Physical Assessment for Aging Prediction

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Aging is a continuum from birth to death but we age at various speeds facing different aspects of aging. Chronological age is not a correct measure of physical or intellectual age, because it might be considered only as one of the facets of the aging process. Signs of mental or physical deficiency do not occur in the normal aging process but are related to diseases occurring frequently with age. Quality of life is related to pathological aging and is influenced by musculoskeletal impairment, which is dependent on normal and pathological aging processes. Both age and diseases contribute to self-insufficiency and institutionalization, and are linked to morbidity and mortality in the elderly population.

Identification of older individuals who are at risk of future functional decline is an essential part of geriatric assessment. Maintenance of independence in aging and quality of life are goals shared by geriatricians and the older adults.

Some studies have reported that factors such as chronic illnesses, poor economic status, poor cognitive function and depression, sedentary life-style, and lack of social support are associated with an increased risk of disability \cite{1, 2}. Functional status, which reflects the different aging processes, is linked to and predictive of outcome.

Basic motor tasks such as walking or stepping are hallmarks of a mobility-related quality of life (and are often underestimated by younger healthy people).

A minimum level of lower extremity strength and ability to maintain postural stability in the upright position are necessary for walking. And strength can compensate for poor balance \cite{3}. Normal mobility is the ability to walk half a mile easily and to climb stairs without problems. Severe walking disability as defined by the Women’s Health and Aging Study \cite{4} is an inability to walk a
quarter of a mile at a customary walking speed of <0.4 m/s, or being unable to walk.

According to the key components of frailty and their measurements as proposed by Campbell and Buchner [5], we will discuss the nutritional state and musculoskeletal function, which are linked to aerobic capacity and cognitive-integrative neurological function. Our geriatric experience leads us to add an environmental parameter: loneliness.

Several studies have shown that physical activity decreases with aging [6–8]. However the scientific literature regarding the nature of changes in physical activity is scarce. In fact, it is difficult to separate changes related to birth cohorts and the effects of aging in cross-sectional studies looking at groups of different ages. In addition, longitudinal studies reflect more transitory changes (linked to changes in life condition, acute pathology, etc.) rather than aging itself.

Age-related disability is an increasing medical and social problem. Disability is defined in the International Classification of Impairments, Disability and Handicaps developed by the World Health Organization as ‘a restriction or lack of ability to perform an activity in a normal manner’. This includes changes in physical performance and cognitive functions, both being important issues for older people. Cognitive decline is one of the major determinants of disability in elderly people in addition to physiological health [9].

In this chapter, we exclude changes related to clinical examination (cardiovascular, renal and hepatic aging) as well as those related to function and usual comprehensive geriatric assessment (vision, hearing, gait, mobility of the upper limbs, incontinence, activities of daily living (ADL) and social environment) in order to focus on the aging part related to functional status: evaluation of body composition, muscle mass and function, and breathing function, all related to physical performance.

In the elderly, quantification of lean body mass and/or fat mass are not appropriated tools to evaluate health risk. Indeed, aging is characterized by body composition changes, namely by decreases in muscular mass, in active cellular mass, in bone density as well as in total body water. Alterations in those compartments are linked to modifications in cognitive and functional status, a correlation being noted particularly with ADL [10] and instrumental capacities of daily living [11] which are the scales closely related to morbidity as well as to quality of life.

Two parameters (aerobic capacity and neuromuscular function) seem especially important for the maintenance of functional status.

**Functional Capacity and Aging**

Changes in body composition are associated with aging. The age-related loss of muscle mass, originally defined by Rosenberg [12] as ‘sarcopenia’, is
associated with a decrease in muscle strength. Evans and Cyr-Campbell [13] examined muscle strength and mass in 200 healthy, 45- to 78-year-old men and women. They concluded that muscle mass (but not function) is the major determinant of age- and sex-related differences in strength, which is independent of muscle location (upper vs. lower extremities) and function (extension vs. flexion). This decrease in strength is a major cause of potential disability, difficulty in walking ability and a high rate of falls. Improving muscle strength might enhance the capacity of many older men and women to perform physical activities such as climbing stairs, carrying packages and even walking [13].

