

## Elderly Mobility Scale (EMS)

### Summary:

**Measures:** Scale of assessment of mobility.

**Description:** The EMS is a 20 point validated assessment tool for the assessment of frail elderly subjects (Smith 1994). The EMS is measured on an ordinal scale.

**Who's it for:** Older people in a hospital setting either on a ward or in a day hospital.

<b>Properties:</b>	<u>Reliability:</u>	Inter-rater	YES
	<u>Validity:</u>	Predictive	YES
		Concurrent	YES
	<u>Responsive to change:</u>	Not established	
	<u>Sensitivity:</u>	Not established	
	<u>Specificity:</u>	Not established	

**Training:** Minimal

**Equipment:** Metre rule, stop watch, access to a bed and chair, and usual walking aid.

**Space needed:** Space for bed, chair, wall, space for 6m walk.

**Time to complete:** 15 minutes

**Good things about it:** Functional, clinically significant, minimal training needed, can be used as an assessment tool and an outcome measure.

**Limitations:** Difficult to use in community environments, ceiling effect for more able patients, not sensitive for patients with issues of poor confidence.

*Version 2  
Updated June 2012*

## Elderly Mobility Scale - EMS

### Purpose

To provide a scale for assessment of mobility, considering locomotion, balance and key position changes.

The Functional Reach component as well as the whole EMS can predict an individual who is at risk of falling (Duncan *et al* 1992, Spilg *et al* 2003)

### Description

The Elderly Mobility Scale (EMS) is a 20 point validated assessment tool for the assessment of frail elderly subjects (Smith 1994). EMS is an ordinal scale measurement.

### Appropriateness

This test is appropriate for elderly patients in a hospital setting (Prosser and Canby 1997, Smith 1994) once the acute medical condition has resolved, or as out patients in Day Hospital environment (Chiu *et al* 2003).

### Theoretical Basis

EMS evaluates an individual's mobility problems through seven functional activities including bed mobility, transfers and bodily reaction to perturbation (Chiu *et al* 2003). Speed of sit to stand and walking speed are analysed. Studies have shown that walking speed diminishes with age with the average walking speed of healthy women over 75 being 1 metre per second (Leiper *et al* 1991). Increasing frailty will reduce walking speed further.

Bassey *et al* (1992) found that frail elderly people often used upper limbs to assist with sit to stand and took longer to carry out the procedure. In EMS gait is assessed based on the type of assistance required to walk. The subject achieves maximum points if they walk safely with no aid or 1 stick. Where a frame, rollator, 2 sticks or crutches are used the score reduces. This differentiation is important as frame and rollator users have been shown to have weaker lower limbs (in terms of leg extensor power), and poorer functional performance in terms of walking speed, stair climbing and chair raise (Bassey *et al* 1992).

(For the theoretical basis of Functional Reach see FR details)

### Properties

**Concurrent Validity** was assessed for the EMS by correlating scores with the Functional Independence Measure and Barthel Index. EMS scores correlated highly at 0.948 and 0.962 respectively.

The EMS was also found to correlate with the Modified Rivermead Mobility Index (Spearman's rho = 0.887) (Nolan *et al* 2008)

**Inter-rater Reliability** was established by comparing results of clinical physiotherapists compared to the researcher. Various grades of clinical staff were used. Results of Mann Whitney Test was 196, p=0.75 showing no significant difference between testers.

**Discriminant Validity** was assessed by testing 20 healthy community dwelling volunteers of a similar age group. This group all scored 20/20 demonstrating the scale discriminated between those with mobility deficits and those with none.

### Predictive Validity / interpretation of results

Although this was not the purpose of the original research, a trend was demonstrated.

EMS > 14 = home

EMS between 10 and 14 = borderline in terms of safe mobility and independence in activities of daily living (ADL) i.e. home with help.

EMS < 10 = high level of help with mobility and ADL

Spilg et al (2003) found that the EMS score was significantly associated with an individual having had 2 or more falls.

Yu *et al* (2007) classified the EMS into Bed mobility and Functional mobility subscales and found that these could be used to provide mobility profiles for people in residential care settings. The scores were found to be useful to allocate people to the most appropriate care setting.

