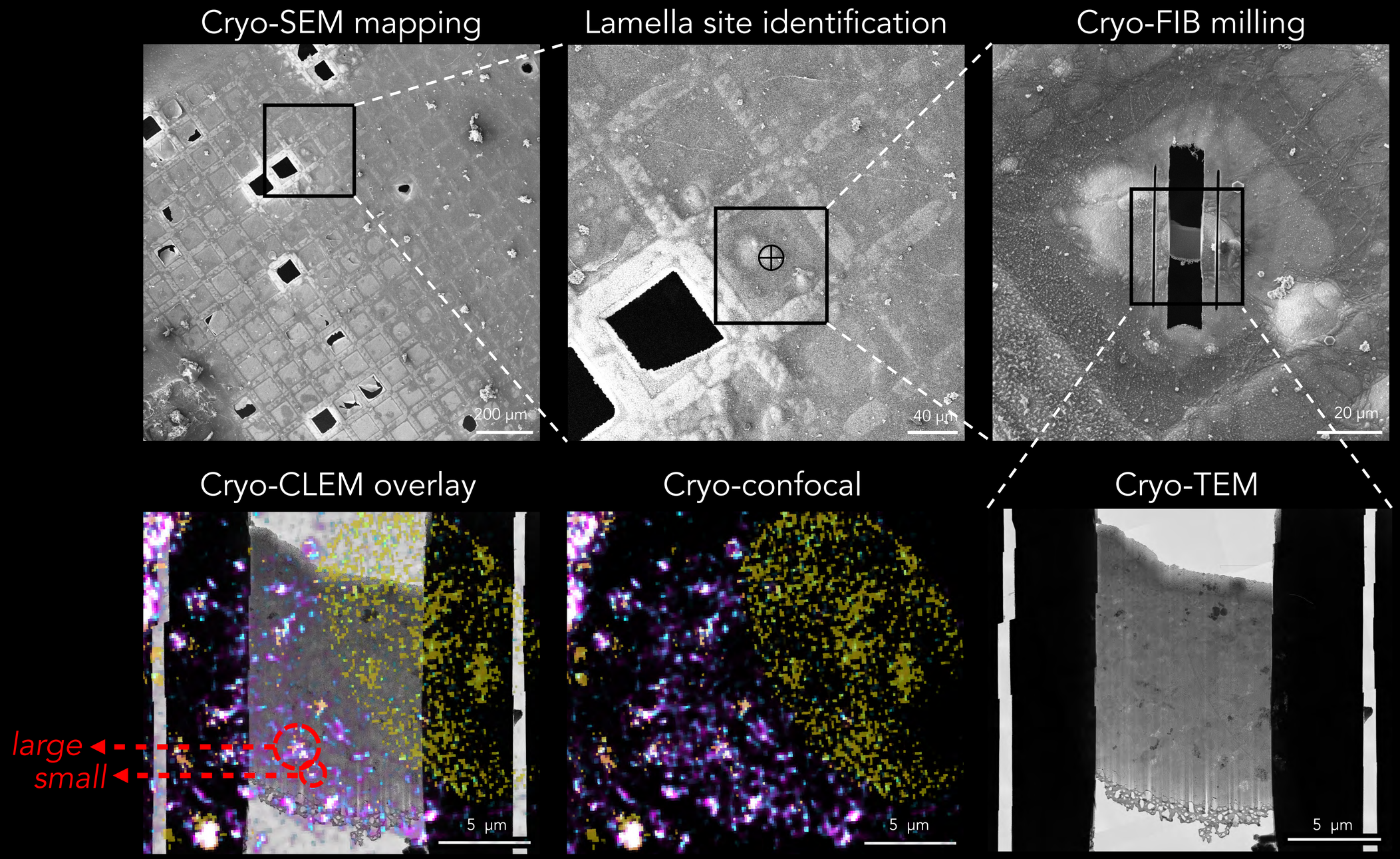


Cryo-FIB milling

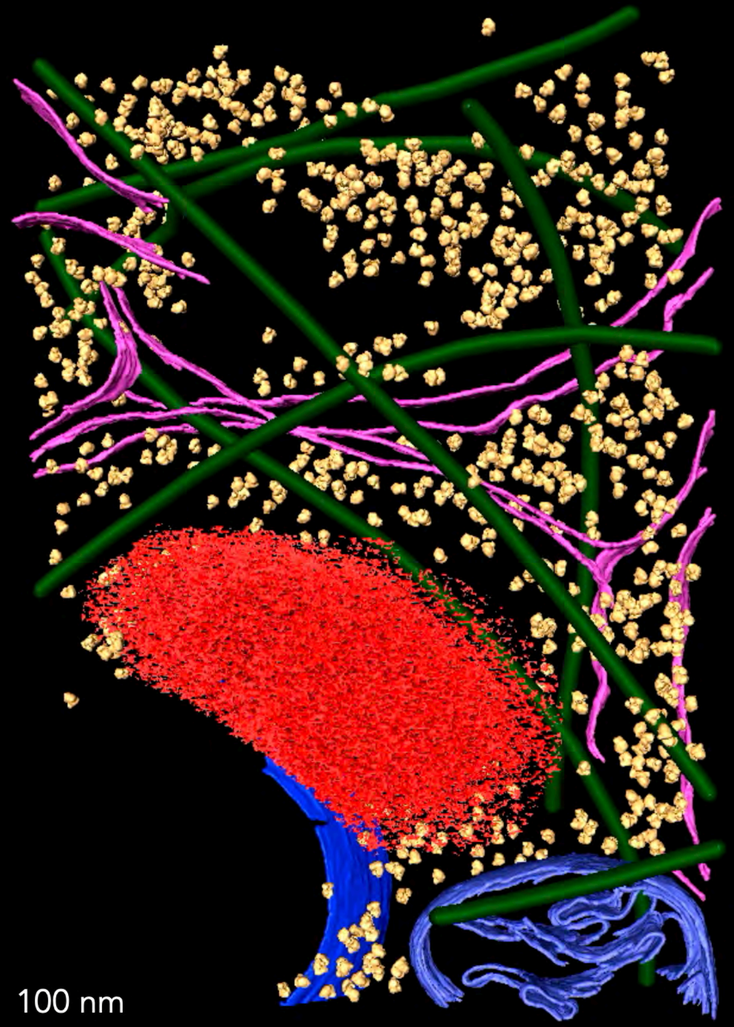


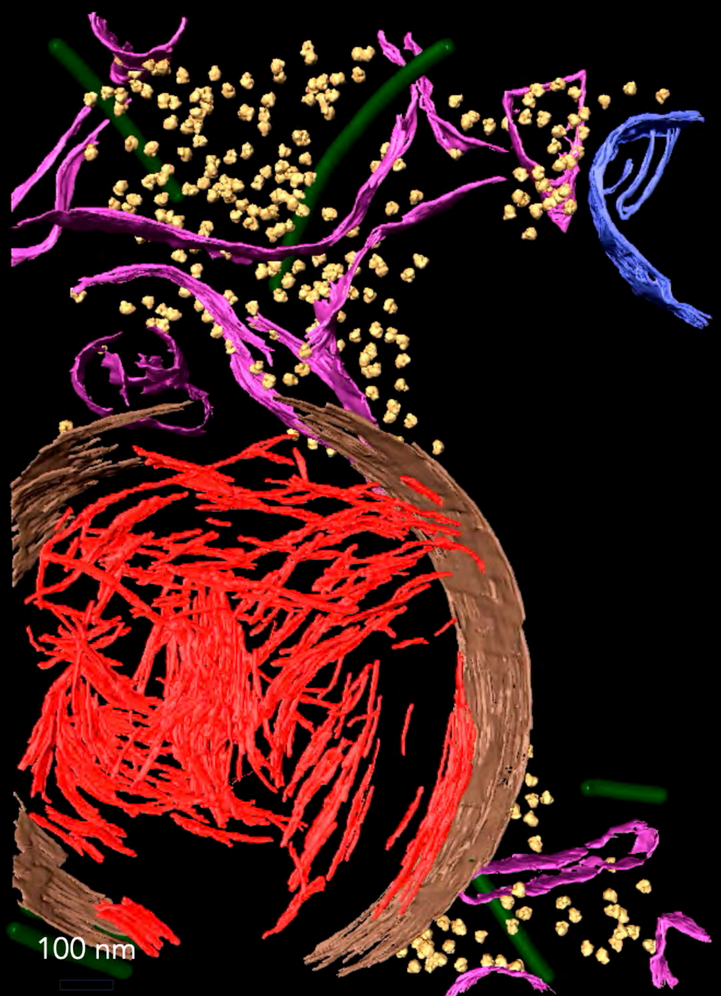


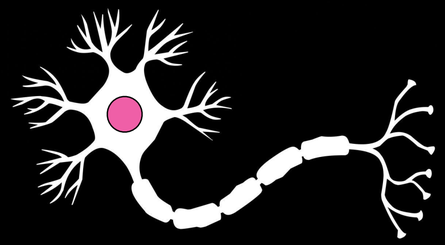
S. Mosalaganti, A. Erwin



S. Mosalaganti, A. Erwin







Nuclear TDP43

RNA

mislocalization

cytosolic droplets

?

