

Frailty in elderly people

# GUIDELINE

Regional Health Council

REGIONE  
TOSCANA



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# Presentation

The elaboration of clinical practice guidelines, even in a particularly complex social and economic regional framework as it currently is, still represents one of the most valuable approaches to help reducing inappropriate assistance, improving healthcare within the best cost/benefit balance, and improving citizens' health.

Guidelines are already considered as a valuable tool to promote updating of professionals within the contexts in which they have been disseminated. Updating means acquiring new knowledge deriving from progresses in medicine and mainly as continuous education, which is the active modification of current clinical practice behaviors. Last, but not of least importance, the implementation of guidelines in clinical practice is a strong impulse to program new clinical and scientific research.

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## Conflicts of interest

All authors of the present guideline, chosen on the basis of their specific knowledge and experience, subscribed a declaration in relation to possible conflicts of interests that may have affected the elaboration of this document. All authors participated to the elaboration of this document within their activities for the Tuscany Health System.

## Guide to levels of evidence and grade of recommendations (following the National Guidelines System – SNLG)

### Level of evidence

- I** Evidence from randomized controlled clinical trials and/or systematic reviews of randomized trials.
- II** Evidence from one single adequately designed randomized trial.
- III** Evidence from non-randomized cohort studies with concurrent or historical control or their metaanalysis.
- IV** Evidence from non-controlled retrospective case-control studies.
- V** Evidence from non-controlled case-series studies.
- VI** Evidence from experts' opinions or opinions from panels as indicated in guidelines or consensus conferences, or based on opinions from members of the work group responsible for this guideline.

### Strenght of recommendations

- A** Carrying out the specified procedure or diagnostic test is strongly recommended. The recommendation is supported by good-quality evidence, even if not necessarily type I or II.
- B** It would be inappropriate to always recommend the specified procedure or intervention, considered the still existing doubts, but it should anyway carefully considered.
- C** Significant uncertainties exist against recommending to carry out the specified procedure or intervention.
- D** The specified procedure is not recommended.
- E** The specified procedure is strongly not recommended.

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# Introduction

## Definition

The concept of frailty has been raising an increasing interest during the last 30 years. This is also due to the “demographic transition” phenomenon (Thomson 1929). However, no formal agreement has yet been met on the most appropriate criteria to identify frailty, even though a large part of scientific literature focused on this topic (Hogan 2003, Bergman 2007, Karunanathan 2009). An agreement has instead been met in considering frailty an age-related biological status, characterized by a reduced ability to cope with stress, consequent to a cumulative decline of several physiological systems (Fried 2001) and related to multiple comorbidities, disability, risk of institutionalization and mortality (Fried 2004).

The paradigms defining frailty are essentially two:

- the biomedical paradigm, that defines frailty as a physiological syndrome characterized by the reduction of functional reserves and a reduced resistance against stressors. The last caused by a cumulative decline of several multiple physiological systems causing vulnerability and adverse consequences (Fried 2004);
- the bio-psycho-social paradigm, that defines frailty as a dynamic state affecting an individual who shows deficits in one or more functional domains (physical, psychic, social). These losses are caused by different variables that increase the risk of adverse results in terms of health (Gobbens 2010).

Rockwood (2007) proposed an alternative definition of frailty with the Frailty Index (FI), a comprehensive list including a number of deficits collected in time. This definition is based on the idea that frailty is a chaotic disorganization of physiological systems, and that this disorganization can be estimated assessing functional status, diseases, physical and cognitive deficits, psycho-social risk factors and geriatric syndromes, with the objective of envisioning as much accurately as possible the risk of adverse events.

The concept of frailty, regardless of its operative definition, is largely used and considered clinically useful from a large part of health professionals (clinicians, nurses, psychologists, social workers) (Kaethler 2003). It has also had merit of contributing to shift the perspectives from an approach to elderly patients centered on the disease or the organ, to a much integrated approach to health and its various aspects (Bergman 2007).

An ethical consideration must be added: communications and information aimed at obtaining informed consent for therapeutic interventions in elderly subjects raise specific critical matters, largely due to a reduced cognitive competence of the patient and to his/her relationship with relatives, who are often present and directly interact with clinicians.

## Epidemiology of frailty

The estimated prevalence of frailty in elderly population varies largely, due to the heterogeneity of criteria used to define it. Studies using similar criteria for the definition of frailty report com-

parable prevalence values: 7.9% in the sample of 5,317 subjects aged >65 years enrolled in the Cardiovascular Health study (CHS) (Fried 2001); 8.5% in another sample of subjects over 65 years enrolled in a study carried out in Spain (Jürschik 2010); 7% in a study conducted in 3 French cities on a sample of 6,068 subjects over 65 (Avila-Funes 2008); 8.8% in the InCHIANTI study (Cesari 2006).

The Survey of Health, Aging and Retirement in Europe (SHARE), conducted among all subjects over 65 in 10 European countries, reports a global prevalence of 17%, but with significant differences between northern and southern countries (from a minimum of 5.8% in Switzerland, to 27% in Spain). The differences persist even accounting for different gender and age distributions in each population. The prevalence in frailty among Italian people over 65 according to this study is 14.3% (increasing to 23% when disabled are included). The prevalence increases to 48.8% if pre-frail subjects (presence of 1 or 2 risk factors) are included in the analysis.

The estimated incidence of frailty among subjects over 65, according to the CHS study, is 7.18% per year; the Precipitating Events Project (Weiss 2011) estimated an incidence ranging from 2.25% to 3.87% persons per year using a frailty index for the diagnosis.

A longitudinal study (Gill 2006) reported that 23% of the subjects defined frail according to Fried's criteria improve their frailty condition, while 13% dies within the following 18 months. The percentage of improving subjects decreases to 12.9% after 4 years, while the percentage of the deceased increases to 20.1%.

## Physiopathology and social and individual determinants

Identifying the age-related biological characteristics of frailty and understanding its physiopathological determinants has been a core issue in gerontological research during the last few years.

In particular, research has centered on identifying biological markers that could allow a screening of frailty in the early stage, when the opportunities of preventing and treating this condition are wider (National Institute on Aging 2003).

Several authors have focused on physical problems related to frailty. In particular:

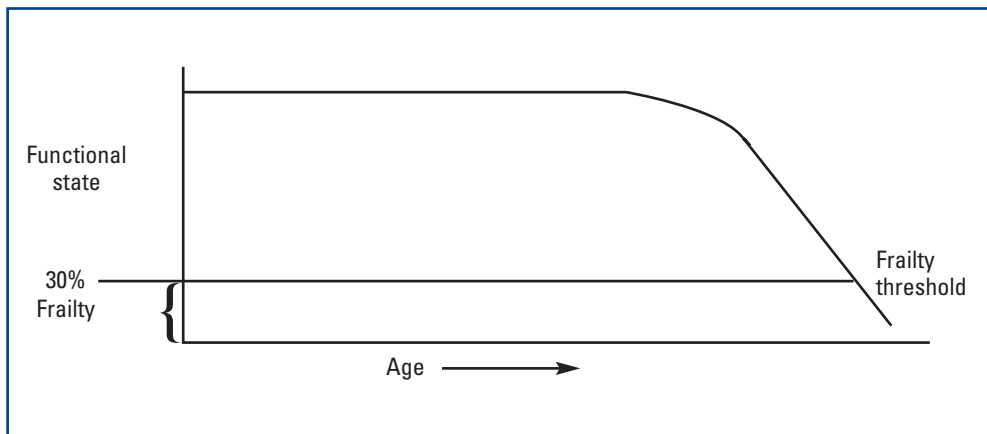
- increased vulnerability due to adverse events (Buchner 1992, Rockwood 2000, Ferrucci 2003, Fried 2004);
- transient disability (Rockwood 2000, Schuurmans 2004);
- multi-systemic involution (Buchner 1992, Fried 2001, 2004);
- reduced adaptive abilities (Campbell 1997, Carlson 1998, Ferrucci 2002, 2003, Fretwell 1990, Fried 2001, 2004, Hamerman 1999);
- atypical disease presentation (Jarrett 1995);
- transient deficit in ADL (Activities of Daily Living), IADL (Instrumental Activities of Daily Living) (Tennstedt 1994, Woodhouse 1997);
- high risk of physical and cognitive deficit (Boyle 2010, Daniels 2010, British Columbia 2008, Robinson 2009, Robinson 2011).

The core issue in frailty, as already mentioned in the introduction, is a latent vulnerability, along with the possible loss of the adaptation ability.

Research has recently focused on the determinants of frailty:

- chronic inflammatory states that can increase serum interleukin-6, decrease hemoglobin and hematocrit (Leng 2002);
- hormonal deficits (in particular IGF-I, DHEA-s), linked to a possible immune dysregulation, even in absence of a certain causal relation (Leng 2004, Walston 2004);
- change in gene expression (shortened telomeres) (Wilson 2004);
- reduced ability of the organism to auto correct due to the loss of efficacy of complex systems (loss of complexity). Frailty leads the person to lose the ability to adapt to stress. (Lipsiz 1992, Lipsiz 2004).

Bortz (2002) estimated that a 30% residue multi-organ function can represent the lowest threshold for the whole system to remain functional. It is therefore possible to lose 70% of one single function without symptoms, especially if the reduction is delayed in time.



