Belgian Inter-university Course
in Geriatric Medecine

16/11/2018

Frailty

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« As geriatricians, our concern is the frail old patient »

Art. 3. Het zorgprogramma voor de geriatrische patiënt richt zich tot de populatie geriatrische patiënten van gemiddeld ouder dan 75 jaar, welke een specifieke aanpak behoeft om verschillende van de hierna vermelde redenen:

1° fragiliteit en beperkte homoïostase;

Art. 3. Le programme de soins pour le patient gériatrique s'adresse à la population de patients gériatriques ayant une moyenne d'âge de plus de 75 ans et qui requiert une approche spécifique pour plusieurs des raisons suivantes :

1° fragilité et homéostasie réduite ;

- What is Frailty ?
- Why identifying frail older people ?
- How to identify frail older people ?

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2. Frailty and Functional decline and comorbidity ? Similarities- differences

Frailty, disability and comorbidity

- 3 different terms often used to described the « geriatric » population, a vulnerable, older population who required enhanced care.

But

- These are distinct clinical entities.

Journal of Gerontology: MEDICAL SCIENCES
2004, Vol. 59, No. 3, 255–263

Review Article

Untangling the Concepts of Disability, Frailty, and Comorbidity: Implications for Improved Targeting and Care

Linda P. Fried,[1,2,3] Luigi Ferrucci,[3] Jonathan Darer,[4] Jeff D. Williamson,[5] and Gerard Anderson[2]

Disability

- Def : difficulty or dependency in carrying out activities in daily living

Physical disability is measured by performance test or assessed by self-report tools.

basic or instrumental ADL

Mobility

Disability

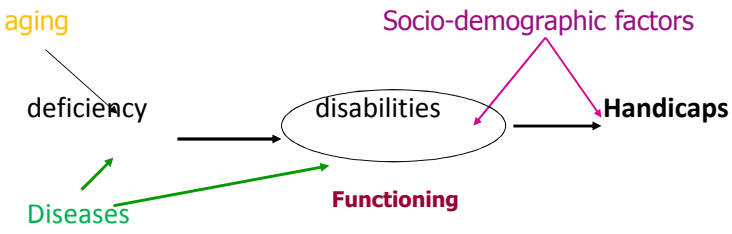
- Prevalence
- - After 65y, 1/7 persons in US

- *- Hébert et al. Incidence of FD and improvement in a community-dwelling very elderly population. Am J Epidemiol 1997;145:935-44*
- Longitudinal, community-dwelling, 572 people 75 y and older, SMAF*
- Stable, no previous FD
  - Incidence of loss of functions :11,9 %/y
  - 6,2% improve
  - mortality 3,2%

- *Hébert R., Carrier R, Bilodeau A. Le Système de Mesure de l'Autonomie Fonctionnelle (SMAF). Rev Geriatr 1988 17;161-7.

Disability : conceptual background

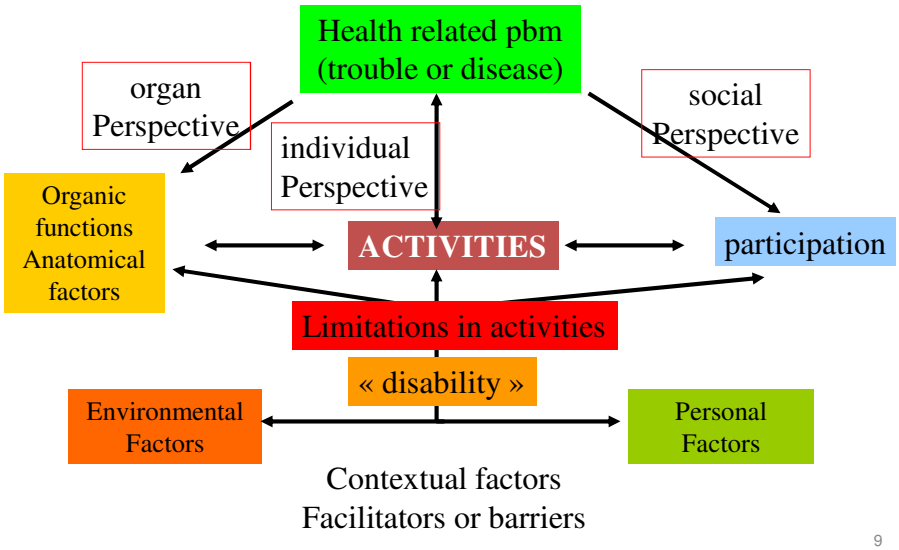
Disability and functional decline
80'



Travaux de Wood , Verbrugge et Jette (1984),
CIH (Classification Int. des Déficiences, Incapacités et Handicaps) et
CIF (Classification Int. du Fonctionnement) (OMS, 1980 et 2001)

ICF (WHO) (2001)

International Classification of functioning, disabilities and health



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Theoretical classification of frailty factors, and markers (according to ICF WHO)

Primary contributors

- Body structure and organ function (impairments)
  - Muscle performance, nutrition
  - Cognitive performances, and sensory organs performance
  - Renal function, Hemoglobin level
- Diseases
  - Comorbidities and severity of chronic diseases
  - Medications (number, sedatives)
  - Health care utilization
- Contextual factors
  - Person's assets (**AGE**, health perception, income, education…)
  - Social support, family
  - Environment and home acomodation

Theoretical classification of frailty factors, and markers (according to ICF WHO)

Consequences of frailty as secondary contributors

- Limitations of individual's activities (disabilities)
  - Loss in iADL's performance
  - Loss of ADL's performance
- Health problems
  - Geriatric syndromes (falls, delirium)
  - Further health care utilization (hospital readmissions)
- Restrictions in individual's participation
  - Dependency
  - Institutionalization

Disability

2 different forms/pathways

- 50% of disabilities develop chronically, progressively, in association with the developement of chronic diseases and comorbidities and frailty.

  ?
- 50% develop acutely in association with an acute disease

  ?

Risk factors

for functional decline in community-living elderly people.
Meta analysis

STUCK, Social Science and Medicine 1999;48:445-469

- **Cognitive impairment**
- **Comorbidity**
- **Lower extremity f. limitation**
- **Low level of physical activity**
- **Poor self perceived health**
- **Visual impairment**
- **Depression**
- **BMI**
- **Low fr. of social contact**
- **No alcohol use (vs moderate)**
- **Smoking**

Factors often assessed in frailty measurements

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Disability

- Disability is also a adverse health outcome in itself

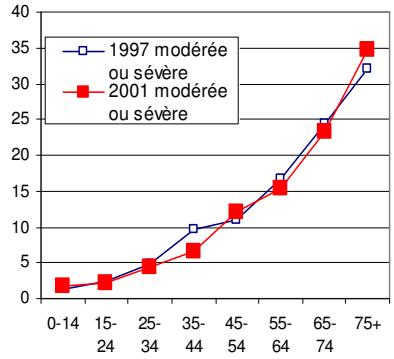
- Mobility disability leads to dependence in IADL
- IADL dependence is a risk factor for dependence in bADL after a hospitalization, whatever the reasons for hospitalization
- Disability in ADL is a risk factor for increased mortality , institutionnalisation

Comorbidity

- Def : the concurrent presence of two or more medically diagnosed diseases in the same individual, with the diagnosis of each contributing disease based on established, widely recognized criteria
- *But also a broader def* : comorbidity involves interactions between any two conditions, even of clinical or subclinical
- Not only a cumulative effects of two conditions (at least) but their synergetic interactions

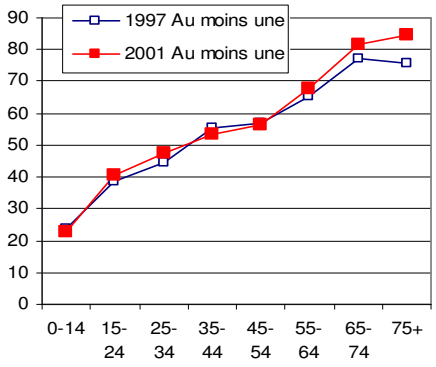
Comorbidity increases with ages
Belgium

Figure 2 – people with moderate to severe disability associated with a chronic disease (%)



Source : UCL, sur base des enquêtes de santé (HIS)

Figure 3 – chronic disease in the past year, according to age (%)



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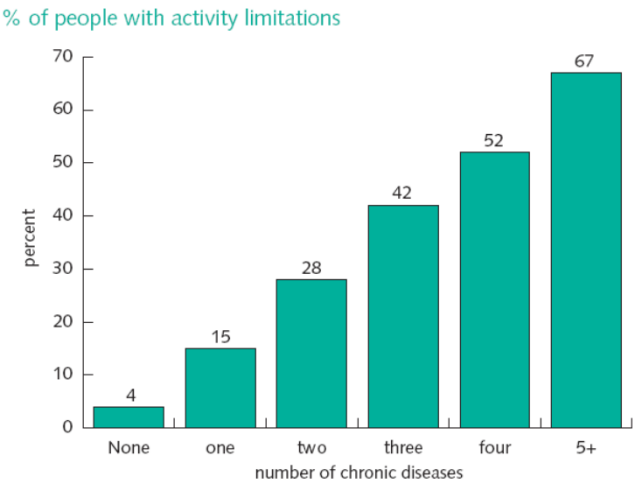
comorbidity

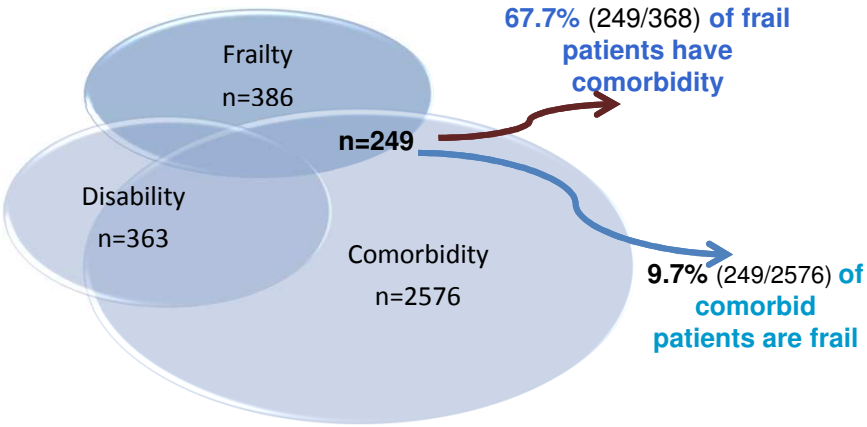
- At 65 y
- - HTA : 36%
- Heart disease: 27%
- Diabetes: 10-15%
  - Stroke: 6%
  - Dementia 10,1% (Eur stat)

Comorbidity increases functional limitations



Source: UK General Household Survey, 2002

Frailty, comorbidity and disability



N=2762 (CHS) 65y+; Comorbidity: 2 or more of 9 diseases

Fried L et al, J Gerontol 2004;59:255-263

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3. Physiopathologic basis of Frailty

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What does «frailty» mean for older people ?

Puts MTE et al, J of Aging Studies, 2009

Qualitative study in frail and non frail older people
(LASA Longitudinal Aging Study Amsterdam)

- Frailty?
  - Being in poor health
  - Having walking difficulties
  - Feeling down
  - Being anxious
  - Having few social contacts
  - Not being able to do things ones like to do
- Men described in more details the physical dimension
- Women elaborated in more depth the social and psy dimensions

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Definition

adapted from Studenski *JAGS 2004;62:1560-66*
and Ferrucci *J Endocrinol Invest. 2002;25:10-5*

Age-related alteration in physiology and pathology that leads to vulnerability with loss of organ system reserve, limited capacity to respond to internal and environmental stresses, unstable homeostasis

Leading to **poor medical and functional outcomes.**

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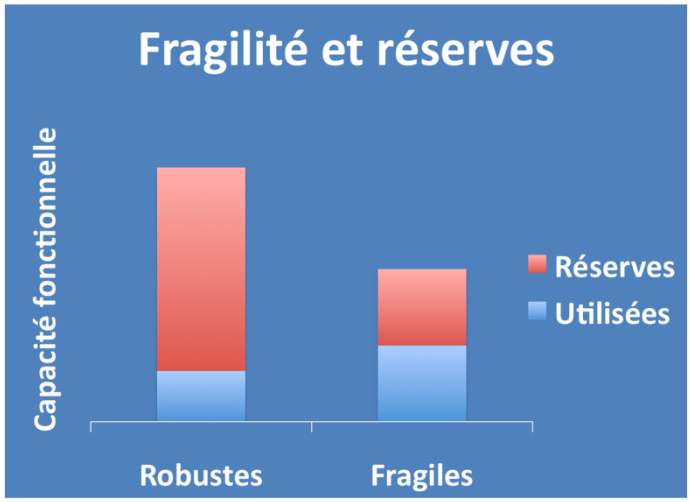
Main elements in the definition of frailty

- Biophysiological base that is age related
- Multiple system impairments
- Reduced reserve with diminished adaptative response
- Vulnerability to stressors and to challenges of the environment
- Increased risk for adverse outcomes
- Instability and change over time

Rockwood K, Drugs Aging 2000;17:295-302



Frailty & stress

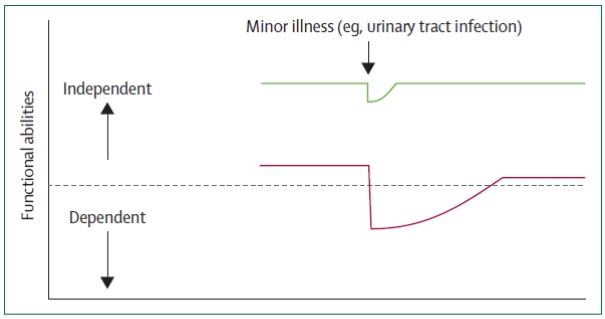


Figure 1: Vulnerability of frail elderly people to a sudden change in health status after a minor illness

Clegg A et al, Lancet 2013;381: 752-62

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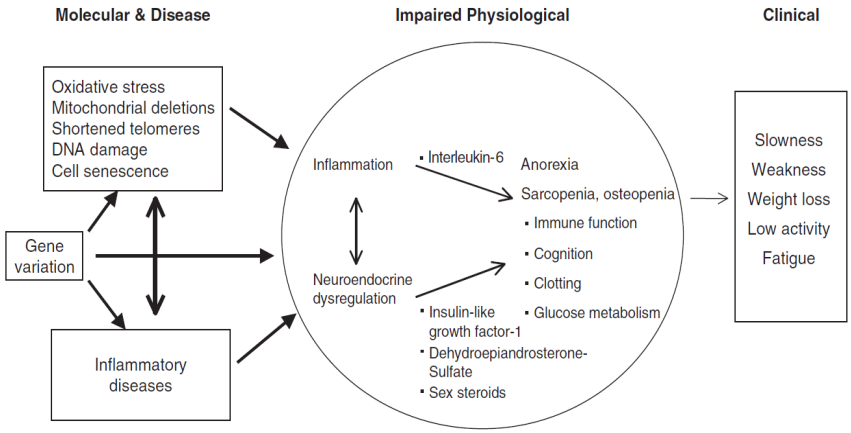
Physical frailty: *Physiopathological pathways?*



Walston J et al. JAGS 2006;54:991-1001

Hypotheses for specific physiopathology of frailty → role of biomarkers?