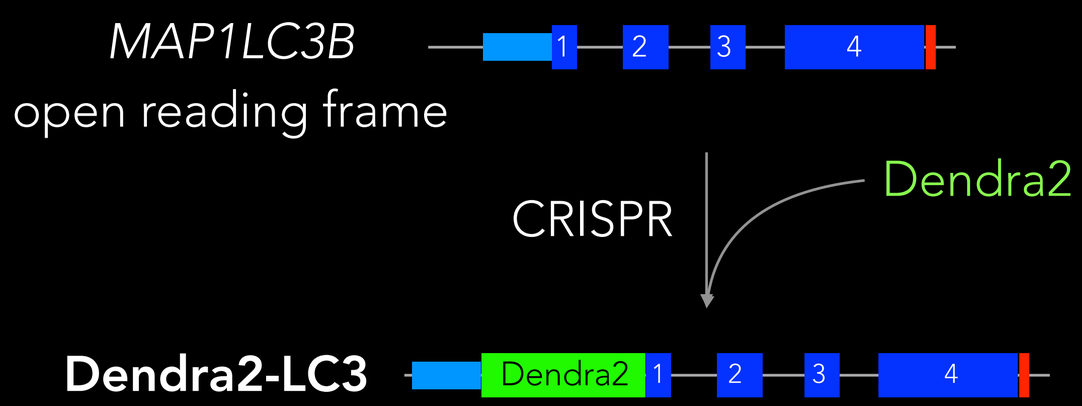
internalization

fibrils

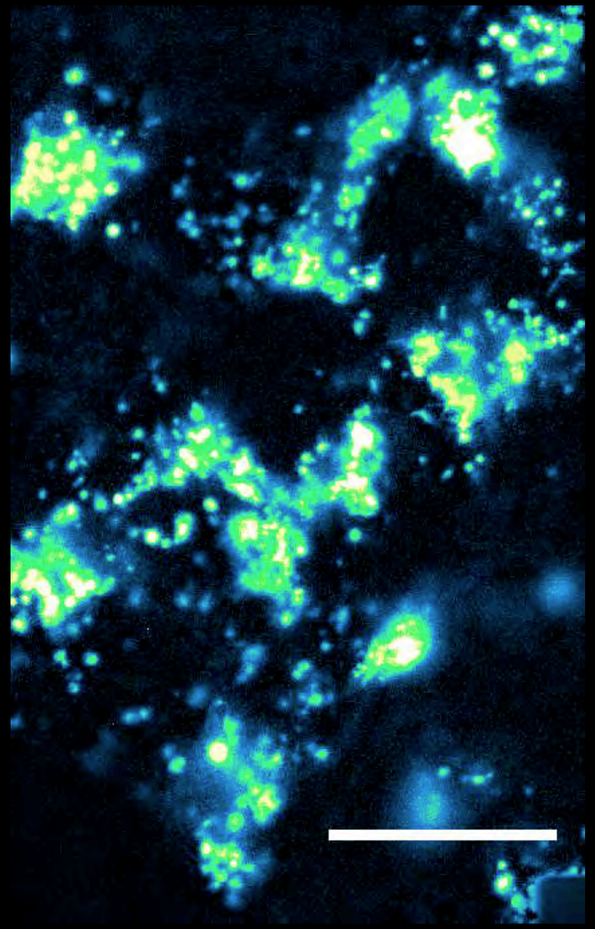
Endoplasmic reticulum
Mitochondria
Autophagosome
TDP43

Ribosomes
Microtubules
Lysosomes
Membranes
MVB

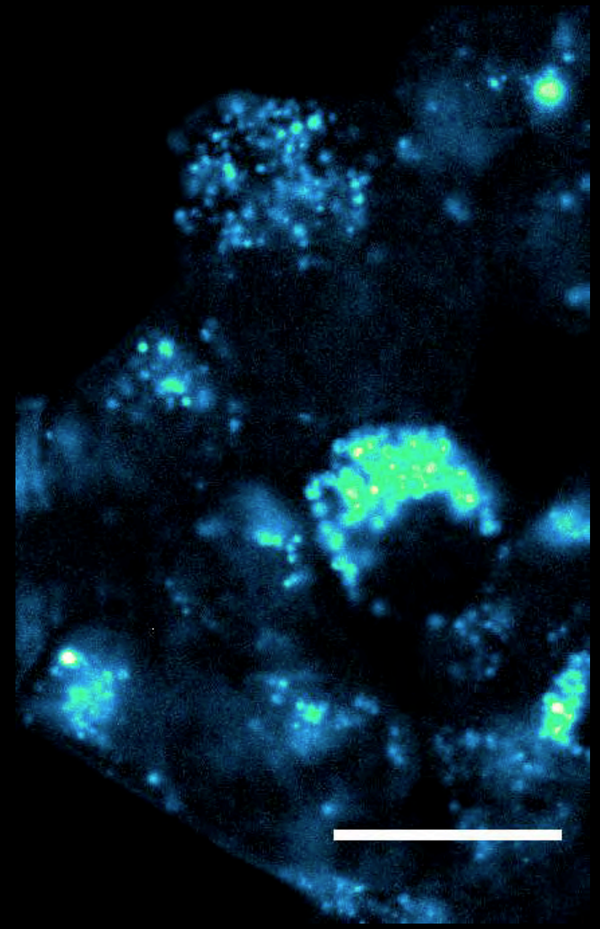
Confirming autophagosomal/lysosomal TDP43 mislocalization