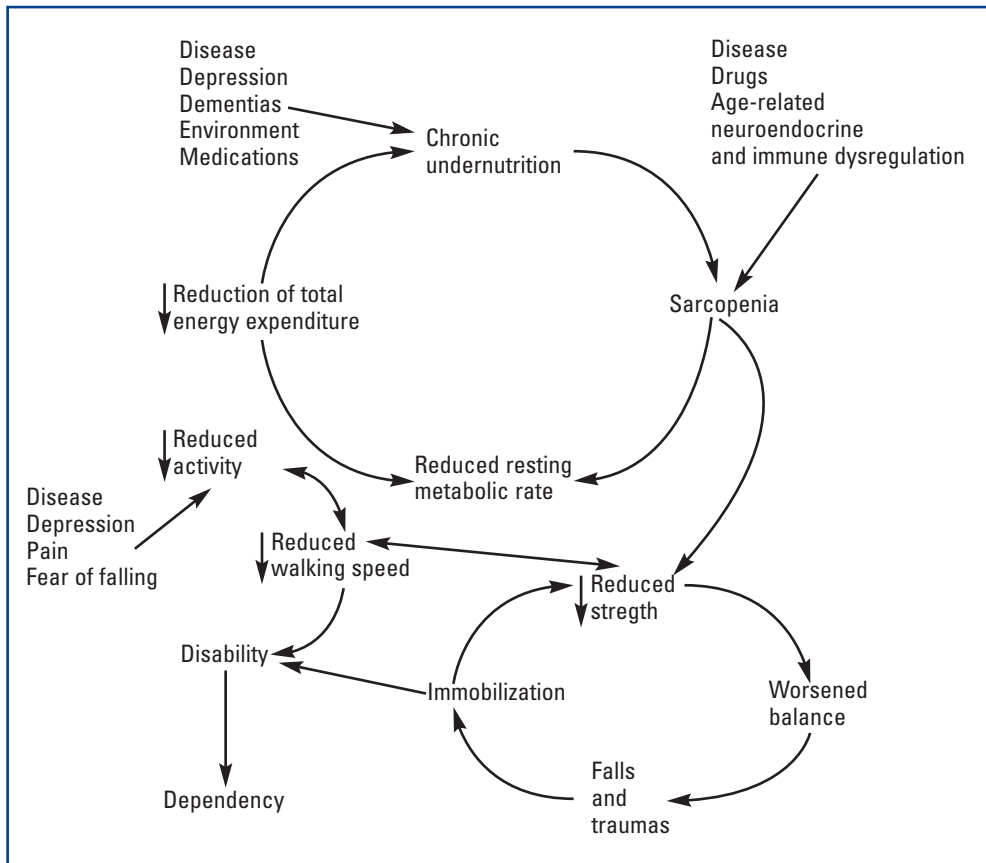
**Figure 1. Bortz's scheme**

Walston (2004) identifies the key components of frailty in the cycle reported in figure 2 (pg 12). This model underlines the cyclic nature of frailty and shows how the functional losses in one or more areas can start or keep up the cycle of functional decline of the whole organism.

Sarcopenia, or the loss of muscle mass/strength, along with aging, is considered the main element of frailty (Morley 2001, Rolland 2008). Roubenoff (2003) claims that the main cause of sarcopenia is in the reduction of motor neurons, in agreement with Doherty (1993) who demonstrates a 50% reduction of motor neurons during the sixth life decade.

Acute and chronic stress, depression, low levels of activity or a reduced protein and micronutrients intake can cause and precipitate frailty (Fried 1999).

Strawbridge (1998) lists as other causes of frailty: social isolation, alcohol abuse, smoke, chronic diseases and multiple-drug therapies. Drug therapies allow a narrower therapeutic window, due to the reduced adaptation ability (Beers 1991). The progressive tightening of these elements causes



**Figure 2. Frailty cycle**

wide differentiation among subjects. This makes each subject become increasingly unique in aging and, at the same time, makes searching standard tools for assessment harder (Ham 2002). Therefore, while it is possible to clinically suspect frailty, its definition in strictly biological terms remains problematic.

Fried (2001) proposes an operative definition, that is useful both to recognize frailty and to identify a therapeutic project. This definition identifies a “fragile phenotype” characterized by five points:

- weight loss (more than 4.5 kg during the last year);
- fatigue (fatigue for at least 3 days/week);
- reduced muscular strength (hand-grip) (<5.85 for men and 3.37 Kg for women);
- reduced physical activity, assessed with PASE scale (Physical Activity Scale for the Elderly);
- reduced walking speed (>7 seconds to cover a 5-meters distance on a known path).

A subject is considered frail if 3 or more among these criteria are present.

Seventy items including signs, symptoms and abnormal tests can characterize frailty according to the Canadian Study on Health and Aging (CSHA) (Rockwood 2005).

A 7-grades scale was elaborated correlating these items, and was then used as a reference in the guideline Frailty in Older Adults published by the British Columbia (2008).

Kamaruzzaman (2010) identified 35 items, with similar criteria, recomposing which 7 main groups can be obtained. These groups may be useful to identify a final easily applicable, reliable, non-invasive index to be implemented in primary care.

**Table 1. The CSHA clinical frailty scale criteria**

List of the variables used by the CSHA to construct the frailty index	
Changes in daily activities	Onset of cognitive symptoms
Head and neck problems	Clouding or delirium
Poor muscle tone in neck	Paranoid features
Bradikinesia, facial	History relevant to cognitive impairment or loss
Problems getting dressed	Family history relevant to cognitive impairment or loss
Problems with bathing	Impaired vibration
Problems carrying out personal grooming	Tremor at rest
Urinary incontinence	Postural tremor
Toileting problems	Intention tremor
Bulk difficulties	Family history of degenerative disease
Rectal problems	Partial complex seizure
Gastrointestinal problems	Generalized seizures
Problems cooking	Syncope or blackouts
Sucking problems	Headache
Problems going out alone	Cerebrovascular problems
Impaired mobility	History of stroke
Musculoskeletal problems	History of diabetes mellitus
Bradikinesia of the limbs	Arterial hypertension
Poor muscle tone in limbs	Loss of peripheral pulses
Poor limb coordination	Cardiac problems
Poor coordination, trunk	Myocardial infarction
Poor standing posture	Arrhythmia
Irregular gait pattern	Congestive heart failure
Falls	Lung problems
Mood problems	Respiratory problems
Feeling sad, blue, depressed	History of thyroid disease
History of depressed mood	Thyroid problems
Tiredness all the time	Skin problems
Depression (clinical impression)	Malignant disease
Sleep changes	Breast problems
Restlessness	Abdominal problems
Memory changes	Presence of snout reflex*
Short-term memory impairment	Presence of the palmomental reflex**
Long-term memory impairment	
Changes in general mental functioning	

\* pouting or pursing of the lips elicited by light tapping of the closed lips near the midline  
 \*\* head turn with a twitch of the chin muscle elicited by stroking a specific part of the palm

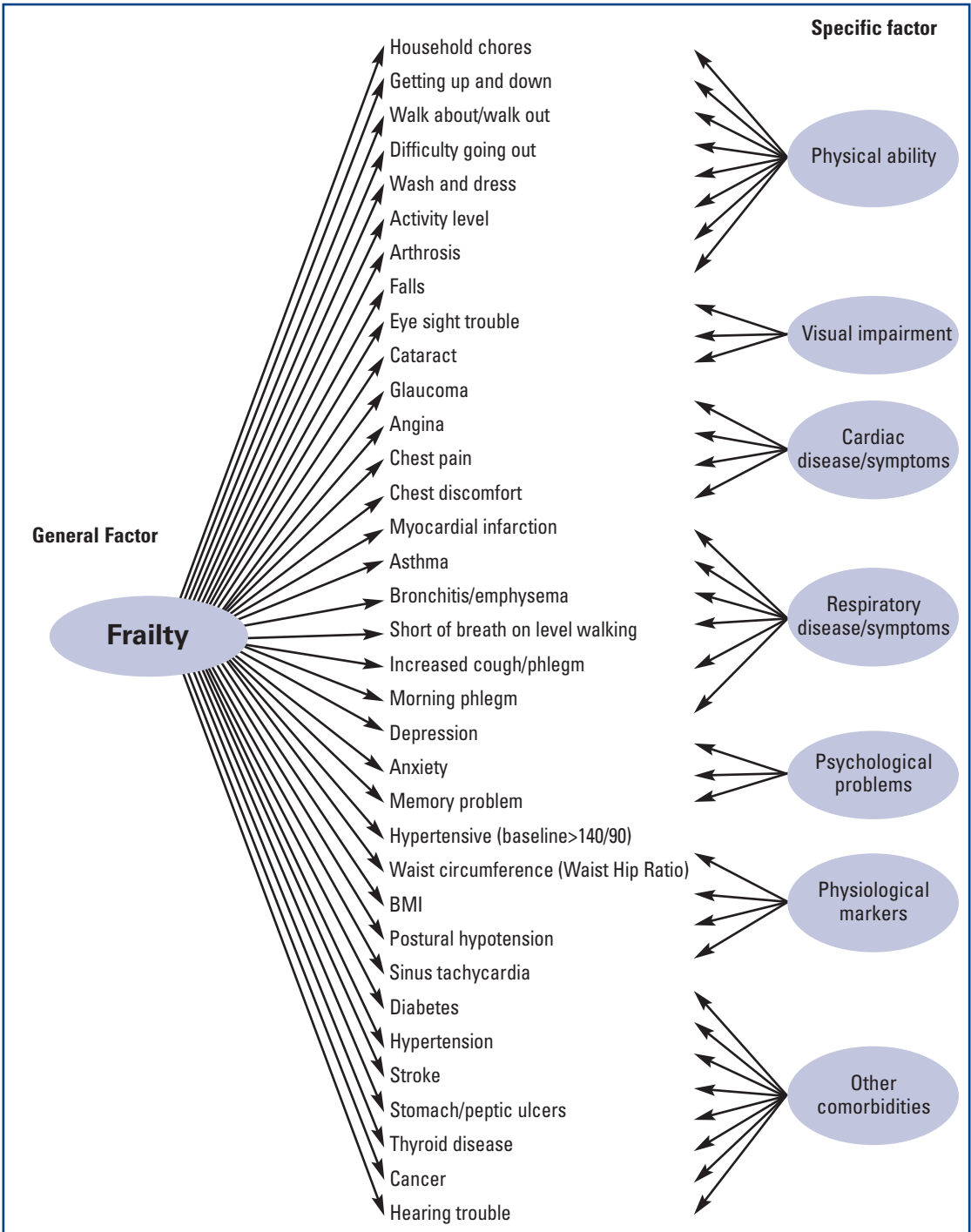


Figure 3. Kamaruzzaman's frailty groups

Other frailty indexes adaptable to various healthcare settings have been developed starting from multidimensional assessment tools such as the Comprehensive Geriatric Assessment (Jones 2004, Pilotto 2008) and from simple questionnaires that are predictive of loss of autonomy and can be used via mail (Hébert 1996, Pasqua 2007). A recent systematic review (De Vries 2011) underlines the importance of these instruments in assessing prognosis, but admits their lack of specificity in defining the functional condition of frailty.

