

# Managing Mobility Outcomes in Vulnerable Seniors (MMOVeS): Current Status and Ways Forward

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MUHC Grand Rounds  
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# Objectives

1. To increase knowledge regarding self-management programs for seniors recently discharged from acute-care.
1. To increase your portfolio of evidence-based strategies aimed at improving mobility of vulnerable seniors.

# Questions

1. Do you really deliver patient-centered care?
2. Can self-management improve the mobility of seniors recently discharged from acute-care?

# Patient-centered Care

- Health care that is compassionate, empathetic, and focused on the patient's own worldview, goals, preferences, values, and needs.

# Patient-centered Outcomes

- Outcomes that patients care about: survival, symptoms, function, and health-related quality of life.

# Hospitalization for Seniors Sentinel Life Event

## Typical outcome study

- 2279 patients discharged from general medical wards (participated in two RCTs)
- 779 (34%) discharged with a new disability
- 1480 (66%) discharged with baseline function

Boyd, C. M., et al. (2008). Recovery of activities of daily living in older adults after hospitalization for acute medical illness. *Journal of the American Geriatrics Society*, 56(12), 2171–2179.

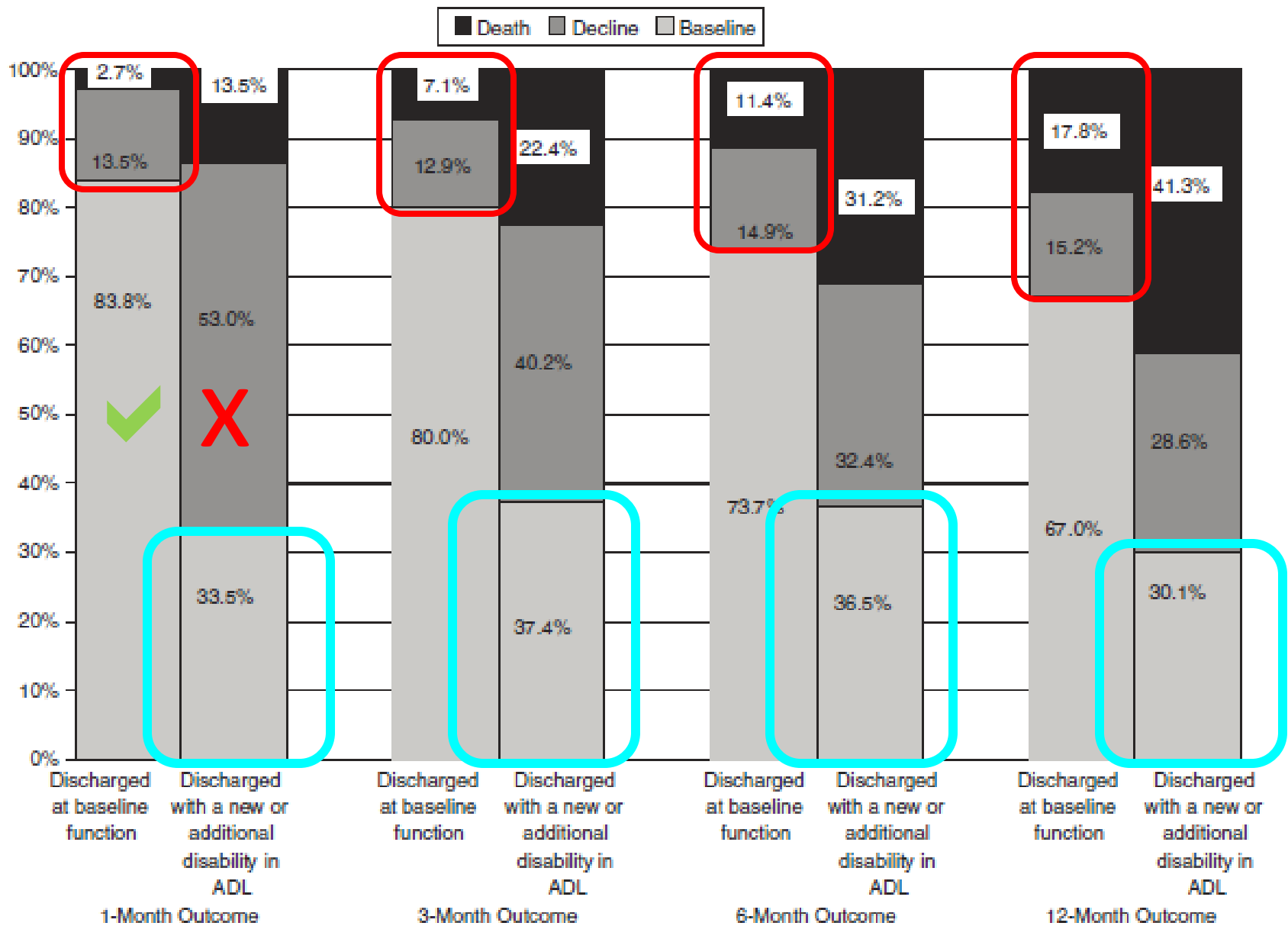


Figure 2. Course of self-care activity of daily living (ADL) outcomes and survival after hospitalization. Discharged at baseline function: N = 1,480. Discharged with new or additional disability in self-care ADLs: N = 799. Baseline: At baseline level of self-care ADLs function. Decline: With more self-care ADLs disabilities compared to baseline level of self-care ADLs function.

# What's Available for Improving Outcomes Post-Hospitalization?

- Several systematic reviews support that interventions can reduce re-admission
- OR: 0.82 [95%CI, 0.73-0.91]
- Most effective were interventions were those with
  - many components
  - more individuals in care delivery
  - supporting patient capacity for self-management

# Example of One Such Intervention

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PLoS one

## Cost-Effectiveness of an Intervention to Reduce Emergency Readmissions to Hospital among Older Patients

CLINICAL INVESTIGATIONS

Nicholas Grave:  
Finlayson<sup>3</sup>

Fewer Emergency Readmissions and Better Quality of Life for Older Adults at Risk of Hospital Readmission: A Randomized Controlled Trial to Determine the Effectiveness of a 24-Week Exercise and Telephone Follow-Up Program

Mary Courtney, PhD,\* Helen Edwards, PhD,<sup>†</sup> Anne Chang, PhD,<sup>†‡</sup> Anthony Parker, PhD,<sup>§</sup>  
Kathleen Finlayson, MN,<sup>†</sup> and Kyra Hamilton, BPsych (Hons)\*

# Target Population

## Inclusion

- $\geq 65$  years
- medical diagnosis
- one risk factor for readmission
  - $\geq 75$  years
  - multiple hospital admissions in the previous 6 months
  - multiple comorbidities
  - living alone
  - lack of social support
  - poor self-rating of health
  - functional impairment
  - history of depression

## Exclusion

- Home oxygen
- Wheelchair dependent or unable to walk independently for 3 m
- Nursing home resident
- Cognitive deficit
- Progressive neurological disease





