Preventing Functional Decline

Jo-Anne Clarke MD FRCPC
Geriatrician
Clinical Lead, North East Specialized Geriatric Services

With thanks to...

- Dr J Puxty
- Dr W Dalziel
- Dr M Borrie
- Dr B Liu
- Dr S-L Kane
- Dr H Bergman

- No conflicts of interest with respect to the content of this talk

Learning objectives

- Appreciate the importance of identifying frailty as a contributor to functional decline
- Understand the concept of geriatric syndromes and their impact on function and disability
- Understand that modifying reversible risk factors for frailty, functional decline and geriatric syndromes can improve outcomes in this population
- Appreciate the need for a structured approach within primary care

Frailty

- Frailty is a complex syndrome of increased vulnerability and inadequate response to stressors due to impairments in multiple inter-related systems

2nd international Working Meeting on Frailty and Aging
Montreal March 2006
Frailty General Agreement

Frailty

- "..increased chance that the wheels will fall off because of so many problems that there is no more room for error" SL Kane Sept 16, 2005

Geriatrics: Heterogeneity

- 80 ♂, nonsmoker
- Return from scuba-diving expedition
- ER with 2 hour Hx of chest pain and SOB

- 81 ♀, lives in own home
- Severe OA, "some STM loss"
- Housebound x 3 mos
- 2 day Hx confusion as reported to family via PSW
- ER with confusion

- "I know frailty when I see it, but I can't define it"

A tale of 3 patients

Patient 1

- Hx ischemic cardiomyopathy, stable CHF, OA knee
- Lifts weights, exercises regularly
- Hospitalized for Sx for BPH
- Ambulated with IV, sedative for sleep
- D/C home after uneventful course

Patient 2

- CHF, Knee OA
- Hospitalized for Sx for BPH
- Fell walking to the bathroom with IV. Pain meds, resulting confusion. Bed rest led to progressive weakness, incontinence. Little Po intake
- D/c to NH for rehab

Linda Fried, 2007

Patient 3

- To ER after nonsyncopal fall, on floor x 5 hours, neighbour called 911
- PMHx: 1999 fall with femoral head #, OA in hip and hands, 15 lb weight loss in last year, increasing fatigue, grieving (not depressed)
- Widowed, lives alone, family and friends for food, check-in
- Admit to Medicine for falls, -ve work up
- Transfer to rehab for PT/OT. Slow course.
- After 2 weeks, ambulate 40 feet with walker. Unable to do self care, safety concerns
- D/c to assisted care, hope to eventually return home

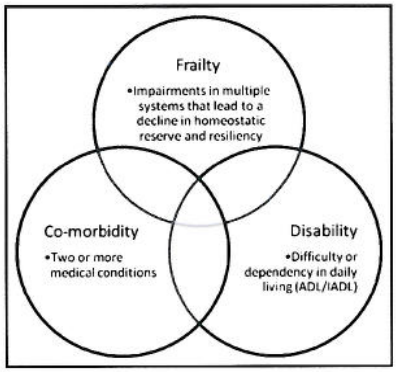
Linda Fried 2007

Frail, pre-frail, non-frail

- Patient#1 – not frail
- Patient # 2 – at risk – decompensates with minor stresses (in hospital → onset of frailty), progressive weakness, falls, loss of independence
- Patient #3 – frail, falls prior to admission, frailty leads to poor outcome → falls, rehab, loss of independence.

Frailty is not.....

- **Simply aging**
- **Disability**
- **Necessarily chronic**



Frailty Outcomes

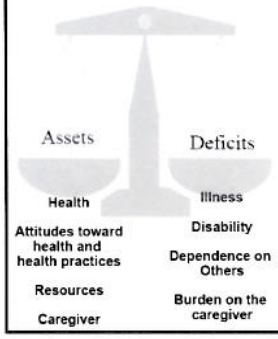
Fried et al. J Gerontol 2001
Rockwood Drugs and Aging 2000, Rockwood CMAJ 1994, Dasgupta 2008

- Increased susceptibility to adverse health outcomes
- Frail patients are at higher risk of:
  - Morbidity and mortality
  - Functional decline and caregiver burden
  - Hospitalization and health care utilization
  - Postoperative complications
  - Atypical disease presentation

Outcomes - Fried

- Prevalence of Frailty in those > 65 in CHS was 6.9%
- Ranged from:
  - 3.2% in those 65-70,
  - 25.7 % in those 85 to 89, and
  - 23.1 % in those 90+
- Overall Women aged 70 to 79: 11% in both CHS and WHAS.