A decrease in muscle mass induces a reduction in the concentration of plasma muscle metabolites (creatine, 3-methylhistidine) and an alteration of greater importance in muscle strength and muscle functions [14], both being linked to the occurrence of frailty [15] and a major increase in falling. In the New Mexico Aging Process Study, which is a longitudinal follow-up study of healthy, upper class, 65- to 85-year-olds living at home, only a decrease of 7% was observed in muscle mass over 15 years [16]. This loss was 60% for muscle mass and 11% for bone mass. The decrease in muscle mass was more pronounced in lower limbs [17]. Organ weight exhibited a lower decrease, probably in order to preserve major body functions.

Changes in muscle mass with aging are related to changes in muscle structure and composition, both being observed in rat-tail hind limb suspension [18]. Some intervention studies, using growth hormone, steroids, or an increase in protein intake, have been unable to reverse such an age-related alteration [19]. Only contractile activity has been shown to reverse the age-related muscular atrophy. As shown by Roubenoff [20], sarcopenia may be a major modifiable cause of frailty in the elderly:

1. aging is linked with a decline in physical activity, muscle mass and maximal oxygen uptake (VO_{2max}) [21], and
2. physical activity can influence both aerobic capacity and muscle function. However, aging decreases muscle mass and muscle function and contributes to a decrease in VO_{2max}, both influencing functional status and physical activity during aging.

Aerobic exercise is recognized as having an important impact on the prevention and/or treatment of chronic diseases associated with aging such as impaired glucose tolerance and type 2 diabetes [22], osteoporosis, hypertension, and reducing sarcopenia occurrence.

In a population-based study in Rochester Minn., sarcopenia had an age- and sex-adjusted prevalence of 6–15% among subjects 65 years of age and over. Sarcopenia was defined as levels >2 SD below the sex-specific young normal means of lean body mass (in kg), total skeletal muscle mass (in kg) and appendicular skeletal muscle mass (in kg) as proposed by Baumgartner et al. [23] (‘arms + legs’ regions of the whole body scan, assuming that this
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figure represents 75% of the total skeletal muscle mass). A more important issue in establishing the prevalence of sarcopenia is the choice of a healthy population of reference subjects in which normal values are determined. Subjects with sarcopenia, estimated from total body scans by dual-energy X-ray absorptiometry, presented with more physical limitations [24]. It is obvious that the prevalence of sarcopenia also depends on the definition of deficient muscle mass. If sarcopenia is arbitrarily defined as a muscle mass >2 SD below the young normal mean, an analogy with osteoporosis may be noted (bone density >2 SD below the young normal mean; Nordin BEC) [25].

Predictive Assessment

How to consider the part of normal aging in the decrease in physical activity? This problem is complicated because aerobic capacity is needed for physical exercise and because ‘usual’ aging decreases this capacity which in turn decreases the physical capacity to exercise; moreover, changes in body composition worsen this decrease.

The predictive parameters can be the following.

Body Composition

Those who enter old age (42 to >66 years) with an adequate body composition have a better health status than those with an inadequate body composition according to the Fels Longitudinal Study [26]. The status of fat and fat-free mass in adults changes with increasing age. This results from numerous factors inducing changes in physical activity, in hormonal (menopausal) status, in nutrition and in disease frequency. Fat and fat-free mass compartments are routinely used to establish risk factors for a variety of chronic diseases. Body composition is also used to assess functional status, disability and mortality.

A low body mass index (BMI; weight/height²) and weight loss are both strong predictors of subsequent mortality. A prospective study has shown that a large waist circumference in nonsmoking men may be a better predictor of mortality than a high BMI and waist/hip ratio [27]. In addition, a low BMI was a better predictor of mortality than a small waist circumference. Lean body mass is probably better reflected by a low BMI, whereas increased abdominal fatness is better reflected by increased waist circumference [27].

A low BMI was supposed to be a long-term predictor of mortality in a survey of 6,040 healthy men aged 45–68 years at the baseline in 1965–1970 and living on Oahu, Hawaii [28].

Among those with a BMI of <20 the adjusted relative risk of mortality over 30 years was 1.36 (95% confidence interval 1.14–1.63) and 1.25 (95% confidence interval 1.08–1.45) for those with a BMI of 20–24.99. BMI alone showed a moderate effect in this study. This can be explained by the fact that
all subjects with documented disease at the first examination were removed from the analyses, as well as deaths that occurred during the first 3 years after the first examination.