# What's On the Spoon

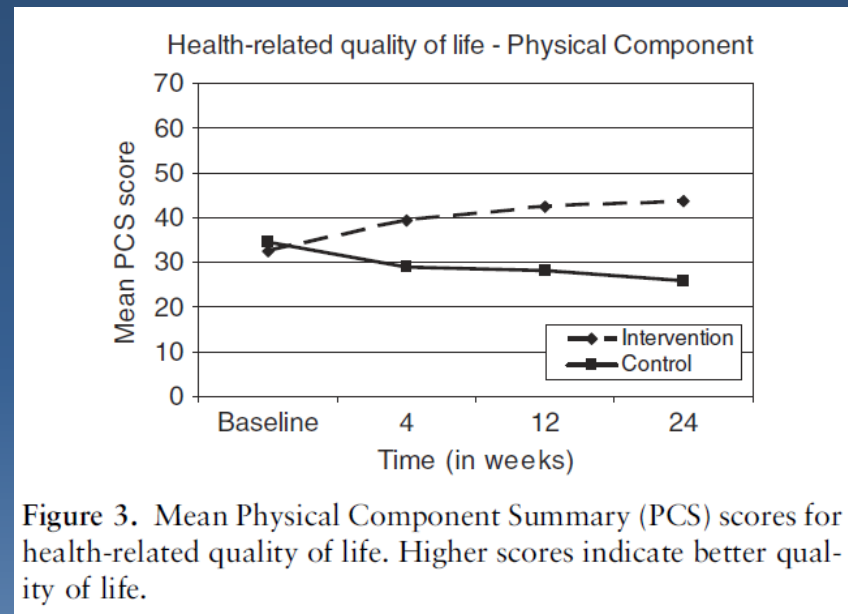
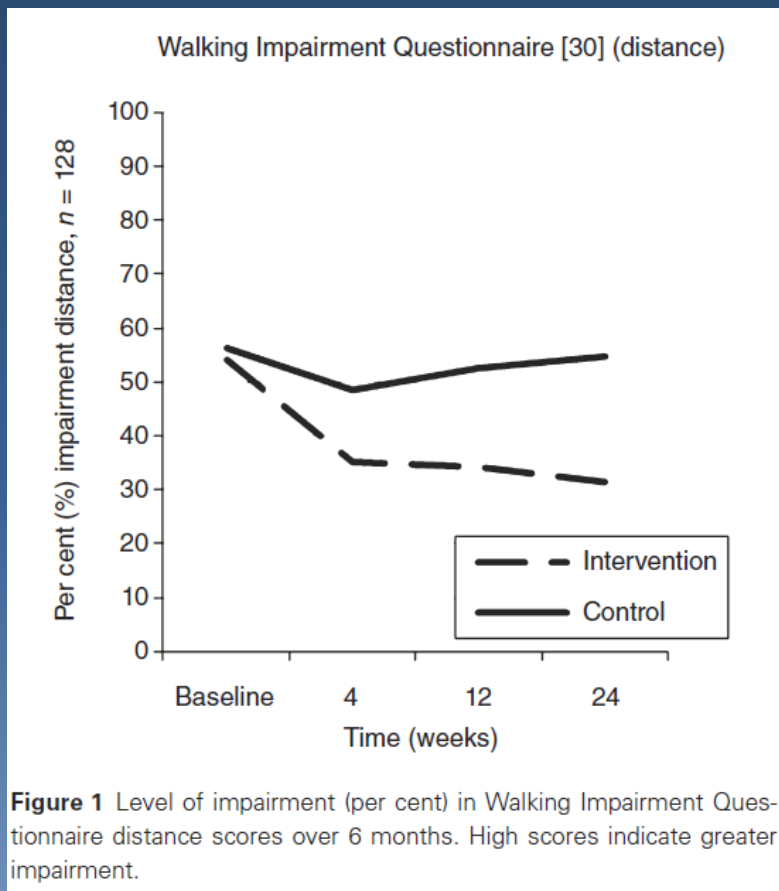
## In-hospital

- Advanced Practice Geriatric Nurse (APGN) and PT
- Assessment within 72 hours of admission
- Individualized exercise program developed
- Goals defined
- APGN visit very day to implement program ( $4.9 \pm 2.6$  days)
- Develop discharge planning

## After discharge

- Home program of exercises, journaling of activities
- Pedometer
- APGN visit within 48 hours post-discharge
- Assess caregiver, medications, reinforce exercise program
- Additional visits if required
- Exercise physiologist weekly for 6 weeks to reassess and revise program
- APGN calls weeks
- Available by telephone 7 days per week
- 10 monthly telephone calls for 6 months

# What did the intervention achieve?



# What did the intervention achieve?

## Any re-admission

- Control: 48% vs. Intervention: 26%
- NNT: 4.5

## Cost implications (on average for 24 week period)

- Costs of intervention lower by \$333
  - 95% Bayesian credible interval \$-1,932 to +1,282
- QALY increased by 0.118
  - 95% Bayesian credible interval 0.1 to 0.136.
- Net-monetary-benefit \$7,907 (assigns \$ to QALY)
  - 95% Bayesian credible interval \$5,959:\$9,995

Could we ever afford this at the  
MUHC?

What about the MUHC?

# What's available for improving outcomes post-discharge?

## Geriatric Liaison Nurse:

- Encourage patients to be autonomous
- Helps with the discharge planning to make sure services are in place upon discharge.

## Outpatient Physiotherapy

- **Waitlist = 830 patient**
- **34% > 65 years .**

## Home-care services

- reserved for short-term nursing interventions
- help with bathing 1x/week



# What about MUHC?

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- How common are functional challenges among elderly patients at the MUHC?
- What is in place to meet their challenges?

Contextualizing, promoting, and estimating longitudinal  
changes of mobility outcomes in older adults.

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**August, 2016**

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the  
requirements for the degree of Doctorate in Rehabilitation Science

**SUPERVISOR: Dr. Nancy E. Mayo**  
**CO-SUPERVISOR: Dr. Jose A. Morais**



**McGill**



# Co-investigators

- Suzanne Morin, Internal Medicine
- Stella Daskalopoulou, Internal Medicine
- Liane Feldman, General Surgery
- Antoinnete Di Re, Allied Health



