



Ageing and disease

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History

- **Slow down** the pace.
- **Ensure the patient can hear.**
- Establish **the speed of onset of the illness.**
- If the presentation is vague, carry out a **systematic enquiry**.
- Obtain **full details of:**
 - **all drugs**, especially any recent prescription changes
 - **past medical history**, even from many years previously
 - **usual function**
 - (a) Can the patient walk normally?
 - (b) Has the patient noticed memory problems?
 - (c) Can the patient perform all household tasks?
- **Obtain a collateral history:** confirm information with a relative or carer and the general practitioner, particularly if the patient is confused or communication is limited by deafness or speech disturbance.

Social assessment

Home circumstances

- Living alone, with another or in a care home.

Activities of daily living (ADL)

- Tasks for which help is needed:
 - domestic ADL: shopping, cooking, housework
 - personal ADL: bathing, dressing, walking.
- Informal help: relatives, friends, neighbours.
- Formal social services: home help, meals on wheels.
- Car stress.

Examination

- **Thorough** to identify all comorbidities.
- **Tailored to the patient's stamina** and ability to cooperate.

- Includes **functional status**:
 - cognitive function
 - gait and balance
 - nutrition
 - hearing and vision.

7 Abbreviated Mental Test

Each correct answer scores 1 mark.

1. What time is it? (*to the nearest hour*)
2. What year is it?
3. What is the name of this place/hospital?
4. How old are you? (*exact year*)
5. What is your date of birth?

Please memorise the following address: 42 West Street.

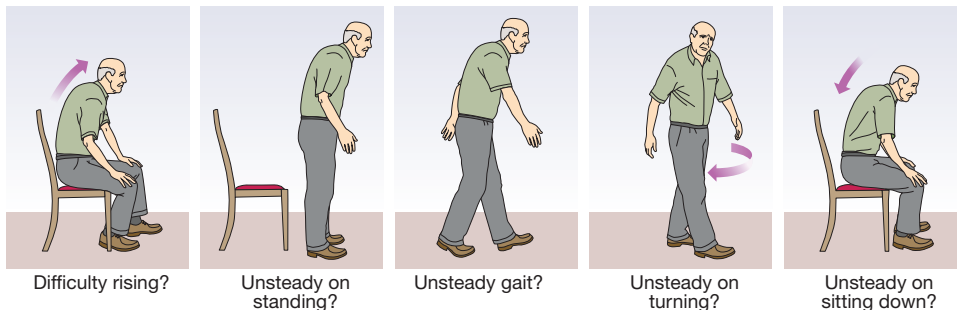
6. When did the First World War begin?
7. Who is the present monarch?
8. Please count backwards from 20 down to 1.
9. Can you recognise two people?
(*e.g. relative or photograph*)
10. Can you tell me the address I asked you to memorise a few minutes ago?

Mini-Mental State Examination is used for more detailed assessment (p. 232).

Multidisciplinary team (MDT) and functional assessment	
Team member	Activity assessed and promoted
Physiotherapist	Mobility, balance and upper limb function
Occupational therapist	Activities of daily living (ADL), e.g. dressing, cooking (Assessment of home environment)
Dietitian	Nutrition
Speech and language therapist	Communication and swallowing
Social worker	Care needs
Nurse	Motivation and initiation of activities Feeding Continence Skin care

12 Get up and go test

To assess balance, ask the patient to stand up from a sitting position, walk 10 m, turn and go back to the chair.



Sweeping demographic change has meant that older people now represent the core practice of medicine in many countries. A good knowledge of the effects of ageing and the clinical problems associated with old age is thus essential in most medical specialties. The older population is extremely diverse; a substantial proportion of 90-year-olds enjoy an active healthy life, while some 70-year-olds are severely disabled by chronic disease. The terms 'chronological' and 'biological' ageing have been coined to describe this phenomenon. Biological rather than chronological age is taken into consideration when making clinical decisions about, for example, the extent of investigation and intervention that is appropriate.

Geriatric medicine is concerned particularly with frail older people, in whom physiological capacity is so reduced that they are incapacitated by even minor illness. They frequently have multiple comorbidities, and acute illness may present in non-specific ways, such as confusion, falls, or loss of mobility and day-to-day functioning. These patients are prone to adverse drug reactions, partly because of polypharmacy and partly because of age-related changes in responses to drugs and their elimination (p. 28). Disability is common, but patients' function can often be improved by the interventions of the multidisciplinary team (p. 165.)

Older people have been neglected in research terms and, until recently, were rarely included in randomised controlled clinical trials. There is thus little evidence on which to base practice.

DEMOGRAPHY

The demography of developed countries has changed rapidly in recent decades. In the UK, the total population grew by 8% over the last 35 years, but the number of people aged over 65 years rose by 31%, with the steepest rise in those aged over 85; the population aged under 16 fell by 19%. The proportion of the UK population aged over 65 is projected to increase further from 16% currently to 24% in 2061. This will have a significant impact on the old-age dependency ratio, i.e. the number of people of working age for each person aged over 65. Young people support older members of the population directly (e.g. through living arrangements) and financially (e.g. through taxation and pension contributions), so the consequences of a reduced ratio are far-reaching. However, many older people support the younger population, through care of children and other older people.

Life expectancy in the developed world is now prolonged, even in old age (Box 7.1); women aged 80 years can expect to live for a further 9 years. However, rates of disability and chronic illness rise sharply with ageing and have a major impact on health and social services. In the UK, the reported prevalence of a chronic illness or disability sufficient to restrict daily activities is around 25% in those aged 50–64, but 66% in men and 75% in women aged over 85.

Although the proportion of the population aged over 65 years is greater in developed countries, two-thirds of the world population of people aged over 65 live in developing countries at present, and this is projected to rise to 75% in 2025. The rate of population ageing is much faster in developing countries (Fig. 7.1) so they have less time to adjust to its impact.