Frailty is a dynamic balance...



Multiple Contributing Factors

- Predisposing
- Precipitating
- Enabling
- Reinforcing

Rockwood. CMAJ 1994; 150:489-507
Bergman www.frail-fragile.ca

Frailty: Is a "changeable" state

- Frailty is dynamic, characterized by frequent transitions between frailty states over time
- However, transition to states of greater frailty (up to 43.3%) was more common than states of lesser frailty (23.0%).

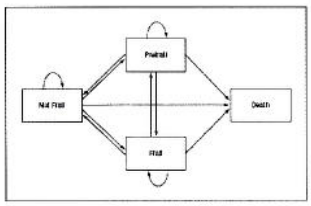
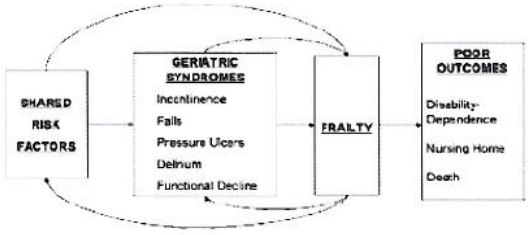


Figure 1. Multistate model depicting possible transitions between frailty states and death.

Gill et al. Arch Intern Med 2006;166:418-23.

Frailty is a Geriatric Syndrome



Medical model – disease specific

One Disease		Many Symptoms		One Rx
Cushing's	→	Moon facies Dorsocervical fat pad Hirsutism and acne Abdominal Striaie Easy Bruising Proximal Muscle Weakness Depression Hyperglycemia Hypertension	→	Remove source of ACTH/ cortisol (adrenal, pituitary)
Pneumonia	→	Fever Tachypnia, SOB Cough Myalgias	→	Antibiotics

Geriatric Syndromes
Not the usual medical model

Many factors	One Syndrome	Multiple Interventions
Circumstances of previous falls		Environmental changes
Medications		Med. Review & ↓
Vision		Ample lighting, ↓ glare, no bifocals while walking
Orthostatic hypotension	→ FALLS →	Treat (stockings, med review, hydrate) and compensate
Balance and Gait impairment		Dx and Rx, PhysioRx, gait aid
Impaired Cognition		Med review, environmental modification
LE weakness		Exercise, Physiotherapy
Foot/joint problems		Physiotherapy, footwear
Home hazards		Environmental Modification

Tinetti, NEJM 2008

Geriatric Syndromes –cont'd

Many factors	One Syndrome	Multiple Interventions
Dehydration		Rehydration protocol
Hearing Impairment		Hearing protocol (aids, adaptive equipment, wax disimpaction) OD
Cognitive Impairment		Orientation protocol cognitive activities TID
Sleep Deprivation	→ DELIRIUM →	Unit wide noise reduction, reduce lights, Med SCH adjustments
Vision Impairment		Vision Protocol (aids, adaptive equipment) OD
Immobility		Early mobilization TID Restraint avoidance
Multiple meds, esp. psychoactive		Medication review/ avoid psychotropics

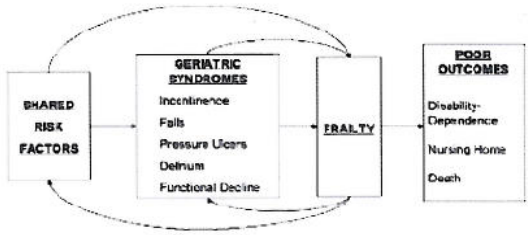
Inouye, NEJM 2006

HRS Study - Association btw disease, geriatric syndromes, and disability

Condition	RR of disability
Number of geriatric conditions	
1	2.1
2	3.6
3+	6.6
Stroke	3.0
Diabetes	1.3
Heart disease	1.2
Cancer	1.0

Ann Intern Med 2007;147:156-64

Frailty is a Geriatric Syndrome



Risk factors for functional decline community dwelling

Cognitive impairment		Modify reversible factors
Depression		Asses and treat
High Disease burden		Co-manage
High and low BMI		Healthy diet, exercise
LE functional limitation		Exercise and physio
Low frequency of social contacts	FUNCTIONAL DECLINE	Social engagement
Low level of physical activity		Exercise and physio
No ETOH use		?
Poor self perceived health		?
Smoking		Smoking cessation
Vision impairment		Assess and treat