# Target Population

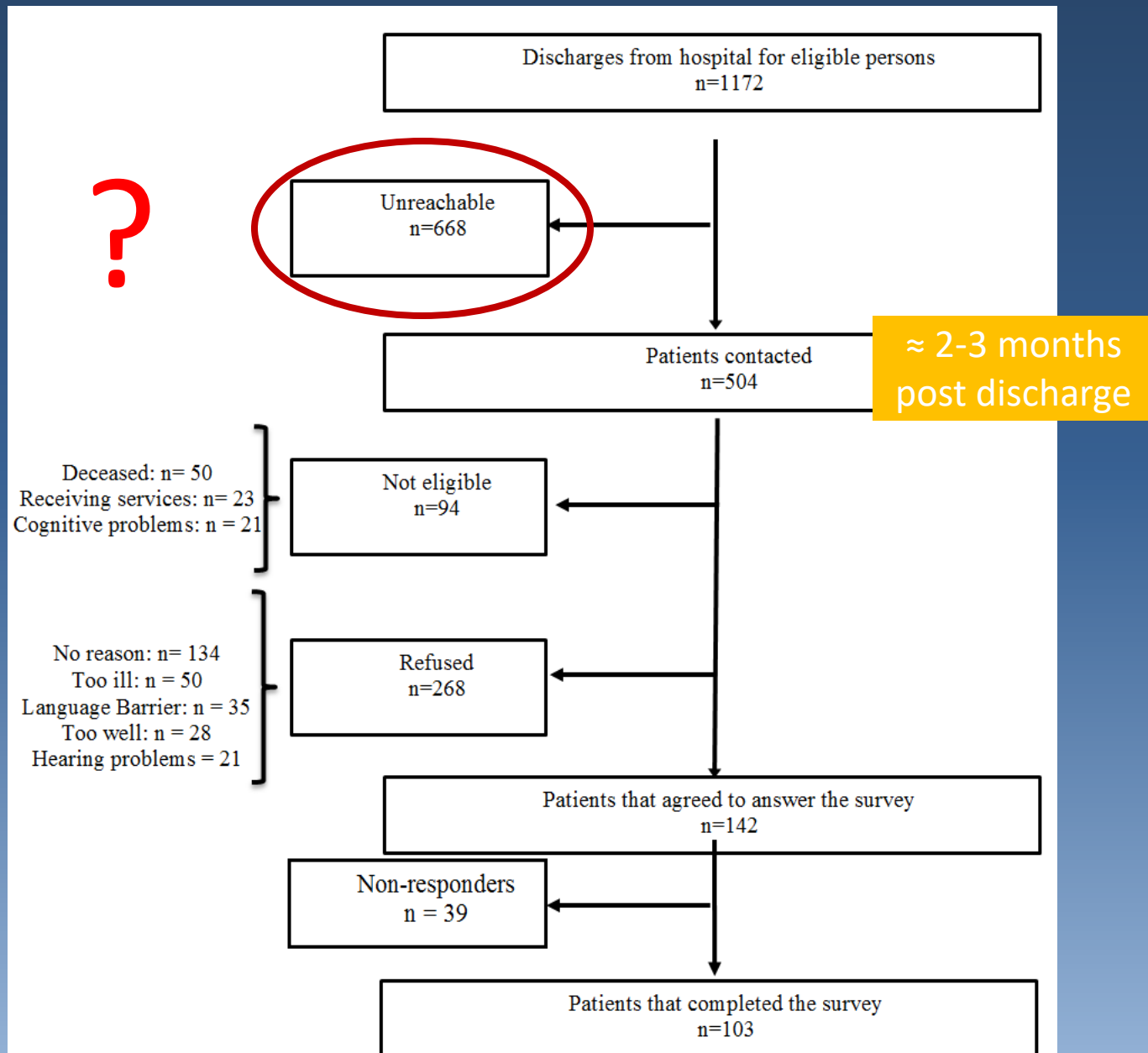
## Inclusion

- Community dwelling seniors
- $\geq 70$
- Recently discharged from RVH and MGH sites
- **Between 2013-2014**

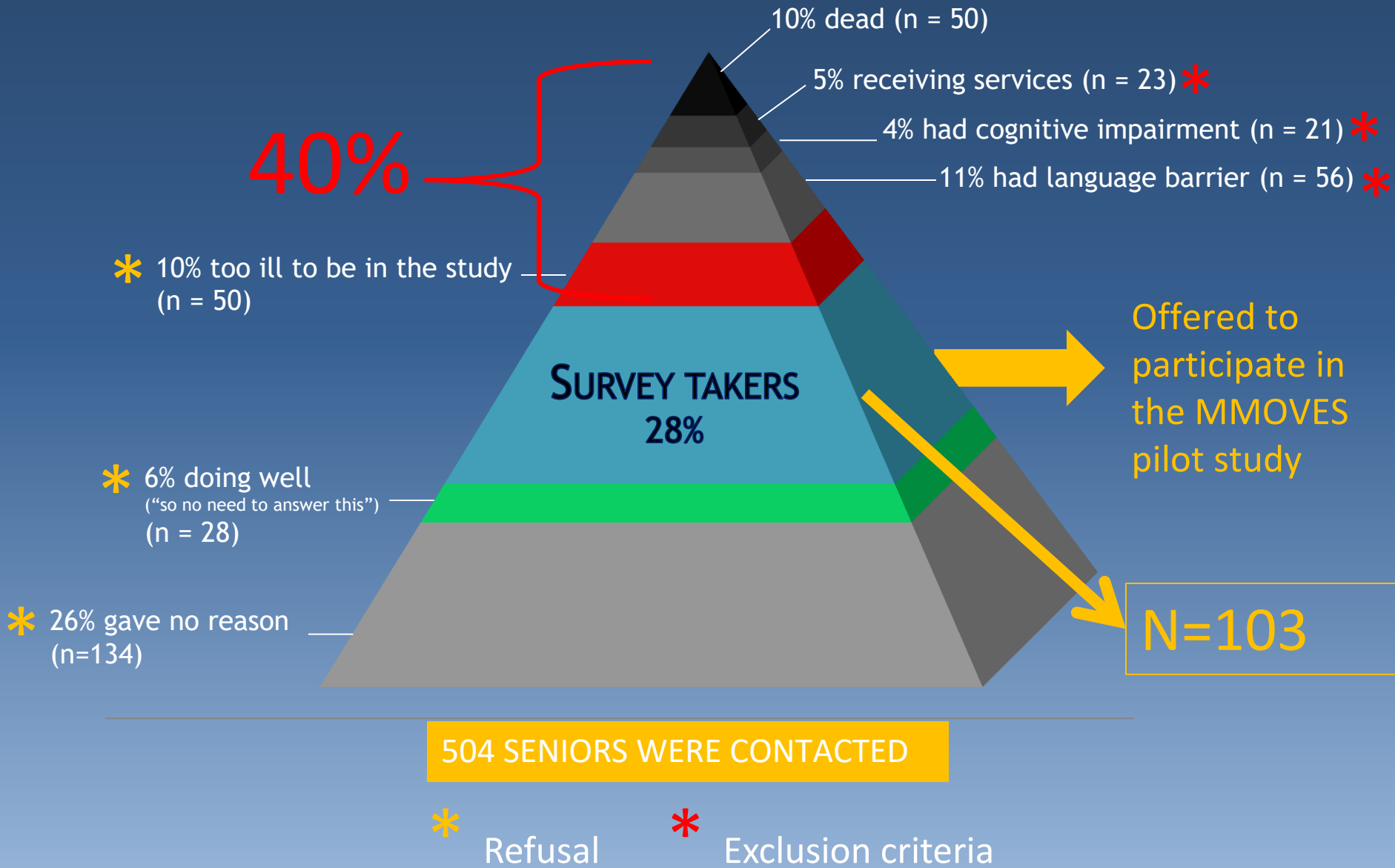
## Exclusion

- Patients for whom formal rehabilitation is part of usual care plan
  - orthopaedic or cardiac surgery
  - stroke or myocardial infarction
- Dementia as identified on the medical chart
- Communication barriers