7.1 Mean life expectancy in years, UK and India

	Males		Females	
	UK	India	UK	India
At birth	77	62	81	64
At 60 years	20.5	15	24	17
At 70 years	13	10	16	11
At 80 years	7.5	7	9	7

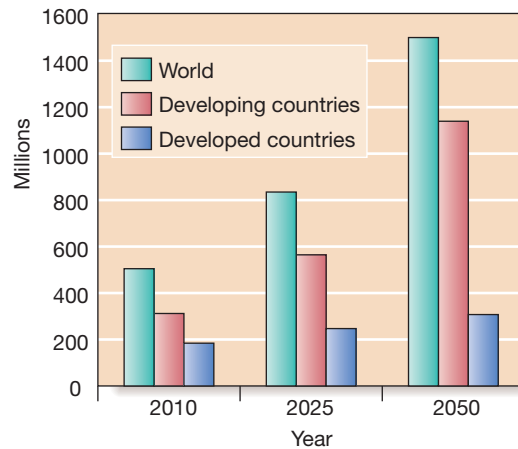


Fig. 7.1 Number of people aged 65 and over projected in the world population.

FUNCTIONAL ANATOMY AND PHYSIOLOGY

Biology of ageing

Ageing can be defined as a progressive accumulation through life of random molecular defects that build up within tissues and cells. Eventually, despite multiple repair and maintenance mechanisms, these result in age-related functional impairment of tissues and organs.

Many genes probably contribute to ageing, with those that determine durability and maintenance of somatic cell lines particularly important. However, genetic factors only account for around 25% of variance in human lifespan; nutritional and environmental factors determine the rest.

A major contribution to random molecular damage is made by reactive oxygen species produced during the metabolism of oxygen to produce cellular energy. They cause oxidative damage at a number of sites:

- *Nuclear chromosomal DNA*, causing mutations and deletions which ultimately lead to reduced gene function.
- *Telomeres*, which are the protective end regions of chromosomes which shorten with each cell division because telomerase (which copies the end of the 3' strand of linear DNA in germ cells) is absent

in somatic cells. When telomeres are sufficiently eroded, cells stop dividing. It has been suggested that telomeres represent a 'biological clock' which prevents uncontrolled cell division and cancer. Telomeres are particularly shortened in patients with premature ageing due to Werner's syndrome, in which DNA is damaged due to lack of a helicase required for DNA repair and messenger RNA formation.

- *Mitochondrial DNA* resulting in reduced cellular energy production and ultimately cell death.
- *Proteins*: for example, those increasing formation of advanced glycosylation end-products from spontaneous reactions between protein and local sugar molecules. These damage the structure and function of the affected protein, which becomes resistant to breakdown. This is the cause of yellowing of ageing nails and cornea.

The rate at which damage occurs is malleable and this is where the interplay with environment, particularly nutrition, takes place. There is evidence in some organisms that this interplay is mediated by insulin signalling pathways.

Physiological changes of ageing

The physiological features of normal ageing have been identified by examining disease-free populations of older people, to separate the effects of pathology from those due to time alone. However, the fraction of older people who age without disease ultimately declines to very low levels so that use of the term 'normal' becomes debatable. There is a marked increase in inter-individual variation in function with ageing; many physiological processes in older people deteriorate substantially when measured across populations, but some individuals show little or no change. Although there is some genetic influence over this, environmental factors such as poverty, nutrition, exercise, cigarette smoking and alcohol misuse play a large part, and a healthy lifestyle should be encouraged even when old age has been reached.

The effects of ageing are usually not enough to interfere with organ function under normal conditions, but reserve capacity is significantly reduced. Some changes of ageing, such as depigmentation of the hair, are of no clinical significance. Figure 7.2 shows many that are clinically important.

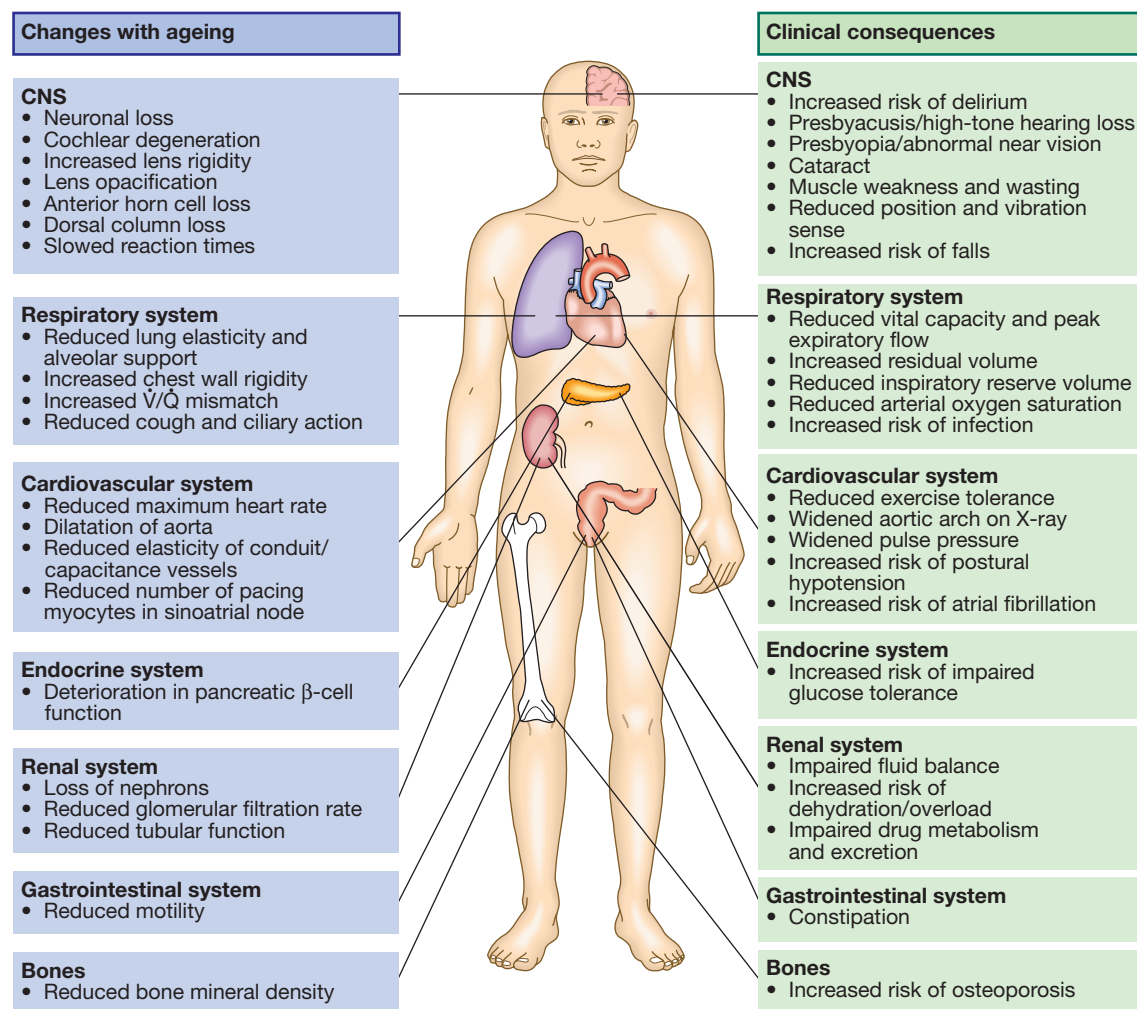


Fig. 7.2 Features and consequences of normal ageing.