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Biomarkers

- *Highly sensitive and specific indicators of disease pathways*
  - Used as substitutes for outcomes in clinical trials when evidence indicates that they predict clinical risk or benefit.
- Definition
  - "A characteristic that is objectively measured as an indicator of normal or pathogenic biological processes, or pharmacologic responses to a therapeutic intervention"
- Exemple: Chol & statine

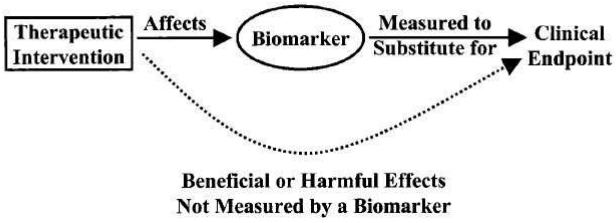
Biomarkers Definitions working Group, Clin Phar Ther 2001
Slide inspirited from Pr JM Degryse

Biological markers

- Many applications in disease detection and monitoring :
  - **Use as a diagnostic tool**
    For the identification of those patients with a disease or abnormal condition
  - **Use as a tool for staging or extension of a disease**
  - **Use as an indicator of disease prognosis**
  - **Use for prediction and monitoring of clinical response to an intervention.**

Definitions

- **Clinical endpoint** :
  - A characteristic or variable that reflects how a patient feels, functions, or survives.
  - They reflect the reflect of a therapeutic intervention.
- **Surrogate endpoint** :
  - A biomarker that is intended to substitute for a clinical endpoint. A surrogate endpoint is expected to predict clinical benefit or harm based on epidemiologic, or pathophysiologic evidence



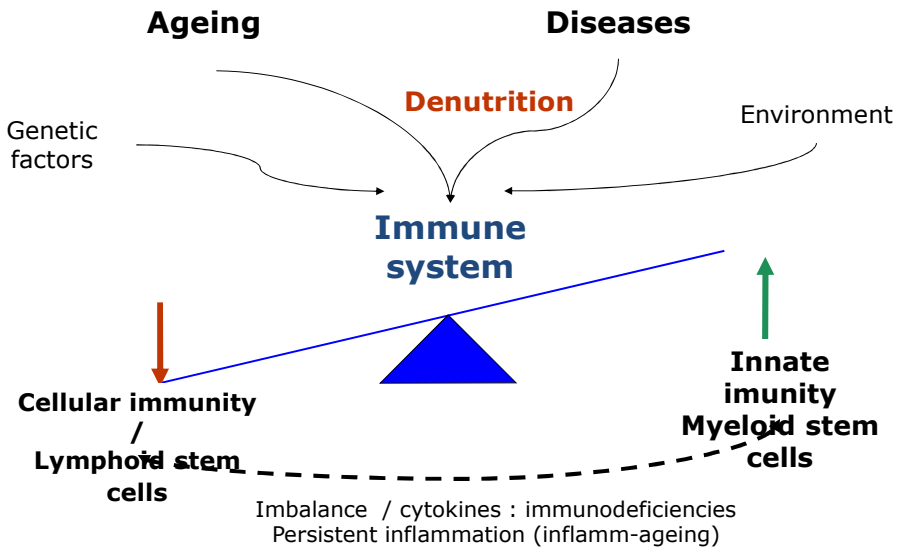
Biomarkers Definitions working Group 2010

Biomarqueurs

Immunosenescence	Chronic inflammation	++
	Cellular immunity	+
Neurohormonal dysregulation	IGF-1, DHEA	+
Replicative senescence	Telomer lenght	?
Oxydative stress	Anomalies RNAm, DNA	?
Proteic glycations	Advanced Glucation Endproducts	?

Fried & Walston, Principles of Geriatric Medicine (…), Hazzard 1999

Immunosenescence



Inflammation & ageing
« Inflamm-ageing »

- C. Franceschi (2000)
- Imbalance between inflammatory and anti-inflammator
- Etiology
  - Immunosenescence
  - Hormonal dysregulation (E2)…
  - Others : polymorphisms, tabac, obésité, HT,…
  - Role of CMV?

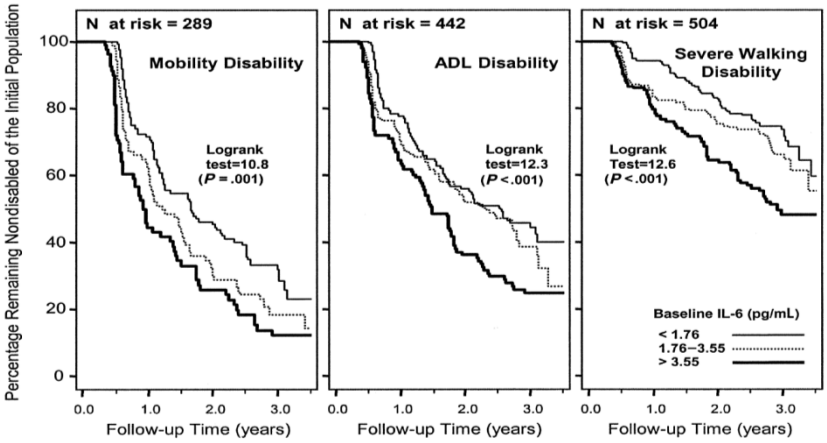
Pawelec et al., Immunol Rev 2005;205:257-268
Ershler W et Keller E, Annu Rev Med 2000;51-245-270
Schmaltz HN et al (Fried LP), JAGS 2005;53:747-754

Il-6: results from the WHAS

- Women's Health & Aging Study
  - 65y+ recruted among the one-third most disabled women (community-dwelling)
  - Randomly sampled form the Medicare beneficiaries in Baltimore
  - Difficulty performing 1 or more tasks in at least 2 of the following 4 domains of functioning:
  - mobility/exercise tolerance, upper extremity abilities, basic self-care, and higher functioning tasks of independent living
- MMSE >18/30
- 5316 → 1002 inclusion, 620 with blood samples

Ferruci L et al, JAGS 2002;50:1947-1954

IL-6 and risk of new disability in WHAS



Potential confounders were baseline age, race, body mass index, smoking, depression, andmedical conditions.

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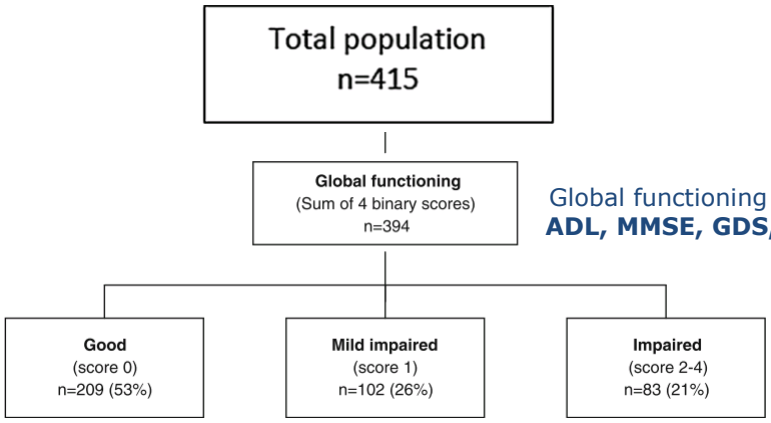
Ferruci L et al, JAGS 2002;50:1947-1954

BELFRAIL
BELGIAN COHORT OF THE VERY ELDERLY

- Prospective population-based study,
- 80y+, selection by GPs
  - Exclusion criteria: severe dementia, palliative care and medical emergency
- Clinical and biological assessment
- N=567
- Cross-sectional and longitudinal analyses
  - Follow-up

Vaes B et al, BMC Geriatr 10:39. doi:10.1186/1471-2318-10-39

BelFRAIL : cross-sectional data



Global functioning index:
ADL, MMSE, GDS, SPPB

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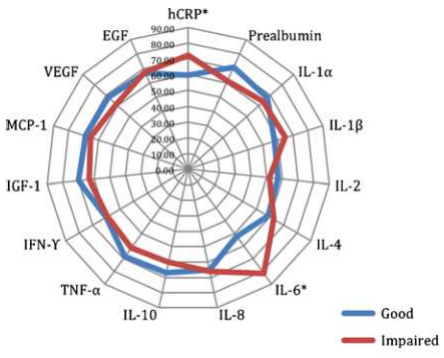
BelFRAIL : crosss-sectional data



IL-6 strongly associated with:
- global functioning
- all individual aspects of functioning, (except suspected depression)
- **Main interest IF NEGATIVE**

	Pre	PPV	NPV
IL-6	0.28	0.38	0.87

Fig. 2 Proportions of older persons with high inflammatory protein levels. *$p<0.05$, significant difference between good and impaired global functioning (chi-square test). *Pre* pretest probability, *PPV* positive predictive value, *NPV* negative predictive value

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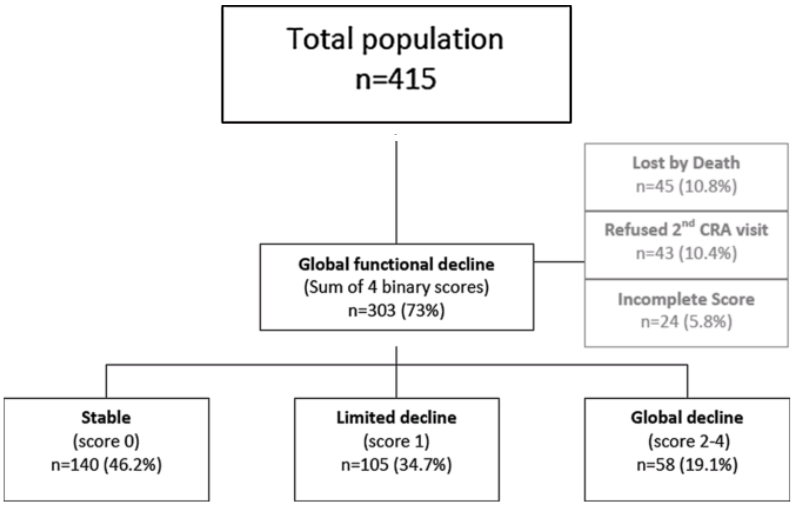
BelFRAIL: longitudinal data



BelFRAIL: longitudinal data

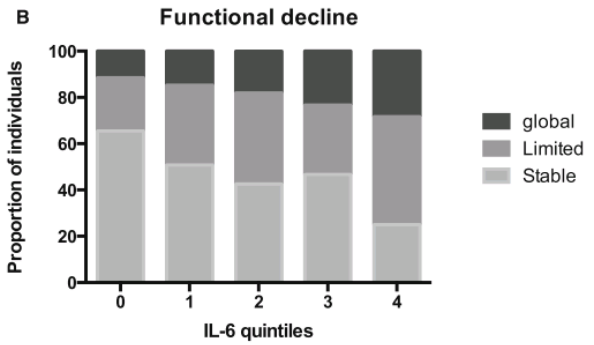


Fig. 2 Predicted probabilities after ordered logistic regression analysis (**a**) and proportions of individuals (**b**) with a stable, limited, and global functional decline, with regard to increasing IL-6 quintiles. Differences in proportions were significant (Kruskal–Wallis test, $p<0.001$). *Pre Prob* predicted probability, *CI* confidence interval

Other markers

- Inflammation: (us)CRP, TNF-a
- Coagulation: D-Dimers, fibrinogen
- IGF-1
- Telomer length
- Association:
  - Cross-sectional
  - Longitudinal (mortality)

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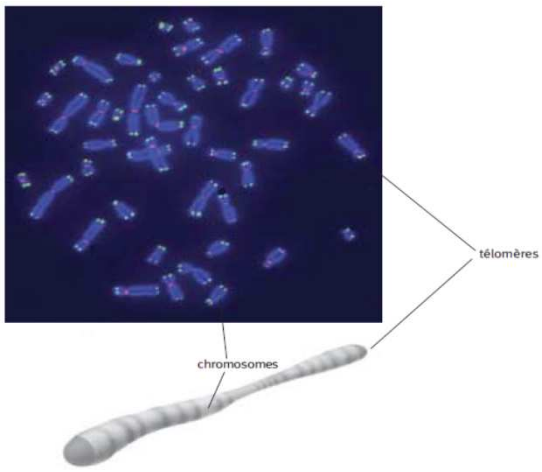
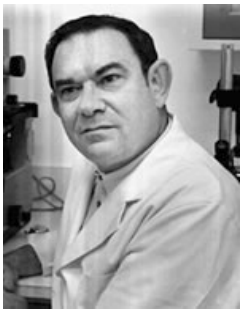
Telomer length & frailty

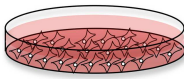


Woo et al, Mech Ageing Dev 129(11): 642-648.

The Hayflick limit: cellular senescence unraveled



1961:Leonard Hayflick:
« Cellular aging » or
« Replicative senescence »



Primary fibroblast culture

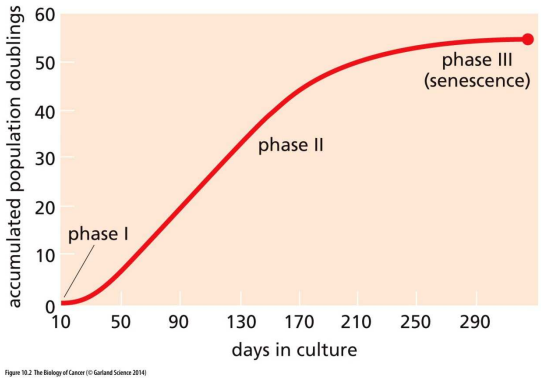
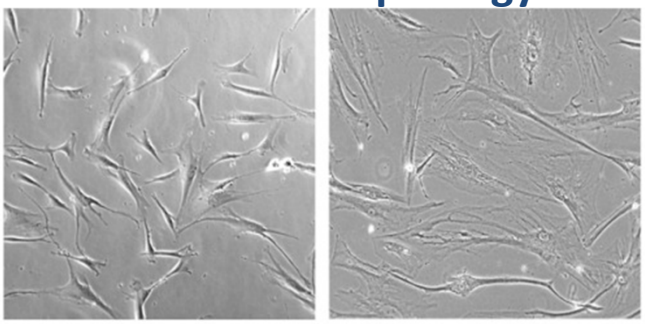


Figure 10.2 The Biology of Cancer (© Garland Science 2014)

Senescent cells remain metabolically active but their morphology is altered



Young fibroblasts | Senescent fibroblasts

Senescence is NOT apoptosis !
Senescent cells are resistant to apoptosis by up-regulating pro-survival pathways

Slide from Pr Anabelle Decottignies, de Duve Institute, UCLouvain

Perspectives of future therapies?