# Functional needs of vulnerable seniors discharged from MUHC



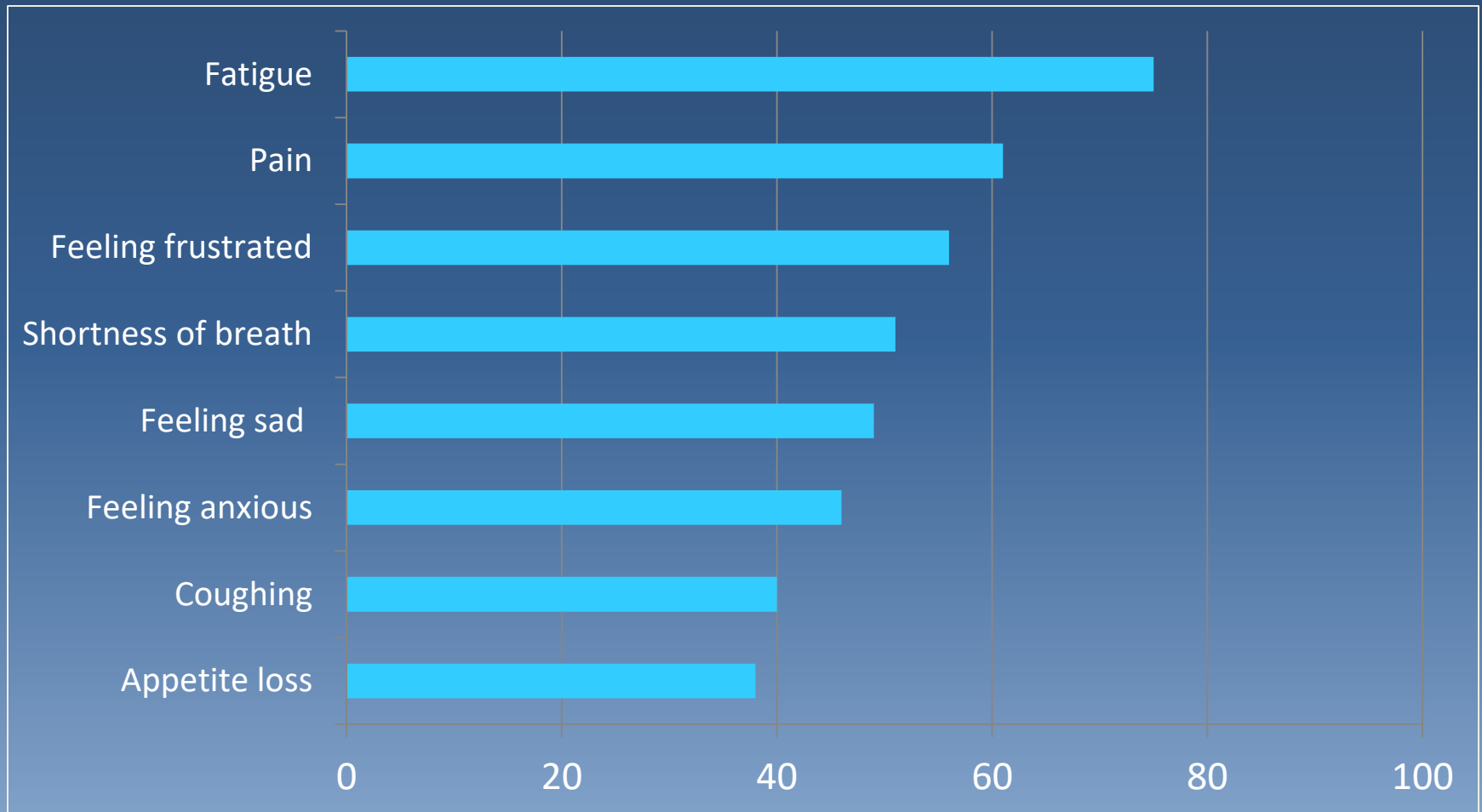
# Functional needs of vulnerable seniors discharged from MUHC



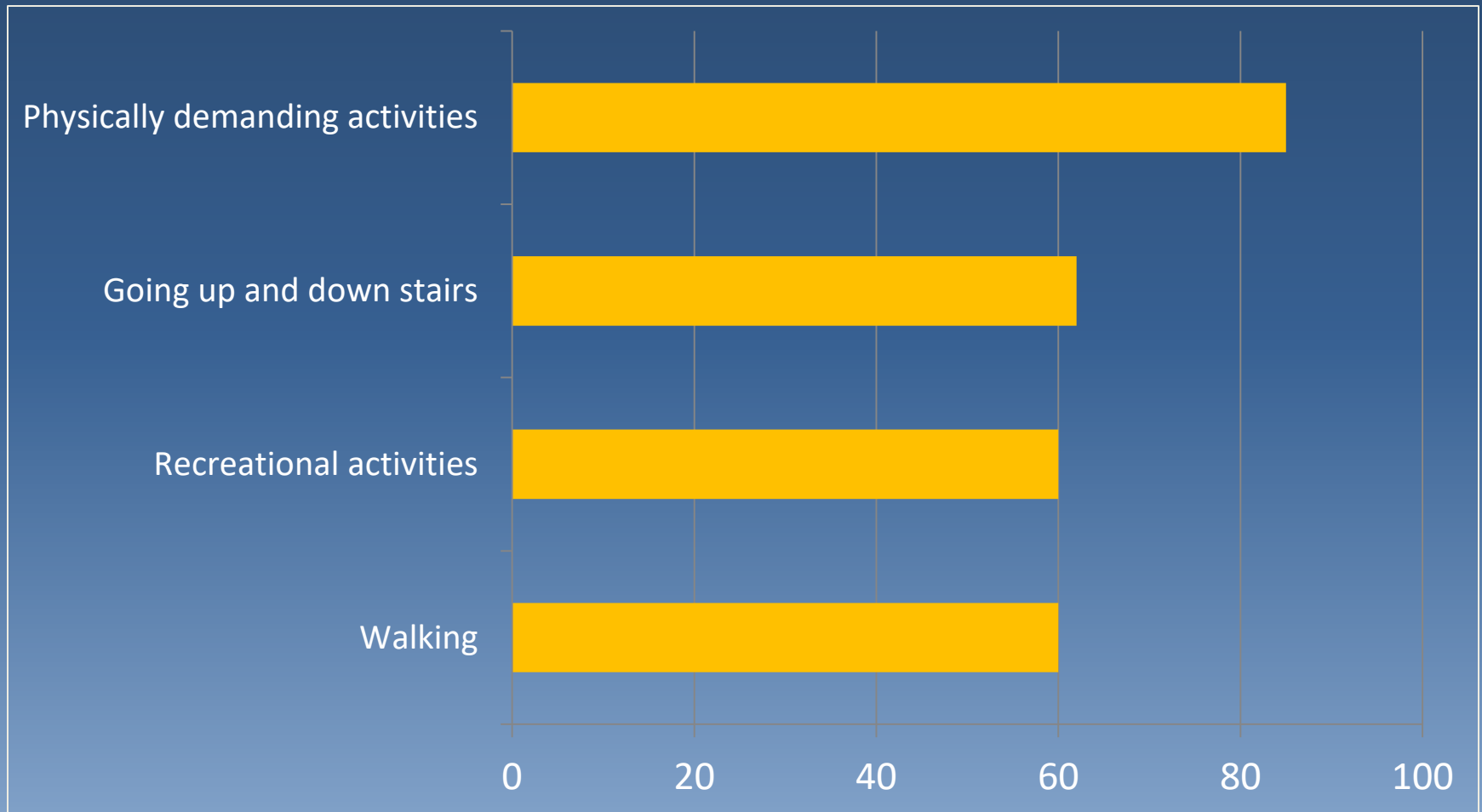
# Source of participants

MUHC department	% of participants
Internal Medicine	40
Short Unit Stay	20
Surgery	20
Urology	7
Gynecology	7
Acute-care	2
ENT	2
Geriatrics	2

# Persistent Impairments Post-Discharge (n=103)



# Persistent Activity Limitations Post-Discharge (n=103)



# Re-admissions

- Re-admissions are high for typically older hospitalized persons (mean age 60) with rates of 18-23%<sup>14, 15</sup>.
  - Limitation in activities of daily living (ADL) was the strongest predictor of readmission.
  - **Mobility challenges is the most common reason for limitation in ADL.**
- Locally, at the MUHC, 30-day readmissions following discharge from a medical floor exceeded the benchmarked quality indicator value (3% vs. >6%; <http://istrategie.aqess.qc.ca>)
- Hence, locally, there is interest in understanding this population and identifying ways to improve (patient-centered) outcomes post-hospitalization.