Frailty

Frailty is defined as the loss of an individual's ability to withstand minor stresses because the reserves in function of several organ systems are so severely reduced that even a trivial illness or adverse drug reaction may result in organ failure and death. The same stresses would cause little upset in a fit person of the same age.

It is important to understand the difference between 'disability' and 'frailty'. Disability indicates established loss of function (e.g. mobility; see Box 7.15 p. 175) while frailty indicates increased vulnerability to loss of function. Disability may arise from a single pathological event (such as a stroke) in an otherwise healthy individual. After recovery, function is largely stable, and the patient may otherwise be in good health. When frailty and disability coexist, function deteriorates markedly even with minor illness, to the extent that the patient can no longer manage independently.

Unfortunately, the term 'frail' is often used rather vaguely, sometimes to justify a lack of adequate investigation and intervention in older people. However, it can be specifically identified by assessing function in a number of domains (Box 7.2). These are all commonly impaired by disease, illness and indeed age, but can often be improved by specific intervention. In clinical practice, 'frailty' per se is rarely measured formally, but a comprehensive assessment (see below) includes an evaluation of each domain.

Frail older people particularly benefit from a clinical approach that addresses both the precipitating acute illness and their underlying loss of reserves. It may be possible to prevent further loss of function through early intervention; for example, a frail woman with cardiac failure will benefit from specific cardiac investigation and drug treatment, but will benefit even further from an exercise programme to improve musculoskeletal function, balance and aerobic capacity, with nutritional support to restore lost weight. Establishing a patient's level of frailty also helps inform decisions regarding further investigation and management, and the need for rehabilitation.



7.2 Domains impaired in frailty

- Musculoskeletal function
- Aerobic capacity, i.e. cardiorespiratory function
- Cognitive function
- Integrative neurological function (e.g. balance and gait)
- Nutritional status

INVESTIGATIONS

Comprehensive geriatric assessment

Although not strictly an investigation, one of the most powerful tools in the management of older people is the Comprehensive Geriatric Assessment, which identifies all the relevant factors contributing to their presentation

EBM 7.3 Comprehensive geriatric assessment

'Inpatient comprehensive geriatric assessment reduces short-term mortality and increases the chance of patients living at home in the long term.'

- Ellis G, Langhorne P. Br Med Bull 2005; 71: 45–59.

(p. 164). In frail patients with multiple pathology, it may be necessary to perform the assessment in stages to allow for their reduced stamina. The outcome should be a management plan that not only addresses the acute presenting problems, but also improves the patient's overall health and function (Box 7.3).

Decisions about investigation

Accurate diagnosis is important at all ages but frail older people may not be able to tolerate lengthy or invasive procedures, and diagnoses may be revealed for which patients could not withstand intensive or aggressive treatment. On the other hand, disability should never be dismissed as due to age alone. For example, it would be a mistake to supply a patient no longer able to climb stairs with a stair lift, when simple tests would have revealed osteoarthritis of a hip and vitamin D deficiency for which appropriate treatment would have restored his or her strength. So how do doctors decide when and how far to investigate?

The patient's general health

Does this patient have the physical and mental capacity to tolerate the proposed investigation? Does he have the aerobic capacity to undergo bronchoscopy? Will her confusion prevent her from remaining still in the MRI scanner? The more comorbidities a patient has, the less likely he or she will be able to withstand an invasive or complex intervention. Information on the outcomes in critically ill older patients is given on page 202.

Will the investigation alter management?

Would the patient be fit for, or benefit from, the treatment that would be indicated if investigation proved positive? The presence of comorbidity is more important than age itself in determining this. When a patient with severe heart failure and a previous disabling stroke presents with a suspicious mass lesion on chest X-ray, detailed investigation and staging may not be appropriate if he is not fit for surgery, radical radiotherapy or chemotherapy. On the other hand, if the same patient presented with dysphagia, investigation of the cause would be important, as he would be able to tolerate endoscopic treatment: for example, to palliate an obstructing oesophageal carcinoma.

The views of the patient and family

Older people may have strong views about the extent of investigation and treatment they wish to receive, and these should be sought from the outset. If the patient wishes, the views of relatives can be taken into account. If the patient is not able to express a view or lacks the capacity to make decisions, because of cognitive impairment or communication difficulties, then relatives' input becomes particularly helpful. They may be able to give

information on views previously expressed by the patient or on what the patient would have wanted under the current circumstances. However, families should never be made to feel responsible for difficult decisions.

Advance directives

Advance directives or 'living wills' are statements made by adults at a time when they have the capacity to decide for themselves about the treatments they would refuse or accept in the future, should they no longer be able to make decisions or communicate them. An advance directive cannot authorise a doctor to do anything that is illegal and doctors are not bound to provide a specific treatment requested, if in their professional opinion it is not clinically appropriate. However, any advance refusal of treatment, made when the patient was able to make decisions based on adequate information about their implications, is legally binding in the UK. It must be respected when it clearly applies to the patient's present circumstances and when there is no reason to believe that the patient has changed his or her mind.

PRESENTING PROBLEMS IN GERIATRIC MEDICINE

Characteristics of presenting problems in old age

Problem-based practice is integral to geriatric medicine. Most problems are multifactorial and there is rarely a unifying diagnosis. All contributing factors have to be taken into account and attention to detail is paramount. Two patients who share the same presenting problem may have completely disparate diagnoses. A wide knowledge of adult medicine is required, as disease in any and often many of the organ systems has to be managed at the same time. There are a number of features that are particular to older patients.

Late presentation

Many people (of all ages) accept ill health as a consequence of ageing and may tolerate symptoms for lengthy periods before seeking medical advice. Comorbidities may also contribute to late presentation; in a patient whose mobility is limited by stroke, angina may only present when coronary artery disease is advanced, as the patient was unable to exercise sufficiently to cause symptoms at an earlier stage.