-Activation of endogenous telomerase gene expression:
androgen therapy (*e.g.* Danazol)
-Transient activation of exogenous telomerase:
AAVs

!!
Cancer

-Gene therapy:
From reprogrammed stem cells of the patient

-Targeting cellular senescence:
SASP modulators, senolytics, immune clearance

Slide from Pr Anabelle Decottignies, de Duve Institute, UCLouvain

Biogerontology
https://doi.org/10.1007/s10522-018-9749-5

REVIEW ARTICLE

A review of telomere length in sarcopenia and frailty

Maria Lorenzi · Stefano Bonassi · Teresa Lorenzi · Silvia Giovannini · Roberto Bernabei · Graziano Onder

Experimental Gerontology 106 (2018) 16–20

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journal homepage: www.elsevier.com/locate/expgero

Review

The association between telomere length and frailty: A systematic review and meta-analysis

Jianghua Zhou[a,b,1], Jiang Wang[c,1], Yanjiao Shen[d], Ying Yang[a,b], Pan Huang[e], Shanping Chen[a,b], Chuan Zou[a,b], Birong Dong[f,g,*]

The association between telomere length and frailty: A systematic review and meta-analysis

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Author, year	Design	Male (%)	n	Frailty preval (%)	Frailty def	Quality (NOS)
Marzetti, 2014	CS	40,8	142	51,7	Index	7
Yu 2015	CS	100	976	7,3	Fried	8
Yu, 2015	CS	0	1030	5,4	Fried	8
Collerton, 2012	CS	61,7	811	21,6	Fried	9
Pathai, 2013	CC	25	256	13,3	Fried	7
Brault 2014	CS	-	53	28,3	mFried	6

CS: cross-sectional; CC: case-control; TL: qPCR from leukocytes; NOS: Newcastle_Ottaxa Scale – assessment of quality of non-randomized studies in meta-analyses: http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp

Zhou et al, Exp Gerontol 2018;106:16-20

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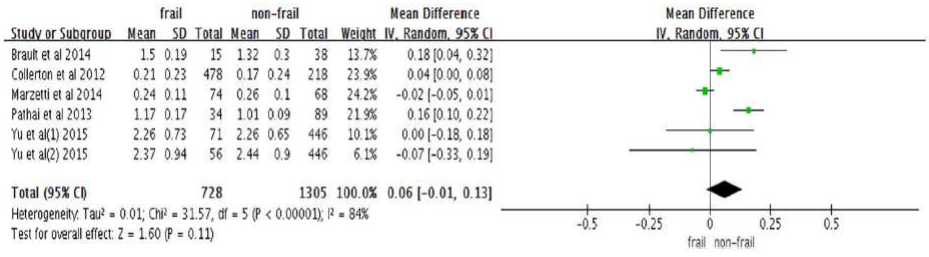

Fig. 2. Meta-analysis of the association between telomere length and frailty.

- *No significant association between frailty and telomere length*
- Association TL and grip strength

Zhou et al, Exp Gerontol 2018;106:16-20

A review of telomere length in sarcopenia and frailty

Maria Lorenzi · Stefano Bonassi · Teresa Lorenzi · Silvia Giovannini · Roberto Bernabei · Graziano Onder

SARCOPENIA	Design	n	Main findings
Marzetti, 2014	CS	142	TL↔ sarcop NOT GripS et GaitSpeed
Woo, 2014	Prospect (5y)	2006	TL ↔ Grip S NOT sarcop or other phys perf
Batsis, 2017	CS	2672	TL NOT ↔ sarcop

Frailty	Design	n	Main findings
Woo, 2014	Prospect (5y)	2006*	TL NOT ↔ frailty
Collerton, 2012	CS	845*°	
Marzetti, 2014	CS	142*°	
Saum, 2014	CS	3537°	
Yu, 2015	Prospect (5y)	2006*	
Breitling, 2016	CS	1820°	DNA methyl ↔ frailty NOT TL

CS: cross-sectional; Sarcop: sarcopenia; GripS: grip strength, TL: telomere length:* Fried; ° Frailty Index

Lorenzi et al, Biogerontology 2018; https://doi.org/10.1007/s10522-018-9749-5

Take home message
Physiopathology of frailty & biomarkers

- Physiopathology of frailty
  - Still debated
  - Frailty & ageing?
  - …but lack of evidence!
- 2 differents positions
  - Biomarkers: ORGAN / CELLULE
  - Frailty : multidimensional syndrom & global assessment
    - Impact of cellular mechanisms PLUS
    - Proeminent environmental impact

→Causal or mechanistic association with frailty unclear

Woo, Mech Ageing Dev 2008; 129:642

Take home message
Physiopathology of frailty & biomarkers

- Limits of biomarker measurements
  - Dynamics
  - Design (longitudinal), population and sample size
  - Measurement methods
  - Survival bias
- Perspectives
  - Recognize biomarkers and their limits (epiphenomen or causal relationship?)
  - Combination of biomarkers?
  - Evaluation of biomarkers / accuracy

Woo, Mech Ageing Dev 2008; 129:642

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4. Is frailty a useful concept from a clinical point of view ?

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Assessment of frailty

- 2 majors approachs…
  - Physical frailty (« Ph-railty »)
    - Phenotype of frailty
    - Fried L
  - Functional frailty (« F-railty »)
    - Index of frailty
    - Rockwood
- …**Same outcomes**

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Cycle of frailty

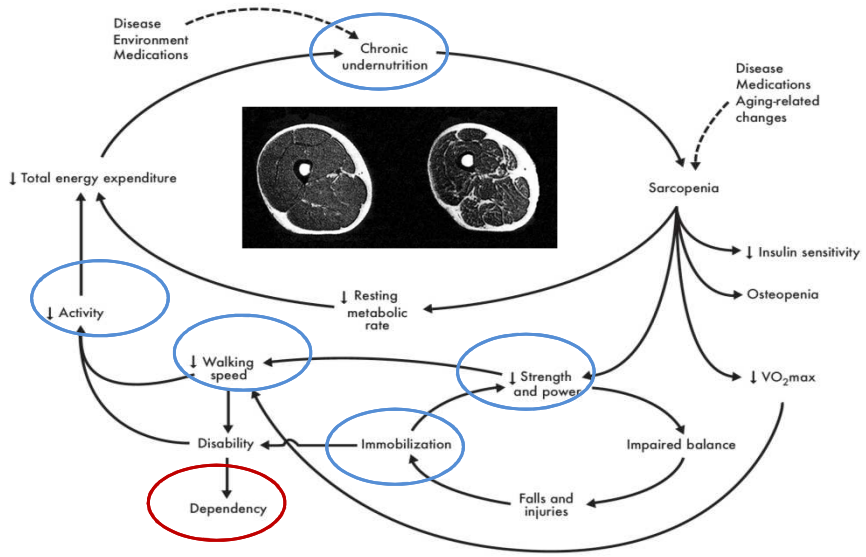


Figure 1. Cycle of frailty.[3,9,13]

Fried L, Walston F, in Hazzard WR 2003;1487-1502

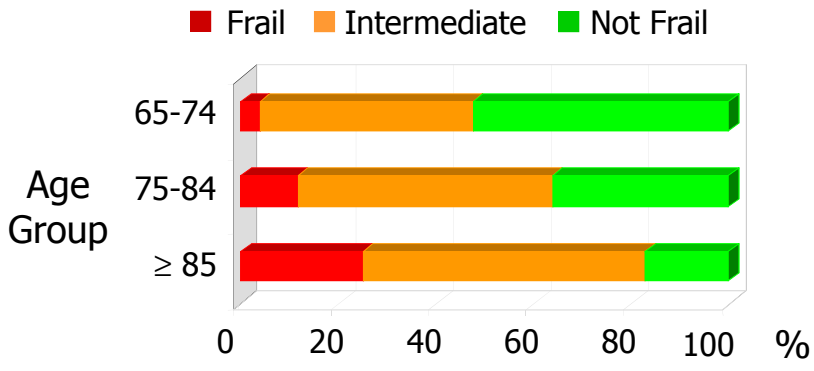
Frailty phenotype

- Lower quintile at GRIP STRENGTH
- Lower quintile at WALKING SPEED
- WEIGHT LOSS more than 4,5 kg past year
- EXHAUSTION criteria
- Bottom quartile for PHYSICAL ACTIVITY

- >=3 : frail
- 1-2 : intermediate
- 0 : robust
- *Cardiovascular Health Study*

Fried et al, J Gerontol Med Sc 2001;56A, M146–M156

Prevalence of the frailty phenotype according to age: The CHStudy



Fried LP et al J Gerontol, 2001

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Predictive validity of physical frailty

3 years (%)	Robusts (n=2469)	Intermediate (n=2480)	Frail (n=368)
Death	3	7	18
1st hospital.	33	43	59
1st fall	15	19	28
Worsening ADL disability	8	20	35
Worsening mobility disability	23	40	51

p<0.001 for all

Fried LP et al J Gerontol, 2001

Frailty index

- List of 20-30-70 (!) deficits (present =1, absent = 0)
- Multiple domains (function, cognitive, psychological, mobility, morbidity etc)
- Rapport deficits / nb max of deficits
- Proposed threshold : 0.25

Rockwood et al, CMAJ 2005;193:489-95

Table 1
46 deficits included in frailty index.

Comorbidities	*Signs/symptoms*
• Stroke	• Heart rate at rest
• Thyroid condition	• Systolic blood pressure
• Cancer	• Cough regularly
• Heart attack	• Leaked/lost control of urine
• Heart disease	• General vision
• Ever had high blood pressure	• Difficulty seeing steps/curbs in dim light
• Angina/angina pectoris	• General hearing
• Osteoporosis	• Confusion or inability to remember things
• Diabetes	
• Arthritis	*Lab values*
• Ever had broken hip	• Homocysteine (μmol/L)
	• Folate, serum (nmol/L)
• Cataract operation	• Glycohemoglobin (%)
• Weak/failing kidneys	• Red blood cell count (million cells/μL)
	• Hemoglobin (g/dL)
Function	• Red cell distribution width (%)
• Difficulty using fork and knife	• Lymphocyte percent (%)
• Difficulty dressing yourself	• Segmented neutrophils percent (%)
• Difficulty getting in/out of bed	
• Difficulty standing up from armless chair	*Other*
• Difficulty managing money	• Medications
• Difficulty preparing meals	• Self-reported health
• Difficulty standing for long periods of time	• Health compared to 1 year ago
• Difficult stooping, crouching, kneeling	• Frequency of healthcare use
• Difficulty grasping/holding small objects	• Overnight hospital stays
• Difficulty lifting or carrying	
• Difficulty pushing or pulling large objects	
• Difficult attending social event	

Levels of frailty

Box 1: The CSHA Clinical Frailty Scale

1 *Very fit* — robust, active, energetic, well motivated and fit; these people commonly exercise regularly and are in the most fit group for their age

2 *Well* — without active disease, but less fit than people in category 1

3 *Well, with treated comorbid disease* — disease symptoms are well controlled compared with those in category 4

4 *Apparently vulnerable* — although not frankly dependent, these people commonly complain of being "slowed up" or have disease symptoms

5 *Mildly frail* — with limited dependence on others for instrumental activities of daily living

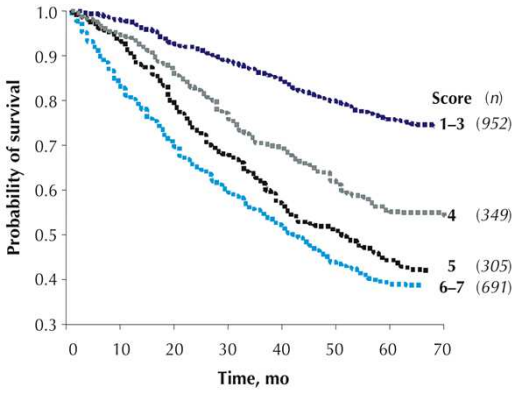
6 *Moderately frail* — help is needed with both instrumental and non-instrumental activities of daily living

7 *Severely frail* — completely dependent on others for the activities of daily living, or terminally ill

Note: CSHA = Canadian Study of Health and Aging.

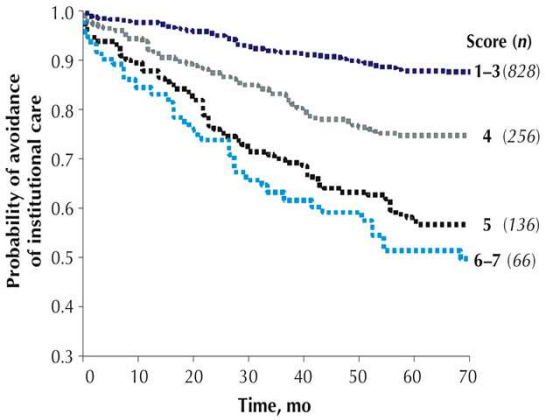
Rockwood et al, CMAJ 2005;193:489-95

Frailty & survival



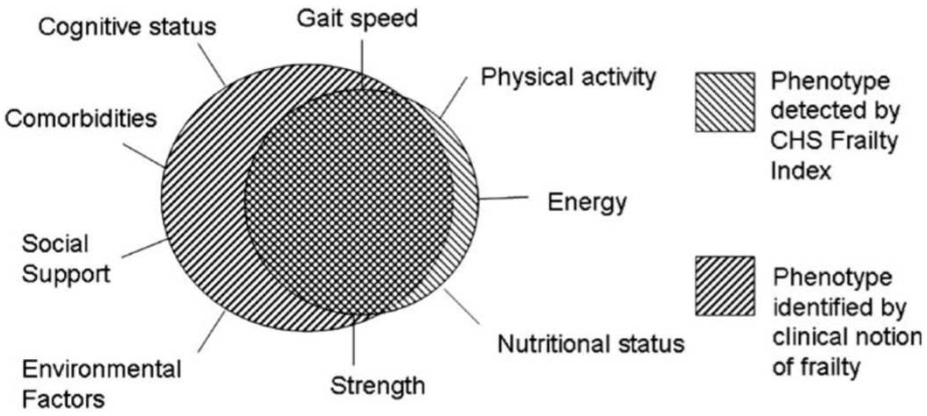
Rockwood et al, CMAJ 2005;193:489-95

Survival without institutionalisation



Rockwood et al, CMAJ 2005;193:489-95

Phénotype & index : overlap



Whitson et al, J Gerontol 2007;62A:728-730

2 definitions, same outcomes

- **Consensus** on outcomes of frailty
  - Functional decline (disability,dependance)
  - Geriatric syndromes (big I 's)
  - Health care utilization (home care, H adm and readm.)
  - Institutionalisation
  - Mortality
- Is more predictive for clinical outcomes than diagnosis per se

Winograd, JAGS 2001;39:778-784

F phenotype or F Index ?

- The 2 concepts are complementary

(Cesari et al, Age and Aging, 2014)

« The frailty phenotype may be more suitable for an immediate identification of non-disabled elders at risk of negative events. »

« The Frailty Index may summarise the results of a comprehensive geriatric assessment providing a marker of deficits accumulation. »

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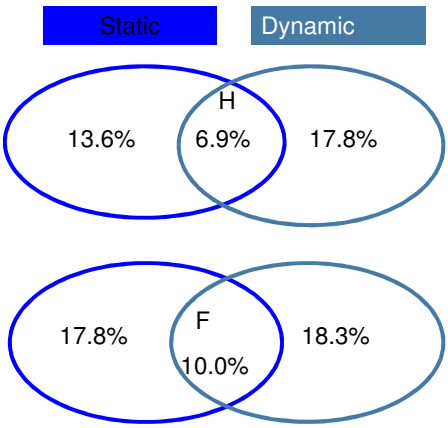
FRAILTY IN A DYNAMIC PERSPECTIVE…

Static or dynamic assessment?

- Static measure of frailty :
  - « Picture »
- Dynamic measure of frailty :
  - Evolution between 2 assessments
  - Identify a decline

Puts MTE et al. JAGS 2005;53:40-47

Static or dynamic assessment?