<http://intranetreseau.rtss.qc.ca/index.php?i-strategie>

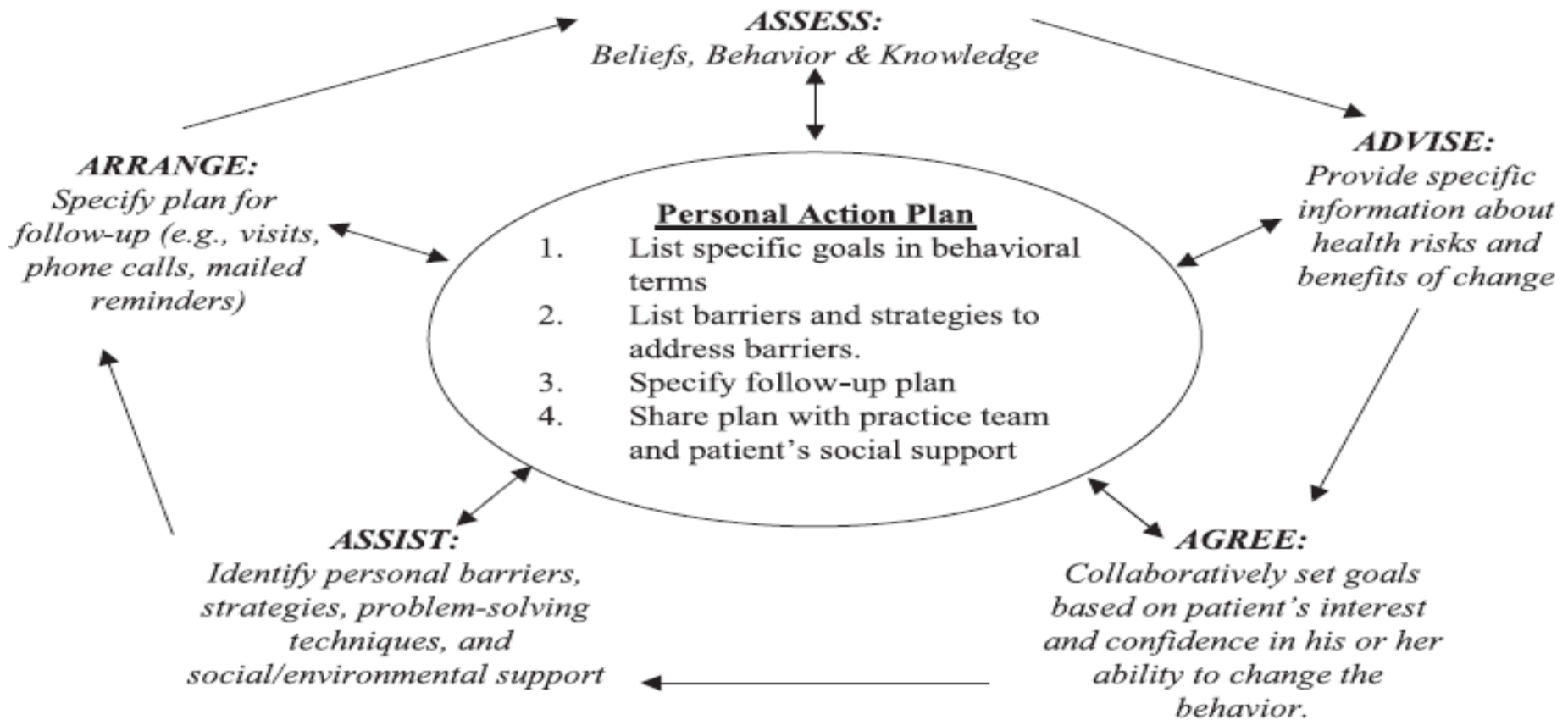
## Possible alternate solutions

- Replace therapy delivered to the patient with coaching patients to take charge of their own mobility limitations.
- Collaborative management of chronic conditions refers to the *“individual’s ability in engaging in activities that promote health, build physiologic reserves and prevent adverse sequelae; interacting with health care providers and adhering to treatment protocols; monitoring physical and emotional status and making appropriate management decisions on the basis of self-monitoring; and managing the effects of illness on the person’s ability to function in important roles and on emotions, self-esteem and relationships with others”* von Korff (page 1047)

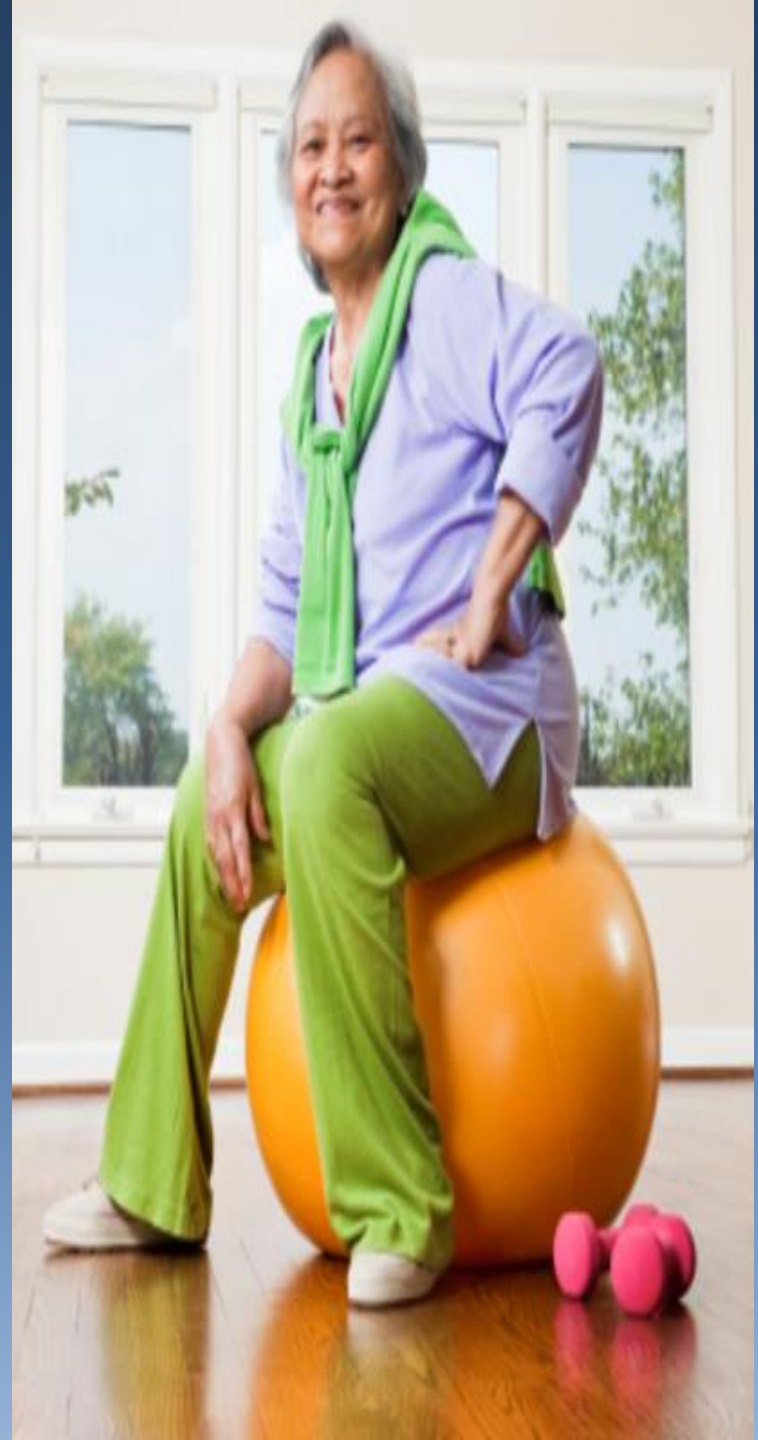
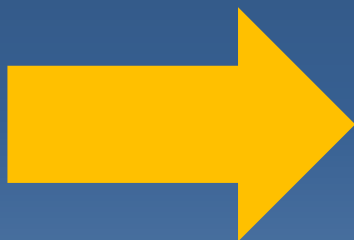
## SELF-MANAGEMENT PROGRAMS



# Five A's Model of Self-Management Support



**Figure 1.** A five A's model of self-management support is used to help patients develop personal action plans. Reprinted by permission of Lawrence Erlbaum Associates, Inc., from Glasgow R.E., et al.: *Self-management aspects of the improving chronic illness care Breakthrough Series: Implementation with diabetes and heart failure teams.* Ann Behav Med 24:80–87, Spring 2002.