Atypical presentation

Infection may present with acute confusion and without clinical pointers to the organ system affected. Stroke may present with falls rather than symptoms of focal weakness. Myocardial infarction may present as weakness and fatigue, without the classical symptoms of chest pain or dyspnoea. The reasons for these atypical presentations are not always easy to establish. Perception of pain is altered in old age, which may explain why myocardial infarction presents in other ways. The pyretic response is blunted in old age so that infection may not be obvious at first. Cognitive impairment may limit the patient's ability to give a history of classical symptoms.

Acute illness and changes in function

Atypical presentations in frail elderly patients include 'failure to cope', 'found on floor', 'confusion' and 'of feet', but these are *not* diagnoses. The possibility that an acute illness has been the precipitant must always be considered. It helps to establish whether the patient's current status is a change from his or her usual level of function by asking a relative or carer (by phone if necessary). Investigations aimed at uncovering an acute illness will not be fruitful in a patient whose function has been deteriorating over several months, but if function has suddenly changed, acute illness must be excluded.

Multiple pathology

Presentations in older patients have a more diverse differential diagnosis because multiple pathology is so common. There are frequently a number of causes for any single problem, and adverse effects from medication often contribute. A patient may fall because of osteoarthritis of the knees, postural hypotension due to diuretic therapy for hypertension, and poor vision due to cataracts. All these factors have to be addressed to prevent further falls, and this principle holds true for most of the common presenting problems in old age.

Approach to presenting problems in old age

For the sake of clarity, the common presenting problems are described individually, but in real life, older patients often present with several at the same time, particularly confusion, incontinence and falls. These share some underlying causes and may precipitate each other.

The approach to most presenting problems in old age can be summarised as follows:

- *Obtain a collateral history.* Find out the patient's usual status (e.g. mobility, cognitive state) from a relative or carer. Call these people by phone if they are not present.
- *Check all medication.* Have there been any recent changes?
- *Search for and treat any acute illness.* See Box 7.4.
- *Identify and reverse predisposing risk factors.* These depend on the presenting problem.



7.4 Screening investigations for acute illness

- Full blood count
- Urea and electrolytes, liver function tests, calcium and glucose
- Chest X-ray
- Electrocardiogram
- Urinalysis for leucocytes and nitrites; if positive, urine culture
- C-reactive protein: useful marker for occult infection
- Blood cultures if pyrexial

Falls

Around 30% of those aged over 65 years fall each year, this figure rising to over 40% in those aged over 80. Although only 10–15% of falls result in serious injury, they are the cause of over 90% of hip fractures in this age group, compounded by the rising prevalence of osteoporosis. Falls also lead to loss of confidence and fear, and are frequently the ‘final straw’ that makes an older person decide to move to institutional care. Management will vary according to the underlying cause.

Acute illness

Falls are one of the classical atypical presentations of acute illness in frail people. The reduced reserves in older people’s neurological function mean that they are less able to maintain their balance when challenged by an acute illness. Suspicion should be high when falls have suddenly occurred over a period of a few days. Common underlying illnesses include infection, stroke, metabolic disturbance and heart failure. Thorough examination and investigation are required (see Box 7.4). It is also important to establish whether any drug which precipitates falls, such as a psychotropic or hypotensive agent, has been started recently. Once the underlying acute illness has been treated, falls may no longer be a problem.

Blackouts

A proportion of older people who ‘fall’ have in fact had a syncopal episode. It is important to ask about loss of consciousness, and if this is a possibility, to perform appropriate investigations (pp. 551 and 1149).

Mechanical and recurrent falls

Amongst patients who have tripped or are uncertain how they fell, those who have fallen more than once in the past year and those who are unsteady during a ‘Get up and go’ test (p. 165) require further assessment. Patients with recurrent falls are commonly frail, with multiple medical problems and chronic disabilities. Obviously, such patients may present with a fall resulting from an acute illness or syncope, but they will remain at risk of further falls even when the acute illness has resolved. The well-established risk factors for falls (Box 7.5) should be considered. If problems are identified with muscle strength, balance, vision or cognitive function, the causes of these must be identified by specific investigation, and treatment should be commenced if appropriate. Common pathologies identified include cerebrovascular disease (p. 1180), Parkinson’s disease (p. 1199) and osteoarthritis of weight-bearing joints (p. 1083). Osteoporosis risk factors should also be sought and DEXA (dual energy X-ray absorptiometry) bone density scanning considered in all



7.5 Risk factors for falls

- Muscle weakness
- History of falls
- Gait or balance abnormality
- Use of a walking aid
- Visual impairment
- Arthritis
- Impaired ADL
- Depression
- Cognitive impairment
- Age over 80 years
- Psychotropic medication

EBM 7.6 Prevention of falls in older people

‘Effective interventions to prevent falls in elderly people living in the community include exercise interventions, assessment and multifactorial intervention, withdrawal of psychotropic medication, a prescribing modification programme in primary care, first eye cataract surgery, pacemaker insertion in those with carotid sinus syndrome, and home safety interventions in those with severe visual impairment and in those at high risk of falling.’

• Gillespie LD, et al. Cochrane Database of Systematic Reviews 2009, issue 2. Art. no. CD0071460.

For further information:  www.nice.org.uk



7.7 Multifactorial intervention to prevent falls

- Individualised or group exercise training
- Rationalisation of medication, especially psychotropic drugs
- Correction of visual impairment, particularly cataract extraction
- Home environmental hazard assessment and safety education
- Treatment of cardiovascular disorders, including carotid sinus syndrome and postural hypotension

older patients who have recurrent falls, particularly if they have already sustained a fracture (p. 1118).

Prevention of falls and fractures

Falls can be prevented by multiple risk factor intervention (Box 7.6), individualised according to those found in a specific patient (Box 7.7). The most effective intervention is balance and strength training by physiotherapists. An assessment of the patient’s home environment for hazards must be delivered by an occupational therapist, who may also provide personal alarms so that patients can summon help should they fall again. Rationalising psychotropic medication may help to reduce sedation, although many older patients are reluctant to stop hypnotics. If postural hypotension is present (defined as a drop in blood pressure of > 20 mmHg systolic or > 10 mmHg diastolic pressure on standing from supine), reducing or stopping hypotensive drugs is helpful. Other measures to address postural hypotension are shown in Box 7.8. Simple interventions, such as new glasses to correct visual acuity, and podiatry, can also have a significant impact on function.