Common Risk factors

Falls	Delirium	Cognitive impairment	Frailty
Previous falls	Dehydration	**Medications**	Cognitive impairment
Medications	Hearing impairment	Orthostatic hypotension	Depression
Vision	Cognitive impairment	Medical illness/A or C	High Disease burden
Orthostatic hypotension	Sleep Deprivation	HTN	High and low BMI
Balance and Gait impairment	Vision impairment	ETOH (none/heavy)	LE functional limitation
Impaired Cognition	Immobility	Low level physical/social activity	↓ frequency of social contacts
LE weakness	**Multiple meds**	Family history	Low level of physical activity
Foot/joint problems		Depression	**Sedative use**
Home hazards		**Vision impairment**	**Poor self perceived health**
		Hearing impairment	**Smoking**
		Pain	**Vision impairment**

Common Risk factors

Falls	Delirium	Cognitive impairment	Frailty
Previous falls	**Dehydration**	Medications	Cognitive impairment
Medications	Hearing impairment	**Orthostatic hypotension**	Depression
Vision	Cognitive impairment	Medical illness/A or C	High Disease burden
Orthostatic hypotension	Sleep Deprivation	HTN	High and low BMI
Balance and Gait impairment	Vision impairment	ETOH (none/heavy)	LE functional limitation
Impaired Cognition	Immobility	Low level physical/social activity	↓ frequency of social contacts
LE weakness	**Multiple meds**	**Family history**	**Low level of physical activity**
Foot/joint problems		Depression	**Sedative use**
Home hazards		Vision impairment	**Poor self perceived health**
		Hearing impairment	**Smoking**
		Pain	**Vision impairment**

Common Risk factors

Falls	Delirium	Cognitive impairment	Frailty
Previous falls	Dehydration	Medications	**Cognitive impairment**
Medications	Hearing impairment	Orthostatic hypotension	**Depression**
Vision	Cognitive impairment	**Medical illness/A or C**	**High Disease burden**
Orthostatic hypotension	Sleep Deprivation	HTN	**High and low BMI**
Balance and Gait impairment	Vision impairment	ETOH (none/heavy)	**LE functional limitation**
Impaired Cognition	**Immobility**	**Low level physical/social activity**	↓ frequency of social contacts
LE weakness	Multiple meds	Family history	**Low level of physical activity**
Foot/joint problems		Depression	Sedative use
Home hazards		Vision impairment	Poor self perceived health
		Hearing impairment	Smoking
		Pain	Vision impairment

Common Risk factors

Falls	Delirium	Cognitive impairment	Frailty
Previous falls	Dehydration	Medications	**Cognitive impairment**
Medications	Hearing impairment	Orthostatic hypotension	Depression
Vision	**Cognitive impairment**	Medical illness/A or C	High Disease burden
Orthostatic hypotension	Sleep Deprivation	HTN	High and low BMI
Balance and Gait impairment	Vision impairment	**ETOH (none/heavy)**	**LE functional limitation**
Impaired Cognition	Immobility	**Low level physical/social activity**	**↓ frequency of social contacts**
LE weakness	Multiple meds	Family history	**Low level of physical activity**
Foot/joint problems		Depression	Sedative use
Home hazards		Vision impairment	Poor self perceived health
		Hearing impairment	Smoking
		Pain	Vision impairment

Common Risk factors

Falls	Delirium	Cognitive impairment	Frailty
Previous falls	Dehydration	Medications	**Cognitive impairment**
Medications	**Hearing impairment**	Orthostatic hypotension	**Depression**
Vision	Cognitive Impairment	Medical illness/A or C	**High Disease burden**
Orthostatic hypotension	Sleep Deprivation	HTN	High and low BMI
Balance and Gait impairment	**Vision impairment**	ETOH (none/heavy)	LE functional limitation
Impaired Cognition	Immobility	Low level physical/social activity	↓ frequency of social contacts
LE weakness	Multiple meds	Family history	Low level of physical activity
Foot/joint problems		Depression	Sedative use
Home hazards		**Vision impairment**	Poor self perceived health
		Hearing impairment	Smoking
		Pain	**Vision impairment**

Shared RF

- Recent systematic review identified common risk factors that appeared consistently across all geriatric syndromes (pressure ulcers, incontinence, falls, functional decline, delirium)
  - Older age
  - Functional impairment
  - Cognitive impairment
  - Impaired mobility