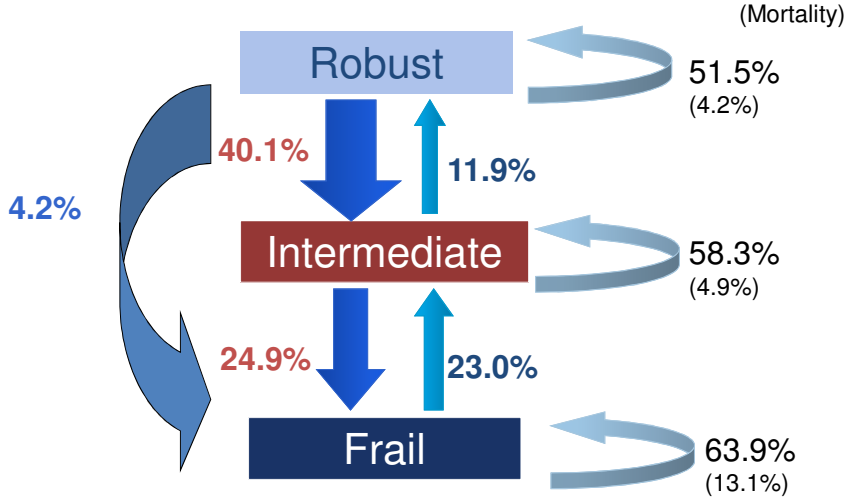


- 9 markers of frailty
  - BMI, VEMS, cognition, sens, continence, locus of control, depression, physical activity
- N=2257 (Amsterdam)
- First assessment (t1) + 3 years (t2)
- Static frailty : 3+ markers at t1
- Dynamic frailty : 3+ changes between t1 & t2

Puts MTE et al. JAGS 2005;53:40-47

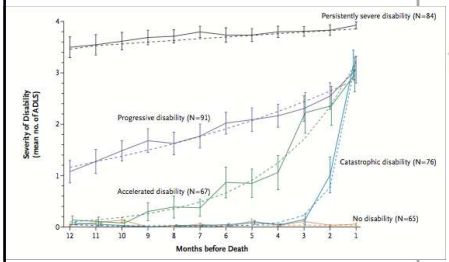
Frailty is reversible

n=754, 75+ (community living), Follow-up 54 m : 57.6% (424) : ≥1 transition



Gill TM et al, Arch Intern Med 2006;166:418-423

Frailty : a cause of death



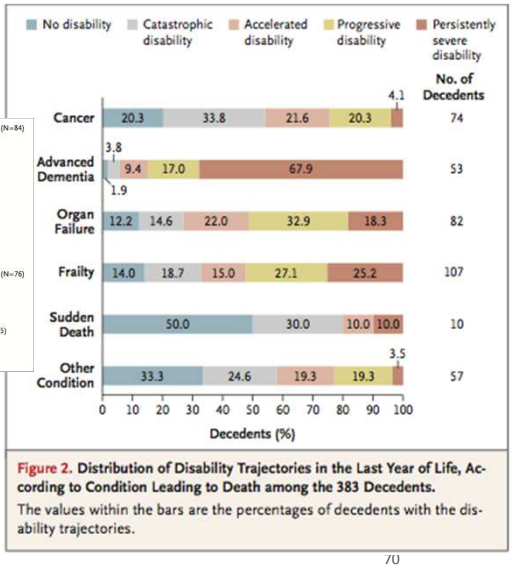


Figure 2. Distribution of Disability Trajectories in the Last Year of Life, According to Condition Leading to Death among the 383 Decedents.
The values within the bars are the percentages of decedents with the disability trajectories.

Gill et al. NEJM 2010; 372: 1173

NEW PERSPECTIVES….

THE GERONTOLOGICAL SOCIETY OF AMERICA®

Journals of Gerontology: Medical Sciences
cite as: *J Gerontol A Biol Sci Med Sci*, 2016, Vol. 71, No. 4, 489–495
doi:10.1093/gerona/glv202
Advance Access publication December 29, 2015

OXFORD

Review

Physical Resilience in Older Adults: Systematic Review and Development of an Emerging Construct

Heather E. Whitson,[1,2,3,4] Wei Duan-Porter,[1,5] Kenneth E. Schmader,[1,2,3] Miriam C. Morey,[1,2,3] Harvey J. Cohen,[1,2,3] and Cathleen S. Colón-Emeric[1,2,3]

1. Change of paradigm

- Point of view focusing on the process leading from frailty to disabilities
- Predominant view of frailty : based on adverse outcomes
- Evolution in classic WHO health definition
  - Dynamic concept of health, linked to resilience and ability to cope

Boers et Cruz-Jentoft, Calcif Tissue Int (2015) 97:429–431

New perspectives

- Health is the resilience or capacity to cope, and to maintain and restore one's integrity, equilibrium, and sense of wellbeing in three domains: physical, mental, and social.
- Frailty is the weakening of (health; see above).

Boers et Cruz-Jentoft, Calcif Tissue Int (2015) 97:429–431
Invitational Conference 'Is health a state or an ability? 'Report of the meeting December 10–11, 2009. www.gezondheidsraad.nl/sites/default/files/bijlage%20A1004_1.pdf

2. Physical and cognitive frailty

- sarcopenia has been proposed to represent the biological substrate of the physical function impairment that characterizes physical frailty (PF)

Calvani R et al, Aging Clin Exp Res 2017;29:29-34

COGNITIVE FRAILTY: RATIONAL AND DEFINITION FROM AN (I.A.N.A./I.A.G.G.) INTERNATIONAL CONSENSUS GROUP

E. KELAIDITI[1], M. CESARI[1,2,3], M. CANEVELLI[1,4], G. ABELLAN VAN KAN[1,2], P.-J. OUSSET[1], S. GILLETTE-GUYONNET[1,2], P. RITZ[2,5], F. DUVEAU[6], M.E. SOTO[1,2], V. PROVENCHER[7], F. NOURHASHEMI[1,2], A. SALVA[8], P. ROBERT[9], S. ANDRIEU[1,2,3,10], Y. ROLLAND[1,2], J. TOUCHON[11], J.L. FITTEN[12], B. VELLAS[1,2,3]

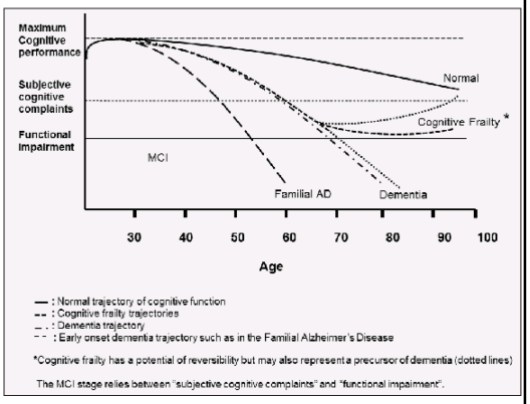
- Main stream based on physical frailty
- Frailty and cognitive impairment : studied separately
- Frailty : associated with low cognitive performance over time in older individuals with and without dementia
- CF : precursor of dementia?
  - PreMCI phase? Reversibility?
  - Lack of definitions & measures….

Kelaiditi E, et al, JNHA 2013;17:9

Cognitive frailty

- Heterogeneous clinical manifestation
- Key factors :
  - Presence of physical frailty and cognitive impairment (CDR=0.5);
  - Exclusion of concurrent AD dementia or other dementias.

Figure 2
Different trajectories of cognitive function according to specific conditions

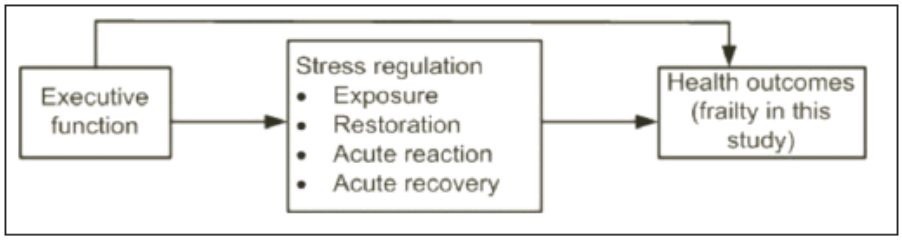


Kelaiditi E, et al, JNHA 2013;17:9

STRESS REGULATION AS A LINK BETWEEN EXECUTIVE FUNCTION AND PRE-FRAILTY IN OLDER ADULTS

R.A. ROILAND[1*], F. LIN[2*], C. PHELAN[1], B.P. CHAPMAN[3]

Figure 1
Conceptual Model (Developed based on Williams et al., 2009)



Rowland et al, JNHA 2015; 19:8

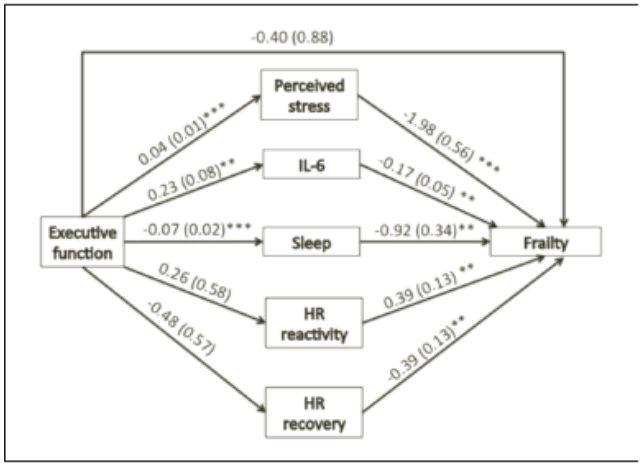
3. Role of executive function (EF)

- EF : cognitive processes involved in problem solving and the adjustment of behaviors in response to stress,
  - Important factor to consider when examining stress regulation.
- Stress exposure and restoration reflect chronic processes, whereas stress reactivity and recovery reflect more acute processes.

Stress regulation, executive function and frailty

- Design: Cross-sectional.
- Participants: 690 community-dwelling older adults ≥ 50 years of age.
- Measurements:
  - Pre-frailty : modified form of the Fried Frailty measure.
  - EF was assessed via telephone- based neurocognitive assessments.
  - Indicators of stress regulation :
    - stress exposure (measured by perceived stress),
    - reactivity and recovery (measured by heart rate) and
    - restoration (measured by serum IL-6 and sleep quality).

Figure 2
Statistical model of relationships between EF, Indicators of Stress Regulation, and Frailty Status (i.e., Pre-Frail or Non-Frail



Note. Parameter estimates (standard error) are presented. Age, gender, education, anti-hypertensives, anti-depressants, corticosteroids, smoking, and time lag between P3 and P4 were controlled. * $p < .05$, ** $p < .01$, *** $p < .001$.

4. Interventions: recommandations for further research

- Outcomes
- Quality of studies
- Robust & validated measurments
- Representativity of participants
- Roles of caregivers

2 recent systematic reviews….

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Age and Ageing 2017; **46:** 383–392
doi: 10.1093/ageing/afw247
Published electronically 7 January 2017

REVIEW

Interventions to prevent or reduce the level of frailty in community-dwelling older adults: a scoping review of the literature and international policies

Martine T. E Puts[1], Samar Toubasi[1], Melissa K. Andrew[2], Maureen C. Ashe[3,4], Jenny Ploeg[5], Esther Atkinson[6], Ana Patricia Ayala[7], Angelique Roy[8], Miriam Rodríguez Monforte[1], Howard Bergman[9], Kathy McGilton[8]

Results: fourteen studies were included: 12 randomised controlled trials and 2 cohort studies (mean number of participants 260 (range 51–610)), with most research conducted in USA and Japan. The study quality was moderate to good. The interventions included physical activity; physical activity combined with nutrition; physical activity plus nutrition plus memory training; home modifications; prehabilitation (physical therapy plus exercise plus home modifications) and comprehensive geriatric assessment (CGA). Our review showed that the interventions that significantly reduced the number of frailty markers present or the prevalence of frailty included the physical activity interventions (all types and combinations), and prehabilitation. The CGA studies had mixed findings.

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Interventions to limit frailty

Clinical Interventions in Aging

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REVIEW

Effects of multi-domain interventions in (pre)frail elderly on frailty, functional, and cognitive status: a systematic review

This article was published in the following Dove Press journal:
Clinical Interventions in Aging
24 May 2017
Number of times this article has been viewed

Lenore Dedeyne[1]
Mieke Deschodt[2–4]
Sabine Verschueren[5]
Jos Tournoy[1,3]
Evelien Gielen[1,3]

Background: Frailty is an aging syndrome caused by exceeding a threshold of decline across multiple organ systems leading to a decreased resistance to stressors. Treatment for frailty focuses on multi-domain interventions to target multiple affected functions in order to decrease the adverse outcomes of frailty. No systematic reviews on the effectiveness of multi-domain interventions exist in a well-defined frail population.

Conclusion: Evidence of beneficial effects of multi-domain compared to mono-domain interventions is limited but increasing. Additional studies are needed, focusing on a well-defined frail population and with specific attention to the design and the individual contribution of mono-domain interventions. This will contribute to the development of more effective interventions for frail elderly.

Multidomains interventions in (pre)frail elderly

- Multi-domain interventions improve frailty characteristics and physical functioning more effectively than mono-domain interventions
- Inconsistent effects on functional abilities, falls, and psychosocial outcomes?
- Physical exercise seems tp play an essential role in the multi-domain intervention

Dedeyne et al, Clin Interventions in Aging 2017

Multidomains interventions in (pre)frail elderly: perspectives

- Effects on cognition, social involvement, or some functional outcomes?
- Optimal duration of intervention
- Core outcome set
  - 1) frailty status, score;
  - 2) muscle outcomes (mass and strength);
  - 3) physical outcomes;
  - 4) cognition, social outcomes, and/or psychological well-being.
- Heterogeneity of populations and frailty tools
- Understanding the contribution of each mono-domain intervention to optimize and prioritize the frailty syndrome management?
- Optimal moment for intervention?

Dedeyne et al, Clin Interventions in Aging 2017

Why to assess frailty ?

- Older people are a heterogeneous group
  - Fit ⇔ Frail ⇔ dependent
- Frailty is an elevated state of risk…
  - ↓ ability to deal with stressor events
  - Strong predictor of several adverse events
- Frailty is reversible
  - Early diagnosis ⇔ preventing and treating
  - Treatment decisions
- Intervention to maintain homeostasis, decrease consequence of frailty

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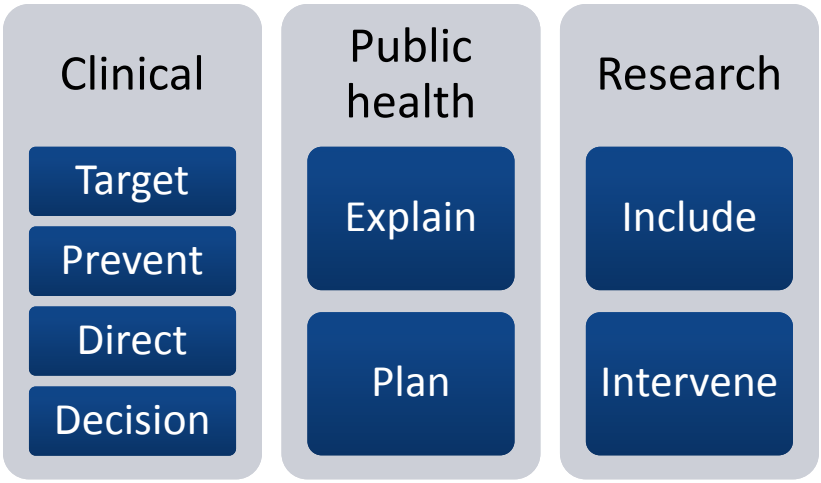
Frailty, a useful concept…



5. Clinical pictures

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Objectives of this last part

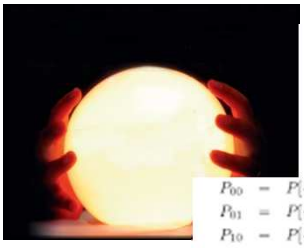
To show :

How frailty screening in different contexts of care help to identify a population of older patients who will benefit from geriatric intervention, in order to limit functional decline, geriatric syndroms, ….