PILOT  
ON DUTY

## Managing Mobility Outcomes in Vulnerable Seniors (MMOVeS): A Randomized Controlled Pilot Study.

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Accepted with revisions by Clinical Rehabilitation

# Managing mobility outcomes in vulnerable seniors (MMOVeS)

## OBJECTIVES

- To estimate the extent to which an individualized, exercise-focused, self-management program (MMOVeS), in comparison to exercise information, is more effective in improving mobility after 6 months among seniors recently discharged from hospital.

## METHODOLOGY

- Randomized controlled feasibility (pilot) study
- 11 outcome indicators: mobility (7), pain (2), health status (2)
- Evaluated at baseline and after 6 months

# Managing mobility outcomes in vulnerable seniors (MMOVeS)

Seniors discharged from MUHC

## Inclusion

> 70 and report limitation in walking more than 1 block or going up 1 flight of stairs; or unable to get groceries without help; or unable to do housework without help; self-rated health fair or poor; pain; or shortness of breath.

## Exclusion

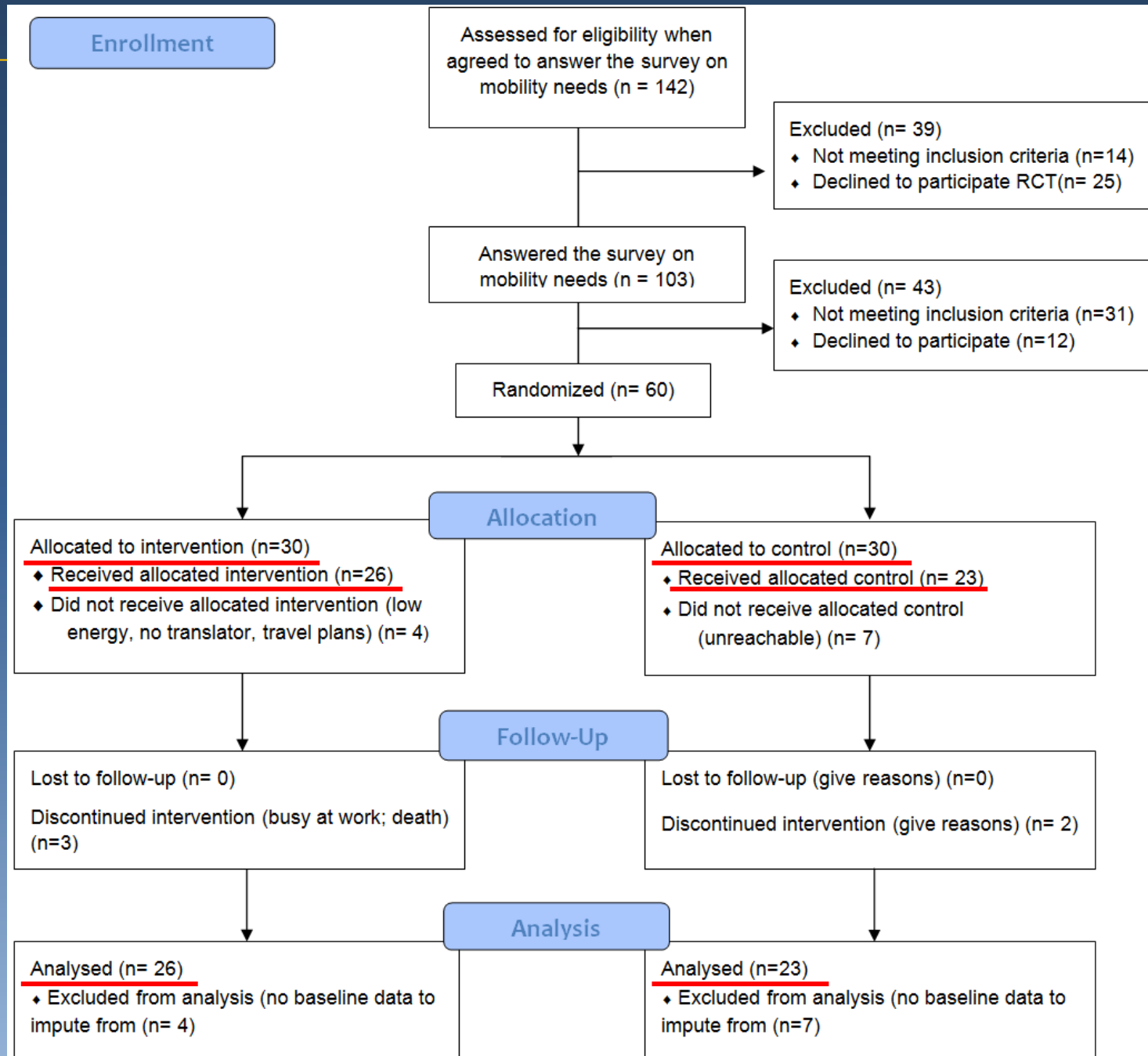
Subjects newly discharged with orthopaedic or cardiac surgery, or with stroke or myocardial infarction; people with dementia or with communication barriers.

142 assessed for eligibility at first contact

60 randomized

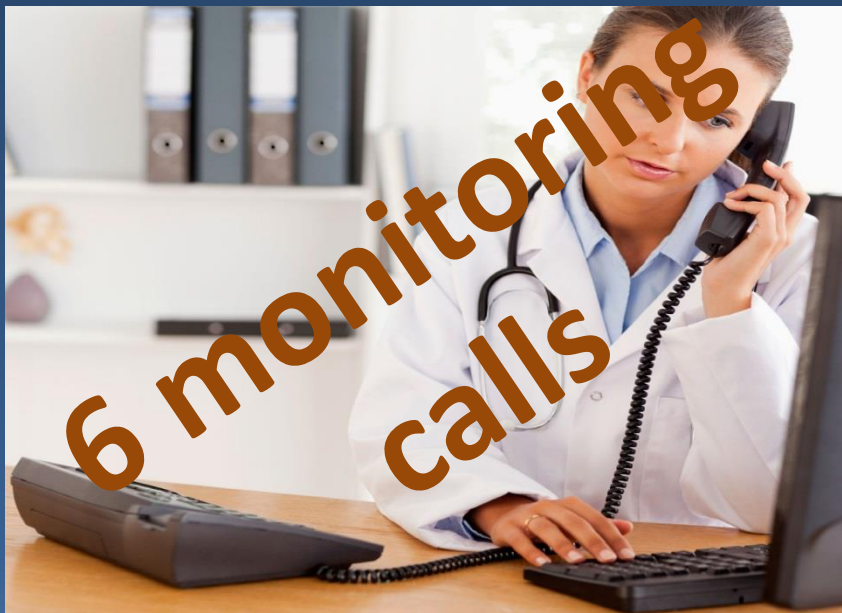
MMOVES = 26 participants  
Information = 23 participants

# Managing mobility outcomes in vulnerable seniors (MMOVeS)





# Managing mobility outcomes in vulnerable seniors



6 monitoring calls

## Goal Setting



Don't just think it. Ink it!"

### Set Goals:

- Setting goals is an important part of the recovery process.
- People who set goals get more accomplished
- Learning how to set goals is part of the Mobility Self-Management Program. People are taught to pick a manageable long-term goal and then develop an action plan of short-term goals to achieve it. Goals need to be broken down into a series of small steps
- After deciding on a goal, write it down.
- You need to have confidence in your goal. Choosing something too easy may not be challenging enough; choosing something too hard may be too difficult to reach.
- The goal should be important to you and that you want to reach.