Previously in older populations thin people have been found to have a greater mortality risk than normal weight people [29] and a double risk of disability in losing 5 kg [30]. It has been suggested that thin people comprise a mix of those who are lean because they are physically active, and those who are at greater mortality risk because they have lost weight due to an illness [31, 32].

The BMI is the first part of the minimum nutritional assessment, which is necessary to evaluate nutritional status linked to muscle mass and function. We need to add an anthropometric measure to assess muscle mass such as arm circumference or calf circumference and ask about appetite, which are included in the short form of the Mini Nutritional Assessment [33].

**Muscle Strength**

The work of Rantanen *et al.* [28] provides evidence that in a healthy population hand grip strength, measured during mid life, predicts the risk of mortality from all causes over a follow-up of 30 years, and this effect is independent of BMI. Within all BMI categories those in the lowest third of grip strength had a 20–39% greater mortality risk than those in the highest third of grip strength (Table 1). Poor muscle strength could be a risk factor for diseases or an indicator of a subclinical disease, as poor muscle strength has been reported in people with chronic conditions [34]. These last results come from analyses in a subgroup of healthy people. However, when the analyses were carried out in the total population, grip strength was also a predictor of mortality. In fact, those who were sick at baseline had poorer strength and were at an increased risk of death [34].

**Walking Speed and Stride Length**

Both age and disease contribute to dependency, and both affect walking speed and stride. Therefore, it was suggested that measurement of walking speed will be useful in predicting outcome. Woo *et al.* [35] carried out a health survey of 2,032 Hong Kong Chinese aged 70 years and older by measuring walking speed and stride length in relation to the 36-month outcome. A longer time taken and a smaller stride length are associated with increased risk of dependency, mortality, and institutionalization. For dependency and mortality, stride length, walking speed, age, and sex are included in the best prediction model, whereas only stride length is included in the prediction of institutionalization.

In the InCHIANTI study Ferrucci *et al.* [36] proposed a classification model of the subsystems that determine walking function: 6 main subsystems are (1) central nervous system; (2) peripheral nervous system; (3) perceptual system; (4) muscles; (5) bone and joints; (6) energy production and delivery.
Table 1. The relative risks of death over a 30-year follow-up in groups according to baseline body mass index and hand grip strength tertiles

<table>
<thead>
<tr>
<th>BMI</th>
<th>Grip strength tertiles</th>
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<tbody>
<tr>
<td></td>
<td>Lowest RR 95% CI</td>
<td>Middle RR 95% CI</td>
<td>Highest RR 95% CI</td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>1.36 1.14–1.63</td>
<td>1.27 1.02–1.58</td>
<td>0.92 0.66–1.29</td>
<td></td>
</tr>
<tr>
<td>20–24.99</td>
<td>1.25 1.08–1.45</td>
<td>1.14 1.00–1.32</td>
<td>1*</td>
<td></td>
</tr>
<tr>
<td>≥25</td>
<td>1.39 1.16–1.65</td>
<td>1.27 1.08–1.49</td>
<td>1.14 0.98–1.32</td>
<td></td>
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</tbody>
</table>

The model is adjusted for age, education, occupation, smoking, leisure time physical activity and body height. RR = relative risk; CI = confidence interval.

* Reference level.

With permission from Rantanen et al. [28].

Ideally an assessment of older people should include measures of all these subsystems. In fact, because all the subsystems underlying walking ability have a certain amount of functional reserve, small impairments are compatible with normal walking [36]. Conversely, co-impairments are predictors of severe walking disability in older women [3]. In the group with the poorest balance and strength, the rate of onset of severe walking disability was 37.1/100 person/years whereas in the group with the best balance and strength the rate was only 3.1/100 person/years.

Performance based on walking (from walking 4 and 7 m at a usual pace to walking 400 m as fast as possible, walking and stepping over obstacles, etc.) can be used and the treadmill test is especially able to measure aerobic capacity.

Physical Activity

Physical activity is a key component of functional performance and perhaps represents one of the most effective efforts to fight against disability in old age. Physical inactivity and impaired mobility predicted dependence and death in 1,109 men and women aged 65–84 years living independently at baseline in the Evergreen Project in Finland [37]. However, among people with impaired mobility, physically active people were at lower risk than the inactive people.