How frailty screening followed by CGA is useful before a surgical intervention, a cancer treatment, …

- Help to identify modifiable risk factors : polymedication, denutrition, delirium
- Better appreciation of risk/benefit balance
- Improve information to patients, carers.

How define frail people in clinical settings ?



$$
\begin{aligned}
P_{00} &= P[\{m_1 \text{ down}\}] = 1 - p_1, \\
P_{01} &= P[\{m_1 \text{ down}\} \cap \{m_2 \text{ up}\}] = (1 - p_1)p_2, \\
P_{10} &= P[\{m_1 \text{ up}\}] = p_1, \\
&\cdots \quad \cdots \quad \cdots \quad \cdots \quad \cdots \\
P_{ii} &= P[\{m_1 \text{ up}\}]P[\{m_2 \text{ up}\}] + P[\{m_1 \text{ down}\}]P[\{m_2 \text{ down}\}] \\
&= p_1 p_2 + (1 - p_1)(1 - p_2), \qquad i = 1, \ldots, N-1, \qquad (4.1) \\
P_{i(i+1)} &= P[(\{m_1 \text{ down}\}]P[\{m_2 \text{ up}\})] \\
&= (1 - p_1)p_2, \qquad i = 1, \ldots, N-1, \\
P_{(i+1)i} &= P[(\{m_1 \text{ up}\}]P[\{m_2 \text{ down}\})] \\
&= p_1(1 - p_2), \qquad i = 1, \ldots, N-1, \\
&\cdots \quad \cdots \quad \cdots \quad \cdots \quad \cdots \\
P_{NN} &= P[\{m_1 \text{ up}\}]P[\{m_2 \text{ up}\}] + P[\{m_2 \text{ down}\}] \\
&= p_1 p_2 + 1 - p_2.
\end{aligned}
$$

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Two step approaches

- To target
  - The population who will benefit from interventions
  - Screening tools
- To assess
  - CGA

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Frailty in specific settings

- Primary care
- Emergency department
- Oncology department
- Surgical department
- Cardiovascular department

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PRIMARY CARE

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Robert's story

Robert -a 87-year old man- is sent to the emergency department where he is found to have suffered a myocardial infarction, developed hyponatremia, and become delirious. He is admitted to your geriatric ward.

Robert's story

During the past 2 days, Robert develops confusion and experiences repeated falls. He now needs assistance from 2 people to transfer and requires assistance with feeding and toileting. His wife is no longer able to manage his care needs.

Robert's story

Six month ago, Robert visited his GP because of worsening urinary incontinence and falls:

- Slow gait speed;
- 6-month weight loss (5%) and reduced muscle mass
- Normal physical examination
- Magnetic resonance imaging: central lumbar spinal stenosis.
- By urologist: Urinary retention after voiding treated by urinary catheter.
- During the following 2 days, Robert develops confusion and experiences repeated falls.

Robert's story

His wife tell you that Robert is a retired engineer, very nice with her and his children, but is slowing down progressively since 2 years. Previously physically active, he was walking more and more slowly and suffered recently from several recent falls. Because of resulted "lost strenght" and fear of falling, he was used a walker or cane to walk short distances. His reduced appetite has resulted in a 9-kg unintentional weight loss over theses 2 years. She does not describe any cognitive problem. He was cognitively intact and did not have any complain.

He has had urinary incontinence for several years, attributed to radiotherapy for prostate cancer in 1996. His medical history includes a stroke in 2003 involving mild left-sided hemiparesis, hypertension, and hyperlipidemia. He lives independently with his elderly wife in a 2-storey house. Robert takes the following medications: 20 mg of simvastatin once daily, 5 mg of ramipril once daily, 75 mg of clopidogrel once daily, and vitamin D.

- How common is frailty in GP practice ?
- How relevant is frailty to GP practice ?
- What can do a GP in his/her practice ?
- When to refer to a specialist ?

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Screening tools for frailty in primary care

- GPs are increasingly confronted with frail patients
  - 7% 65+; 25-40% 80+
  - Importance to distinguish normal ageing from frailty, potentially reversible/prevention of adverse outcomes
- GPs require a simple screening tool for frailty
  - Easy, reliable and inexpensive tool ? + *practical feasibility*
- When screening positive: medical review
  - Medical evaluation (comorbidity, other underlying conditions) and medication review
  - Intervention related to malnutrition and physical activity (exercise program): *cf.* supra
  - Referral to geriatrician (…) and allied health professional
  - Advance Care Planning

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Tool/study	No. items	Mode of administrat°	Language	Administrat° duration	Reference G assessment
Screening letter	9 simple items	Self-administered questionnaire	English	–	CGA by geriatrician
Sherbrooke postal questionnaire	6 simple items	Self-administered questionnaire	French	–	SMAF scale by nurse in the home
Functional assessment screening package	16 simple items or measures	Non-medical staff	English	8–12 min	CGA by geriatrician
Screening instrument	16 simple items	–	English	5 min	CGA by geriatrician
Strawbridge questionnaire	16 simple items	Self-administered questionnaire	English	–	CGA by geriatrician

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Tool/study	No. items	Mode of administrat°	Language	Administrat° duration	Reference G assessment
PRISMA-7	7 simple items	Self-administered questionnaire	French	3 min	SMAF scale
Bright tool	11 simple items	Self-administered questionnaire	English	–	MDS-HC by nurse in the home
Self-administered test	49 simple items	Self-administered questionnaire	Italian	–	MCPS by geriatrician
Tilburg frailty indicator	15 simple items	Self-administered questionnaire	Dutch	14 min	CGA by trained interviewers
SHARE-FI	5 simple items plus grip measured on a dynamometer	Non-medical staff	–	–	No CGA Mortality physical, social and cognitive data from the SHARE survey

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Table 2. Description of instruments

Tool/study	Patient-reported fatigue	Physical performance	Walking	No. comorbidities	Nutritional state	Psychometric properties compared to CGA
Screening letter[25]	+	–			–	Se = 0.95/Sp = 0.68
Sherbrooke postal questionnaire[26]	–	–	+	–	–	Se = 0.75/Sp = 0.52
Functional assessment screening package[27]	–	+	+	–	+	Kappa = 0.77–1/Se = 0.70–0.95/Sp = 0.64–0.95
Screening instrument[28]	–	+	+	–	–	Se = 0.65–0.93/Sp = 0.50–0.96
Strawbridge questionnaire[29]	–	+	+	–	+	Inter-evaluation agreement = 0.67/kappa = 0.29
PRISMA-7[30]	+	–	+	–	–	Se = 0.78/Sp = 0.74
Bright tool[31]	+	+	+	–	–	Kappa = 0.77/α = 0.77/Se = 0.65/Sp = 0.84
Self-administered test[32]	–	–	+	+	+	Similar classification for 48% of the subjects
Tilburg frailty indicator[33]	+	+	+	–	+	Kappa = 0.79/α = 0.73/Pearson's corr. coeff. (*r*) significant ($P < 0.001$)
SHARE-FI[34]	+	+	+	–	+	Compared to non-frail odds ratio for mortality among frail >1/Spearman's corr. coeff. significant ($P < 0.001$)

corr. coeff, Correlation coefficient; Se, sensibility; Sp, specificity.

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The "PRISMA 7" Questions

1. Are you more than 85 years?
2. Male?
3. In general do you have any health problems that require you to limit your activities?
4. Do you need someone to help you on a regular basis?
5. In general do you have any health problems that require you to stay at home?
6. In case of need, can you count on someone close to you?
7. Do you regularly use a stick, walker or wheelchair to get about?

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Tilburg Frailty Indicator (TFI)*
Gobbens RJJ, van Assen MALM, Luijkx KG, Wijnen-Sponselee MTh, Schols JMGA. The Tilburg Frailty Indicator: psychometric properties. J Am Med Dir Assoc 2010; 11(5):344-355.

Part A Determinants of frailty

1. Which sex are you?	0 male	0 female
2. What is your age?	..... years	
3. What is your marital status?	0 married/living with partner 0 unmarried 0 separated/divorced 0 widow/widower	
4. In which country were you born?	0 The Netherlands 0 Former Dutch East Indies 0 Suriname 0 Netherlands Antilles 0 Turkey 0 Morocco 0 Other, namely.....	
5. What is the highest level of education you have completed?	0 none or primary education 0 secondary education 0 higher professional or university education	
6. Which category indicates your net monthly household income?	0 €600 or less 0 €601 - €900 0 €901 - €1200 0 €1201 - €1500 0 €1501 - €1800 0 €1801 - €2100 0 €2101 or more	
7. Overall, how healthy would you say your lifestyle is?	0 healthy 0 not healthy, not unhealthy 0 unhealthy	
8. Do you have two or more diseases and/or chronic disorders?	0 yes	0 no
9. Have you experienced one or more of the following events during the past year?		
- the death of a loved one	0 yes	0 no
- a serious illness yourself	0 yes	0 no
- a serious illness in a loved one	0 yes	0 no
- a divorce or ending of an important intimate relationship	0 yes	0 no
- a traffic accident	0 yes	0 no
- a crime	0 yes	0 no
10. Are you satisfied with your home living environment?	0 yes	0 no

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Part B Components of frailty

B1	**Physical components**			
11.	Do you feel physically healthy?	0 yes		0 no
12.	Have you lost a lot of weight recently without wishing to do so? *('a lot' is: 6 kg or more during the last six months, or 3 kg or more during the last month)*	0 yes		0 no
	Do you experience problems in your daily life due to:			
13.	.....difficulty in walking?	0 yes		0 no
14.	.....difficulty maintaining your balance?	0 yes		0 no
15.	.....poor hearing?	0 yes		0 no
16.	.....poor vision?	0 yes		0 no
17.	.....lack of strength in your hands?	0 yes		0 no
18.	.....physical tiredness?	0 yes		0 no
B2	**Psychological components**			
19.	Do you have problems with your memory?	0 yes	0 sometimes	0 no
20.	Have you felt down during the last month?	0 yes	0 sometimes	0 no
21.	Have you felt nervous or anxious during the last month?	0 yes	0 sometimes	0 no
22.	Are you able to cope with problems well?	0 yes		0 no
B3	**Social components**			
23.	Do you live alone?	0 yes		0 no
24.	Do you sometimes miss having people around you?	0 yes	0 sometimes	0 no
25.	Do you receive enough support from other people?	0 yes		0 no

Scoring Part B Components of frailty (range: 0 – 15)

Question 11:	yes = 0, no = 1
Question 12 – 18:	no = 0, yes = 1
Question 19:	no and sometimes = 0, yes = 1
Question 20 and 21:	no = 0, yes and sometimes = 1
Question 22:	yes = 0, no = 1
Question 23:	no = 0, yes = 1
Question 24:	no = 0, yes and sometimes = 1
Question 25:	yes = 0, no = 1

Cutpoint: 5

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References

- Pialoux et al. Screening tools for frailty in primary care: a systematic review. Geriatr Gerontol Int 2012
- Clegg et al. Diagnostic test accuracy of simple instruments for identifying frailty in community-dewelling older people: a systematic review. Age and Ageing 2015
- Lee et al. Frailty: identifying elderly patients at risk of poor outcomes
- Chen et al. Approach to frailty in the elderly in primary care and the community. Singapore Med J 2018
- Theou O, Rockwood K (eds): Frailty in Aging. Biological, clinical and social implications. Interdiscipl Top Geratr. Basel, Karger, 2015, vol 41, pp85-94

EMERGENCY DEPARTMENT

Personal story

You are admitted because of a stupid fall at sport. What happened in emergency department (ED) ?

Robert is admitted because of a stupid fall at home. What happened in the ED ?

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Main way of admission: the emergency department

Qualitative and quantitative concerns: the emergency dept. (ED) constrains and the geriatric complexity

Rapid management of an acute illness	Multiple comorbidities and complex care needs (ψsocial)
Unforeseeable nature and 24/7 availability	Atypical presentations
Overcrowding	Longer LOS in ED Fragmentation of care

Aminzadeh & al. Annals of Emergency Medicine 2002
Salvi F & al. Intern Emerg Med, 2007
Samaras & al. Annals of Emergency Medicine 2010

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Older Patients in the Emergency Dept: adverse outcomes after discharge

- Discharged OP to community:
  - 1 patient in 2 readmitted to ED at 6 months
  - 1 patient in 3 with functional decline (FD) at 3 months
  - 1 patient in 10 : death
  - Risk for hospitalization : x3

Salvi et al, Intern Emerg Med 2011

- Hospitalized OP:
  - Early FD (48h)
  - 1 patient in 3 with persistent FD at 3 months
    - ↑mortality,
    - ↑LOS, ↑%unplanned readmissions,
    - ↑institutionalization, ↑use health care resources

Ellis et al. BMJ 2011; Ellis et al. Cochrane 2010

111

Older Patients in the Emergency Dept: Effectiveness of interventions

- Discharged OP to community: promising results

Hastings et al. Acad Emerg Med October 2005
Fealy et al. Journal of Advanced nursing, 2009
Graf et al. Aging Clin Exp Res. October 5, 2010
Sinha et al. Annals Emerg Med, 2011

- Hospitalized OP: **G**eriatric **E**valuation and **M**anagement **U**nit:
  - Higher likelihood of being alive and in their own homes
  - Less likely to be institutionalized, to suffer death or deterioration
  - More likely to experience improved cognition
  - Potential cost reduction

Ellis et al. BMJ 2010
Ellis et al. Cochrane 2011

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CGA and Case-finding in ED

- CGA following by appropriate interventions could improves outcomes
  - CGA is time-consuming and cannot be applied routinely in ED
- Screening of at-risk patient more efficient than age-based screening
  - Identifying older people that would benefit the most from G intervention
  - Time and resources saving

Graf et al. Aging Clin Exp Res. October 5, 2010

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Rapid Emergency Dpt Intervention for « senior at risk » of FD

- Case-finding :
  - Screening tool ISAR to 65+: positive ≥ 2/6
  - Self-reported or nurse evaluation
- Intervention : CGA and referral to community services for high-risk patients
- Outcomes : death, institutionalization and increased functional dependence at 6-month

Mc Cusker et al. JAGS 2001

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The Identification Senior At Risk Tool :

Mc Cusker et al. JAGS 1999

		Hospital use only
1. Before the illness or injury that brought you to the Emergency, did you need someone to help you on a regular basis?	☐ YES ☐ NO	1 0
2. Since the illness or injury that brought you to the Emergency, have you needed more help than usual to take care of yourself?	☐ YES ☐ NO	1 0
3. Have you been hospitalized for one or more nights during the past 6 months (excluding a stay in the Emergency Department)?	☐ YES ☐ NO	1 0
4. In general, do you see well?	☐ YES ☐ NO	0 1
5. In general, do you have serious problems with your memory?	☐ YES ☐ NO	1 0
6. Do you take more than three different medications every day?	☐ YES ☐ NO	1 0
	TOTAL:	_____

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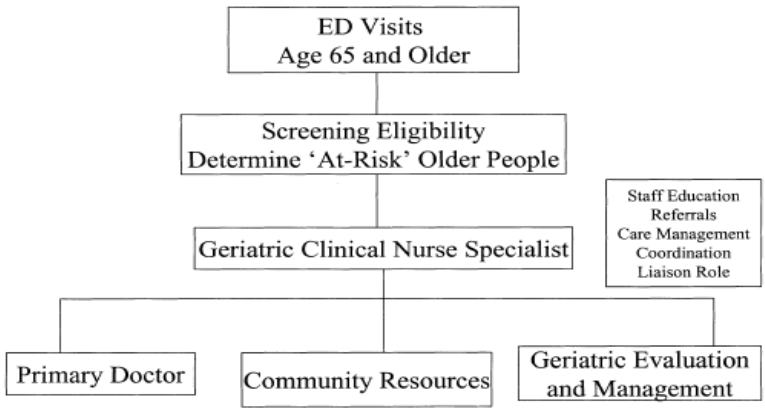
The SIGNET Model :

Case-Finding and Referral to community services



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The Triage Risk Screening Tool :
Meldon et al. Acad Emerg Med 2003

1. ☐ History of cognitive impairment (poor recall or not oriented)
2. ☐ Difficulty walking / transferring or recent falls
3. ☐ Five or more medications
4. ☐ ED use in previous 30 days or hospitalization in previous 90 days
5. ☐ Lives alone **and/or** no available caregiver
6. ☐ ED staff professional recommendations:
   - □ Suspected abuse/neglect
   - □ Non compliant patient with < 5 med
   - □ Suspected substance abuse
   - □ Problems with iADL
   - □ Others : specify…

If 2 or more factors identified: ☐ Referral to GEM Nurse ☐ Referral to GEM Nurse **not** indicated

☐ Referral to Social Work when GEM nurse not available

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The Flemish TRST

GRP*

RISICO	JA	NEE
1. Aanwezigheid van een cognitieve stoornis	2	0
2. Alleenwonend of geen hulp mogelijk door inwonende partner/familie	1	0
3. Moeilijkheden bij stappen/transfers of gevallen in de afgelopen 6 maanden	1	0
4. Hij/Zij werd gehospitaliseerd in de afgelopen 3 maanden	1	0
5. De patient gebruikt ≥ 5 geneesmiddelen	1	0
Totaalscore	.....	