In summary, scientific literature is consistent in identifying a biological condition characterized by reduced resources and resistance to stress, caused by a cumulative decline of several different physiological systems (Fried 2001) and as severe as to determine institutionalization, hospitalization and mortality.

## **Aims of the guideline**

The aims of this guideline are:

- to provide tools to identify frail subjects;
- to provide indications on possible interventions to prevent disability, that is, a limited ability to act due to an handicap (WHO, 1980).

The target population of this guideline are non-disabled older adults. The guideline audience are: managers of health agencies and local authorities, nurses, clinicians, social workers, physiotherapists, occupational therapists.

# Suspecting frailty

## Opportunity approach

This kind of approach is used by health professionals. Cassell and Boudreau state, in an unpublished work, that listening to the patient’s narrative and observing attitudes and emotional manifestations in clinical practice, allows to use intuition as a clinical method.

“Intuition is a decision-making method that is used unconsciously by experienced practitioners [...]. It is rapid, subtle, contextual, and does not follow simple, cause-and-effect logic” (Greenhalgh 2002).

Clinicians suspect frailty syndrome using a clinical approach centered on listening (see box 1), and therefore on the basis of their “narrative competence” (Hunter 1996, Greenhalgh 1999, Charon 2001, Charon 2004).

The opportunity approach can be used:

- by general practitioners within a primary care setting;
- while referring to territorial and hospital specialists;
- while referring to social and health services.

### Box 1. Opportunity approach

#### Advice for the opportunity approach

- **Questions about the organization of the day (when do you wake up, do you go shopping and when, who makes meals, who cleans the house, who does laundry, how do you spend the day, what were your job duties).**
- **Questions about personal grooming and hygiene (autonomy in personal hygiene, in dressing, in toileting, problems chewing).**
- **Questions about feeding: if eats solid or liquid foods; what kind food does he/she eats; amount of water drank during the day; constipation.**
- **Observation of the patient: posture and mobility.**
- **Questions about pharmacological therapy (if possible, ask for the packages of all currently prescribed drugs or the available medical documentation).**
- **Assessment of physical status: assessment of oral cavity, thinness, muscles observation and palpation, hand grip strength measurement, visual acuity and hearing assessment, tests for limbs coordination and neck mobility, SPPB (Short Physical Performance Battery).**

**NB. Visit patient’s home whenever possible to assess home environment.**



## Screening of target population (proactive approach)

Recent randomized studies (Van Hout 2005, Metzelthin 2010) show that screening programs can help to identify subjects needing a direct assessment of frailty, and consequently to proceed with preventive and healthcare interventions.

### **Recommendation 1A**

**Subjects over 75 should be always considered potentially frail. The suspect of frailty can be based on observation and/or the patient's narrative, gathering information on health status and in particular on mobility, cognitive function, feeding and life habits, and sensory functions (evidence VI A).**

### **Recommendation 1B**

**Frailty can be suspected by healthcare professionals following an opportunity approach, and in particular:**

- **within a primary care setting;**
- **while referring to specialists;**
- **while referring to social and health services.**

**The use of mailed questionnaires, in terms of health policy, can allow a preliminary screening of the subjects at risk, before their direct clinical observation (evidence VI A).**

## Assessing and confirming frailty

The variable association of signs, symptoms, abnormal tests and functional and environmental limitations which is at the basis of a diagnosis of frailty can lead to an infinite number of possible conditions that make it extremely difficult to identify a clinical semiology of frailty.

The guideline issued by the Agencia de Evaluación de Tecnologías Sanitarias de Andalucía (Carlos 2008) reviews available literature from 1985 to 2007 and concludes that a single tool allowing the diagnosis of frailty does not exist.

A confirm to this difficulty in diagnosis is the indication included in the British Columbia guideline for the diagnosis and treatment of frailty (2008), which states that 20 different areas should be assessed. A recent review (Pel-Little 2009) further confirms the difficulty in finding a single tool able to define a clinical profile of frailty.

However, literature standardized some assessment methods.

- Linda Fried (2001) indicated 5 parameters taken from the Cardiovascular Health Study (CHS) that could be useful to identify a fragile phenotype. Using all proposed parameters could lead to uncertainties due to the absence of a reference standard and to the scarce reliability of answers to some questions on exhaustion and loss of body weight.
- Ensrud (2008) reduced the number of parameters to 3 to compensate for these difficulties:
  - intended or unintended loss of more than 5% of body weight in 4 repeated controls;
  - inability to stand up and sit down 5 times without help;
  - persistent exhaustion.

A comparison between this index and the one indicated by Fried showed similar results (Kiely 2009).

- The SHARE (Survey of Health Ageing and Retirement in Europe) group proposed a simple tool to identify and quantify frailty on the basis of results from a still ongoing European study on frailty in adults. The SHARE-FI (Survey of health Ageing and retirement in Europe Frailty Index) (Romero-Ortuno 2010) tool is a computer-based tool to detect the variables that define frailty according to Linda Fried and provides a quantitative total value using a specific algorithm accounting for gender differences. Box 2 (page 19) shows all mentioned aspects (the online format attached at <http://www.ncbi.nih.gov/pmc/articles/PMC2939541/pdf/1471-2318-10-57.pdf> shows results for each gender).

**Box 2. SHARE-FI****SHARE-FI****1. EXHAUSTION****In the last month, have you had too little energy?**

- No
- Yes

**2. DIMINUTION IN DESIRE FOR FOOD****What has your appetite been like during this last month?**

- it has been the same as usual and/or you have been eating as usual
- it has been less than usual and/or you have been eating less than usual
- it has been more than usual and/or you have been eating more than usual

**3. WEAKNESS****Highest handgrip strength (Kg)****- right hand**

Measurement 1:

Measurement 2:

**- left hand**

Measurement 1:

Measurement 2:

**4. DIFFICULTY IN MOVING****Because of a health or physical problem, do you have difficulty doing one of the following things? (exclude problems expected to last within 3 months)****walking 100 meters:**

- No
- Yes

**climbing one flight of stairs without resting:**

- No
- Yes

**5. LOW PHYSICAL ACTIVITY****How often do you engage in activities that require a low or moderate level of energy such as gardening, cleaning the car, or doing a walk?**

- More than once a week
- Once a week
- One to three times a month
- Hardly ever or never

**FRAILITY SCORE:** <http://www.biomedcentral.com/1471-2318/10/57>**CATEGORY SCORE:** <http://www.biomedcentral.com/1471-2318/10/57>

The Italian Ministry of Health dedicated a monographic issue of its journal to “Criteria for the appropriate clinical, technological and structural assistance of elderly adults”. The issue, in relation to the available tools for the identification of frailty, suggests the introduction in clinical practice of tests for the assessment of physical performance, and in particular of the Short Physical Performance Battery (SPPB). The SPPB is a short battery designed to assess lower limbs function (Guralnik 1994), and including 3 different sections (see box 3).

### Box 3. SPPB

#### Short Physical Performance Battery (SPPB)

##### 1. Balance assessment in 3 tasks:

- standing with his/her feet together for 10 seconds
- maintaining semitandem position for 10 seconds (heel of one foot placed by the big toe of the other foot)
- maintaining tandem position for 10 seconds (heel of one foot in front of and touching the toes of the other foot)

Grading varies from a minimum of 0 if the patient is unable to hold the feet together position for at least 10 seconds, to a maximum of 4 if the patients is able to complete all the three tasks.

##### 2. Walking assessment (4 meters)

Grading of this section varies on the basis of time needed to complete the test, from 0 if unable, to 4 if completes the task in less than 4 seconds.

##### 3. Assessment of the ability of standing up from a chair 5 times without using the upper limbs (arms should be kept folded across the chest)

Grading varies from 0 if unable, to 4 if able to complete the task in less than 11 seconds.

SCORE	0	1	2	3	4
balance	side-by-side stand <10"	1-9"	1-2"	3-9"	>10"
walking (4mts)	unable	>7,5"	5,5-7,5 "	4-5,5"	<4"
chair stands	unable	>16,5"	13,7-16,5 "	11,2-13.6 "	<11,2"

The functional aspect of frailty is not the only issue observed and studied. Scientific literature includes also research studies aimed at the identification of biological markers of frailty.