7.8 Management of postural hypotension

- Correction of dehydration
- Head-up tilt of the bed
- Support stockings (older patients may struggle to get these on)
- Non-steroidal anti-inflammatory drugs (NSAIDs; increase circulating volume via salt and water retention; gastric and renal side-effects limit use)
- Fludrocortisone (causes salt and water retention; often poorly tolerated due to fluid overload)
- Midodrine (α-adrenergic agent; not licensed in the UK)

If osteoporosis is diagnosed, specific drug therapy should be commenced (p. 119). In female patients in institutional care, calcium and vitamin D₃ have been shown to reduce fracture rates, and may also reduce falls by reversing the changes in neuromuscular function associated with vitamin D deficiency. They are not effective in those with osteoporosis living in the community, in whom bisphosphonates are first-line therapy.

In the UK, government policy and National Institute for Health and Clinical Excellence guidelines (www.nice.org.uk) for falls prevention have led to the development of specific Falls and Fracture Prevention Services in many parts of the country.

Delirium (acute confusion)

Delirium is very common, affecting up to 30% of older hospital inpatients either at admission or during their hospital stay. It is associated with high rates of mortality, complication and institutionalisation, and with longer lengths of stay. Characteristic features must be present to make a diagnosis of delirium (Box 7.9) but it may be missed unless routine cognitive testing with an Abbreviated Mental Test (AMT; see p. 165) is performed. Delirium often occurs in patients with



7.9 Diagnostic criteria for delirium (DSM IV*)

A patient must show each of features 1–4.

1. Disturbed consciousness with reduced ability to focus, sustain or shift attention
2. A change in cognition (e.g. memory, language, orientation) or the development of a perceptual disturbance (hallucinations) that is not accounted for by a pre-existing or developing dementia
3. Development of the disturbance over a short period (hours or days) and a tendency to fluctuate over the course of the day
4. Evidence from the history, physical examination or laboratory findings that the disturbance is caused by the direct physiological consequences of a general medical condition, or by substance intoxication or withdrawal

*American Psychiatric Association's Diagnostic Statistical Manual Vol. 4 (see also p. 230).

dementia, and a history from a relative or carer about the onset and course of confusion is needed to distinguish acute from chronic features. Other risk factors are shown in Box 7.10. More than one of the precipitating causes of delirium (Fig. 7.3) is often present.

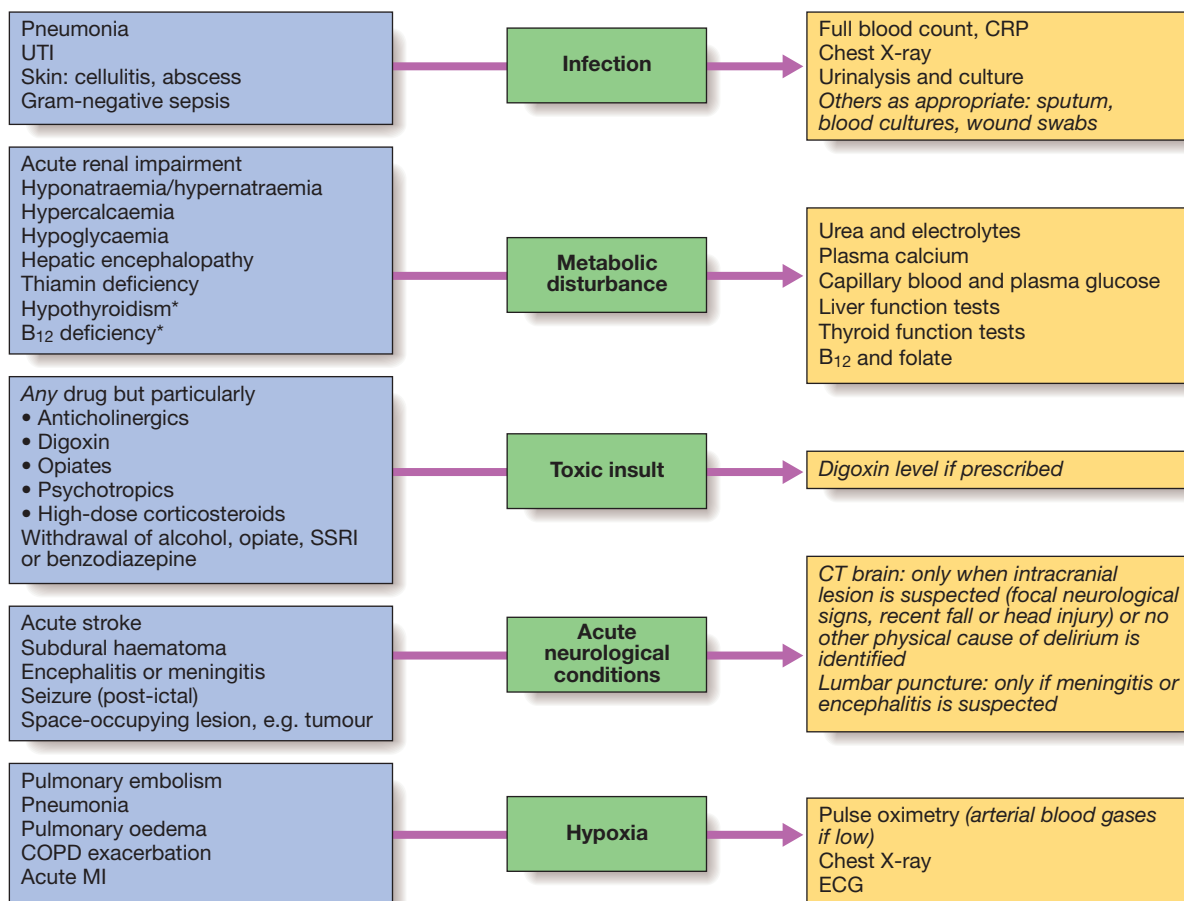


Fig. 7.3 Common causes and investigation of delirium. All investigations are performed routinely, except those in italics.* Tend to present over weeks to months rather than hours to days. (COPD = chronic obstructive pulmonary disease; CRP = C-reactive protein; MI = myocardial infarction; SSRI = selective serotonin re-uptake inhibitor; UTI = urinary tract infection)



7.10 Risk factors for delirium

- Old age
- Dementia
- Admission with infection or dehydration
- Surgery, e.g. hip fracture repair
- Alcohol misuse
- Severe physical illness
- Frailty
- Visual impairment
- Polypharmacy
- Renal impairment

Its pathophysiology is unclear; it may be an abnormal reaction of cognitive function to the physiological increase in cortisol release in acute illness, or it may reflect a sensitivity of cholinergic neurotransmission to toxic insults.