Kenis et al. Crit Rev Oncol Hematol 2006

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G Syndromes predict postdischarge outcomes among older patients

Academic Emergency Medicine
Official Journal of the Society for Academic Emergency Medicine

ORIGINAL CONTRIBUTION

Geriatric Syndromes Predict Postdischarge Outcomes Among Older Emergency Department Patients: Findings From the interRAI Multinational Emergency Department Study

Andrew P. Costa, PhD, John P. Hirdes, PhD, George A. Heckman, MD, MSc, Aparajit B. Dey, MD, Palmi V. Jonsson, MD, Prabha Lakhan, RN, PhD, Gunnar Ljunggren, MD, PhD, Katrin Singler, MD, MME, Fredrik Sjostrand, MD, PhD, Walter Swoboda, MD, Nathalie I.H. Wellens, PhD, and Leonard C. Gray, MD, PhD

Costa et al. Acad Emerg Med April 2014

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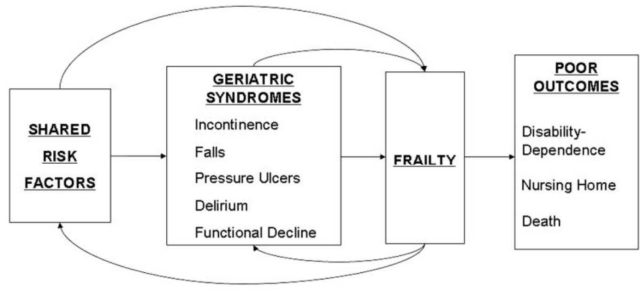
Frailty and Geriatric Syndromes

Figure 2



A unifying conceptual model demonstrates that shared risk factors may lead to geriatric syndromes, which may in turn lead to frailty, with feedback mechanisms enhancing the presence of shared risk factors and geriatric syndromes. Such self-sustaining pathways may result in poor outcomes involving disability-dependence, nursing home placement, and ultimately death, thus holding important implications for elucidating pathophysiologic mechanisms and designing effective intervention strategies.

Inouye et al. JAGS 2007

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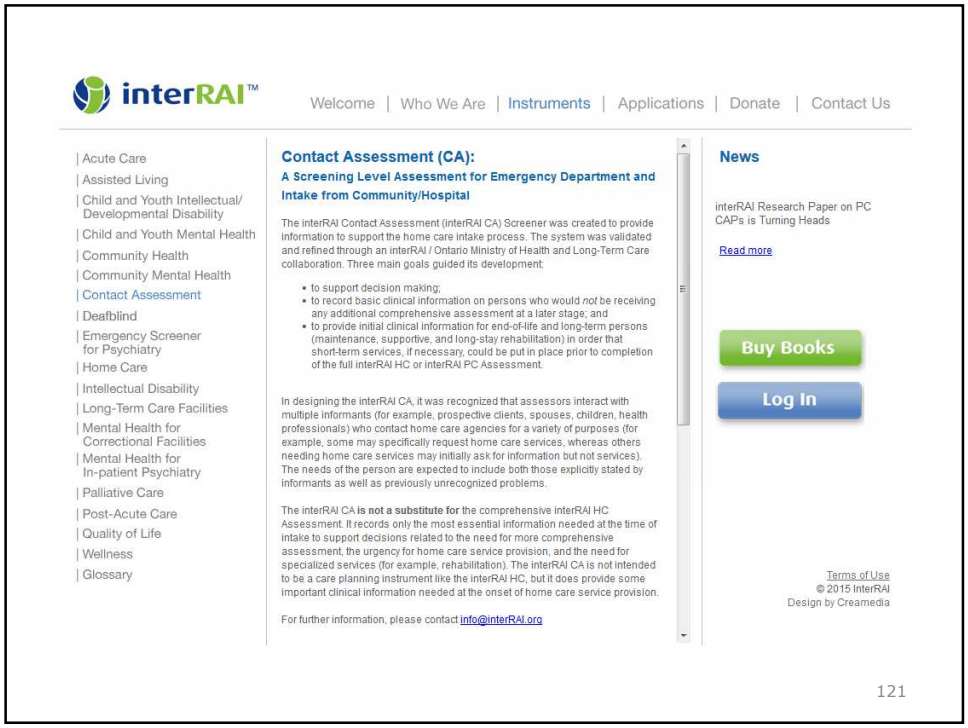
interRAI™
Welcome | Who We Are | Instruments | Applications | Donate | Contact Us
| Acute Care
| Assisted Living
| Child and Youth Intellectual/ Developmental Disability
| Child and Youth Mental Health
| Community Health
| Community Mental Health
| Contact Assessment
| Deafblind
| Emergency Screener for Psychiatry
| Home Care
| Intellectual Disability
| Long-Term Care Facilities
| Mental Health for Correctional Facilities
| Mental Health for In-patient Psychiatry
| Palliative Care
| Post-Acute Care
| Quality of Life
| Wellness
| Glossary
Contact Assessment (CA):
A Screening Level Assessment for Emergency Department and Intake from Community/Hospital
The interRAI Contact Assessment (interRAI CA) Screener was created to provide information to support the home care intake process. The system was validated and refined through an interRAI / Ontario Ministry of Health and Long-Term Care collaboration. Three main goals guided its development:
• to support decision making;
• to record basic clinical information on persons who would not be receiving any additional comprehensive assessment at a later stage; and
• to provide initial clinical information for end-of-life and long-term persons (maintenance, supportive, and long-stay rehabilitation) in order that short-term services, if necessary, could be put in place prior to completion of the full interRAI HC or interRAI PC Assessment.
In designing the interRAI CA, it was recognized that assessors interact with multiple informants (for example, prospective clients, spouses, children, health professionals) who contact home care agencies for a variety of purposes (for example, some may specifically request home care services, whereas others needing home care services may initially ask for information but not services). The needs of the person are expected to include both those explicitly stated by informants as well as previously unrecognized problems.
The interRAI CA is not a substitute for the comprehensive interRAI HC Assessment. It records only the most essential information needed at the time of intake to support decisions related to the need for more comprehensive assessment, the urgency for home care service provision, and the need for specialized services (for example, rehabilitation). The interRAI CA is not intended to be a care planning instrument like the interRAI HC, but it does provide some important clinical information needed at the onset of home care service provision.
For further information, please contact info@interRAI.org
News
interRAI Research Paper on PC CAPs is Turning Heads
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Design by Creamedia

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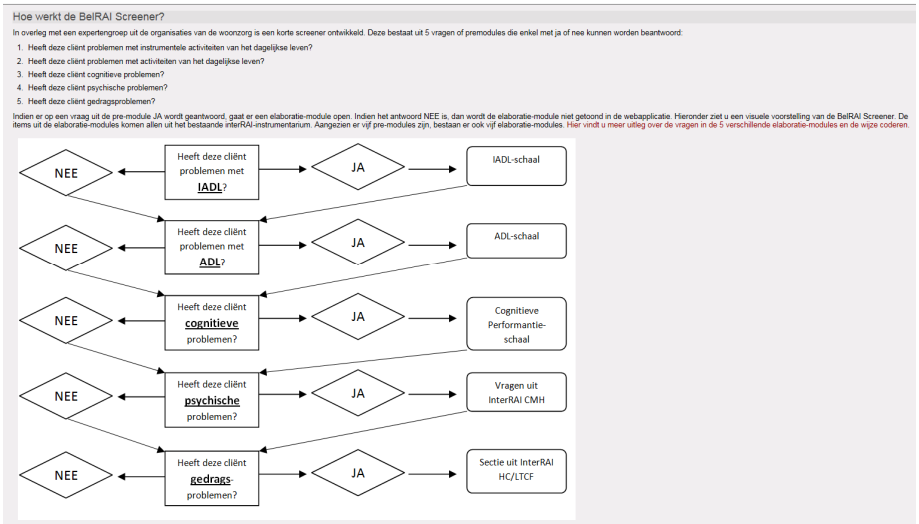
Hoe werkt de BelRAI Screener?
In overleg met een expertengroep uit de organisaties van de woonzorg is een korte screener ontwikkeld. Deze bestaat uit 5 vragen of premodules die enkel met ja of nee kunnen worden beantwoord:
1. Heeft deze cliënt problemen met instrumentele activiteiten van het dagelijkse leven?
2. Heeft deze cliënt problemen met activiteiten van het dagelijkse leven?
3. Heeft deze cliënt cognitieve problemen?
4. Heeft deze cliënt psychische problemen?
5. Heeft deze cliënt gedragsproblemen?
Indien er op een vraag uit de pre-module JA wordt geantwoord, gaat er een elaboratie-module open. Indien het antwoord NEE is, dan wordt de elaboratie-module niet getoond in de webapplicatie. Hieronder ziet u een visuele voorstelling van de BelRAI Screener. De items uit de elaboratie-modules komen allen uit het bestaande interRAI-instrumentarium. Aangezien er vijf pre-modules zijn, bestaan er ook vijf elaboratie-modules. Hier vindt u meer uitleg over de vragen in de 5 verschillende elaboratie-modules en de wijze coderen.
NEE
Heeft deze cliënt problemen met IADL?
JA
IADL-schaal
NEE
Heeft deze cliënt problemen met ADL?
JA
ADL-schaal
NEE
Heeft deze cliënt cognitieve problemen?
JA
Cognitieve Performantie-schaal
NEE
Heeft deze cliënt psychische problemen?
JA
Vragen uit InterRAI CMH
NEE
Heeft deze cliënt gedrags-problemen?
JA
Sectie uit InterRAI HC/LTCF

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G Syndromes predict postdischarge outcomes among older patients

- Common G conditions influence the p! of some adverse events among older patients
- Geriatric clinical features may help to refine and focus existing clinical reasoning
  - In-patients: psychosocial, locomotion and trauma
    - GEMU, co-management (hip #) elder-friendly care
  - Out-patients: recent ED visits, bADL impairment, psy
    - Unmet needs, mental health services, coordination with primary care in suba-cute cases

•Costa et al. Acad Emerg Med 2014

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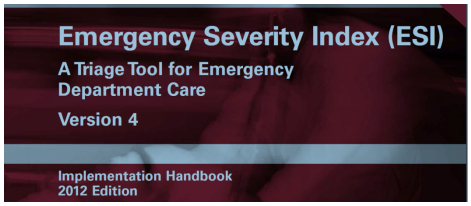
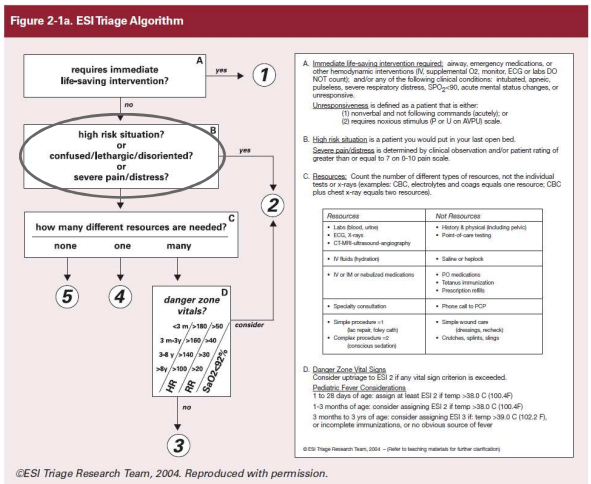
New onset of confusion in an elderly patient





©ESI Triage Research Team, 2004. Reproduced with permission.

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A novel multidimensional geriatric screening tool in the ED: evaluation of feasibility and clinical relevance ☆

Andreas W. Schoenenberger, MD [a,*], Christoph Bieri [a], Onur Özgüler, MD [b], André Moser, PhD [a,c], Monika Haberkern, MD [b], Heinz Zimmermann, MD [b], Andreas E. Stuck, MD [a], Aristomenis Exadaktylos, MD, FCEM [b]

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ABSTRACT

Purposes: Geriatric problems frequently go undetected in older patients in emergency departments (EDs), thus increasing their risk of adverse outcomes. We evaluated a novel emergency geriatric screening (EGS) tool designed to detect geriatric problems.
Basic procedures: The EGS tool consisted of short validated instruments used to screen 4 domains (cognition, falls, mobility, and activities of daily living). Emergency geriatric screening was introduced for ED patients 75 years or older throughout a 4-month period. We analyzed the prevalence of abnormal EGS and whether EGS increased the number of EGS-related diagnoses in the ED during the screening, as compared with a preceding control period.
Main findings: Emergency geriatric screening was performed on 338 (42.5%) of 795 patients presenting during screening. Emergency geriatric screening was unfeasible in 175 patients (22.0%) because of life-threatening conditions and was not performed in 282 (35.5%) for logistical reasons. Emergency geriatric screening took less than 5 minutes to perform in most (85.8%) cases. Among screened patients, 285 (84.3%) had at least 1 abnormal EGS finding. In 270 of these patients, at least 1 abnormal EGS finding did not result in a diagnosis in the ED and was reported for further workup to subsequent care. During screening, 142 patients (42.0%) had at least 1 diagnosis listed within the 4 EGS domains, significantly more than the 29.3% in the control period (odds ratio 1.75; 95% confidence interval, 1.34-2.29; $P < .001$). Emergency geriatric screening predicted nursing home admission after the in-hospital stay (odds ratio for ≥3 vs <3 abnormal domains 12.13; 95% confidence interval, 2.79-52.72; $P = .001$).
Principal conclusions: The novel EGS is feasible, identifies previously undetected geriatric problems, and predicts determinants of subsequent care.