Some studies identify a correlation between frailty and vitamin deficits (Ble 2006, Ensrud 2010, Ensrud 2011), endocrine dysregulations (Blaum 2005, Tajar 2011), inflammatory processes (Chang 2010), abnormal glucose tolerance (Kalyani 2011). Some authors underline also the mutual relationship between depression and frailty (Mezuk 2011), and a correlation has been highlighted between orthostatic hypotension tolerance and frailty (Romero-Ortuno 2011). None of these studies reported evidence of the existence of a clinically useful marker.

**Recommendation 2**

**If frailty is suspected, the elder adult should be evaluated:**

- using the SPPB test;
- assessing loss of body weight, reduced physical activity and fatigue.

**Assessment should be carried out by specifically trained professionals (evidence IV A).**

**Recommendation 3**

**Frailty in an older adult is confirmed if at least 3 of the following conditions are present:**

- unintended weight loss ( $\geq 5\%$  during the last 12 months);
- rapid onset of fatigue in carrying out daily activities;
- reduced weekly frequency of physical activity;
- reduced gait speed (SPPB-gait test  $\leq 3$ );
- reduced muscular strength (SPPB-chair test  $\leq 2$ ).

**(evidence IV A)**

**Note:** Recommendations 2 and 3 include the 5 criteria proposed by Linda Fried (2001).

## Analyzing frailty

The Comprehensive Geriatric Assessment is a diagnostic instrument designed to assess functions measuring performance and clinical and psychosocial data, (NIH Consensus Statement, 1987).

The CGA is characterized by three main aspects:

- it is focused on the complexity of older adults, analyzing the “Five I’s of Geriatrics” (Intellectual impairment, Immobility, Instability, Incontinence and Iatrogenic disorders) (Hazzard 1985);
- it measures global functioning;
- it is multidimensional, as it includes the assessment of both the functional status and the psychosocial, cognitive, economic and spiritual profile. The other medical evaluation of elderly people are mostly similar. Table 2 shows the indications provided by Rosen and Reuben (2011). Appendixes 1 to 7 show the tests reported by the mentioned authors.

A meta-analysis (Stuck 1993) including 4,959 cases and 4,912 controls verified by the authors showed that using the CGA tool for the assessment and the monitoring of older adults significantly improves their functional level and life expectancy.

**Table 2. CGA**

Assessment	TEST
functional status	BADL (Katz 1983), IADL (Lawton 1969), AADL (Reuben 1990, Rosow 1996)
psychological	PHQ-9 o PHQ-2 (Spitzer 1999), GDS-30 (Brink 1982), GDS-15 (Sheik 1986)
cognitive	MMSE (Folstein 1975), Mini-Cog (Borson 2000)
social	interview ± direct assessment of living environment
economic	gathering of information
need of spirituality	interview
clinical status	risk of falling: objectivity ± brief test hearing assessment: objectivity ± brief test visual acuity assessment: objectivity ± brief test urinary continence: screening questionnaire nutritional status: weight and BMI and/or self-assessment pharmacological therapy: pre-visit questionnaire

A review of the literature carried out in 2011 by Ellis and Langhorne confirmed this data and highlighted that CGA increases by 3% older adults' life expectancy in their homes.

A systematic review from the Cochrane Collaboration (Ellis 2011), based on 21 randomized clinical studies (10,315 patients), showed that administering CGA to older patients hospitalized for acute conditions, significantly increases life expectancy and significantly reduces the risk of institutionalization after discharge. The meta-analysis of the same studies has been recently published by the British Medical Journal (Ellis 2011) and shows the same results.

#### **Recommendation 4**

**Older adults in whom a frailty status has been identified should be assessed for:**

- **functional status (IADL)**
- **clinical status**
- **cognitive function and psychological and affective status**
- **pharmacological treatments**
- **social, economic and environmental conditions**
- **individual preferences, needs and values**

**The assessment is included within the multi-professional group of primary care, relying on support from other healthcare professionals where necessary (evidence I A).**

## Preventing progression of frailty

The core issue in assisting frail patients is the extremely high number of variables that can increase individual vulnerability and interact with often unpredictable effects. Each human being is a complex system, a network of heterogeneous components interacting in a non-linear way and triggering emergent behaviors resulting in something that is not the mere sum of each one of them: frailty is an emergent behavior. Its prevention currently consists in stabilizing the system as a whole: the mere correction of one single factor implied in frailty could be insufficient to correct the phenomenon (Fried 2009). Ageing causes a progressive reduction in serum sexual hormones, DHEA-S, vitamin D and IGFs (Cappola 2009). Some authors studied the potential efficacy of hormonal supplements for the treatment of frailty with the following results:

- testosterone increases muscular mass, but does not improve performance, and causes adverse events (O’Connell 2011);
- vitamin D increases muscular mass, but did not result in benefits on the condition of frailty (Rosen 2010);
- the administration of GH increases muscular mass and bone density, but has no effect on frailty (Giovannini 2008).

The absence of a biological definition of the specific deficits causing frailty makes physical exercise the most significant clinical intervention. The increased protein intake could also have an additional effect, but only in association with physical exercise. Several studies (Ory 1993, Province 1995, Chin 2008) showed that a regular physical activity increases muscular strength and aerobic capacity, improves balance and performance in ADL. References to ways and schedules of physical activity for healthy older adults, and elderly people with chronic diseases, can be found in the evidence based guideline “Lotta alla sedentarietà e promozione dell’attività fisica” issued by the Sistema Nazionale Linee Guida (SNLG) (Cipriani 2011).

Frailty causes the progressive reduction on muscular strength and body weight, therefore motor activity and dietetic interventions are the most useful strategies to prevent its evolution. Several data from literature underline the positive correlation between scheduled physical activity and health (Haskell 2009), and between physical activity and preservation of brain volume, and subsequent reduction of cognitive decline (Erickson 2010). The 2009 edition of Merck’s handbook reported that “people who carry out aerobic exercises (walking, swimming, running, etc.) have longer life expectancy and less functional decline than those with a sedentary life”, that “weightlifting helps preserving bone mass”, and that “physical activity can also positively affect mood and cognitive functions”. A recent cohort study on more than 416,000 subjects (Wen 2011) received wide media coverage after reporting a significant correlation between life expectancy and physical activity. In particular, 90 weekly minutes of scheduled physical activity increase lifespan of 3 years, and each 15 minutes more of physical activity means a further 4% increase of life expectancy. These data suggest that physical activity is a specific method to stabilize vulnerability.

One of the signs suggestive of frailty is unintended loss of more than 5% of bodyweight within one year (see recommendation 3). The nutritional aspect is therefore one of the core elements

to control frailty. The American Dietetic Association (ADA) guideline provides useful recommendations for a nutritional therapy aimed at increasing energy through an optimal protein and nutrients intake, and at improving global nutritional status and quality of life.

The main recommendations are reported in summary in appendix 8, and the Mini Nutritional Assessment and Check List “DETERMINE” are reported in appendix 9 and 10.

Frailty is a biological condition that increases the incidence of morbidity and disability. As mentioned before, it is related to several possible functional deficits interacting with almost unpredictable effects. Assessing the functional deterioration to determine possible treatments should therefore be a multidimensional process. Evidence of the efficacy of such approach in

### **Recommendation 5**

**Frailty is caused by several concomitant factors whose main aspect is the progressive reduction of muscular strength and bodyweight. Therefore, the main strategies to stabilize the system and control frailty are promoting physical activity and monitoring diet and bodyweight (evidence III A).**

reducing mobility and mortality are already available (Monteserin 2010, Daniels 2010).

Data from a multidimensional assessment of older adults can be registered in several ways (Gallo 2006): the Polar Diagram (Vergani 2004), the Comprehensive Geriatric Assessment (Mann 2004) and the VAOR-RAI (Morris 1996) are widespread tools in clinical practice. The British Columbia guideline (2008) concerning frailty-related aspects suggests the use of forms including functional measures, pharmacological treatment plans, clinical evolution and medication review (appendixes 11 and 12).

Frailty is a biological condition that can evolve in disability depending on both health and social adverse events. Its treatment should therefore rely on a continuous observation and therapy. Frailty should be managed with a multi-professional approach. International literature suggest a multidimensional assessment within a primary care setting, providing recommendations to the frail subject’s caregiver (Reuben 1999, Walston 2003).

The close connection between strictly following recommendation and cooperation between frail patient and general practitioner is to be underlined in this frame (Maly 2002). The general practitioner uses a multidimensional assessment as a tool to identify conditions underlying the frailty status and to define an optimal management and/or treatment. Some other professionals can participate to this assessment (nurses, geriatricians, psychologists, physiotherapists, social workers).



### **Recommendation 6**

**A subject defined frail should be regularly monitored and assessed within a primary care setting using specific tools for data collection.**

**The general practitioner should identify and coordinate all necessary actions to be taken to solve problems related to frailty, with support from other health professionals and social workers if needed (evidence II A).**

# Hospitalization of frail people

Hospitalization is a significant risk factor of adverse events (post-operative complications, long-term hospital stay, post-discharge institutionalization) for frail subjects, irrespective of the severity of the event that caused it (Makary 2010, Robinson 2011). Some authors (Gill 2011) showed that hospitalization is a factor hampering the recovering from an ascertained frail state, and can also worsen frailty.