Clinical assessment

Confused patients will be unable to give an accurate history and this must be obtained from a relative or carer. Important details are the speed of onset, previous mental state and ability to manage day-to-day tasks. Symptoms suggestive of a physical illness, such as an infection or stroke, should be elicited. An accurate drug and alcohol history is required, especially to ascertain whether any drugs have been recently stopped or started.

A full physical examination should be performed, noting in particular:

- consciousness level
- pyrexia and any signs of infection in the chest, skin, urine or abdomen
- oxygen saturation
- signs of alcohol withdrawal, such as tremor or sweating
- any neurological signs.

A range of investigations are needed to identify the common causes (see Fig. 7.3).

Management

Specific treatment of the underlying cause(s) must be commenced as quickly as possible. However, the symptoms of delirium also require specific management. To minimise ongoing confusion and disorientation, the environment should be kept well lit and not unduly noisy, with the patient's spectacles and hearing aids in place. Good nursing is needed to preserve orientation, prevent pressure sores and falls, and maintain hydration, nutrition and continence.

The use of sedatives should be kept to a minimum, as they can precipitate delirium; in any case, many confused patients are lethargic and apathetic rather than agitated. However, sedation is appropriate if patients' behaviour is endangering themselves or others, to relieve distress in those who are extremely agitated or hallucinating, and to allow investigation or treatment. Small doses of haloperidol (0.5 mg) or lorazepam (0.5 mg) are tried orally first, and increased doses given if the patient fails to respond. Sedation can be given intramuscularly but only if absolutely necessary. In those with alcohol withdrawal, a reducing course of a benzodiazepine should be prescribed (p. 247).

The resolution of delirium in old age may be slow and incomplete. Delirium may be the first presentation of an

underlying dementia, and is also a risk factor for subsequent dementia.

Urinary incontinence

Urinary incontinence is defined as the involuntary loss of urine, and comes to medical attention when sufficiently severe to cause a social or hygiene problem. It occurs in all age groups but becomes more prevalent in old age, affecting about 15% of women and 10% of men aged over 65 years. It may lead to skin damage if severe and can be socially restricting. While age-dependent changes in the lower urinary tract predispose older people to incontinence, it is not an inevitable consequence of ageing and requires investigation and appropriate treatment. Urinary incontinence is frequently precipitated by acute illness in old age and is commonly multifactorial (Fig. 7.4).

Initial management is to identify and address contributory factors. If incontinence fails to resolve, further diagnosis and management should be pursued, as described on pages 476–477.

- *Urge incontinence* is usually due to detrusor over-activity and results in urgency and frequency.

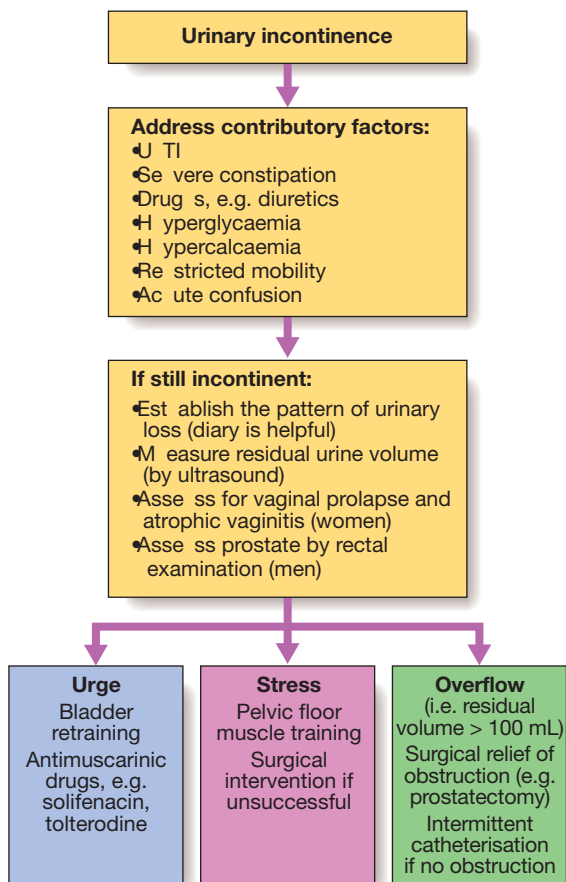


Fig. 7.4 Assessment and management of urinary incontinence in old age. See also Chapter 17 (pp. 476–7) and NICE guideline on the Management of Incontinence in Women: www.nice.org.uk.

- *Stress incontinence* is almost exclusive to women and is due to weakness of the pelvic floor muscles, which allows leakage of urine when intra-abdominal pressure rises, e.g. on coughing. Both may be compounded by atrophic vaginitis, associated with oestrogen deficiency in old age, which can be treated with oestrogen pessaries.
- *Overflow incontinence* is most commonly seen in men with prostatic enlargement, which obstructs bladder outflow and is more common in the elderly.

In patients with severe stroke disease or dementia, treatment may be ineffective, as frontal cortical inhibitory signals to bladder emptying are lost. A timed/prompted toileting programme may help. Other than in overflow incontinence, urinary catheterisation should never be viewed as first-line management but may be required as a final resort if the perineal skin is at risk of breakdown or quality of life is affected by intractable incontinence.