Table 1
Emergency geriatric screening tool, consisting of short validated instruments for screening 4 domains (cognition, falls, mobility, and ADL) [10,25–27]

Cognition		
Instruction: Ask the patient the following questions. If the patient does not respond, the question is rated incorrect.		
What day is today?	Incorrect*	Correct
What is the date today? (±1 day is correct)	Incorrect*	Correct
What year is this?	Incorrect*	Correct
Spell "radio" backward.	Incorrect	Correct
Evaluation consistent with impairment of cognition (if one single response was incorrect):	Yes	No
Falls		
Instruction: Rate the following questions considering all available sources (patient, proxy, observation, reports).		
Did the patient present to the ED because of a fall?	Yes*	No
Did the patient have one or more falls during the last 12 months?	Yes	No
Evaluation consistent with patient history of falls (if one single response was yes):	Yes	No
Mobility		
Instruction: Rate the following question considering all available sources (patient, proxy, observation, reports).		
Did the patient require walking aids (cane, wheeled walker, or helping person) indoors or outdoors before presenting to the ED?	Yes	No
Instruction: Rate the following questions according to the current situation in the ED.		
Is the patient currently confined to bed?	Yes*	No
Does the patient currently need help (walking aids or helping person) to get out of bed?	Yes*	No
Does the patient need ≥20 seconds for the Timed Up and Go Test?	Yes	No
Evaluation consistent with impairment of mobility (if one single response was yes):	Yes	No
ADLs		
Instruction: Rate the following question considering all available sources (patient, proxy, observation, reports).		
Did the patient require assistance for personal hygiene (sponge bath, tub bath, or shower) before presenting to the ED?	Yes*	No
Instruction: Rate the following questions according to the current situation in the ED.		
Is the patient currently confined to bed or does he need help (walking aid or helping person) to get out of bed?	Yes*	No
Does the patient require assistance (for direct help or instruction) for dressing (clothes or shoes)?	Yes*	No
Does the patient require assistance (for direct help or instruction) for toileting?	Yes*	No
Does the patient require assistance (for direct help or instruction) for feeding?	Yes	No
Evaluation consistent with impairment in ADL (if one single response was yes):	Yes	No

* If one of the responses marked with an asterisk applies, the rater may directly proceed to evaluating the domain (hierarchical structure).

Oncogeriatrics

Use of Geriatric Assessment for Older Adults in Oncology Setting: A Systematic Review
Puts et al. J Natl Cancer Inst 2012

International Society of Geriatric Oncology Consensus on Geriatric Assessment in Older Patients With Cancer
Wildiers et al. J Clinical Oncol 2014

Four Screening instruments for frailty in older patients with and without cancer: a diagnosis study
Smets et al. BMC Geriatrics 2014

Frailty screening methods for predicting outcome of a comprehensive geriatric assessment in elderly patients with cancer: a systematic review
Hamaker et al. The Lancet Oncology 2012

Older Patients in the Oncology dpt: Rationale

- >50% newly diagnoses 65+, heterogeneous group
  - Cancer type, stage, disease & R/ trajectories
  - Ageing process: not only chronologic age
- Debilitating disease: preserve QOL
  - Prevent functional decline
  - Live in own home
- Treatment toxicity & decision: decompensation of other comorbidity/psychosocial factors

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Older Patients in the Oncology Dpt: Rationale

- Detection of potentially reversible G problems
  - Identify opportunities for intervention
- Prediction of treatment toxicity/↓ in QOL
  - Preventive measures/Intervention to ↑ QOL and compliance
  - Treatment decision
- Prognostic information
  - P! to die because of / with the cancer
- Appraising objective health
  - Comorbidity/ψsocial factors that may decompensate

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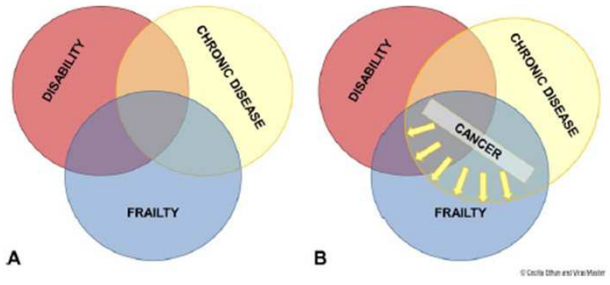
Oncogeriatrics : prevalence of frailty

CA CANCER J CLIN 2017;67:362–377



62% of older cancer patients are « frail » or « pre-frail »

Handforth et al. Ann Oncol 2015;26:1091

Oncogeriatrics Organisation

- Several ways of implementation
- Preference should be given to models that fit the local health care structure and setting
- Interaction with multidisciplinary G teams is highly recommended… **for selected patients**

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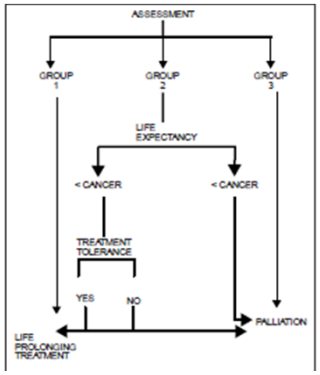
How to identify frailty in older cancer patients ?

CGA = gold standard in oncologic literature for 20y

Management of Cancer in the Older Person: A Practical Approach

Lodovico Balducci, Martine Extermann

The Oncologist 2000;5:224-237



VOLUME 32 · NUMBER 24 · AUGUST 20 2014

JOURNAL OF CLINICAL ONCOLOGY

REVIEW ARTICLE

International Society of Geriatric Oncology Consensus on Geriatric Assessment in Older Patients With Cancer

Hans Wildiers, Pieter Heeren, Martine Puts, Eva Topinkova, Maryska L.G. Janssen-Heijnen, Martine Extermann, Claire Falandry, Andrew Artz, Etienne Brain, Giuseppe Colloca, Johan Flamaing, Theodora Karnakis, Cindy Kenis, Riccardo A. Audisio, Supriya Mohile, Lazzaro Repetto, Barbara Van Leeuwen, Koen Milisen, and Arti Hurria

Hans Wildiers, Pieter Heeren, Johan Flamaing, Cindy Kenis, and Koen Milisen, University Hospitals Leuven, KU Leuven, Leuven, Leuven, Belgium;

Oncogeriatrics: Which domains and tools ?

- Important domains are:
  - Functional status
  - Fatigue
  - Comorbidity
  - Cognition and mental health status
  - Social support
  - Nutrition
  - G syndromes

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Oncogeriatrics
Screening tools

- Screening for relevance of CGA
  - abbreviated CGA (aCGA)
  - Vulnerable Elders Survey-13 (VES-13),
  - Groningen Frailty Indicator (GFI)
  - Geriatric 8 (G8)
- Various tools available, no superiority proven

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	GFI[5]	G8[36]	VES-13[6]	aCGA[38*]	Fried[4]	Barber[24]	TRST[37]
Functional status	27%	12%	60%	60%	60%	..	..
ADL impairment	13%	..	..	20%	..	33%	..
IADL impairment	7%	..	..	40%	..	11%	..
Mobility and falls	7%	..	..	..	..	..	20%
Psychosocial domain	40%	12%	..	40%	..	..	..
Cognitive disorder	7%	..	..	27%	..	..	20%
Mood and anxiety	13%	..	..	13%	..	..	..
Social support	20%	..	..	..	..	11%	..
Neurosensory deficits	13%	..	..	..	..	22%	..
Nutritional status and weight loss	7%	46%	..	..	20%	..	..
Polypharmacy	7%	6%	..	..	..	..	20%
Comorbidity	..	..	..	..	..	..	..
Recent hospital admission	..	..	..	..	..	11%	20%
Geriatric syndromes	..	..	..	..	..	..	20%
Self-reported health	7%	12%	10%	..	20%	11%	..
Age	..	12%	30%	..	..	..	..
Optimum score	0	17	0	..	0	0	0
Poorest score	15	0	10	..	5	9	5
Standard cutoff value†	4+	≤14	3+	..	3+	1+	2+
Population designed for	Various	Patients with cancer	Community-dwelling elderly	Patients with cancer	No specific population	Patients in primary care	Patients in emergency room

GFI=Groningen Frailty Index. G8=Geriatric 8. VES-13=Vulnerable Elders' Survey-13. aCGA=abbreviated comprehensive geriatric assessment. TRST=triage risk screening tool. ADL=activities of daily living. IADL=instrumental activities of daily living. *No overall scoring; subscores are calculated for each geriatric domain. †Cutoff score for a patient to be considered frail.

Table 2: **Relative weight of geriatric conditions assessed in frailty screening tools (% of total points)**

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The G8 Screening Questionnaire

- **8 questions**
- **Nurse administered**
- **Takes 5-10 min to perform**
  - Appetite, weight loss, BMI
  - Mobility
  - Mood and cognition
  - Number of medications
  - Patient-related health
  - Age categories
- **Abnormal if score ≤14**
  - Preliminary analysis
  - Sensitivity: 89.6%, Specificity: 60.4%

	Items	Possible answers (score)
A	Has food intake declined over the past 3 months due to loss of appetite, digestive problems, or chewing or swallowing difficulties?	0: severe decrease in food intake
		1: moderate decrease in food intake
		2: no decrease in food intake
B	Weight loss during the last 3 months	0: weight loss > 3 kg
		1: does not know
		2: weight loss between 1 and 3 kg
		3: no weight loss
C	Mobility	0: bed or chair bound
		1: able to get out of bed/chair but does not go out
		2: goes out
E	Neuropsychological problems	0: severe dementia or depression
		1: mild dementia or depression
		2: no psychological problems
F	Body mass index (BMI weight in kg)/(height in m²)	0: BMI < 18.5
		1: BMI = 18.5 to BMI < 21
		2: BMI = 21 to BMI < 23
		3: BMI = 23 and > 23
H	Takes more than 3 prescription drugs per day	0: yes
		1: no
P	In comparison with other people of the same age, how do they consider their health status?	0: not as good
		0.5: does not know
		1: as good
		2: better
	Age	0: > 85 yr
		1: 80-85 yr
		2: < 85 yr
	Total Score	**0-17**

Fig. 1: The G8 Screening Questionnaire. BMI = body mass index. Courtesy of Marie E. Wood, MD. Adapted from Soubeyran P, et al.[7]

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The Groningen Frailty Indictor

Are you able to carry out these tasks single-handed without any help? (The use of aids such as a walking stick, walking frame, wheelchair, is considered as independent)

1 Shopping,
2 Walking around outside (around the house or to the neighbors)
3 Dressing and undressing
4 Going to the toilet
5 What score do you give yourself for physical fitness? (scale 0 to 10)
6 Do you experience problems in daily life due to poor vision?
7 Do you experience problems in daily life due to poor hearing?

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VES-13

VES-13

1. Age _____ SCORE: *1 POINT FOR AGE 75-84; 3 POINTS FOR AGE ≥ 85*

2. In general, compared to other people your age, would you say that your health is:

☐ Poor,* *(1 POINT)*
☐ Fair,* *(1 POINT)*
☐ Good,
☐ Very good, or
☐ Excellent

SCORE: *1 POINT FOR FAIR or POOR*

3. How much difficulty, on average, do you have with the following physical activities:

	No Difficulty	A little Difficulty	Some Difficulty	A Lot of Difficulty	Unable to do
a. stooping, crouching or kneeling?	☐	☐	☐	☐ *	☐ *
b. lifting, or carrying objects as heavy as 10 pounds?	☐	☐	☐	☐ *	☐ *
c. reaching or extending arms above shoulder level?	☐	☐	☐	☐ *	☐ *
d. writing, or handling and grasping small objects?	☐	☐	☐	☐ *	☐ *
e. walking a quarter of a mile?	☐	☐	☐	☐ *	☐ *
f. heavy housework such as scrubbing floors or washing windows?	☐	☐	☐	☐ *	☐ *

SCORE: *1 POINT FOR EACH * RESPONSE IN Q3a THROUGH f . MAXIMUM OF 2 POINTS*

4. Because of your health or a physical condition, do you have any difficulty:

a. shopping for personal items (like toilet items or medicines)?
☐ YES → Do you get help with shopping? ☐ YES * ☐ NO
☐ NO
☐ DON'T DO → Is that because of your health? ☐ YES * ☐ NO

b. managing money (like keeping track of expenses or paying bills)?
☐ YES → Do you get help with managing money? ☐ YES * ☐ NO
☐ NO
☐ DON'T DO → Is that because of your health? ☐ YES * ☐ NO

Continued

© 2001 RAND

c. walking across the room? USE OF CANE OR WALKER IS OK.
☐ YES → Do you get help with walking? ☐ YES * ☐ NO
☐ NO
☐ DON'T DO → Is that because of your health? ☐ YES * ☐ NO

d. doing light housework (like washing dishes, straightening up, or light cleaning)?
☐ YES → Do you get help with light housework? ☐ YES * ☐ NO
☐ NO
☐ DON'T DO → Is that because of your health? ☐ YES * ☐ NO

e. bathing or showering?
☐ YES → Do you get help with bathing or showering? ☐ YES * ☐ NO
☐ NO
☐ DON'T DO → Is that because of your health? ☐ YES * ☐ NO

SCORE: *4 POINTS FOR ONE OR MORE * RESPONSES IN Q4a THROUGH Q4e*

A simple function-based tool for screening community-dwelling populations to identify older persons at risk for health deterioration. The **VES** considers age, self-rated health, and limitations in physical function, and functional disabilities.

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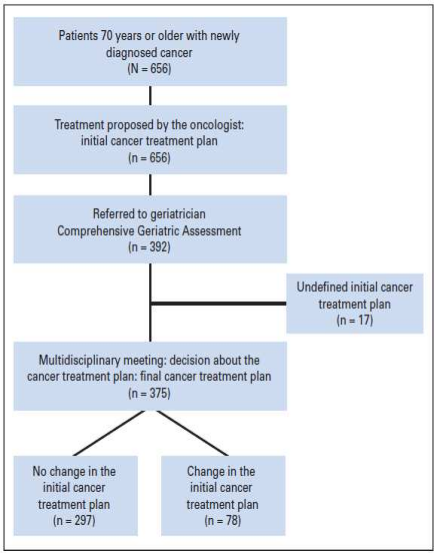
Impact of CGA on oncological decision treatment



Adaptation of oncological treatment in **20% of patient** following CGA

Caillet et al, J Clin Oncol 2011.

Impact of CGA on oncological decision treatment

- **ADL**
- **Nutrition**

Table 5. Multivariate Analysis to Identify Factors Independently Associated With Changing the Cancer Treatment

Factor	OR	95% CI	*P*
ECOG PS 1-point increase	1.07	0.72 to 1.59	.74
Inappropriate social environment	1.34	0.61 to 2.95	.46
ADL .5-point decrease	1.25	1.04 to 1.49	.016
Walking problems: risk of falls	1.27	0.53 to 3.03	.54
Malnutrition	2.99	1.36 to 6.58	.007
Cognitive impairment	0.93	0.44 to 2.00	.86
Depressive disorder	1.84	0.89 to 3.80	.10
Polypharmacy	1.72	0.72 to 4.14	.22
Urinary and/or fecal incontinence	1.09	0.45 to 2.64	.84
No. of comorbidities by 1-point increase	1.09	0.98 to 1.22	.11

NOTE. Multivariate analysis using a logistic regression model that included factors listed in the table: ECOG PS, inappropriate social environment, 1-point ADL score decrease, walking problems/risk of falls, malnutrition, cognitive impairment, depressive disorder, polypharmacy, incontinence, and 1 point per additional comorbidity.
Abbreviations: OR, odds ratio; ECOG PS, Eastern Cooperative Oncology Group performance status; ADL, Activities of Daily Living.

Caillet et al, J Clin Oncol 2011.

VOLUME 30 · NUMBER 15 · MAY 20 2012

JOURNAL OF CLINICAL ONCOLOGY

ORIGINAL REPORT

Predictors of Early Death Risk in Older Patients Treated With First-Line Chemotherapy for Cancer

Pierre Soubeyran, Marianne Fonck, Christèle Blanc-Bisson, Jean-Frédéric Blanc, Joël Ceccaldi, Cécile Mertens, Yves Imbert, Laurent Cany, Luc Vogt, Jerôme Dauba, Francis Andriamampionona, Nadine Houédé, Anne Floquet, Francois Chomy, Véronique Brouste, Alain Ravaud, Carine Bellera, and Muriel Rainfray

Soubeyran et al, J Clin Oncol 2012.