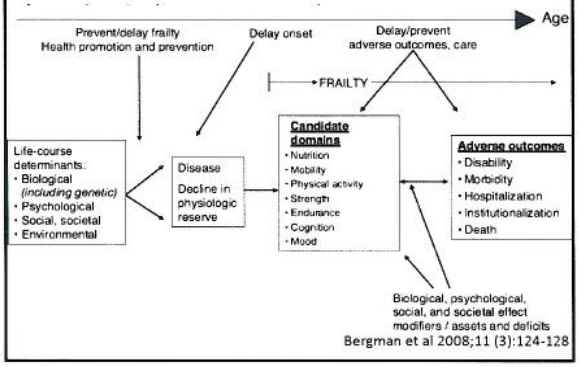
3 of 4 amenable to intervention:
- Maintain cognition
- Exercise or balance training
- Environmental modification to improve function

Inouye et al 2007

Targeting (frailty) functional decline

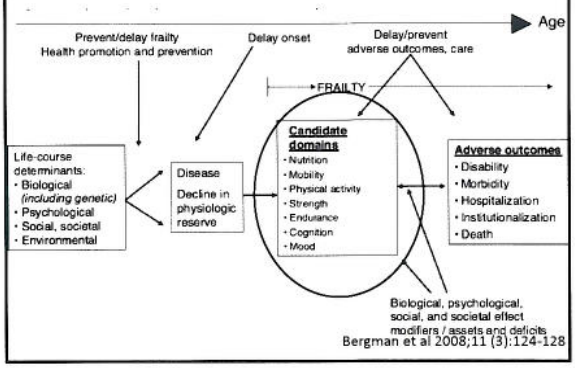
Is it reversible? Is it preventable?

Frailty: a possible framework



Bergman et al 2008;11 (3):124-128

Frailty: a possible framework



Bergman et al 2008;11 (3):124-128

Comprehensive assessment

An individualized approach to Risk Factor Modification

- Medication Review
- Optimize Communication (vision, hearing)
- Dehydration/Orthostatic BP
- Mood
- Cognition
- Function
- Balance
- Gait Aids, Environmental modification
- Formal and informal supports

Interdisciplinary

With timely access and open with communication home care /community services

Activities of Daily Living: The key to diagnosis

- Basic Activities of Daily Living (ADL's)
  - transferring, bathing, toileting, eating, dressing, continence
- Instrumental ADL's
  - phone, cooking, laundry, cleaning, meds, transportation, finances, shopping
- Activity-Related Instrumental ADL
  - recreation, occupation, community service

ADL's/Function : The key to diagnosis

- Questions:
  - "When did you start/stop…."
  - "Why did you start/stop…."
- Establish the timeline for changes via ADL's
- Look for reasons for the changes, address reversibility
  - Depression
  - Medication changes
  - Postural hypotension

Medications and Function

- Several studies have shown associations between exposure to certain classes of medications, especially those with sedative and anticholinergic actions, and physical and mental function.
- Higher Serum antichiolinergic activity has consistent shown to negatively affect the cognitive performance of older adults (1)
- Anticholinergic drug burden is strongly associated with limitations in physical and cognitive function. (2-3)
- Sedative burden is associated with impaired functioning (3-4.)

1. Campbell et al Clin Interv Aging 2009;4:225-33
2. Landi et al. Clin Pharmacol Ther 2007;81:235-41
3. Cao e tal. Clin Pharmacol Ther 2008;83:422-429
4. Gray et al J am Geriatric Soc 2003;51:1563-70

Drug Burden Index and Functional Decline

- The Drug Burden Index (DBI), a measure of exposure to anticholinergic and sedative medications
- Has been independently associated with physical and cognitive function in a cross-sectional analysis
- In a longitudinal study looking at at the relationship between DBI and functional outcomes high functioning community dwelling older people, DBI is associated with poorer measures of physical function over 5 years

Health, Aging and Body Composition Study, Hilmer et al. Am J Med 2009;122;1142-49

PRIMARY CARE APPROACH TO CGA CAN IMPROVE FUNCTIONAL OUTCOMES

Primary healthcare providers can improve functional ability

- RCT, 3years, 34 municipalities in Denmark
- 17 municipalities (2104 people)allocated to the intervention:
- Education for all municipality HC professionals who conducted routine preventative home visits to people > 75
- 2x/yr: key people from each municipality were asked to promote training in the use and interpretation of a standardized assessment tool (6 sessions over 3 years)
- Visiting professionals were asked to assess functional ability at every visit
  - Tiredness -> interpreted as an early sign of disability
  - Prompted search for reasons, and contact GP if medical suspected

Intervention

Introduction to all local GPs to a short geriatric assessment, and were encouraged to use SGA in their usual clinical practice.