Adverse drug reactions

Adverse drug reactions (ADRs) and the effects of drug interactions are discussed on pages 31–35. They may result in symptoms, abnormal physical signs and altered laboratory test results (Box 7.11). ADRs are the cause of around 5% of all hospital admissions but account for up

7.11 Common adverse drug reactions in old age	
Drug class	Adverse reaction
NSAIDs	Gastrointestinal bleeding and peptic ulceration Renal impairment
Diuretics	Renal impairment, electrolyte disturbance Gout Hypotension, PH
Warfarin	Bleeding
ACE inhibitors	Renal impairment, electrolyte disturbance Hypotension, PH
β -blockers	Bradycardia, heart block Hypotension, PH
Opiates	Constipation, vomiting Delirium Urinary retention
Antidepressants	Delirium Hyponatraemia (SSRIs) Hypotension, PH Falls
Benzodiazepines	Delirium Falls
Anticholinergics	Delirium Urinary retention Constipation

(ACE = angiotensin-converting enzyme; NSAID = non-steroidal anti-inflammatory drug; PH = postural hypotension; SSRI = selective serotonin reuptake inhibitor)

to 20% of admissions in those aged over 65 years. This is partly because older people receive many more prescribed drugs than younger people. Polypharmacy is defined as the use of four or more drugs but may not always be inappropriate, as many conditions such as hypertension and heart failure dictate the use of several drugs, and older people may have several coexisting medical problems. However, the more drugs that are taken, the greater the risk of an ADR. This risk is compounded by age-related changes in pharmacodynamic and pharmacokinetic factors (pp. 28–29) and by impaired homeostatic mechanisms, such as baroreceptor responses, plasma volume and electrolyte control. Older people are thus especially sensitive to drugs that can cause postural hypotension or volume depletion (see Box 7.11). Non-adherence to drug therapy also rises with the number of drugs prescribed.

The clinical presentations of ADRs are diverse, so for any presenting problem in old age the possibility that the patient's medication is a contributory factor should *always* be considered. Failure to recognise this may lead to the use of a further drug to treat the problem, making matters worse, where the better course would be to stop or reduce the dose of the offending drug or to find an alternative.

Several factors contribute to polypharmacy (Box 7.12) and it has been shown that most ADRs are preventable. This is achieved by using as few drugs as possible, at the lowest dose possible in easy-to-take formulations, by ensuring that the patient understands the dosage regime, and by reviewing medication regularly. The patient or carer should be asked to bring all medication for review rather than the doctor relying on previous records. Those drugs that are no longer needed or that are contraindicated can then be discontinued.



7.12 Factors leading to polypharmacy

- Multiple pathology
- Poor patient education
- Lack of routine review of all medications
- Patient expectations of prescribing
- Over-use of drug interventions by doctors
- Attendance at multiple specialist clinics
- Poor communication between specialists

Dizziness

Dizziness is very common, affecting at least 30% of those aged over 65 years in community surveys. It is a good example of the importance of a problem-based rather than an organ-based approach in older people, as it is frequently multifactorial rather than due to a single condition (pp. 551 and 1149). Acute dizziness is relatively straightforward and common causes include:

- hypotension due to arrhythmia, myocardial infarction, gastrointestinal bleed or pulmonary embolism
- onset of posterior fossa stroke
- vestibular neuritis.

Although older people more commonly present with recurrent dizzy spells and often find it difficult to describe the sensation they experience, the most effective way of establishing the cause(s) of the problem is nevertheless to determine which of the following is predominant (even if more than one is present):

- *lightheadedness*, suggestive of reduced cerebral perfusion
- *vertigo*, suggestive of labyrinthine or brain-stem disease
- *unsteadiness/poor balance*, suggestive of joint or neurological disease.

Lightheadedness

Structural cardiac disease (such as left ventricular dysfunction or aortic stenosis) and arrhythmia must be considered, but disorders of autonomic cardiovascular control, such as vasovagal syndrome and postural hypotension, are also very common in old age. Hypotensive medication may exacerbate these. Further investigation and treatment are described on page 1149.

Vertigo

This is most commonly due to benign positional vertigo in old age (p. 1151), but if other brain-stem symptoms or signs are present, magnetic resonance imaging (MRI) of the brain is required to exclude a cerebello-pontine angle lesion.

Unsteadiness

This may be caused by a wide range of joint and neurological conditions. Examination of the gait, joints and neurological system (Box 7.13) guides further specific investigation and treatment. Whatever the cause, gait and balance problems in old age can be improved by physiotherapy. If the patient is falling as a result of dizziness, interventions to prevent falls should be instigated (see Box 7.7, p. 170).

Other problems in old age

There is a vast range of other presenting problems in older people and they present to many medical specialties.



7.13 Abnormal gaits and probable causes

Gait abnormality	Probable cause
Antalgic	Arthropathy
Waddling	Proximal myopathy
Stamping	Sensory neuropathy
Foot drop	Peripheral neuropathy or radiculopathy
Ataxic	Sensory neuropathy or cerebellar disease
Shuffling/festination	Parkinson's disease
Marche à petits pas	Small-vessel cerebrovascular disease
Hemiplegic	Cerebral hemisphere lesion
Apraxic	Bilateral hemisphere lesions



7.14 Other presenting problems in old age

• Hypothermia	p. 101
• Under-nutrition	p. 121
• Infection	pp. 292 and 302
• Fluid balance problems	p. 437
• Heart failure	p. 543
• Hypertension	p. 551
• Dizziness and blackouts	pp. 551 and 1149
• Atrial fibrillation	p. 563
• Diabetes mellitus	p. 804
• Peptic ulceration	p. 874
• Anaemia	p. 997
• Painful joints	p. 1065
• Bone disease and fracture	pp. 1116–1124 and 1068
• Immobility	p. 1154
• Stroke	p. 1180
• Dementia	p. 1197

End-of-life care is an important facet of clinical practice in old age and is discussed in Chapter 12 (pp. 286–287). Relevant sections in other chapters are referenced in Box 7.14.

Within each chapter, 'In Old Age' boxes highlight the areas in which presentation or management differs from that in younger individuals. These are listed on page 176.

REHABILITATION

Rehabilitation aims to improve the ability of people of all ages to perform day-to-day activities, and to restore their physical, mental and social capabilities as far as possible. Acute illness in older people is often associated with loss of their usual ability to walk or care for themselves, and common disabling conditions such as stroke, fractured neck of femur, arthritis and cardiovascular disease become increasingly prevalent with advancing age.

Disability is an interaction between factors intrinsic to the individual and the context in which they live, and both medical and social interventions are needed to address this (Box 7.15). Doctors tend to focus on health conditions and impairments, but patients are more concerned with the effect on their activities and ability to participate in everyday life.