+Torin1



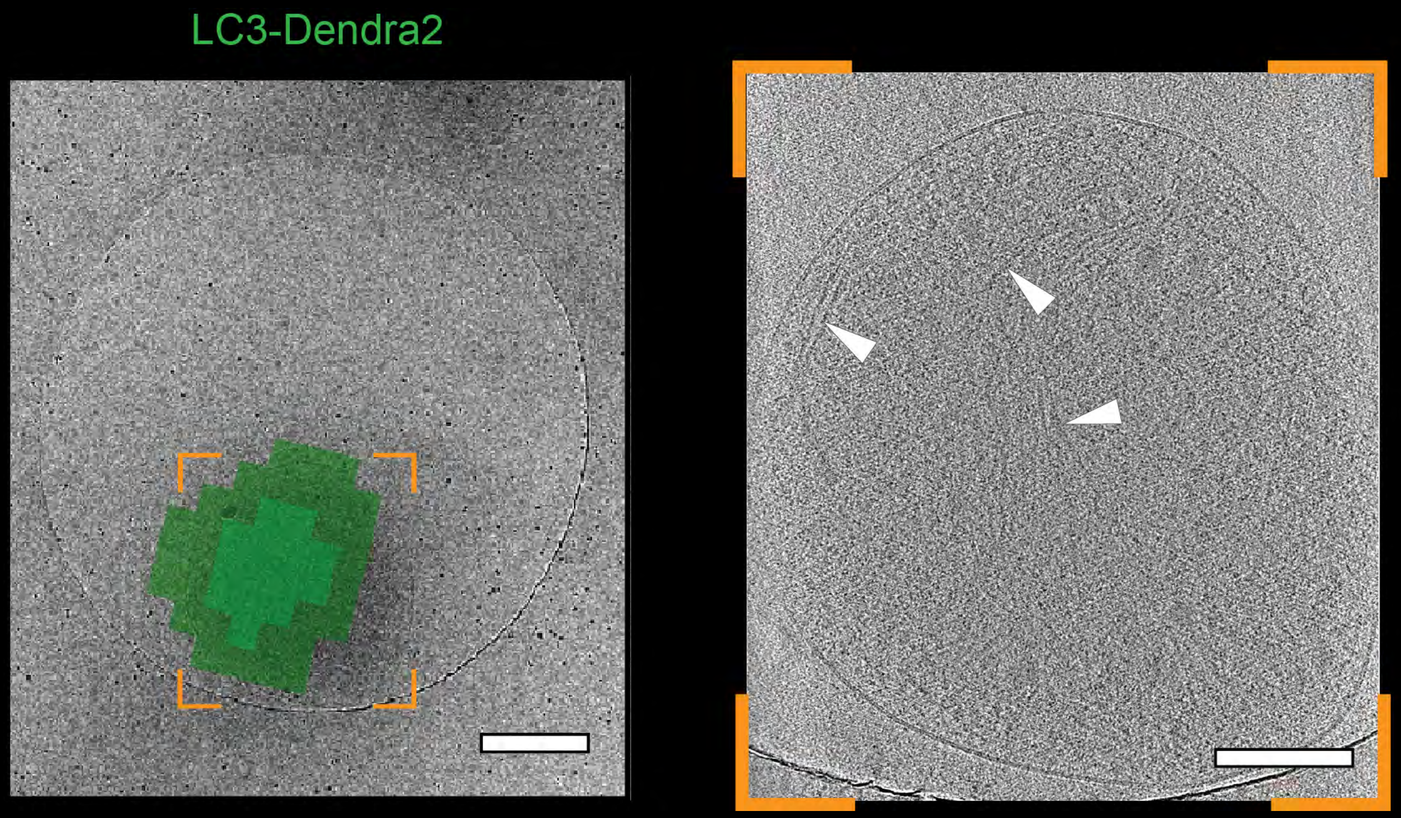
+BafilomycinA1



Patent: UM OTT 7751

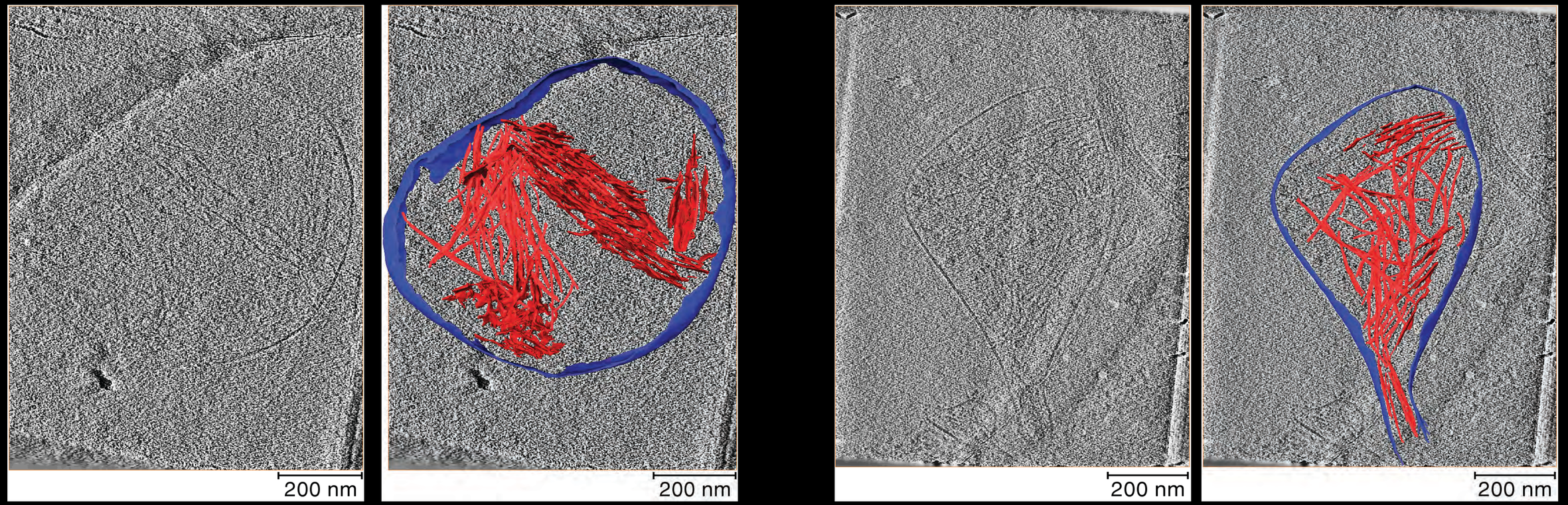
Safren et al. *J Biol Chem. 2021 Jul 22;101003*