Scientific literature highlight specific factors related to hospitalization, that can be responsible for the adverse effects on frail patients. Avoiding and preventing them can significantly contribute to improve the care plan, and to reduce iatrogenicity. Frailty, for example, is associated to a high risk of deep vein thrombosis (Folsom 2007) and an increased risk of cardiovascular events (Afilalo 2009). The suspect of frailty should be especially investigated in case of surgery, as frailty increases peri-operative risk (Saxton 2011) and post-operative mortality (Makary 2010), and can cause delirium (Leung 2011), that is known to lead to unfavorable outcomes (Inouye 1998). Hospitalization, irrespective of the cause that made it necessary, is long since known (Creditor 1993) to be a risk factor of functional delirium in older patients, mainly due to immobility.

Moreover, frail and complex elder adults are known to be discriminated with respect to hospitalization for intensive care and surgery (Centre for Policy on Ageing 2009, Royal College of Physicians 2011): the English association McMillan in support to cancer patients called in 2012 attention to the need of the multidimensional assessment as a starting point for every care plan in older patients, to ensure an equity of healthcare provision based both on age and on the global situation of each subject.

The multidimensional assessment is the procedure used by the multidisciplinary hospital staff (geriatricians, physiotherapists, social workers, occupational therapists and pharmacists) of the Canadian (Latour 2010) and French (Somme 2011) Geriatric Assessment Units: the older patients treated in ERs or in other hospital units are followed with the objective of stabilize their physiology, organize follow-up measures (aimed also at preventing the pharmacological damage) and activate adequate social and health paths (Rodriguez-Artalejo 2009). Furthermore, twenty years of studies showed that frail older patients with orthopedic and trauma conditions can benefit from hospitalization in units specialized in orthogeriatrics (<http://www.ganfyd.org/index.php?title=Orthogeriatrics>).

The personalized therapeutic path is subsequent to the identification of the potential frailty of the older patient starting from the first hospitalization phases (Goldstein 2012), and using both already known administrative data (SILVER CODE) (Di Bari 2010), and diagnostic tools such as the Identification of Seniors at Risk (ISAR) (McCusker 2003) and the Triage Risk Screening Tool (TRST) (Meldon 2003).

The path from hospital to territory is made easier by compiling a Discharge Planning (DP) (appendix 13). The DP is a personalized discharge plan. Its arrangement starts at the admission in hospital of the patient and is aimed at limiting costs, optimizing therapeutic outcomes and ensure that patients are discharged at an appropriate time, with sufficient information and support, and with the availability of adequate home-based services to carry on the treatment (Courtney 2011).

Evidence are available confirming the effectiveness of DP in limiting re-hospitalization (Shepperd 2010), also specifically referring to frail subjects (Bauer 2009). Box 4 shows the principles of the Discharge Planning as elaborated by the Department of Veteran's Affairs of the Australian Government ([http://www.dva.gov.au/service\\_providers/dental\\_allied/discharge\\_planners/Documents/dprk.pdf](http://www.dva.gov.au/service_providers/dental_allied/discharge_planners/Documents/dprk.pdf)).

#### Box 4. Discharge Planning

##### Principles of the Discharge Planning (DP)

- Hospitalization should be considered an opportunity to identify frail subjects, to assess their global health, to define recommendations, and to start long-term actions coordinated by the general practitioner along with other health professionals.
- An effective DP is the standard for all patients receiving hospital care in National Health Services.
- A DP is a global approach to health that underlines the importance of continuity in healthcare provision and launches a strong message on preferring longitudinal care rather than episodic care.
- The DP is part of the care plan and includes both hospitalization and all therapies, treatments and care provided after discharge.

##### Recommendation 7

**A possible condition of frailty should be identified in older adults at admission to the hospital. This can be done gathering already known data and through suspected diagnosis and/or adequate diagnostic tools.**

**Hospitalized frail subjects should be taken in charge using the Geriatric Multidimensional Assessment method to avoid adverse events and progression to disability.**

**The arrangement of the personalized Discharge Planning should start at the moment of admission to hospital (evidence I A).**

# Sharing of information and bioethical aspects

The objective of providing assistance to older subjects is trying to preserve as much of their personal and social autonomy as possible. This is even more important if their phenotype is frail. This objective can be achieved “going from the diagnosis to the patient” (Cliff, 2012). This method is at the basis of the Patient Centered Care that means: “taking care of people’s health while respecting their individual preferences, answering their needs and values, taking decisions allowing the achievement of the best possible outcomes for each specific person”. This means, in summary, to identify the resources that each subject has to limit his/her functional decline and its interaction with comorbidities. The regular flux of health and social information should be available to achieve this goal; a privileged viewpoint is the primary care setting (De Lepeleire 2009, Lacas 2012). Taking in charge patients as previously described means providing information to the subject and, if he/she gives consent, to his/her relatives, to involve them in choices and therapeutic activities (Barry 2012, Stacey 2011).

Sharing information is consequent to the bioethical principles shown in box 5.

## Box 5. Bioethical principles of information

**Information on frailty should be managed with adequate means to protect patients’ sensitive data. Consent should be obtained to disseminate data.**

**Communicating and informing frail elder patients to obtain their consent can be difficult due to a possible progressive reduction of their cognitive competence and their relationship with families, which are often very present and actively participate relating with the caregivers.**

**The difficulties raised by interacting with frail older adults should not affect the ethical integrity of the processes involving them, neither should elder patients be deprived of their rights, included the right of self-determination.**

**Gathering data on frailty in a computer system results in the creation of a precious set of data that can be very useful to expand our knowledge on frailty, and to carry out epidemiological studies and clinical pharmacology trials.**

**Considering the complexity of this specific subject, its ethical weight, and the legitimacy issues related to the transmission of data, all the recommendations included in the present guideline should be complemented with the ethical and deontological indications from the competent bioethical commission.**

## Recommendation 8

**Information on subjects’ frailty should be updated and available, if possible, through a computer system covering each step of the healthcare network (evidence I A).**

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## **Appendixes\***

**\*The tests presented in Appendix all come from the web, where they are freely accessible.**



## Appendix 1: diagnostic tools for the assessment of frail older adults

### DEPENDENCY IN BASIC ACTIVITIES OF DAILY LIVING (BADL)

(Lawton MP at al. 1969)

PERSONAL DATA

Surname ..... First name .....  
Date of birth ..... Fiscal code.....

**Apply the following scores for each activity on the basis of the subject's performance (what he/she does in his/her environment, with walking aids but without personal assistance) during the last 7 days.**

- Independent:** no help or supervision once or twice during last week 0
- Supervision:** supervision three times or more or physical assistance less than three times 1
- Slight assistance:** very cooperative elderly patient, slight physical assistance (for example guided positioning of the limbs) three times or more and heavy physical help (for example take the patient in arm) less than three times during last week 2
- Heavy assistance:** cooperative elderly patient, heavy physical help (for example take the patient in arm) more than three times during last week 3
- Total assistance:** not cooperative elderly patient, totally dependent on the aid of others (and lack of activity during last week) 4

ACTIVITY	SCORE
<b>1. DRESSING/UNDRESSING</b> how the subject puts on, ties and gets off clothes, shoes, prostheses, orthopedic devices, from waist upwards	
<b>2. PERSONAL HYGIENE</b> how the subject washes and dries his/her hands, arms, face, feet and perineum, combs his/her hair, shaves, brushes his/her teeth	
<b>3. TOILETING</b> how the subject goes to toilet room, uses toilet, wipes, and arranges clothes; how he/her manages walking aids	
<b>4. MOVING INSIDE THE HOUSE</b> how the subject moves from a place to another inside his/her own house, even on wheelchair	
<b>5. TRANSFERRING</b> come la persona compie i trasferimenti letto - posizione eretta - posizione seduta; esclusi trasferimenti per minzione/evacuazione	
<b>6. MOBILITY IN BED</b> how the subject changes position while in bed (from lying to sitting, from one side to the other)	
<b>7. FEEDING</b> how the subject drinks and eats; if he/she is tube-fed with PEG or parenteral, and consider how he/she manages the devices	
<b>TOTAL SCORE (RANGE 0-28)</b>	

DATA ARE GATHERED THROUGH INTERVIEWS CARRIED OUT. ....  
(place) ..... date ..... length. ....  
Date file was closed ..... role and signature of the operator  
.....



## INSTRUMENTAL ACTIVITIES OF DAILY LIVING (IADL)

(Lawton MP et al. 1969)

### PERSONAL DATA

Surname ..... First name .....  
Date of birth ..... Fiscal code.....

#### Ability to use telephone

1	Operates telephone on own initiative	1
2	Dials a few well-known numbers	1
3	Answers telephone but does not dial	1
4	Does not use telephone at all	0
	Not applicable	NA

#### Shopping

1	Takes care of all shopping needs independently	1
2	Shops independently for small purchases	0
3	Needs to be accompanied on any shopping trip	0
4	Completely unable to shop	0
	Not applicable	NA

#### Food preparation

1	Plans, prepares, and serves adequate meals independently	1
2	Prepares adequate meals if supplied with ingredients	0
3	Heats and serves prepared meals, or prepares meals but does not maintain adequate diet	0
4	Needs to have meals prepared and served	0
	Not applicable	NA

#### Housekeeping

1	Maintains house alone or with occasional assistance (eg. "heavy work domestic help")	1
2	Performs light daily tasks but cannot maintain acceptable level of cleanliness	1
3	Needs help with all home maintenance tasks	0
4	Does not participate in any housekeeping tasks	0
	Not applicable	NA

#### Laundry

1	Does personal laundry completely	1
2	Launders small items; rinses stockings, etc.	1
3	All laundry must be done by others	0
	Not applicable	NA

#### Mode of transportation

1	Travels independently on public transportation or drives own car	1
2	Arranges own travel via taxi, but does not otherwise use public transportation	1
3	Travels on public transportation when assisted or accompanied by another	1
4	Travel limited to taxi or automobile with assistance of another	0
5	Does not travel at all	0
	Not applicable	NA

#### Responsibility for own medications

1	Is responsible for taking medication in correct dosages at correct time	1
2	Takes responsibility if medication is prepared in advance in separate dosages	0
3	Is not capable of dispensing own medication	0
	Not applicable	NA

#### Ability to handle finances

1	Manages financial matters independently	1
2	Manages day to day purchases	1
3	Incapable of handling money	0
	Not applicable	NA

**Total preserved functions** \_\_\_\_/8 (if female)

**Total preserved functions** \_\_\_\_/5 (if male)

DATA ARE GATHERED THROUGH INTERVIEWS CARRIED OUT. ....  
(place) ..... date ..... length. ....  
Date file was closed ..... role and signature of the operator  
.....