- Incorporate the 5 mnemonic D's
- Perform a comprehensive medication review
- Focus on how older people manage everyday life, and what has changed (why?)
- Use of multidimensional interventions targeting functional abilities rather than diagnoses.
- Interdisciplinary approaches to common problems focusing on locally applicable solutions
- Individualized counseling on how to continue or initiate physical activity was a mantra, e.g. by detailed mapping of the community's physical activity services ranging from elder sports to specific rehabilitative services.
- Refer back to the visitors to let them take over motivational follow-up and ensure that such interventions were actually implemented.

TABLE 1

The 5 mnemonic Ds to incorporate into usual clinical practice

Drugs	
	Comprehensive ongoing review at every contact with focus on compliance/concordance
	Avoid nonsteriodal anti-inflammatory drugs (NSAID) and all psychotropics and try to avoid unnecessary polypharmacy
Delirium	
	Disease–dehydration–diabetes
	Exclude urinary tract infection
	Enough daily liquid intakes? Concentrated urine?
	Orientation?
Dementia	
	Delayed three-word recall
	Clock drawing
Depression	
	Keep in mind in connection with concomitant somatic disease and consider asking through the 'facade': 'Are you sad or depressed?'
Drinking	
	Keep in mind and enquire about consumption

Results

- At 3 years, ITT analysis:
  - Intervention group had higher functional ability than those in the control group (adjusted odds ratio 1.20, 95% CI 1.01 to 1.42)
- Increased effects if GPs participated in the education
- More beneficial for those > 80 than < 75
- No difference in mortality or NH admission at 3 years
- After 4 ½ years, 80 year old at baseline subgroup had lower NH admissions

Vass JAGS 2005, Vass Family practice 2009

Incorporate the 7 mnemonic D's

- Daily Activity
  - Focus on how older people manage everyday life, and what has changed (why?)
    - This will guide your interventions
  - Individualized counseling on how to continue or initiate physical activity as a mantra, e.g. by what are your community's physical activity services ranging from elder sports to specific rehabilitative services.
- Dizziness/falls
  - Rule out postural hypotension
  - Have you fallen or nearly fallen in the last year?
  - Rule out gait or balance problem (Watch Them Walk)
  - Ca/Vitamin D/BMD if needed
- Drugs
  - Perform a comprehensive medication review (Can we reduce Drug Burden, avoid NSAIDs, psychotropics, sedatives)
  - Focus on compliance and concordance
- Delirium
  - Drugs-dehydration-diabetes
  - Exclude UTI
  - Enough daily fluid intake?
- Dementia
  - Delayed three word recall
  - Clock draw
  - Vascular risk factor review
- Depression
  - Consider multiple somatic complaints as a presentation of depression
  - Are you sad or depressed?
  - Is life still worth living?
- Drinking
  - Keep in mind and enquire

Adapted from Vass et al. Jags 2005

Key Points

- Demand driven care does not always work in this population
- Need multi-dimentional assessment, in an interdisciplinary fashion
- Need to focus on function
- Need cooperation between home care and primary care
- Need to be able to follow assessment with follow ups and treatment

3 cases

Case 1- referred for functional decline, recurrent falls

- History
  - 73 retired ICU nurse
  - Recurrent falls
  - Episodes of postural lightheadedness 2-3x/week, one ?syncopal episode
  - Not as confident on stairs, walking
  - LB pain 2° to DDD
  - Bifocals/awaiting cataract Sx
  - L UE an LE weakness x6 yrs (?TIA)
  - Nightime nocturia (2-3x)
  - No memory/mood complaints
- PMHx
  - Atrial fibrillation
  - HTN.
  - Carotid artery stenosis,

Functional Inquiry

- Independent ADLs, IADLs
- Limiting her hobbies because of lightheadedness, fear of falling