Confirmation of TDP43 mislocalization by correlative light-EM microscopy



S. Mosalaganti, A. Erwin. M. Chang

Confirming autophagosomal/lysosomal TDP43 mislocalization

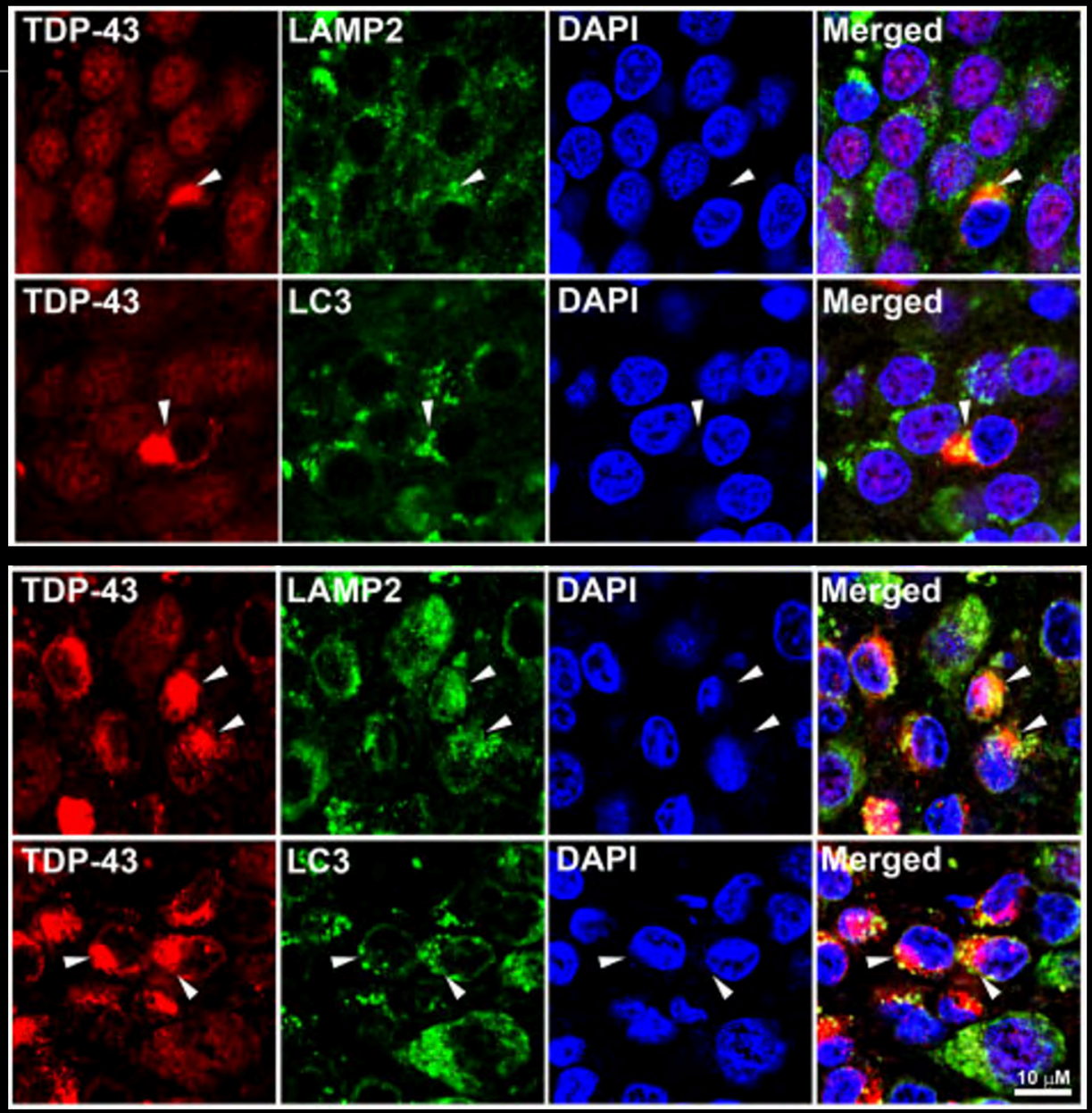


S. Mosalaganti, A. Erwin. M. Chang, M. Fernandez

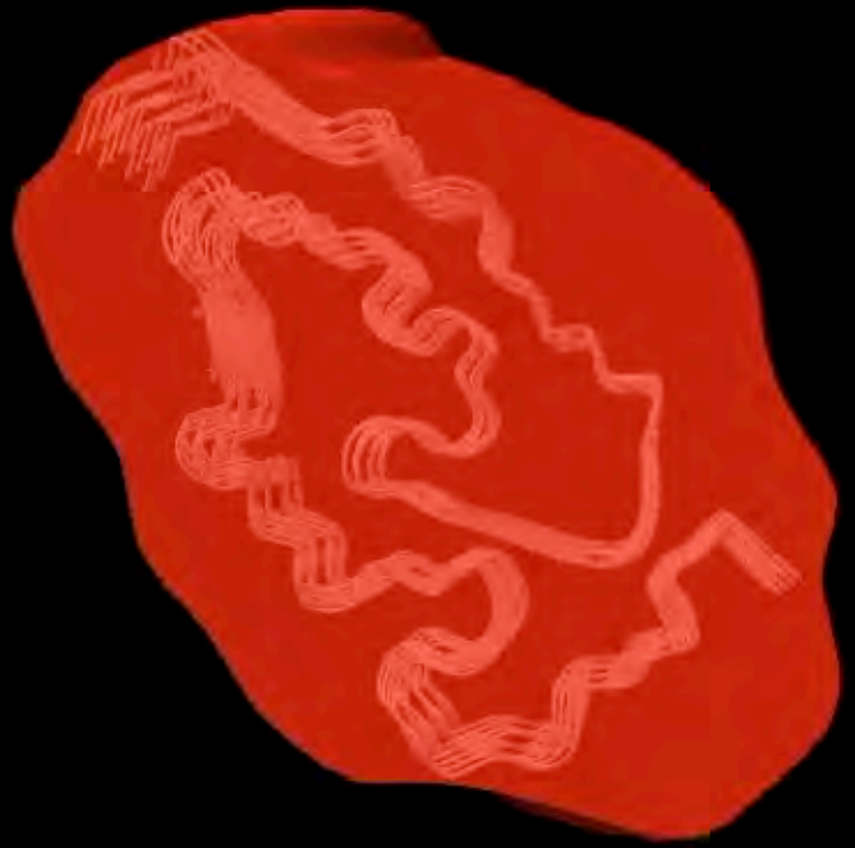
How relevant is this?