## HIERARCHICAL HEALTH SCALE TO MEASURE AADL

(Rosow I et al. 1996)

Which of these actions your health status allows you to carry out without help?

- A. heavy works around the house, such as shoveling snow or washing walls.
- B. (men) working on a full time job  
(women) *carrying out usual house duties*
- C. walking 800 meters
- D. going to the cinema, to church, to a meeting or to friends
- E. walking 2 floors upstairs and downstairs

## HIERARCHICAL EXERCISE SCALE TO MEASURE FUNCTION AT THE AADL

(Reuben DB et al. 1990)

1. Do you participate on a frequent basis (at least three times a week) in sports such as swimming, jogging, tennis, bicycle, aerobics, gym or other activities strenuous enough to cause sweating or strain?
2. Do you walk on a regular basis (at least three times a week) for at least 1.5 kilometer or more each session, without stopping.
3. Do you walk on a regular basis (at least three times a week) for at least 500 meters without stopping?

**PHYSICAL ACTIVITY SCALE FOR THE ELDERLY (PASE)**

(Washburn 1993)

**ATTIVITÀ DEL TEMPO LIBERO**

1. Over the past 7 days, how often did you participate in sitting activities such as reading, watching TV, or doing handcrafts?

[0] never ⇓	[1] seldom (1-2 days) ⇓	[2] sometimes (3-4 days) ⇓	[3] often (5-7 days) ⇓
Go to Q2	<b>1a. What were these activities?</b>		
	<b>1b. What were these activities?</b>		
	[1] less than 1 hour [3] 2 - 4 hours	[2] 1 but less than 2 hours [4] more than 4 hours	

2. Over the past 7 days, how often did you take a walk outside your home or yard for any reason? For example for fun or exercise, walking to work, walking the dog etc?

[0] mai ⇓	[1] rarely (1-2 days) ⇓	[2] sometimes (3-4 days) ⇓	[3] often (5-7 days) ⇓
Go to Q3	<b>2a. On average, how many hours per day did you spend walking on these days?</b>		
	[1] less than 1 hour [3] 2 - 4 hours	[2] 1 but less than 2 hours [4] more than 4 hours	
	<b>2b. What was the total distance that you walked in the past 7 days?</b>		
	[1] less than 1 km [2] one but less than 2 km [3] two to 4 km [4] more than 4 km		
	<b>2c. How many flights of stairs did you climb up in the past 7 days?</b>		
	[1] less than 1 flight [2] one but less than 2 flights [3] two to 4 flights [4] more than 4 flights		

3. Over the past 7 days, how often did you engage in light sport or recreational activities such as 'light' cycling on an exercise bike, lawn bowls, bowling, water aerobics, golf with a cart, yoga, Tai Chi, fishing from a boat or pier or other similar activities?

[0] never ⇓	[1] seldom (1-2 days) ⇓	[2] sometimes (3-4 days) ⇓	[3] often (5-7 days) ⇓
Go to Q4	<b>3a. What were these activities?</b>		
	<b>3b. On average, how many hours per day did you engage in these light sport or recreational activities on these days?</b>		
	[1] less than 1 hour [3] 2 - 4 hours	[2] 1 but less than 2 hours [4] 2 - 4 hours	





**WORK ACTIVITIES**

**10.** During the past 7 days did you work for pay or as a volunteer?

[1] No [2] Yes

if you did:

10a. How many hours per week did you work for pay and/or as a volunteer? hours ?

10b. Which of the following categories best describes the amount of physical activity required on your job and /or volunteer work?

(1) Mainly sitting with light arm movements (eg. office work, watch maker, seated assembly line worker, bus driver etc)

(2) Sitting or standing with some walking (eg. cashier, general office worker, light tool and machinery worker)

(3) Walking with some handling of materials generally weighing less than 50 pounds (eg. mailman, waitress, construction worker, heavy tool and machinery worker)

(4) Walking and heavy manual work often requiring handling of materials weighing over 50 pounds (eg. lumberjack, stone mason, farm or general laborer)

**PATIENT HEALTH QUESTIONNAIRE (PHQ-9)**

(Spitzer RL et al. 1999)

<b>Over the last 2 weeks, how often have you been bothered by any of the following problems?</b>	<b>Not at all</b>	<b>Several days</b>	<b>More than half the days</b>	<b>Nearly every days</b>
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself - or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself in some way	0	1	2	3

0 + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_

Total: \_\_\_\_\_

**If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?**

<b>Not difficult at all</b>	<b>Somewhat difficult</b>	<b>Very difficult</b>	<b>Extremely difficult</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**GERIATRIC DEPRESSION SCALE (GDS)**

(Brink TL et al. 1982)

	<b>YES</b>	<b>NO</b>
1. Are you basically satisfied with your life?	0	1
2. Have you dropped many of your activities and interests?	1	0
3. Do you feel that your life is empty?	1	0
4. Do you often get bored?	1	0
5. Are you hopeful about the future?	0	1
6. Are you bothered by thoughts you can't get out of your head?	1	0
7. Are you in good spirits most of the time?	0	1
8. Are you afraid that something bad is going to happen to you?	1	0
9. Do you feel happy most of the time?	0	1
10. Do you often feel helpless?	1	0
11. Do you often get restless and fidgety?	1	0
12. Do you prefer to stay at home, rather than going out and doing new things?	1	0
13. Do you frequently worry about the future?	1	0
14. Do you feel you have more problems with memory than most?	1	0
15. Do you think it is wonderful to be alive now?	0	1
16. Do you often feel downhearted and blue?	1	0
17. Do you feel pretty worthless the way you are now?	1	0
18. Do you worry a lot about the past?	1	0
19. Do you find life very exciting?	0	1
20. Is it hard for you to get started on new projects?	1	0
21. Do you feel full of energy?	0	1
22. Do you feel that your situation is hopeless?	1	0
23. Do you think that most people are better off than you are?	1	0
24. Do you frequently get upset over little things?	1	0
25. Do you frequently feel like crying?	1	0
26. Do you have trouble concentrating?	1	0
27. Do you enjoy getting up in the morning?	0	1
28. Do you prefer to avoid social gatherings?	1	0
29. Is it easy for you to make decisions?	0	1
30. Is your mind as clear as it used to be?	0	1

Total score: \_\_\_\_\_/30

No depression = 0-9; mild depression = 10-19; severe depression = 20-30.

**GERIATRIC DEPRESSION SCALE (GDS) (SHORT FORM)**

(Sheik JI et al. 1986)

	<b>SI</b>	<b>NO</b>
1. Are you basically satisfied with your life?	0	1
2. Have you dropped many of your activities and interests?	1	0
3. Do you feel that your life is empty?	1	0
4. Do you often get bored?	1	0
5. Are you in good spirits most of the time?	0	1
6. Are you afraid that something bad is going to happen to you?	1	0
7. Do you feel happy most of the time?	0	1
8. Do you often feel helpless?	1	0
9. Do you prefer to stay at home, rather than going out and doing things?	1	0
10. Do you feel that you have more problems with memory than most?	1	0
11. Do you think it is wonderful to be alive now?	0	1
12. Do you feel worthless the way you are now?	1	0
13. Do you feel full of energy?	0	1
14. Do you feel that your situation is hopeless?	1	0
15. Do you think that most people are better off than you are?	1	00

Punteggio totale: \_\_\_\_\_/15

Normal = 0-5; Depression = &gt;5.