The Elderly Mobility Scale is significantly more likely to detect improvement in mobility than either the Barthel Index or Functional Ambulation Category and the magnitude of detected improvement is significantly greater using the Elderly Mobility Scale (Spilg et al 2001)

**Sensitivity** - not established.

**N.B.**

The original paper by Smith (1994) contained an error in the FR measurement section of the EMS. This error was replicated in Version 1 of the EMS section of the AGILE Outcome measures manual.

This was corrected in Smith (1994a) and the corrected version is used and referenced in Version 2 of this manual. However, it must be noted that several research papers quoted in this review use the version referenced originally, rather than the corrected version.

## ELDERLY MOBILITY SCALE SCORE



Patient details.....

TASK	Date			
<b>Lying to Sitting</b>	2 Independent 1 Needs help of 1 person 0 Needs help of 2+ people			
<b>Sitting to Lying</b>	2 Independent 1 Needs help of 1 person 0 Needs help of 2+ people			
<b>Sitting to Standing</b>	3 Independent in under 3 seconds 2 Independent in over 3 seconds 1 Needs help of 1 person 0 Needs help of 2+ people			
<b>Standing</b>	3 Stands without support and able to reach 2 Stands without support but needs support to reach 1 Stands but needs support 0 Stands only with physical support of another person			
<b>Gait</b>	3 Independent (+ / - stick) 2 Independent with frame 1 Mobile with walking aid but erratic / unsafe 0 Needs physical help to walk or constant supervision			
<b>Timed Walk (6 metres)</b>	3 Under 15 seconds 2 16 - 30 seconds 1 Over 30 seconds 0 Unable to cover 6 metres <i>Recorded time in seconds.</i>			
<b>Functional Reach</b>	4 Over 20 cm. 2 10 - 20 cm. 0 Under 10 cm.  <i>Actual reach</i>			
<b>SCORES</b>		/ 20	/ 20	/ 20
<b>Staff Initials</b>				

**Scores under 10** - generally these patients are **dependent** in mobility manoeuvres; require help with basic ADL, such as transfers, toileting and dressing.

**Scores between 10 - 13** - generally these patients are **borderline** in terms of safe mobility and independence in ADL i.e. they require some help with some mobility manoeuvres.

**Scores over 14** - Generally these patients are able to perform mobility manoeuvres alone and safely and are **independent** in basic ADL.

## Feasibility

<b>Practicalities</b>	<b>Comments</b>
Training	Minimal as long as the standard protocol is followed.
Equipment	Stop watch/ metre rule/ access to a bed and chair/ usual walking aid
Time taken to complete the test	Approximately 15 minutes (less depending on level of expertise / proficiency of the operator)
Space	Space for bed and chair plus a suitable walking space to allow observation of a 6 metre walk
Acceptability to Older People	Good for both staff and patient as seen as very functional

The following section is based mostly on the clinical experience of practitioners who are experienced in the use of the tool

### **Uses**

Considered functional  
Has clinical and personal significance  
Little training necessary  
Tests (crudely) for both leg power and strength  
As both an assessment tool and outcome measure with the appropriate patients

### **Limitations**

In community environments, 6 metres is not often available  
Functional reach distances inconsistent with original Functional Reach test  
Ceiling effect achieved quickly for those recovering from an acute illness / or who are more able  
Not a very sensitive tool for people with issues of poor confidence

### **N.B. Ensuring Consistency of administration**

When new members of staff join the team, their method of conducting the test should be compared to the documented method. Good practice would dictate that the correct method is demonstrated to the new staff and that experienced clinicians subsequently observe them for competency whilst conducting the test. The Consistency, particularly between different observers in administering the test should be checked regularly.

## References

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## Case Study for Elderly Mobility Scale (EMS)

- HPC** Mr A. is a frail 83-year-old man with infective exacerbation of COPD. He has been admitted to an elderly medical ward for medical intervention and rehabilitation. His coughing has increased his chronic low back pain and he is finding it hard to cope with the pain.
- PMH** COPD 23 years, Osteoarthritis in (L) knee and (R) hip and in hands L.B.P., Angina
- DH** Reviewed as relevant to his medical history.  
On antibiotics for current admission.
- SH** Retired miner, ex smoker of 30/day, stopped 5 years ago.  
Widower of 1 year, lives alone in a bungalow.  
Son visits weekly to help with heavy shopping, laundry and cleaning.  
Goes out in a car with son.  
No social service support; previously independently mobile with no aids indoors.