C9ORF72-related ALS

Sporadic ALS



Lee et al. *Brain Comm. 2019*

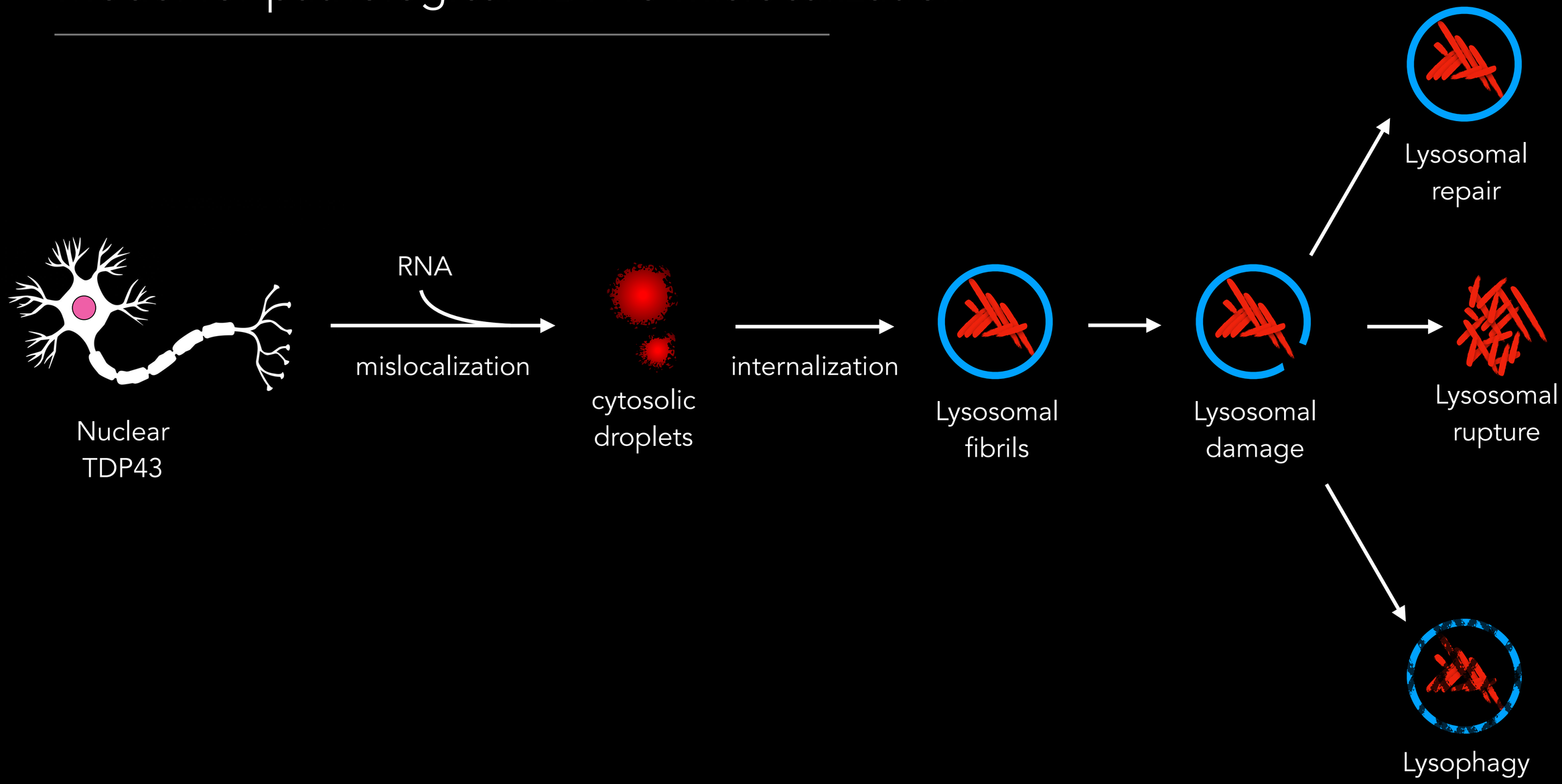


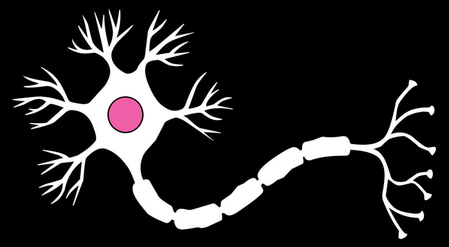
Cryo-EM map of
TDP43 fibrils from
FTLD-TDP brain
(Arseni et al., *Nature*, 2021)