Case 1

- MEDS
  - Flurazepam 15 mg po 1 -2 at hs,
  - Caltrate 600/D 400 po daily
  - Diovan 80 mg two tablets bid
  - HCTZ 25 mg daily
  - Norvasc 5 mg daily
  - Metoprolol 25 mg bid, if HR >60.
  - Plavix 75 mg every other day
  - Amiodarone 300 mg daily
  - Warfarin
  - Omeprazole 20 mg
  - Lorazepam 1 mg prn
  - Talwin 50 mg q6 prn
  - Tramacet 37.5 mg prn
  - Norflex 100 mg bid prn
  - Tylenol, taking every other day.
- Physical Exam
  - Supine 151/74 HR 54.
  - 2 min standing, 126/68, HR 64.
  - Review diary – HR range 48-58, 64 (give metoprolol)
  - Syst MM (aortic sclerosis)
  - LUE and LLE grade 4, grade 5 otherwise
  - Neuro N, Resp/GI N
  - TUG 15 seconds, could not rise from sitting w/o arms
  - MOCA 22/30

BMD at hip t score -2.2

Case 1, recommend

- D/C talwin, tramacet, norflex, ativan
- Reduce flurazepam to 15 q other day
- Tylenol 650 scheduled,2, 1, 2 (watch INR)
- Vitamin D 1000
- PHYSIO, OT
- Reduce HR limiting drugs
- Optimize fluids (aim 1.5-2L/day)
- No fluids post 6-7pm, limit caffeine, alcohol esp after noon
- Anti-slip in winter

Follow up – 2months

- Not taking Metoprolol unless HR < 80
- Feels steadier (esp on stairs), less orthostasis
- Compliant with exercise program (physio)
- 151/65,supine, 140/76 standing, HR 63.
- MOCA 24/30 (up two points)
- TUG 10 seconds, able to get up not using arms.

Case 2. 71 ♂, RFR ↓ short term memory

History

- 1 yr , more dependent on calendar for appointments
- Occasional repetitiousness
- Slower with task completion, but can complete if focuses on one thing at a time
- Concerned b/c mom and sister had AD

Functionally

- Intact in all ADLs and IADLs
- Recently lead administrator for Lions club event, n=190
- Continues to do yard work, soduko, no Δ in activity level

Review of symptoms

- No mood symptoms
- No sleep disturbance
- No weight loss
- No falls, gait disturbance

PM Hx

- HTN, Hyperlipidemia, OA, Carotid artery stenosis

Meds

- Arthrotec, HCTZ, Lipitor, ASA

Case 3

History

- 96 retired schoolteacher
- Lives with daughter, very frail post hip # 10 yrs ago
- Mild Cog impairment
- Fully dependent on IADLS/ADLS because physical limitations
- Walks short distances with walker
- Multiple falls (during transfers)

PMHx

- Cataract, L non-surgical
- Hip fracture ,age 87
- Shingles, L trunk, arm, post herpetic neuralgia
- Hearing impairment

Medications

- Glucosamine Chondroitin
- Aspirin, 2 grams /day
- Ginkgo Biloba 800 mg
- Ferrous Gluconate 600 mg
- Memory pills (herbal) 2/day

Physical exam

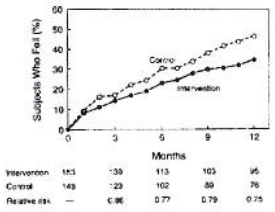
- Wt 87 lbs, BP 122/60, HR 85, no orthostatic drop.
- TUG 80 secs, Acuity abysmal
- Extreme kyphosis
- Mild contractures, knees, hips.
- Power 4 throughout
- MMSE 20/30,
- BMD Hip T-score -4.9, spine -3.5

Recommendations - Case 3

- Vitamin D/Calcium
- Bisphosphonate (once monthly)
- D/C ASA
- Tylenol for pain, 1g, 500, 1g.
- CCAC occupational therapist and physiotherapist have (home exercises to prevent contractures)
- Hip Protectors

Miscellaneous data

Multifactorial assessment and intervention



Intervention	153	139	113	103	95
Control	149	123	102	89	76
Relative risk	—	0.86	0.77	0.79	0.75

Adjustment in their medications, behavioral instructions, vision and hearing assessment, and exercise programs
Tinetti et al N Engl J Med 1994; 331:821-827

- Reduced falls by 24%
  - RR 0.76 (0.58 to 0.98)
- Reduced the number of falls/person/week by 36%
  - RR 0.69 (0.52 to 0.90)

- Cochrane review 2009
  - Assessment and multi-factorial intervention reduced rate of falls
    - RR 0.75, 95%CI 0.65 to 0.86