### Summary of Problems following Initial Assessment

- Respiratory assessment conducted and Mr A is self-managing his chest and clearing when appropriate.
- Lower back assessed and determined as a chronic problem from his working days. Now being treated conservatively with heat and advice on slow, regular, gentle range of movement to prevent stiffness, ↓ pain and ↑ range of movement (ROM) Advised on postural maintenance at rest, and expectation is that as cough abates, the L.B.P. will ease.
- Physically Mr A requires help from nurses in all personal and functional tasks due to back pain and SOBOE.
- He is generally weak, but motivated to improve.

### Agreed Physiotherapy Goals

- Mr A agrees that his back will improve as his cough improves.
- To return home independent of help with no Social Service support, as before.
- To have his respiratory problems returned to a level, which he can, self-manage independently at home.

### Choice of O/M - EMS

- No LBP measure was used as it seemed appropriate to use a more holistic tool.
- EMS was chosen as it encompasses functional components, which have been identified as a problem for this patient, e.g. in/out of bed, sitting to standing, walk in excess of 6 metres.

Initial Score = 3/20 (see table below)

#### ELDERLY MOBILITY SCALE

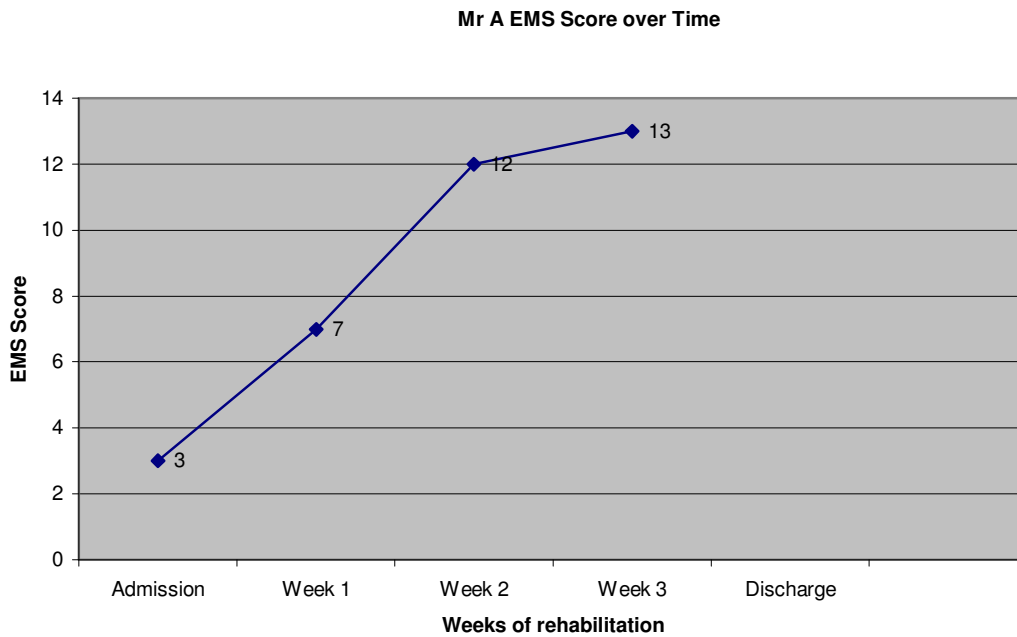
		O/A	O/D
Lying - sitting	(Max score = 2)	1	2
Sitting - lying	(Max score = 2)	1	2
Sit - stand	(Max score = 3)	1	2
Stand	(Max score = 3)	0	2

Gait	(Max score = 3)	0 WZF	3 stick
Timed walk (over 6m)	(Max score = 3)	0	2
Functional reach	(Max score = 4)	0	0
<b>TOTAL MAXIMUM SCORE POSSIBLE = 20</b>		<b>3</b>	<b>13</b>

**Intervention** - Over 3 week period in hospital and daily intervention:-

- Initially ROM and strengthening exercises in lying and sitting, progressing to standing leg and trunk exercises.
- Specific functional task practise with occupational therapy on lying to sitting, sitting to lying and transfers from chair, bed and toiler.
- Endurance work on walking to increase distance within levels of breathlessness and as strength improved.
- Advice for LBP and general energy saving tips to carry out tasks whilst synchronising breathing.

Re-measurement score = 13/20



At the end of his three-week hospitalisation, Mr A was still not fully independent or confident in all functional tasks. Social services were arranged on discharge home with a referral to Community (domiciliary) physiotherapy.