FIT WITH PDB MODEL

S. Mosalaganti, A. Erwin. M. Chang, M. Fernandez

Model for pathological TDP43 mislocalization





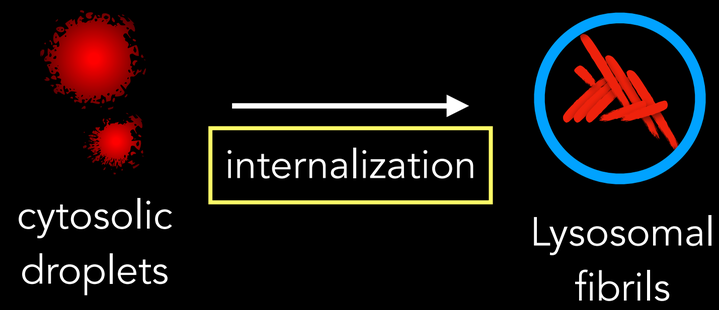
Nuclear
TDP43

RNA

mislocalization

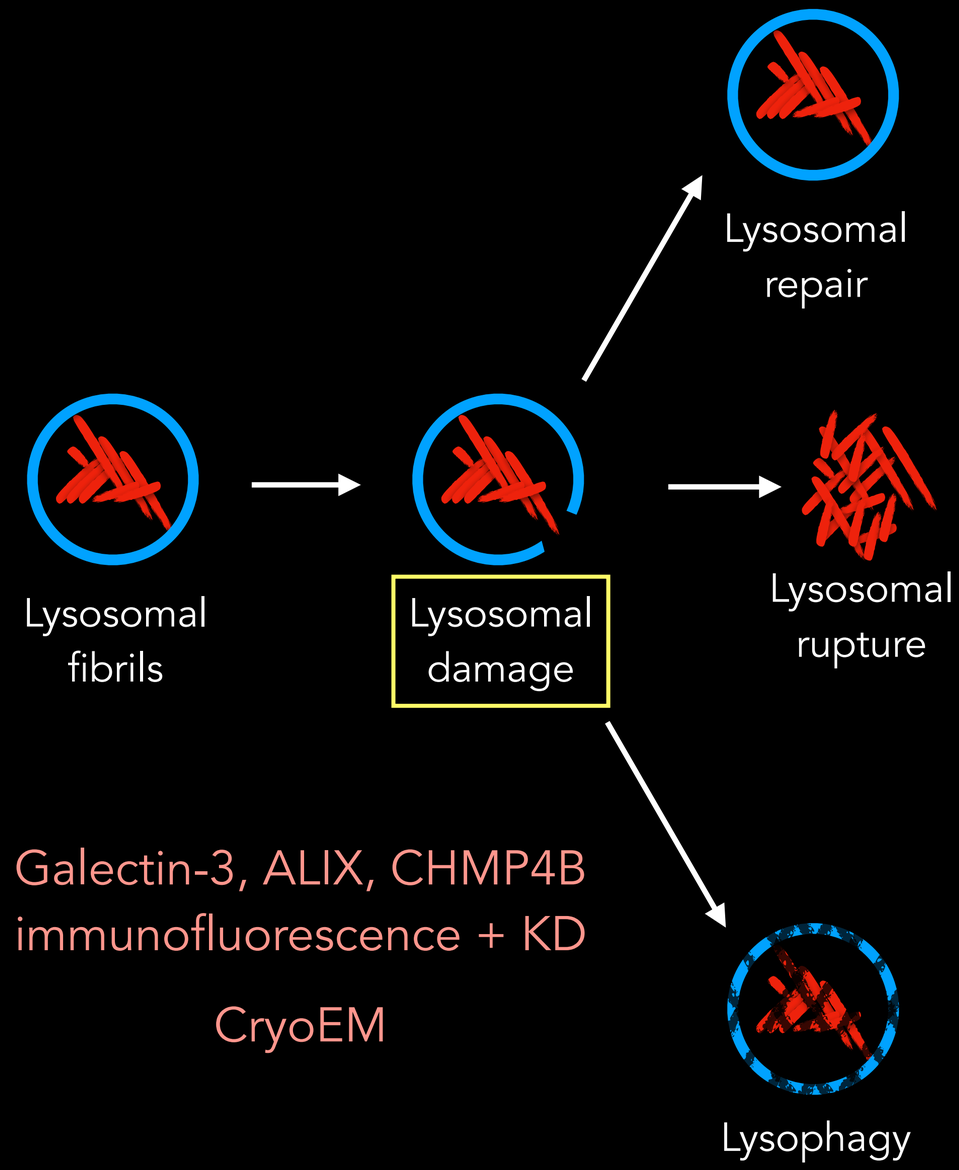
cytosolic
droplets

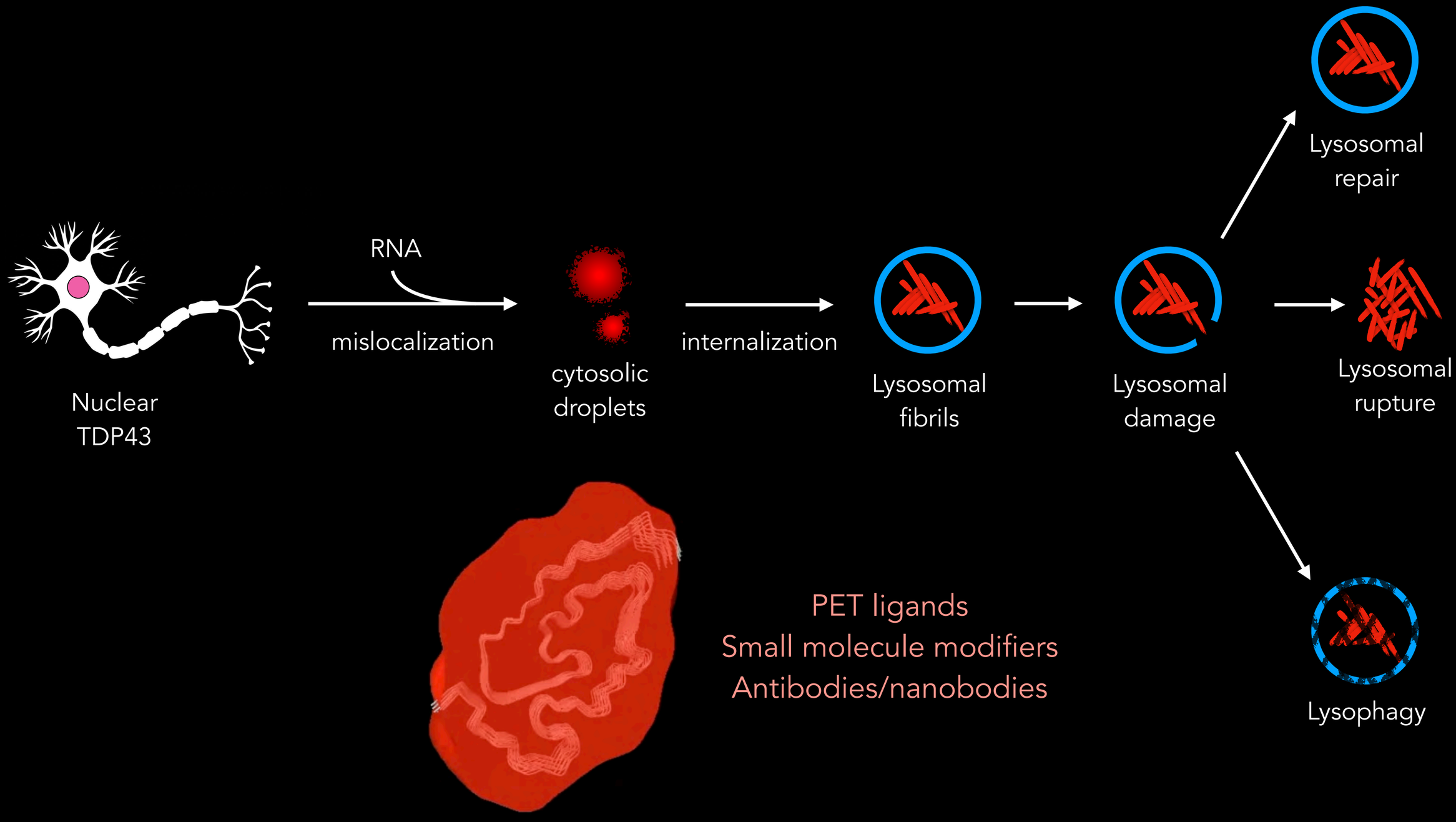
RNA length
GU content
Spacing of GU motifs
Other RBP motifs
Secondary structure
Methylation (m6A)
m6A-GU proximity
Other modifications
Stoichiometry



Proximity labeling of
HaloTag-TDP43

Mass spectroscopy


Lysosomal repair
Lysosomal fibrils
Lysosomal damage
Lysosomal rupture
Galectin-3, ALIX, CHMP4B
immunofluorescence + KD
CryoEM
Lysophagy


RNA
mislocalization
Nuclear
TDP43
cytosolic
droplets
internalization
Lysosomal
fibrils
Lysosomal
damage
Lysosomal
repair
Lysosomal
rupture
Lysophagy
PET ligands
Small molecule modifiers
Antibodies/nanobodies

Summary and next steps (2)

- TDP43 pathology can be recapitulated by RNA introduction
  - Nuclear mislocalization