### Make Sure your goals are SMART

- S** *Specific:* A general goal would be: get in shape. A specific goal would say: I will walk for 20 min, 3x/w
- M** *Measurable:* To determine if your goal is measurable, ask yourself: How will I know when it is accomplished
- A** *Attainable:* You can attain a goal you set when you plan wisely and establish a time frame that allows you to carry out steps towards the goal.
- R** *Realistic:* Your goal is probably realistic if you truly believe that it can be accomplished.
- T** *Timely:* A goal should have a time frame.



**Sit-to-Stand:** Sitting on a straight backed chair, stand up and sit down as quickly as you can until you cannot do it anymore. To start, you may want to have a support such as a table in front of you.



**Core Strength:** Sit on the edge of a chair with your back straight, while holding your belly button in, raise one knee for a count of 6, keeping your back straight, repeat with the other knee. All of your trunk muscles will be working to keep you steady.



**Wall push-ups:** Stand facing the wall with your feet about 1 foot from the wall and put your hands on the wall at shoulder height, bring your chest to the wall and pushback

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1 to 2 visits

# Managing mobility outcomes in vulnerable seniors (MMOVeS)

Table 1: Characteristics of participants from intervention and control groups at baseline

Characteristic	Intervention (n = 30)	Control (n = 30)	p-value
Age (y), mean $\pm$ SD	79 $\pm$ 7	78 $\pm$ 8	0.45
Women, n (%)	20 (67)	21 (70)	0.78
Disability, n (%)			
Walking	20 (66)	16 (53)	0.29
Climbing stairs	19 (63)	20 (66)	0.78
Housework	22 (73)	18 (60)	0.23
Groceries	22 (73)	17 (57)	0.17
Pain, n (%)	21 (70)	22 (73)	0.77
Self-reported health, n (%)			0.47
Excellent	0 (0)	1 (3)	
Very good	2 (6)	0 (0)	
Good	14 (47)	11 (37)	
Fair	13 (44)	16 (53)	
Poor	1 (3)	2 (6)	



Generic Exercise Guide Book

Tailored exercise program

Self-management support

Coaching on goal attainment



# Managing mobility outcomes in vulnerable seniors (MMOVeS)

## RESULTS

Outcome	Percentage of participants classified as making a positive response on each outcome measure	
	MMOVeS (n = 26)	Information (n = 23)
Walking between rooms	12%	4%
Getting into or out of the bath	20%	0%
Getting into or out of the car	30%	9%
Walking 2 blocks	31%	13%
Going up and down 10 steps	54%	35%
Carrying a shopping bag	46%	30%
Use a knife to cut food	23%	0%

- Statistical challenge on comparing two groups on multiple correlated outcomes
- Solution: Generalized Estimating Equation (GEE) to identify the probability of response in the intervention group relative to the probability of response in the control group, no matter how response is defined.

# Managing mobility outcomes in vulnerable seniors (MMOVeS)

## RESULTS

Outcome	OR (95% CI)
Mobility outcomes	3.08 (1.65 – 5.77)
Lower extremity function	2.60 (1.25 – 5.40)
Upper extremity function	2.98 (0.95-9.38)
Pain reduction	1.73 (0.57 – 5.09)
Health Perception	1.85 (0.83-4.60)

\*all models were adjusted for age and sex

$$\frac{(1-(\text{PEER}*(1-\text{OR})))}{((1-\text{PEER})*(\text{PEER})*(1-\text{OR}))}$$

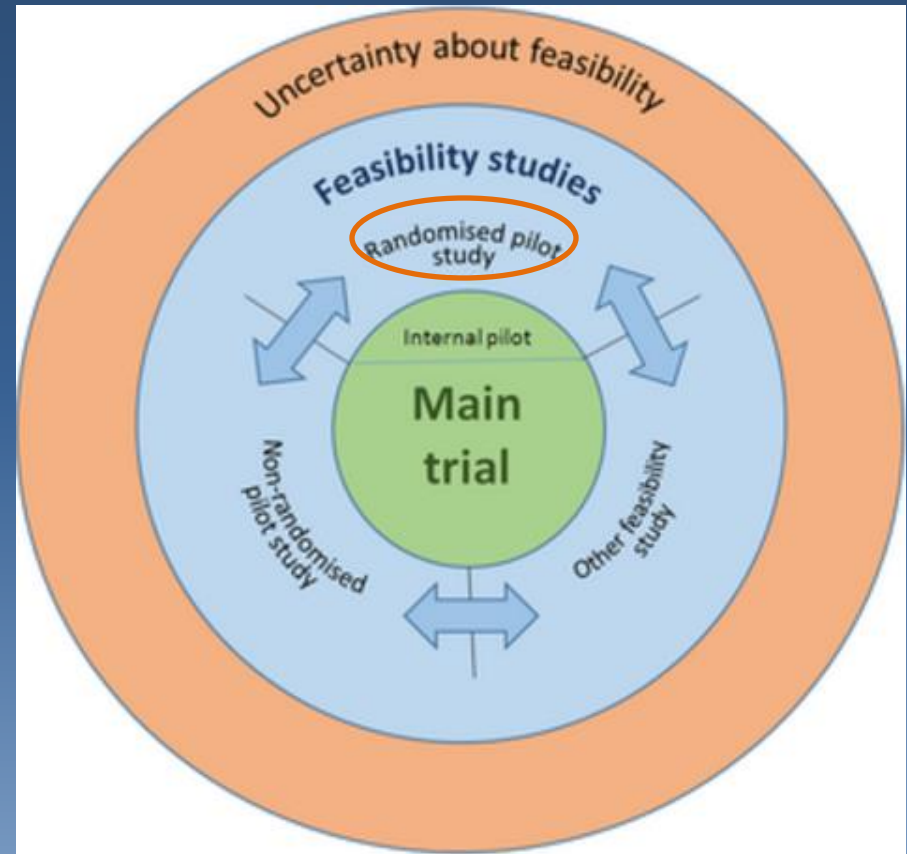
where PEER = proportion of success in the intervention group

$$\text{NNT} = 4$$

# Managing mobility outcomes in vulnerable seniors (MMOVeS)

## CONCLUSION

1. *MMOVES*, a mobility self-management program, was more effective than exercise *Information* in improving mobility outcomes in seniors recently discharged from acute-care - demonstrating feasibility of a main trial.



### Conceptual framework for pilot studies

Elridge et al (2016) PLoS ONE 11(3)

<http://dx.doi.org/10.1371/journal.pone.0150205.g007>

# Main Trial: MMOVES

- Nancy E. Mayo, Clinical Epidemiology, MUHC
- Jose Morais, Geriatrics, MUHC
- Sabrina Figueiredo, POTH
- Julio Fiore, Dept of Surgery, MUHC
- Liane Feldman, Dept of Surgery, MUHC
- Suzanne Morin, Internal Medicine, MUHC
- Johanne Monette, Geriatrics, JGH

# MMOVES Objective

- The primary confirmatory objective is to estimate, for mobility-limited seniors receiving or discharged from in- or out-patient acute care, the extent to which a physiotherapy-facilitated, mobility self-management intervention (MMOVeS) improves mobility in the six months following discharge, in comparison to general exercise recommendations.
- The primary outcome for this question is the proportion of people making meaningful gains on two mobility outcomes (gait speed and chair rises), quantified together as an ordinal variable.