The rehabilitation process

Rehabilitation is a problem-solving process focused on improving the patient's physical, psychological and social function. It entails:

- *Assessment.* The nature and extent of the patient's problems are identified using the framework in Box 7.15. Specific assessment scales, such as the Elderly Mobility Scale or Barthel Index of Activities of Daily Living, can be used to quantify components of disability, but do not determine the underlying

7.15 International classification of functioning and disability	
Factor	Intervention required
Health condition Underlying disease, e.g. stroke, osteoarthritis	Medical or surgical treatment
Impairment Symptoms or signs of the condition, e.g. hemiparesis, visual loss	Medical or surgical treatment
Activity limitation Resultant loss of function, e.g. walking, dressing	Rehabilitation, assistance, aids
Participation restriction Resultant loss of social function, e.g. cooking, shopping	Adapted accommodation Social services

causes or the interventions required in individual patients.

- *Goal-setting.* Goals should be specific to the patient's problems, realistic, and agreed between the patient and the rehabilitation team.
- *Intervention.* This includes the active treatments needed to achieve the established goals and to maintain the patient's health and quality of life. 'Hard' interventions include hands-on treatment by therapists using a functional, task-orientated approach to improve day-to-day activities. 'Soft' interventions are just as important, and include psychological support and education (Fig. 7.5). The emphasis on the type of intervention will be different, depending on the patient's disabilities, psychological status and progress. The patient and his or her carer(s) must be active participants.

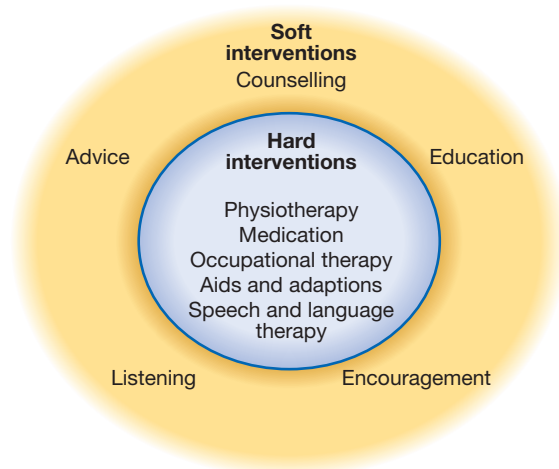


Fig. 7.5 Rehabilitation techniques.

- *Reassessment.* There is ongoing re-evaluation of the patient's function and progress towards the goals by the rehabilitation team, the patient and the carer. Interventions may be modified as a result.

Multidisciplinary team working

The core rehabilitation team includes members from several professional disciplines (Box 7.16). Others may be involved, e.g. audiometry to correct hearing impairment, podiatry for foot problems, and orthotics where a prosthesis or splinting is required. Good communication and mutual respect are essential. Regular team meetings allow sharing of assessments, agreement of rehabilitation goals and interventions, evaluation of progress and planning for the patient's discharge home. Rehabilitation is *not* when the doctor orders 'physio' or 'a home visit', and takes no further role.

Rehabilitation outcomes

There is evidence that rehabilitation improves functional outcomes in older people following acute illness, stroke and hip fracture. It also reduces mortality after stroke and hip fracture. These benefits accrue from complex multi-component interventions, but occupational therapy to improve personal ADLs, and individualised exercise interventions have now been shown to be effective in improving functional outcome in their own right.

7.16 The rehabilitation team	
Team member	Role
Physiotherapist	Promotion of balance, mobility and upper limb function
Occupational therapist	Promotion of ADLs, e.g. dressing, cooking Assessment of home environment and care needs
Speech and language therapist	Management of speech and swallowing problems
Dietitian	Management of nutrition
Social worker	Organisation of home support services or institutional care
Nurse	Encouragement towards independent function in all activities Promotion of continence Communication with relatives and other professionals
Doctor	Management of medical problems Coordinator of rehabilitation programme



7.17 Index of 'In Old Age' boxes

Environmental and nutritional factors in disease		Alimentary tract and pancreatic disease	
• Environmental factors in disease	p. 99	• Endoscopy	p. 849
• Thermoregulation	p. 102	• Acute abdominal pain	p. 861
• Energy balance	p. 123	• Oral health	p. 863
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• Fever	p. 292	• Constipation	p. 914
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Kidney and urinary tract disease		• Haematological function	p. 997
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Cardiovascular disease		• Use of oral NSAIDs	p. 1078
• Congestive cardiac failure	p. 548	• Osteoarthritis	p. 1087
• Atrial fibrillation	p. 563	• Rheumatoid arthritis	p. 1092
• Angina	p. 593	• Gout	p. 1098
• Myocardial infarction	p. 598	• Joint and bone infection	p. 1103
• Atherosclerotic vascular disease	p. 601	• Osteoporosis	p. 1120
• Hypertension	p. 609	Neurological disease	
• Aortic stenosis	p. 620	• Neurological examination	p. 1133
• Endocarditis	p. 625	• Headaches	p. 1149
Respiratory disease		• Dizziness	p. 1150
• Respiratory function	p. 646	• Epilepsy	p. 1174
• Obstructive pulmonary disease	p. 675	Skin disease	
• Respiratory infection	p. 686	• Skin changes	p. 1243
• Interstitial lung disease	p. 715	• Eczema	p. 1260
• Thromboembolic disease	p. 721	• Prescribing in old age	p. 28
• Pleural disease	p. 729	• Mechanisms of drug toxicity	p. 29
Endocrine disease		Other	
• The thyroid gland	p. 752	• Genetic disease and counselling	p. 64
• Gonadal function	p. 763	• Immune senescence	p. 80
• The parathyroid glands	p. 768	• The critically ill older patient	p. 202
• Glucocorticoids	p. 777	• Poisoning	p. 206
• Spontaneous hypoglycaemia	p. 782	• Medical psychiatry	p. 237
• The pituitary and hypothalamus	p. 793	• Cancer	p. 266
Diabetes mellitus			
• Diagnosis of diabetes mellitus	p. 804		
• Diabetes management	p. 826		

Further information

Websites

www.bgs.org.uk British Geriatrics Society: useful publications including a guideline on the diagnosis and management of delirium, and links to other relevant websites.

www.effectiveolderpeoplecare.org Collates and summarises the Cochrane evidence for best practice in the health care and rehabilitation of frail older people.

www.geriatricsyllabus.com Provides information on the ageing process and on the care and treatment of older people.

www.profane.eu.org Prevention of Falls Network Europe: focuses on the prevention of falls and improvement of postural stability in older people.

Journal articles

Lally F, Come P. Understanding Frailty. Postgraduate Medical Journal 2007 83 : 16.- 20