  - Cytosolic fibril formation
  - Lysosomal origin of TDP43 aggregates?

- Search for small molecule TDP43 ligands
  - Selective for TDP43 fibrils
  - Biomarkers (PET)
  - Therapeutics?

Sami Barmada
Elizabeth Tank
Xingli Li
Michael Bekier
Amanda Erwin
Durga Atili
Babhru Roy
Emile Pinarbasi
Christopher Altheim
Ataur Rahman
Genesis Rodriguez
Megan Dykstra
Caroline Hsieh
Josephine Wu
Hari Sheela
Jake Waksmacki
Terry Hahn
Jen Bai

Shyamal Mosalaganti
Martin Fernandez
Matthew Chang

www.barmadalab.com
sbarmada@umich.edu

University of Michigan
Mats Ljungman
Nils Walter
Peter Todd
Hank Paulson
Hayley McLoughlin
Eva Feldman
Stephen Goutman
Vivian Cheung

Mayo Clinic
Wilfried Rossol
Veronique Belzil

St. Louis University
Yuna Ayala

WashU in St. Louis
Tim Miller

Mayo Jacksonville
Veronique Belzil
Wilfred Rossol

Funding
NIH/NINDS
Target ALS
Department of Defense
Robert Packard Center
Ann Arbor Active Against ALS
Angela Dobson, Lyndon Welch & family