# Types of Interventions



## Target

the intervention is specific for one outcome; others may be measured but they do not contribute evidentiary support



## Domino

the intervention targets one outcome and improvement in this proximal outcome initiates a cascade of downstream effects supporting the relevance of the intervention



## Fan

the intervention simultaneously affects many outcomes; each outcome contributes evidentiary support

**Personal factors**

Age, gender, reason and duration of hospital care, social support, living situation, type of dwelling



**Intervention**

MMOVEs vs. Recommendations

**Primary outcome**

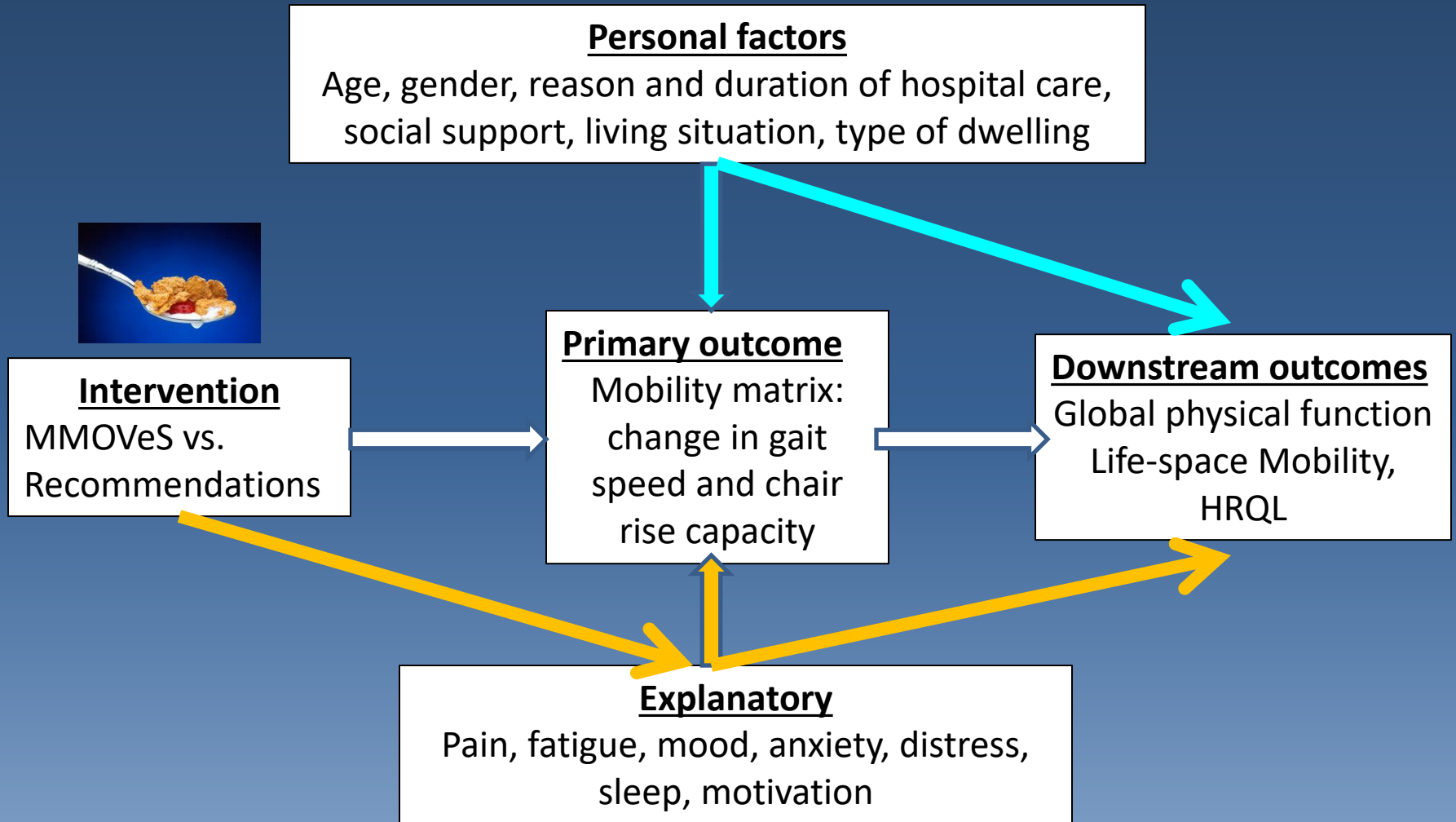
Mobility matrix:  
change in gait speed and chair rise capacity

**Downstream outcomes**

Global physical function  
Life-space Mobility,  
HRQL

**Explanatory**

Pain, fatigue, mood, anxiety, distress, sleep, motivation







# Intervention

Element	MMOVEs	Control (Recommendations)
1 <sup>st</sup> Visit	Assessment, Goal setting, choosing of 4-7 targeted exercises from exercise guide	Assessment, prescription of 4 to 7 exercises from exercise guide
2 <sup>nd</sup> Visit	Home visit to review goals, review assessment, development of action plan, review exercises	Telephone call to review exercises
Monitoring	6 via telephone to provide mentoring for modifying goals, modifying action plan, progressing or adding exercises	6 via telephone for purposes of keeping in contact
Final assessment	after 6 months	after 6 months

# Why this intervention?

- Evidence of effectiveness from feasibility phase
- Only 1 service participating (PT)
- Emphasis is on self-management
- We might be able to afford this
  - Two PT visits (\$200 @ \$100 per visit)
  - 6 phone calls (\$180 @ \$30 per call)

# Outcome

- Ordinal response permitting a test of proportions
- Clinically relevant as conclusion is about the probability an individual would have of a meaningful improvement in mobility in intervention group relative to the probability in the control group
- Rather than average change which can be achieved by some people making little change or even deteriorating, some around the average change, and some a much greater change
- These data are lost with a simple test of means

# Challenges of Measuring mobility outcomes for RCTs. Composite Change Matrix as a potential solution

		Outcome 1						
		-3 MIC	-2MIC	-1MIC	0	+1MIC	+2MIC	+3MIC
Outcome 2	-3MIC							
	-2MIC							
	-1MIC							
	0							
	+1MIC							
	+2MIC							
	+3MIC							

Numbers represent ranks of change with 1 indicating the least improvement (here deterioration) and 28 the most improvement.

MIC gait speed = 0.1 m/s

MIC distance walked = 50 meters

Perera S, et al. A. Meaningful change and responsiveness in common physical performance measures in older adults.  
*J Am Geriatr Soc.* 2006; 54: 743-9

Wright AA, et al. . A comparison of 3 methodological approaches to defining major clinically important improvement of 4 performance measures in patients with hip osteoarthritis.  
*J Orthop Sports Phys Ther.* 2011; 41: 319-27.

# Challenges of Measuring mobility outcomes for RCTs. Composite Change Matrix as a potential solution

		Outcome 1						
		-3 MIC	-2MIC	-1MIC	0	+1MIC	+2MIC	+3MIC
Outcome 2	-3MIC	1			2	4		
	-2MIC							
	-1MIC							
	0	2			3	5		
	+1MIC	4			5	6		
	+2MIC							
	+3MIC							

Numbers represent ranks of change with 1 indicating the least improvement (here deterioration) and 28 the most improvement.

MIC gait speed = 0.1 m/s

MIC distance walked = 50 meters

# Sample Size

## Feasibility Study

Frequency of response

- Walking outcome: 31% vs. 13% favouring the intervention group
- Sair climbing outcome, the response was 54% vs. 35%.

Composite odds ratio (OR)

- 3.08 favouring the intervention group
- 95%CI excluded 1 (1.65 – 5.77).

## Main Study

- OR from this pilot is likely over optimistic
- Study will be powered for an OR of 2.0
- Expected prevalence of favourable outcome in the control group will be set at 20%.
- 80 per group will provide 80% power (alpha 0.05), to detect this OR with a 95%CI of 1.2-3.3

**Ordinal outcome increases power by approximately 40% thus power will be maintained even with an expected degree of attrition and the need to statistically deal with incomplete data.**

# Status of MMOVES

- Submitted to CIHR
- NOT REJECTED YET
- Wish us luck in funding!
- Hope to have you help us refer patients soon

Thank you

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