## MINI-MENTAL STATE EXAMINATION (MMSE)

(Folstein MF et al. 1975)

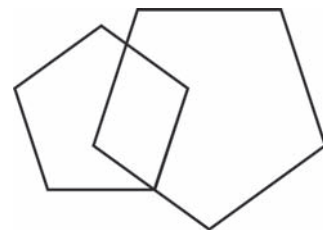
Possibility of administering the test: Yes  No

What is the current year? (0-1)	
What is the current season? (0-1)	
What is the current date? (0-1)	
What is the current day? (0-1)	
What is the current month? (0-1)	
In what country are we now? (0-1)	
In what region/district are we now? (0-1)	
In what town/city are we now? (0-1)	
On what floor are we now? (0-1)	
Asks the patient to repeat: "bread, house, cat". The patient's first response is used for scoring. The examiner repeats them until patient learns all of them, max 6 times (0.3)	
Ask the patient to count backward from 100 by sevens <input type="checkbox"/> 93 <input type="checkbox"/> 86 <input type="checkbox"/> 79 <input type="checkbox"/> 72 <input type="checkbox"/> 65 Alternative: to spell WORLD backwards: D-L-R-O-W (0-5)	
Ask the patient to repeat the 3 previously presented words (0-3)	
Show the patient two simple objects, such as a wristwatch and a pencil, and ask the patient to name them (0-2)	
Repeat the phrase: "Freshly fried fresh flesh" (0-1)	
Take the paper in your right hand, fold it in half, and put it on the table (0-3)	
Please read this and do what it says (written instruction is "Close your eyes") (0-1)	
Write a sentence about anything (this sentence must contain a noun and a verb) (0-1)	
Please copy this picture (intersecting pentagons)* (0-1)	

Maximum total score = 30

Total score \_\_\_\_\_

\* Drawing



Total score per age and education\*\* \_\_\_\_\_

\*\* Adjustment coefficient of MMSE per age classes and education in Italian population

Age interval	65-69	70-74	75-79	80-84	85-89
<i>Years of education</i>					
0-4 years	+0.4	+0.7	+1.0	+1.5	+2.2
5-7 years	-1.1	-0.7	-0.3	+0.4	+1.4
8-12 years	-2.0	-1.6	-1.0	-0.3	+0.8
13-17 years	-2.8	-2.3	-1.7	-0.9	+0.3

The coefficient must be added (o subtracted) to the raw score to obtain the adjusted score

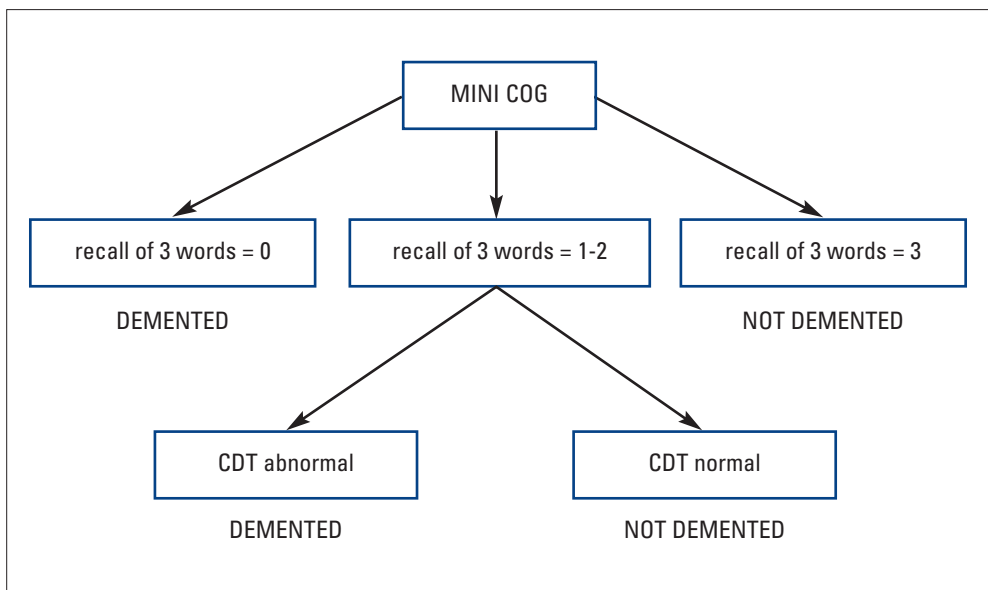
## MINI-COG TEST (Borson S et al. 2000)

1. Instruct the patient to repeat 3 unrelated words. Same as in the Mini-Mental State Examination (MMSE).
2. Instruct the patient to:
  - draw the face of a clock
  - draw the hands of the clock
  - put the hands of the clock to read a specific time, such as 11:10

The clock drawing test (CDT) is considered normal if all numbers are present in the correct sequence and position, and the hands readably display the requested time.

3. Ask the patient to repeat the 3 previously presented words.

### Mini-cog scoring algorithm:





**SUMMARY OF THE MAJOR RECOMMENDATIONS OF THE  
“UNINTENDED WEIGHT LOSS IN OLDER ADULTS (UWL) EVIDENCE-BASED  
NUTRITION PRACTICE GUIDELINE”  
(American Dietetic Association (ADA), 2009)\***

- All older adults should be screened for unintended weight loss.
- Only screening tools that have been validated in the older population should be used, such as The Mini Nutritional Assessment Short Form and the Nutrition Screening Initiative DETERMINE Your Nutritional Health (DETERMINE) (Posner BM et al. 1993).
- Multiple days of assessment are necessary to evaluate food intake, amount of fluid discarded, nutritional intake, chewing and swallowing functions.
- The average nutritional intake for an older adult should be estimated on the based on an appropriate body weight.
- Medical food supplements should be recommended for older adults who are undernourished or at risk of undernutrition.
- Older adults with unintended weight loss should always be considered for evaluation of depression.
- Older adults could benefit from dining in a pleasant environment and atmosphere and with others rather than alone.
- For older adults liberalization of diets should be recommended, with the exception of texture modification in subjects with dysphagia.
- Appetite stimulants, such as cyproheptadine or mirtazapine can be useful.

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\* Some of the recommendation of the original guideline are summarized here.

**MINI NUTRITIONAL ASSESSMENT MNA®**  
(Vellas 2006; Rubenstein 2001; Guigoz 2006; Kaiser 2009)

Last name:		First name:		
Gender:	Age:	Weight, kg:	Height, cm:	Date:

Complete the screen by filling in the boxes with the appropriate numbers. Add the numbers for the final score.

<p><b>Screening</b></p> <p><b>A Loss of appetite, digestive problems, chewing or swallowing difficulties?</b>                  0 = severe decrease in food intake                  1 = moderate decrease in food intake                  2 = no decrease in food intake</p> <hr/> <p><b>B Recent weight loss (&lt;3 months)</b>                  0 = weight loss greater than 3kg (6.6lbs)                  1 = does not know                  2 = pweight loss between 1 and 3kg (2.2 and 6.6 lbs)                  3 = no weight loss</p> <hr/> <p><b>C Mobility</b>                  0 = able to get out of bed and to move to chair                  1 = moves independently around the house but does not go out                  2 = goes out</p> <hr/> <p><b>D Psychological stress or acute disease in the past 3 months?</b>                  0 = yes                  2 = no</p> <hr/> <p><b>E Neuropsychological problems</b>                  0 = severe dementia or depression                  1 = mild dementia                  2 = no psychological problems</p> <hr/> <p><b>F1 Body Mass Index (BMI) (weight in kg)/(height in m)<sup>2</sup></b>                  0 = BMI less than 19                  1 = BMI 19 to less than 21                  2 = BMI 21 to less than 23                  3 = BMI 23 or greater</p>
--

IF BMI IS NOT AVAILABLE, REPLACE QUESTION F1 WITH QUESTION F2.  
DO NOT ANSWER TO QUESTION F2 IF QUESTION F1 IS ALREADY COMPLETED

<p><b>F2 Calf circumference (CC) in cm</b>                  0 = CC less than 31                  3 = CC 31 or greater</p> <hr/> <p><b>Screening assessment</b>  <input type="checkbox"/> <input type="checkbox"/> (mx 14 points)                  12-14 points: normal nutritional status                  8-11 points: at risk of malnutrition                  0-7 points: malnourished</p>
---

**“DETERMINE” CHECK LIST**

(Posner BM et al. 1993)

Nutritional status is often poor. This checklist helps assessing it.	
For each <b>YES</b> answer, score the number in the box. The sum of the scores is a global measure of nutritional status.	
<b>I have an illness or condition that made me change the kind and /or amount of food I eat.</b>	2
<b>I eat fewer than two meals per day.</b>	3
<b>I eat few fruits or vegetables, or milk products.</b>	2
<b>I have three or more drinks of beer, liquor or wine almost every day.</b>	2
<b>I have tooth or mouth problems that make it hard for me to eat.</b>	2
<b>I don't always have enough money to buy the food I need.</b>	4
<b>I eat alone most of the time.</b>	1
<b>I take three or more different prescribed or over-the-counter drugs a day.</b>	1
<b>Without wanting to, I have lost or gained 10 pounds in the last six months.</b>	2
<b>I am not always physically able to shop, cook and/or feed myself.</b>	2
<b>TOTAL</b>	
Scores:	
<b>0-2 Good.</b> Recheck nutritional score in 6 months.	
<b>3-5 Moderate nutritional risk.</b> Refer to a doctor to see what can be done to improve eating habits and lifestyle. Recheck nutritional score in 3 months.	
<b>6 or more. High nutritional risk.</b> Refer to a doctor in a short time to discuss any problems and find strategies improve nutritional health.	
<b>A score higher than 2 means a “risk”, not a disease.</b>	
<b>It is however necessary to talk to a doctor.</b>	

## Appendix 2: assisting frail older adults

### CARE PLAN (from: British Columbia Guidelines, 2008)

		PATIENT PERSONAL HEALTH NUMBER
NAME OF PATIENT	TELEPHONE NUMBER	DATE
NAME OF CAREGIVER	TELEPHONE NUMBER(S) DAY: _____ EVENING: _____	
NAME(S) OF SUPPORTING HEALTH CARE PROVIDER(S)	ROLE OF RESPONSIBILITY	TELEPHONE NUMBER
1		
2		
3		
HAS PHARMACOLOGICAL THERAPY BEEN PLANNED?	_ NO      Y   Y   M   M   D   D _ YES DATE	FURTHER ANNOTATIONS

HEALTH CARE GOALS <small>Prioritized based on patient preferences</small>	STRATEGIES <small>Include referrals made</small>	CAREGIVER RESPONSIBLE	OUTCOMES EXPECTED	STATUS