In the Zutphen Elderly Study, a longitudinal study on 939 Dutch men born between 1900 and 1920, physical activity was investigated in 863 men in 1985, 520 in 1990 and 342 in 1995. Only a third (306 men) completed the physical activity records of the three surveys [38]. Evaluation of physical performance plays a valuable role in aging assessment.
Physical Performance (Physical Performance Test, Stand Chair, Tandem Test)

The Survey in Europe on Nutrition and the Elderly a Concerted Action (SENECA 1988/89–1999), a 10-year longitudinal study, provides data on changes over time in diet, lifestyle, health and physical performance at the European level. Performance assessments are important indicators of change in health over time and valuable end point measures [39].

The use of measures of self-reported physical performance has a long history and widespread application in the assessment of disability in elderly people. Questions on ADL [10] were employed already at the SENECA baseline (1988/89). The capacity to perform ADL was assessed by 16 questions, each of them being quantified by a 4-point scale. A total ability score was calculated as the sum score over all items ranging from 16 to 64. The lower the rating, the better the score. A mobility score was calculated as the sum of four items (moving outdoors, using stairs, walking at least 400 m, carrying a heavy object). A self-care ability score was calculated as the sum of seven questions (walking between rooms, using the toilet, dressing, getting in and out of bed, cutting toe-nails, feeding yourself). Mobility and self-care ability scores were calculated as the sum score overall mobility and self-care items ranging from 4 to 16 and 7 to 28, respectively [39].

The tests of simple function employed in the SENECA follow-up add the chair stand and the tandem test [4] to the 7-item physical performance test (PPT) of Reuben and Siu [40] to enhance the sensitivity to change, and diminish the cultural influence. Each test simulates a basic activity which is likely to be at the threshold for what a 75- to 80-year-old person is able to do. The subject performs an activity, while the examiner counts the seconds used to do it and notices the stability and continuity with which the task is performed. Seconds and/or stability are then transformed into a score from 1 to 4 according to a standardized scoring system. The higher the score the less the time to perform a test. The sum score of the 7-item PPT ranges from 7 to 28.

Men were reported to be less dependent than women (1993 \( p < 0.005; \) 1999 \( p < 0.04 \)), while the decline in ability to perform ADL were of the same magnitude in both genders. Between the two first surveys (5-year interval) participants declined in their PPT performance (\( p < 0.0001 \)) as well as in the tandem stand (\( p < 0.0001 \)). This finding was only significant for the chair stand in women (\( p < 0.04 \)). Men were significantly better than women in performing the PPT and the tandem stand (\( p < 0.05 \)). However, the decline in the ability to perform all three tests was of the same magnitude in men and women. Participants who were poor at performing an objective test were more dependent on help than participants who had a good test result.

The measures of the PPT and the chair stand in 1993 were predictive of the dependency on help 6 years later (in 1999). However, the rate of participants who were able to perform all ADL without help declined by 50%
Fig. 1. Changes in subjective measures of physical performance (sum scores all mobility ADL*) and objective measures: chair stand in Elderly European men and women in SENECA follow-up 1993 and SENECA finale 1999.
Fig. 2. Changes in subjective measures of physical performance: sum scores ADL and mobility and objective measures: Physical Performance Test (PPT) from Reuben in Elderly European men and women in SENECA follow-up 1993 and SENECA finale 1999.
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in all categories of performance. The tandem stand was not a good predictor of ability to perform ADL [41].

Cognitive Functions

The mental status can influence mobility and balance or the desire to move in the environment. Furthermore, emotional status, including poor motivation, due to depression limits the physical capacities.

A part of the Kungsholmen project in Stockholm showed in 105 participants, aged between 90 and 94 years and not cognitively impaired, that the degrees of intellectual, social and physical activity are independent of each other [42]. Those very elderly people tended to have relatively low activity levels. In them, good health status as well as moving outside home was associated with greater intellectual activity. A positive association was also found between physical activity and well-being. Conversely the longitudinal study on depression in old age performed in Finland shows that a depressive disorder is a predictor of physical disability in old age [43].