Effective Single Interventions

Intervention	Effect
Exercise -Multi-component group exercise -Tai Chi -Individually Rx, multi-component home-based exercise	↓Rate of falling by 22%, ↓ risk of falling by 17% ↓ Rate of falling by 38%, ↓ risk of falling by 35% ↓ Rate of falling by 34%, ↓ risk of falling by 23%
Home Modification	↓ risk of falling by 11%, more effective if high risk, visually impaired
Medication Reduction -Gradual withdrawal of psychotropics - Prescribing modification program for 1° care provider	↓rate of falls 66%, ↓ reduced risk of falling 39%
Vision - expedited cataract surgery	↓ rate of falls by 24%
Vitamin D (700-1000u/day)*	↓ falls by 19%, up to 26% with vitamin D3
Anti Slip devices	↓rate of falls in icy conditions by 58%
Cardiac Pacemaking	↓ rate of falls in pts with CHS by 58%

Gillespie Cochrane Syst Review 2009, *Bischoff-Ferrari BMJ Oct 2009

Exercise

- Numerous studies have shown that exercise is beneficial for older persons along the whole spectrum of health status, even in the frailest subset. (Province JAMA 1995)
- Benefits of exercise:
  - Improvement in ADLS
  - Increased mobility
  - Improved gait
  - Fewer falls
  - Increased BMD
  - Increased sense of well being.

Exercise

- Systematic reviews have demonstrated that exercise programs including walking, strength, and balance training reduce the risk of falls and related injuries.[1,2]
- 6 mo, home based program frail pts age> 75, including physical therapy focused on improving underlying impairments in physical abilities
  - Less functional decline at 7 and 12 months[3]
- RCT 424 sedentary seniors aged 70 to 89 yrs,
  - an exercise program of moderate intensity walking for 150 minutes/week, with strength and balance exercises, reduced the risk of major mobility disability over 1.2 years by 30%compared to an educational intervention.[4]

1. Howe et al. Cochrane Database Syst Rev 2007Gillespie et al. Cochrane Database Syst Rev 2008
3. Gill et al. NEJM 2002;347:1068-74
4. Pahor et al. J Gerontol A biol Sci Med Sci 2006;61:1157-1165

Exercise – even amongst the most frail

- Nursing homes with patients of median age 87 years demonstrated that a high intensity, progressive regimen of resistance exercise training improves muscle strength and size in frail older people.
  - increased muscle strength > 100%, muscle size in LE, and gait velocity.
- The changes were accompanied by improvement in mobility and an increased level of spontaneous physical activity.

- Fiatarone *N Engl J Med 1994; 330(25): 1769–1775.*

Home OT and Exercise

Three hundred nineteen adults aged 70 and older with difficulties performing daily activities.

Occupational and physical therapy sessions to instruct participants in compensatory strategies, home modifications, home safety, fall recovery techniques, and balance and muscle strength exercises.

At 2 years, intervention participants (n 5160) had a 5.6% mortality rate and controls (n 5159) a 13.2% rate (P=.02).
Mortality rates remained lower for intervention participants up to 3.5 years from study entry.

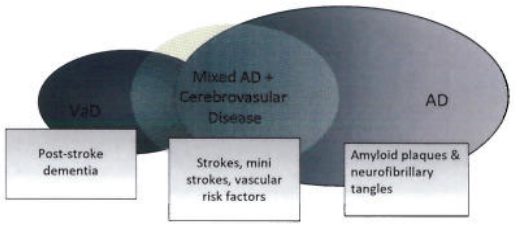
Gitlin et al. JAGS 57:476–481, 2009

MCI

PRESERVE COGNITION

Vascular (VaD) and Mixed Alzheimer's/Vascular Dementia (AD/VaD)

The Continuum of Vascular Dementia and Alzheimer's Disease



Nun Study

- 102 nuns, aged 76 to 1011
  - 61 met pathological criteria for AD
  - Only 57% met clinical criteria for AD
- Difference was: underlying strokes
- Less AD pathology was needed if strokes were present
- Stroke-free participants in the Nun Study tolerated more AD lesions in their brain before showing the symptoms of dementia
- Concept of "Brain Reserve"
  - Education, language density, as a protective element
  - More synapses

Common Risk Factors, Alzheimer's Dementia and Vascular Dementia

- Age
- High blood pressure
- High cholesterol
- APOE E4
- Type 2 Diabetes
- Strokes and mini-strokes
- Obesity
- Lack of physical exercise

1. Ad/Vad, sabotage successful aging
2. AD is or is mediated by an aging vasculopathy
3. Stop pretending there is pure AD

Sandra Black, leading neurologist, vascular dementia, CCD 2009

Prevention

Maintain an active, healthy lifestyle

A Mediterranean-style diet is associated with decreased risk of Alzheimer's disease (not to mention CV disease, cancer and mortality)