NEXT CARE PLAN REVIEW DATE

Y	Y	M	M	D	D
---	---	---	---	---	---

**MEDICATION REVIEW**  
(from: British Columbia Guidelines, 2008)

NAME OF PATIENT	SEX <input type="checkbox"/> M <input type="checkbox"/> F	AGE AT DIAGNOSIS	DATE OF BIRTH
		CODE	
<b>CARE OBJECTIVES</b>			
DATE OF REVIEWE		NAME OF REVIEWER	
ALLERGIES OR INTOLERANCES	COMPLIANCE ISSUES		SYSTEM <input type="checkbox"/> VIALS <input type="checkbox"/> DOSETTE <input type="checkbox"/> BLISTER PACKS

**RISK FACTORS AND COMORBIDITIES**

<p><b>Neurological</b></p> <input type="checkbox"/> Stroke	<p><b>Cardiovascular</b></p> <input type="checkbox"/> Hypertension <input type="checkbox"/> Coronary disease <input type="checkbox"/> Peripheral vascular disease <input type="checkbox"/> Hypercholesterolemia <input type="checkbox"/> Myocardial infarction <input type="checkbox"/> Congestive heart failure Echo: _____ <input type="checkbox"/> Arrhythmia	<p><b>Gastrointestinal</b></p> <input type="checkbox"/> Gastroesophageal reflux <input type="checkbox"/> Ulcer <input type="checkbox"/> Inflammatory bowel disease <input type="checkbox"/> Constipation	<p><b>Psychiatric</b></p> <input type="checkbox"/> Depression <input type="checkbox"/> Anxiety <input type="checkbox"/> Bipolar	<p><b>Endocrine</b></p> <input type="checkbox"/> Diabetes <input type="checkbox"/> Hypothyroid	<p>Other:</p> <hr style="width: 80%; margin-left: 0;"/>
<p><b>Musculoskeletal</b></p> <input type="checkbox"/> Arthritis <input type="checkbox"/> Osteoporosis		<p><b>Respiratory</b></p> <input type="checkbox"/> Asthma <input type="checkbox"/> Chronic obstructive pulmonary disease			
<p><b>Renal</b></p> <input type="checkbox"/> Chronic kidney disease GFR: _____					

<b>VISITS (EVERY 6 MONTHS)</b>		
DRUG SCHEDULE (Rx, OTC, HERBS, PRN)	MEDICAL PROBLEM	PLAN (CANGE/NO CHANGE)

### DISCHARGE PLANNING CHECK LIST

(from: Australian Government Department of Veteran's Affaire, 1996, 2002, 2003)

This checklist is filled in by who is in charge of assistance  
to plan the patient's discharge from hospital

<b>Entitled Person Name</b>	
-----------------------------	--

<b>Caregiver Name</b>	
-----------------------	--

<b>Relationship of carer to entitled person</b>
Informal (ex. relative)
Formal (ex. nurse)

<b>Date of admission</b>	
--------------------------	--

<b>Reason for admission</b>

<b>Date of commencement of formal discharge planning</b>	
--	--

<b>Date and time of discharge</b>	
-----------------------------------	--



## On Admission

1. Inform GP that patient is in hospital and try to obtain information on patient's home environment medications, and any other information that would be useful for planning discharge.

---

2. Talk to carer regarding the same information as above and provide him/her information about the hospital stay.

---

3. Inform territorial services in case the patient is supported by them.

---

4. Provide the patient informations about the ward he/she is admitted in.

---

5. Screen for potential difficulties in discharge and discuss them with caregiver and GP with particular reference to:
  - living conditions, including hygiene and environment
  - management and care of the home environment in patient's absence

Indicate what of the following conditions pertain to the patient on admission to the ward:

- Patient lives alone
  - Patient is frail or aged
  - Patient has multiple health problems
  - Patient had not been visited by GP for more than 3 months
  - Patient's care is shared by a number of different specialists
  - Patient has an ill, frail or incapable carer
  - Patient usually cares for someone else (family members, pets, etc.)
  - Patient does not participate to this DP
  - There are family conflicts about the patient's living arrangements after discharge
  - Patient exhibits difficulties with compliance in taking medication
  - Patient has pain and tiredness
  - Patient has reduced mobility and grief regarding loss of ability
  - Patient will require aids and/or equipment at home after discharge
  - Other potential problems; specify:
6. Screen for other issues or risk factors that need to be followed up (physical exercise, nutrition, smoking, mental health, etc.).



**Within 1-2 days of admission**

<b>1.</b>	<p><b>Are patient and carer aware of the expected recovery path?</b>  <i>If not, provide information.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>2.</b>	<p><b>Are patient and carer aware of likely changes to health status on discharge?</b>  <i>If not, specify actions to be undertaken.</i></p> <p>.....</p> <p>.....</p> <p>.....</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>3.</b>	<p><b>Is it reasonable to expect the patient to be independently ambulating by the discharge date?</b>  <i>If not, will the patient be discharged anyway?</i>  <i>If yes, are there management plans to overcome this problem?</i>  <i>If not, specify.</i></p> <p>.....</p> <p>.....</p> <p>.....</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
<b>4.</b>	<p><b>Does the carer live with the patient?</b>  <b>Is the carer capable and prepared to assist the patient after discharge?</b>  <i>If not, specify actions to be undertaken</i></p> <p>.....</p> <p>.....</p> <p>.....</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
<b>5.</b>	<p><b>Does the primary healthcare sector who already provides for the patient at home needs to be informed about new needs? (ex. walking aids, nutrition, etc.)</b>  <i>If yes, specify needed actions.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>6.</b>	<p><b>Is it reasonable to expect the patient to be independent and self-sufficient with personal care?</b>  <i>If not specify possible actions.</i></p> <p>.....</p> <p>.....</p> <p>.....</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No





### At least 2 days prior to discharge

<b>1.</b>	<p><b>TRAVEL</b>  <b>Has suitable transport been arranged from the hospital to the community?</b>  <i>If no, specify actions to be undertaken.</i>            .....            .....</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<p><b>Are the travel documents ready?</b>  <i>If not, take action.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>2.</b>	<p><b>MOVING BACK HOME</b>  <b>Have all issues of safe access to the home been considered?</b>  <i>If not, take action.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<p><b>L'ambiente domestico è già pronto per il ritorno a casa?</b>  <i>If not, take action.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<p><b>Has home environment been organized for homecoming?</b>  <i>If yes, have they been organized?</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<p><b>If home modifications are required, will they be in place by the day of discharge?</b></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>3.</b>	<p><b>HOME CARE</b>  <b>Are home care services required?</b>  <i>If yes, have they been organized?</i>  <i>If not, take action.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<p><b>If home care services have already been organized, will they be in place by the day of discharge?</b>  <i>If not, take action.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>4.</b>	<p><b>INFORMATION</b>  <b>Have the patient and carer been provided with sufficient information on medications to be taken?</b>  <i>If not, take action.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<p><b>Have the patient and carer been provided with information on support groups that can provide help?</b>  <b>Is this information relevant?</b>  <i>If yes, take action.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<p><b>Have the patient and carer been provided with emergency contacts?</b>  <i>If not, take action.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No



**On the day prior to discharge**

<b>1.</b>	<p><b>PREPARATIVI PER LA DIMISSIONE</b></p> <p><b>Are all needed plans for a safe discharge in place?</b></p> <p><i>If not, specify what is left to do:</i></p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<p><b>If discharge plans cannot be implemented by the time of discharge, is there an alternative plan?</b></p> <p><i>If yes, take action.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>2.</b>	<p><b>MEDICATIONS</b></p> <p><b>Have all relevant information on medication and use of devices been provided?</b></p> <p><i>If not, specify what is left to do:</i></p> <p>.....</p> <p>.....</p> <p>.....</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<p><b>Is it reasonable that patient and/or carer are familiar with the use of medications and devices?</b></p> <p><i>If not, specify what is left to do:</i></p> <p>.....</p> <p>.....</p> <p>.....</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>3.</b>	<p><b>EQUIPMENT</b></p> <p><b>Have all relevant equipment and/or devices been provided?</b></p> <p><i>If not, specify what is left to do:</i></p> <p>.....</p> <p>.....</p> <p>.....</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<p><b>Have the patient and the carer able to use all provided equipment and devices?</b></p> <p><i>If not, specify what is left to do:</i></p> <p>.....</p> <p>.....</p> <p>.....</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No



### On the day of discharge

<b>1.</b>	<b>DISCHARGE SUMMARY</b> <b>Has the GP been sent the discharge summary by email or fax prior to discharge? Or has the GP been informed by phone that patient is going home?</b> <i>If not, take action..</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<b>Has the discharge summary been given to the patient or to the carer?</b> <i>If not, is it appropriate not to give it.</i> <i>If yes, give it to the entitled person.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
<b>2.</b>	<b>MANAGING AT HOME</b> <b>Have there been a final discussions with patient and carer regarding all issues of managing at home?</b> <i>If not, conduct discussions as soon as possible.</i> <i>If yes, do any further actions need to be taken?</i> <i>If yes, take action.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No  <input type="checkbox"/> Yes <input type="checkbox"/> N
	<b>3. FOLLOW-UP APPOINTMENTS</b> <b>Have appropriate follow-up appointments been made?</b> <i>If no, are they required?</i> <i>If yes, take action.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No

### Follow-up action

<b>I.</b>	<b>Phone patient next day to check if support services are working, and check whether there have been any problems managing home life.</b> <i>There have been problems?</i> <i>If yes, gather information about the reason and try to solve them.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>II.</b>	<b>Phone patient 1 or 2 more times in the next two weeks after discharge to check on progress.</b> <i>First time.</i> <i>Second time.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No