In the SENECA study mental health was assessed in two ways using the Mini Mental State Examination (MMSE) [44] and the 15 – item Geriatric Depression Scale (GDS) [45]. A score of 23 or less was indicative of cognitive impairment for the MMSE and a score of >5 in the GDS was indicative of the presence of depression [46].

In the last part of the study in Romans, we correlated the MMSE and GDS with the ADL and the physical performance test (data not published). We confirm a strong association between cognitive decline and dependency.

Talking while walking, such as answering a standard question during walking, is interesting. The superimposition of a motor and a cognitive task is problematic in persons with even minimal cerebral damage [47, 48].

Might We Propose a ‘Minimum’ Physical Assessment?

This assessment is composed of 5 levels (Table 2)

1. **Evaluation of nutritional status** can be obtained by the Short Form of the Mini Nutritional Assessment, including a measure of height, body weight and a decrease in body weight, and a question about appetite.

2. **Aerobic capacity** is strongly correlated with functional disability. We did not find a validated test of endurance in old people which is able to measure the maximal aerobic capacity and would probably be the most predictive test. Ten physical activity questionnaires were recently compared with two validation measures: doubly labelled water to calculate the energy expenditure and the VO$_{2\text{max}}$, and the Stanford Usual Activity Questionnaire scoring six habitual activities is best correlated with VO$_{2\text{max}}$ [49].

3. **Evaluation of musculoskeletal function**: to evaluate lower limb muscles and balance, we used the one-leg stand [50] or the timed ‘up & go’
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Table 2. Minimum physical assessment

<table>
<thead>
<tr>
<th>Nutritional status</th>
<th>MNA short form (6 items)</th>
<th>BMI, losing weight, appetite, mobility, disease, dementia or not</th>
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</thead>
<tbody>
<tr>
<td>Aerobic capacity</td>
<td>Stanford Usual Activity Questionnaire 6 items</td>
<td></td>
</tr>
<tr>
<td>Evaluation of musculoskeletal function</td>
<td>Grip Strength Chair stand (5 tests)</td>
<td></td>
</tr>
<tr>
<td>Cognitive functions</td>
<td>MMS - GDS Talking while walking</td>
<td></td>
</tr>
<tr>
<td>Environmental factors</td>
<td>Loneliness</td>
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test [51]. We propose the use of the chair stand: stand up and sit down five times as quickly as possible with arms across the chest. In SENECA this easy and rapid test was the most predictive of a decrease in functional capacities and the need of help in 5 years time, as well as the Physical Performance Test which is more time-consuming. The chair stand is, in fact, correlated with aerobic capacity, balance and sarcopenia.

Handgrip strength to evaluate both muscle strength and upper extremity function is a long-term predictor of mortality in healthy men. Grip strength should be the ‘best functional test’ of performance and possibly a predictor of aging successfully.

(4) **Cognitive functions** can be evaluated by the Mini Mental Status and the Geriatric Depression Scale to assess the capacity to maintain an interaction with the environment.

The test ‘talking while walking’ is interesting for the evaluation of part of the cognition in motor activities.

(5) **Environmental factors** especially include loneliness.

**Conclusion**

Measurement of function in multiple physiological systems is limited because it is difficult to derive a comprehensive score.

We discussed the evaluation of nutritional status, musculoskeletal function, aerobic capacity, and cognitive and neurological function. These tests do not give therapeutic direction.

But if we are able to detect some risks, we can modify evolution by adapted intervention programs, such as exercise to restore muscle bulk and strength and aerobic capacity, in association with adequate nutrition to maintain weight, muscle mass and bone mass. An evaluation of the environment, as already stated by Tinetti [52] in 1986, would be interesting.
We certainly need to elaborate a noninvasive, easy to perform test to directly measure the reserve aerobic capacity. In association with the cognitive status, it will probably be the best predictor of aging outcome.

Prevention of disease remains the best method to prevent disability. But among subjects who present with chronic diseases or a transient or small reduction in function, assessment of functional capacities enables the suggestion of focused interventions that may reduce the onset or the progression of disability, preserve quality of life, and prepare for successful aging.

References

35. Woo J, Ho SC, Sham A. Longitudinal changes in body mass index and body composition over 3 years and relationship to health outcomes in Hong Kong Chinese age 70 and older. *Am J Geriatr Soc* 2001; 49: 737–46.