MEDI DIET	Effect:
• Fruits • Nuts • Legumes • Cereals • Fish • Olive oil the primary source of monounsaturated fat • Low to moderate intake of wine • Low intake of red meat and poultry	• Reduce risk of developing alzheimer's disease by 40% • When combined with physical activity, reduced the risk by 61 to 67%

Scarmeas N et al Ann Neurol 2006
Scarmeas N et al JAMA 2009

Blood Pressure, Cholesterol and Cognition

- PROGRESS , perindopril + indapamide (blood pressure medications) reduced stroke related dementia by 34% and cognitive decline by 45%
  - **Progress Lancet 2001: 358:1033-1041.**
- SYST-EUR, nitrendipine (blood pressure medication) reduced dementia by 55% at 4 years
  - **Forette et al. Arch Intern Med 2002;162:2046-2052**
- Several studies have suggested that people using statins (a particular kind of cholesterol lowering medication) had a lower risk of having dementia (50-40%)
  - **Haag JNeurol Neurosurg Psychiatry 2009;**
  - **Bernick Neurology 2005, Rockwood 2002, Jick Lancet 2000**

Exercise

- Regular exercise is important for overall health promotion
- Might be effective to delay onset of dementia
  - Can improve cognitive function in people at risk for Alzheimer's Disease
  - 2 studies have suggested that physical exercise is associated with a reduced risk of dementia, by up to 40% (OR 0.63)

Lautenschlager JAMA 2008
Laurin Arch Neurol 2001
Larson Ann Intern Med 2006

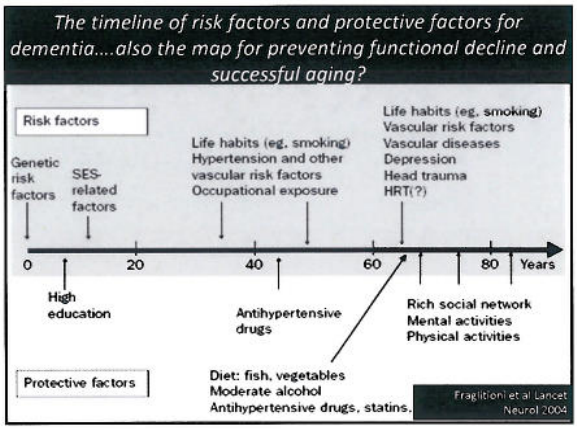
Potential effects of increasing exercise in people > 65

Short Term Impact 10 years	Long Term Impact (30 years)
• ↓ # of new cases > 5,970	• ↓ # of new cases of > 10,750
• ↓ # of Canadians living with dementia >32,450	• ↓ # of Canadians living with dementia > 96,410
• ↓ total Economic Burden > $5.6 billion (2008 dollars)	• ↓ Total Economic Burden > $51.8 billion (in 2008 dollars)

Rising Tide:The Impact of Dementia on Canadian Society

Cognitive Activity

- Being involved in challenging cognitive activities has been associated with reduced age related cognitive decline and reduced risk for dementia
- Use it or lose it principle
  - Building on brain reserve principle
  - Crosswords, reading, playing sudoku, chess, bridge, etc..
- Cognitive training in people at risk of dementia improves performance in the areas addressed
  - Whether this translates into delaying progression to dementia is unknown



Incorporate the 7 mnemonic D's

- Daily Activity
  - Focus on how older people manage everyday life, and what has changed (why ?)
    - This will guide your interventions
  - Individualized counseling on how to continue or initiate physical activity as a mantra, e.g. by what are your community's physical activity services ranging from elder sports to specific rehabilitative services
- Dizziness/Falls
  - Rule out postural hypotension
  - Have you fallen or nearly fallen in the last year?
  - Rule out gait or balance problem (Watch Them Walk)
  - Ca/Vitamin D/BMD if needed
- Drugs
  - Perform a comprehensive medication review (Can we reduce Drug Burden, avoid NSAIDs, psychotropics, sedatives)
  - Focus on compliance and concordance
- Delirium
  - Drugs-dehydration-diabetes
  - Exclude UTI
  - Enough daily fluid intake?
- Dementia
  - Delayed three word recall
  - Clock draw
  - Vascular risk factor review
- Depression
  - Consider multiple somatic complaints as a presentation of depression
  - Are you sad or depressed?
  - Is life still worth living?
- Drinking
  - Keep in mind and enquire