Table 2. Distribution of Advanced Tumors Across Tumor Sites (N = 348)

Cancer Type	Nonmetastatic/IPI 0-1		Metastatic/IPI 2-3	
	No. of Patients	%	No. of Patients	%
Non-Hodgkin's lymphoma*	61	57.0	44	41.1
Stomach/colon cancer	39	30.2	90	69.8
Other solid tumors	21	18.8	91	81.3
Lung	9		27	
Primary unknown	0		4	
Ovarian	1		19	
Bladder	3		15	
Prostate	0		18	
Pancreas	8		15	

Abbreviation: IPI, age-adjusted International Prognostic Index.
*Two patients had missing data for disease stage.

Table 4. Logistic Regression Model Analysis for Early Deaths (within 6 months) That Occurred for All Patients Who Received First-Line Chemotherapy (n = 339)

Risk Factor*	Odds Ratio	95% CI	*P*
Sex			
Female	1	Reference	
Male	2.40	1.20 to 4.82	.013
Tumor stage			
Localized	1	Reference	
Advanced	3.9	1.59 to 9.73	.003
Mini Nutritional Assessment			
Good nutrition, score > 23.5	1	Reference	
At risk/poor nutrition, score ≤ 23.5	2.77	1.24 to 6.18	.013
Timed Get Up and Go			
No impairments (≤ 20 seconds)	1	Reference	
Impaired	2.55	1.32 to 4.94	.006

NOTE: Model was adjusted for treatment site (regional and teaching hospitals *v* community hospitals).
*Age, tumor site, Activities of Daily Living, Mini-Mental State, platelet count, and performance status were also included in the model but not retained because they were not significant.

Conclusion

In patients greater than 70 years of age with cancer, advanced disease, a low MNA score, and poor mobility predicted early death. We recommend that the MNA and GUG, performed by a trained nurse, be maintained as part of routine pretreatment workup in these patients to identify at-risk patients and to inform the decision-making process for chemotherapy.

Soubeyran et al, J Clin Oncol 2012.

CGA in older cancer patients…

- Identify underlying diseaese at risk of decompensation during oncological treatment
- Assess preferences and motivation of patients
- Screen for caregivers'burden
- Help to maintain QOL
- Plan follow up
- Talk about palliative care
- …

Clinical picture in oncogeriatric

- M. JL, born in 1935
- Urologic symptoms in 08/2018 (pain, pollakiuria et hamaturia)
- Cystoscopie : High grade adenocarcinoma (G3), pT2, negative extension assessment.
- OMC : neo-adjuvant chemotherapy+ radical cystoprostatectomy (+Bricker) *versus* Radiotherapie + chemotherapy.
- Comorbidity : ischemic cardiovascular disease (MI 2015 with low residual EF 40%)
- R/ Bisoprolol, AAS, lisinopril, aldactone

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JL, 1935

- G8 : 13/17
- ECOG : 0
- Isar 1/6
- Social : live at home, MD in oncology !
- ADL : Katz 6/6; lawton 7/7
- Mobility : no previous fall, Timed Up&Go : 13 sec
- Pain : miction 2/10
- Fatigue : 4/10, sleep disturbances due to nycturia (7-8x)
- QOL (Eortc Qlq-C30) : 5/7
- No sensoriel limitations (audition, vision)
- MMSE : 29/30
- Geriatric Depression Scale : 3/15
- MNA 11/14 risk of denutrition, loss of 2 kg last 2 months (72 kg, BMI 24)

- CCLs :
- OncoG MC :

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Cardiovascular and surgical department

Importance of frailty in patients with cardiovascular disease

Mandeep et al. European Heart Journal 2014

Role of frailty assessment in patients undergoing cardiac interventions

Rowe et al. Open Heart 2014

Importance of frailty in CV patients

- CVDs are the leading cause of morbidity and mortality
  - 82% CVD ✝ are 65+; 46% CVD ✝ are 75+
  - ↑ CVD hospital admission
  - Non-cardiac predictors for 1-yr survival (TAVI)
- G prognosis determinants are seldom measured into clinical decision-making
  - High-risk interventions : CABG *vs.* PCI *vs.* TAVI *vs.* conservative treatment

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Frailty in the older surgical patient

- Higher increase of older surgical people than the rate of population ageing
- Adverse post-operative outcomes, despite surgical, anaesthetic and medical advances
- Frailty is an independant risk factors for morbidity, mortality, ↑ LOS and institutional discharge
  - Preoperative risk stratification tool
  - Identifying potentially modiafiable factors

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Importance of frailty in CV patients

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Table 5 Reasons for evaluating whether frailty is present in patients with cardiovascular diseases

1	Population ageing is increasing the number of frail patients with CVD
2	Eye ball or end of the bed assessments of frailty may not be reliable
3	Frailty increases the risks of cardiac surgery and other cardiovascular interventions
4	Frailty increases the risk of cardiovascular and non-cardiovascular mortality and the need for future institutional care
5	Frail patients may have more complications from medical treatments
6	The benefits of some cardiac interventions may be less in frail elderly patients because of competing risks. Non-cardiac deaths dominate following TAVR, PCI, and CABG

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Measuring frailty in CV patients

- Eye ball test at the end of the bed
  - Unreliable & prone to bias
- Questionnaires or simple measurements

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Measuring frailty in CV patients

- Eye b
  - Un
- Ques

Table 2 Simplified Fried criteria for frailty[99,100]

1	Unintentional weight loss	>4.5 kg in the past year
2	Exhaustion	For at least 3 days during the last week 'I felt that everything I did was an effort' or 'I could not get going'
3	Physical activity	No physical activity, spend most of the time sitting or rarely a short walk during the last year
4	Walk time	Time to walk 4 m >6 s
5	Grip strength	Grip strength by dynamometer

Frail = 3 or more criteria present, pre-frail = 1 or 2 criteria.

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Measuring frailty in CV patients

- Eye ba
  - Unre
- Questi

Table 3 The simple 'FRAIL' Questionnaire Screening Tool[101]

3 or greater = frailty; 1 or 2 = pre-frail
Fatigue: are you fatigued?
Resistance: cannot walk up one flight of stairs?
Aerobic: cannot walk one block
Illness: do you have more than five illnesses?
Loss of weight: have you lost >5% of your weight in the past 6 months?

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Measuring frailty in CV patients

Table 1 Frailty risk assessment scores

	FFS	MSSA	MFS	CAF	FORECAST
Number of indicators	5	4	5	6	5
Weight loss >5 kg in preceding year	Y		Y		
Grip strength >16 kg	Y	Y	Y	Y	
Low levels of physical activity	Y	Y			
6 min walk <210 m	Y	Y		Y	
SF-36 <40% for energy and vitality	Y				
MMSE <24		Y	Y		
Get-up-and-go >17 s			Y		
FEV_1 <30%			Y		
Put on and remove jacket				Y	
Pick up a pen from floor				Y	
Balance				Y	
Get up and down from a chair—performed three times				Y	Y
Feeling weak over the past 2 weeks					Y
Serum creatinine					Y
Stair climb assessment					Y
CSHA Clinical Frailty Scale					Y

CAF, comprehensive assessment of frailty; CSHA, Canadian study of health and ageing; FEV_1, forced expiratory volume in 1 s; FFS, Fried frailty score; FORECAST, Frailty predicts death 1 year after Elective Cardiac Surgery Test; MFS, motor fitness scale; MMSE, Mini-Mental State Examination; MSSA, McArthur study of successful ageing.

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Management of frail CV patients

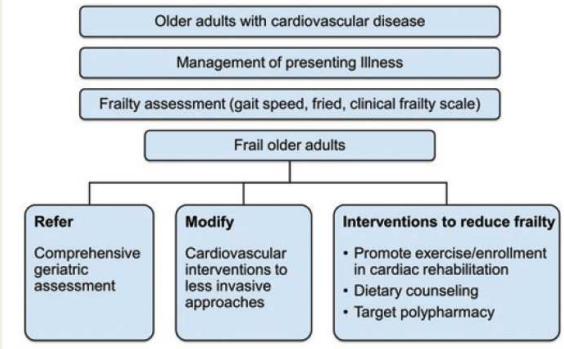

Figure 3 Proposed algorithm for older adults with cardiovascular disease.

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Edmonton Frail Scale

Table 1. The Edmonton Frail Scale

The Edmonton Frail Scale:				Score: ___/17
Frailty domain	Item	0 point	1 point	2 points
Cognition	Please imagine that this pre-drawn circle is a clock. I would like you to place the numbers in the correct positions then place the hands to indicate a time of 'ten after eleven'	No errors	Minor spacing errors	Other errors
General health status	In the past year, how many times have you been admitted to a hospital?	0	1–2	≥2
	In general, how would you describe your health?	'Excellent', 'Very good', 'Good'	'Fair'	'Poor'
Functional independence	With how many of the following activities do you require help? (meal preparation, shopping, transportation, telephone, housekeeping, laundry, managing money, taking medications)	0–1	2–4	5–8
Social support	When you need help, can you count on someone who is willing and able to meet your needs?	Always	Sometimes	Never
Medication use	Do you use five or more different prescription medications on a regular basis?	No	Yes	
	At times, do you forget to take your prescription medications?	No	Yes	
Nutrition	Have you recently lost weight such that your clothing has become looser?	No	Yes	
Mood	Do you often feel sad or depressed?	No	Yes	
Continence	Do you have a problem with losing control of urine when you don't want to?	No	Yes	
Functional performance	I would like you to sit in this chair with your back and arms resting. Then, when I say 'GO', please stand up and walk at a safe and comfortable pace to the mark on the floor (approximately 3 m away), return to the chair and sit down'	0–10 s	11–20 s	One of >20 s patient unwilling, or requires assistance
Totals	Final score is the sum of column totals			

0-3 : non frail ; 4-5 : slight ; 6-8 : moderate ; 9-17 : severe frailty level

Rolfson et al, Age Ageing 2006;35(5):526-9

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- + role of inflammatory biomarkers: CRP, IL6, TNF-α
  - Pathophysiology of frailty
  - Association with post-operative complications in older colorectal surgical patients

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Impact of frailty on surgical outcomes

Method of measuring frailty	Impact of frailty on surgical outcome	Surgical population studied	Authors and reference
Grip strength	Increased postoperative complications Increased LOS	All ages Elective major abdominal surgery	Klidjian *et al.*[44]
Gait speed	Composite endpoint of in-hospital postoperative mortality or major morbidity (as defined by Society of Thoracic Surgeons criteria) Cardiac surgery	≥70 years old	Afilalo *et al.*[16]*
Edmonton Frail Scale	Postoperative complications Prolonged LOS Increased institutionalisation rate	≥70 years old Lower limb orthopaedic surgery Spinal surgery Abdominal surgery Vascular surgery	Dasgupta *et al.*[13]
Frailty score based on frailty phenotype	Postoperative complications Prolonged LOS New institutionalisation at discharge	≥65 years old Elective surgery (major and minor)	Makary *et al.*[14]
Comprehensive Assessment of Frailty Score	Increase in 30-day mortality	Cardiac surgery	Sundermann *et al.*[15]
8 'markers' of frailty (age, cognition, recent weight loss, BMI, serum albumin, falls, depression, haematocrit)	Increase in 6-month mortality (although underpowered for this) Post-discharge institutionalisation	≥65 years old General, thoracic, urology and vascular surgery (patients undergoing major elective surgery necessitating postoperative surgical ICU admission)	Robinson *et al.*[46]
14 frailty 'characteristics' in 6 domains (comorbidity, function, cognition, geriatric syndromes, extrinsic frailty) NB: most closely associated were TUAG ≥ 15 seconds and functional dependence	Institutionalisation at hospital discharge	≥ 65 years old Elective general, cardiac, thoracic, urology and vascular surgery (patients undergoing major elective surgery necessitating postoperative surgical ICU admission)	Robinson *et al.*[47]
Frailty defined as any impairment in activities of daily living (Katz index) or impairment of ambulation or diagnosis of dementia	In-hospital mortality Institutional discharge Mid-term survival	All ages Cardiac surgery	Lee *et al.*[17]
Groningen frailty indicator	Post-operative delirium	All ages Elective vascular surgery	Pol *et al.*[86]

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Impact of frailty on surgical outcomes

Method of measuring frailty	Impact of frailty on surgical outcome	Surgical population studied	Authors and reference
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Gait speed	Composite endpoint of in-hospital postoperative	≥70 years old	Afilalo *et al.*[16]*

Key points

- An increasing number of frail older patients are undergoing surgical procedures.
- Frailty is an independent risk factor for adverse postoperative outcomes.
- The evidence that aspects of frailty can be modified is emerging.
- Optimisation of frail older patients prior to surgical procedures could improve postoperative outcomes.

activities of daily living (Katz index) or impairment of ambulation or diagnosis of dementia	Institutional discharge Mid-term survival	Cardiac surgery	
Groningen frailty indicator	Post-operative delirium	All ages Elective vascular surgery	Pol *et al.*[86]

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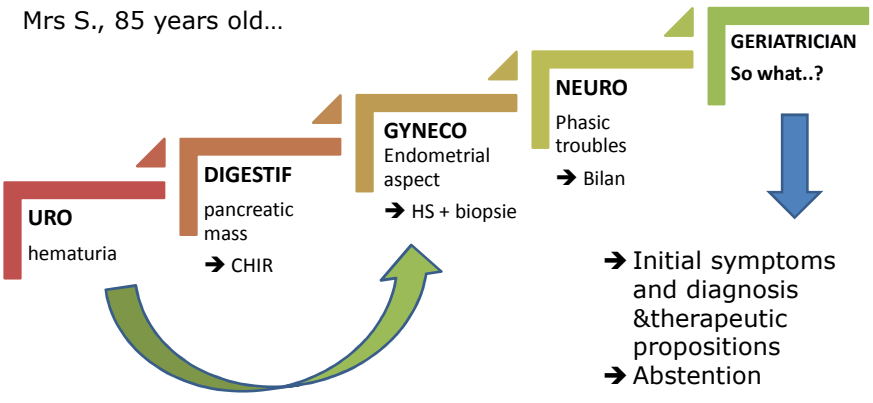
A long way from home…

Mrs S., 85 years old…



➔ Initial symptoms and diagnosis &therapeutic propositions
➔ Abstention

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Edmonton Frail Scale:

Severe frailty: 10/17

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Mood	Do you often feel sad or depressed?	No	Yes	
Continence	Do you have a problem with losing control of urine when you don't want to?	No	Yes	
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Totals	Final score is the sum of column totals			

Rolfson et al, Age Ageing 2006;35(5):526-9

Cliniques universitaires SAINT-LUC UCL BRUXELLES

UCL Université catholique de Louvain

CHU UCL NAMUR

Conclusions

Take HOmes Messages THOMS

- Heterogeneity in ageing
  - Fit ⇔ Frail ⇔ dependent
- Frailty is associated with adverse outcomes in different settings
- Frailty is often clinically recognizable

•↔

•Variability in operational criteria

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THOMS

- No consensus about the best form of screening/assessment
  - Translation of the G 6th sense for non G caregivers (MD, nurses, …)
- Point out on red flags
  - Frailty is dynamic/reversible
  - R/ decision for people at risk of adverse events
  - Settings and patient preferences

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