**Discussion**

*Dr. Wellman:* I appreciated the strong case you made for the role of nutrition, which I think is often overlooked but is key to the quality of life. I would like to address my comments to the types of screening and nutritional assessment that we need to include. I agree that screening is the usual first step in assessment, but for some populations we might as well go straight to an assessment as so many people are malnourished – in the USA that means most people in nursing homes. But I think it may be inappropriate to assume that one tool works for all purposes with all populations at all stages of aging. For example, in our country we are using some tools for program planning and others for clinical assessment of individuals. If we are committed to keeping people healthy we need to think about nutrition as a complete process, which includes screening not only for weight loss but for hydration status and other variables as well, and comprises what we call ‘nutrition care planning’ in the USA. This starts with a brief screening procedure, goes on to an in-depth assessment, and individually tailored interventions follow that. But that is not the end, because we then have monitoring and reevaluation, so there is an ongoing process. How do we do that? The monitoring is very individual and depends on where we were in terms of nutritional status at the beginning.

*Dr. Ferry:* You are completely right, I agree with you. However, my topic was preparing for successful aging, so I specifically excluded discussion of the components of frailty. I agree that we need different kinds of screening for different sectors of the population. But my role was to discuss the possibility of changing the aging process by interventions such as physical activity and good nutrition, including perhaps the timing of protein meals.

*Dr. Payette:* You mentioned the use of the Stanford Usual Activity aerobic activity questionnaire. I believe it is very short, only five questions. Is it supposed to be more practical in the field, and how has it been validated?

*Dr. Ferry:* We didn’t use that particular questionnaire in our study because it was too recent. We wanted a simple way of assessing aerobic capacity. In our population it is difficult to organize indirect calorimetry or body composition studies so we need to try to assess aerobic capacity using simple methods. Most of the questionnaires used so far have not been validated in elderly people. M. Bonnefoy performed a validation study on 19 old men using various questionnaires [1]. These men performed the basic
activities of each of the questionnaires while calculations were made of maximum oxygen uptake using the doubly labeled water technique. With this comparison, the Stanford Usual Activity questionnaire showed the best correlation. We will use it in our future studies. It seems almost too simple to be true!

**Dr. Payette:** Don’t you think that talking while walking could be an evaluation of aerobic capacity as well as of cerebral capacity?

**Dr. Ferry:** It is possible. We’ll try to validate it.

**Dr. Rosenberg:** I’d like to ask Dr. Payette and Dr. Roubenoff what they would use themselves for evaluation in a health care setting. Is evaluating the aerobic capacity the right question to be posing, or should we be evaluating physical activity capacity or physical activity functional capacity? Or are they the same? What would you recommend?

**Dr. Payette:** There are many different settings in which we carry out these evaluations — there is a hospital setting and there is a community setting as well. The choice of the tool or the function to be evaluated can differ from one setting to another. In the community I would go for the simplest tool and it seems as though the Stanford questionnaire may be the best.

**Dr. Ferry:** Questionnaires can be educational as well. If you ask the question ‘do you climb stairs instead of taking the elevator’, it can be a discussion point.

**Dr. Roubenoff:** I believe there are so many different methods because no single method gives the answer. We can’t escape that. But it is important to investigate function in both objective and subjective ways. Each is important, though many of us are more comfortable with something we measure directly. In fact, however, disability is a subjective experience. We not only need standardized measures like a chair stand or grip strength, which will depend on the population studied, but we also need self-reporting of how people do in their own environment. The real world is very different from the laboratory. Both types of information are legitimate and both need to be obtained.

**Dr. Gassull:** It seems to me that ‘loneliness’ is a very subjective concept. How important is loneliness as a cause of lack of activity?

**Dr. Ferry:** We are not using that now. It has not been validated. But we do need to have simple tools to screen those who are at risk of disability.

**Dr. Folstein:** If you take the concept of disability as being something that involves various impairments, then you find that overall disability is not necessarily best assessed by, let’s say, identifying that there is severe walking difficulty. Most disabled people also have a bit of a visual problem or a bit of a middle ear problem, and it is the sum of these small deficits that is the most common cause of the disability. It is part of the geriatrician’s examination to find out if the patient can see and hear and whether there is vertigo, and it would seem to be a simple matter to factor those items into your intervention scale.

**Dr. Ferry:** I forgot to say that in the Euronut Seneca we checked for general health, self-perceived health, and impairments such as vision and hearing problems. You are right. We need to have that information.

**Dr. Wellman:** I appreciate your wanting to keep things short, and a questionnaire with five or six questions is always a good screening approach. However, when we put different small screening scales together there is often overlap. We need to develop a broader method of screening that is multifaceted to focus attention on the many different things that impede healthy aging and quality of life. I would make a plea for more attention to hydration, for example. I would also like to make a comment about the pyramid that Russell developed with eight glasses of water at the bottom. If you look at that journal article [2] or talk to Dr. Russell directly he really means fluids, not water per se. One of the driving forces behind the special pyramid for older
adults is the decreased food intake, so every swallow should be more nutrient-dense. When I talk to dieticians I suggest we do not push the eight glasses of water. The fear of incontinence and of accidents is very great in old people. They stop drinking in the afternoon because they don’t want to get up at night when they might fall. We need to emphasize fluids more than water per se, although water is of course part of the fluid intake. We have stopped worrying about the caffeine content, for example; that is a side issue. It is the overall fluid intake that’s important. There is also room for carbonated beverages and perhaps even for some good red wine, in addition to nutrient-dense fluids.

**Dr. Ferry:** You are right. It’s very important to inquire about fluid intake. It is important to remember that with a decreased food intake you will also decrease the water intake, as half the daily intake is contained in food.

**Dr. Meydani:** I don’t believe that you should replace water with fluids containing empty calories because if you do that you will interfere with the intake of nutrient-dense foods. If you replace your eight glasses of water with eight glasses of calorie-containing fluids that are not nutrient-dense you will cause nutritional problems.

**Dr. Wellman:** Whether or not fluids enhance or reduce the total nutrient and energy intake depends on when they are drunk and on what is in them. In the USA the organization that is in charge of paying for most of the long-term care has now required that water be presented on a tray at meal times. We have new data showing that that has decreased the total energy intake. If there is a fluid shortage we should be encouraging an increase in total fluids but not necessarily just at meal times.

**Dr. Ferry:** I personally believe that the main problem is mobility. If the old person can go and get a drink of water then there is usually no problem. The problem occurs when lack of mobility hinders them from getting drinks.

**Dr. Poblete:** This is a comment, not a question. It is important to make clear that ‘screening tests’ are just that – they are tests to help us identify candidates for further testing to make a diagnosis. I don’t think they should be considered as diagnostic tools per se.

**Dr. Ferry:** Our screening is done in the context of epidemiological studies, as a public health issue, not in relation to diagnosing disease in the individual. It allows us to take appropriate action before intercurrent problems occur.

**Dr. Burckhardt:** This is the question of a non-geriatrician! When you do screening, what is it for? It seems to me there are different issues here. If screening is used in a preventive capacity, one has to know what preventive measures can be successfully undertaken. Do you have any preventions that work? If it is used to evaluate frail people who are already dependent, it will probably be for programs to make them less dependent. If it is used in the evaluation of sick elderly people, it is probably for assessing what to do with them – whether they can get back home or whether they need to be in a nursing home, and so on. These are three quite different issues and I think it is the issue which defines which screening or evaluation is the best.

**Dr. Ferry:** It is difficult to discuss the question of screening in specific terms because the same person can be healthy and then become frail and then become healthy again. I tried to focus on successful aging in free-living elderly people.

**Dr. Burckhardt:** Did I understand that you make a distinction between the type of screening you spoke about and a geriatric assessment such as we do in hospital?

**Dr. Ferry:** I specified at the start that I was not talking about a global geriatric assessment. We certainly have the tools for adequate diagnosis and treatment of disease in elderly people. What we need now is a way of identifying factors that may help us prevent frailty in old people.

**Dr. Payette:** I think it is absolutely right that when we screen for something we have to have something to offer afterwards. So if we screen for nutrition risk, we have
to have a nutrition care plan, which we do. As for physical activity, it is not certain that we are in a position to implement physical activity programs in the community, so we have to work on that, but in the screening sense you are absolutely right and it was very clearly argued by Dr. Rush some years ago, that we have to have a subsequent program to reverse the identified risk.

References