

## How to Do the EDSS

Stephen S. Kamin, MD  
New Jersey Medical School

## EDSS

- Expanded Disability Status Scale
  - Devised by John Kurtzke in the 1960s and modified in the 1980s

## EDSS

- Advantages
  - Widely used
  - Provides a single number measure of disability
- Disadvantages
  - Non-linear
  - Bi-modal distribution
  - Overemphasizes ambulation
  - Minimizes cognition
  - Limited inter-rater reliability
  - Some ambiguities

## EDSS

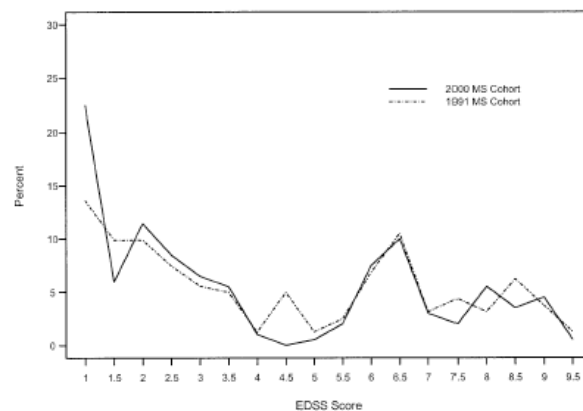
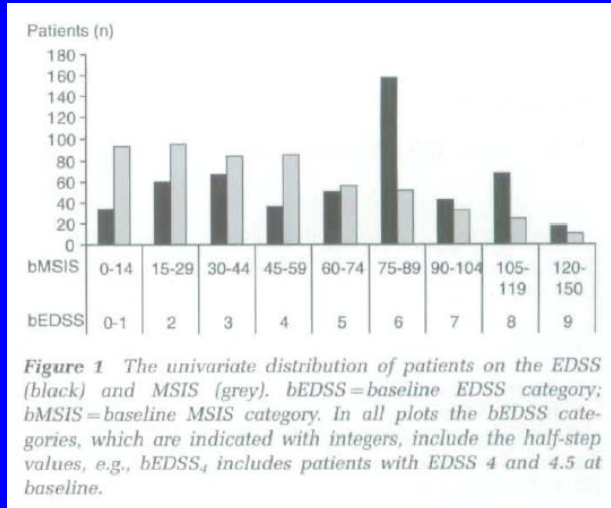


Figure 1. Frequency distribution of the Kurtzke Expanded Disability Status Scale (EDSS) scores for the 1991 and 2000 cohorts with definite multiple sclerosis. Scores of 0 and 1 were grouped as the value 1.

## MS Impairment Scale



## EDSS vs. MSIS

		MSIS			
		Deteriorated	Unchanged	Improved	
EDSS	Deteriorated	134	43	0	177
	Unchanged	113	206	7	326
	Improved	4	14	13	31
		251	263	20	534

# MS Severity Score

Years	0	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	EDSS
1	0.67	2.44	4.30	5.87	7.62	7.93	8.44	8.69	8.15	8.50	8.63	8.74	8.94	8.99	9.24	9.07	9.36	9.56	9.99	100
2	0.53	2.01	3.69	5.24	6.46	7.27	7.93	8.58	8.95	8.19	8.58	8.59	8.79	8.88	9.33	9.07	9.59	9.99	9.99	9.99
3	0.45	1.77	3.34	4.82	6.00	6.81	7.54	8.14	8.55	8.83	9.07	9.35	9.63	9.77	9.86	9.92	9.97	9.98	9.98	9.98
4	0.39	1.55	2.87	4.27	5.41	6.24	6.93	7.63	8.14	8.44	8.74	9.04	9.47	9.68	9.88	9.88	9.94	9.98	9.98	9.98
5	0.30	1.28	2.60	3.90	4.95	5.70	6.55	7.26	7.75	8.08	8.38	8.83	9.32	9.48	9.76	9.88	9.95	9.98	9.98	9.98
6	0.25	1.13	2.33	3.54	4.55	5.30	6.14	6.81	7.33	7.65	7.93	8.50	9.08	9.45	9.66	9.81	9.93	9.97	9.99	9.99
7	0.24	1.04	2.10	3.17	4.19	4.96	5.71	6.40	6.98	7.27	7.53	8.24	8.91	9.29	9.59	9.78	9.90	9.95	9.98	9.98
8	0.21	0.94	1.92	2.93	3.81	4.57	5.34	6.10	6.61	6.95	7.32	7.93	8.74	9.21	9.56	9.74	9.89	9.96	9.98	9.98
9	0.21	0.88	1.76	2.65	3.45	4.17	4.93	5.64	6.14	6.50	6.90	7.63	8.53	9.09	9.47	9.70	9.87	9.95	9.98	9.98
10	0.19	0.79	1.53	2.34	3.10	3.79	4.55	5.28	5.77	6.14	6.55	7.28	8.21	8.82	9.34	9.61	9.83	9.94	9.98	9.98
11	0.17	0.71	1.40	2.13	2.82	3.49	4.21	4.94	5.46	5.84	6.29	7.16	8.15	8.79	9.41	9.62	9.78	9.82	9.85	9.85
12	0.16	0.64	1.28	1.98	2.64	3.25	3.94	4.63	5.13	5.54	6.03	6.92	7.93	8.63	9.13	9.43	9.71	9.88	9.97	9.97
13	0.13	0.57	1.14	1.80	2.44	3.05	3.70	4.38	4.91	5.32	5.80	6.74	7.83	8.58	9.03	9.34	9.63	9.85	9.96	9.96
14	0.11	0.49	1.03	1.70	2.33	2.91	3.55	4.26	4.82	5.23	5.70	6.56	7.66	8.44	8.86	9.20	9.67	9.82	9.85	9.85
15	0.10	0.45	0.99	1.64	2.26	2.82	3.44	4.14	4.66	5.09	5.51	6.33	7.41	8.17	8.70	9.11	9.51	9.70	9.84	9.84
16	0.09	0.38	0.85	1.42	1.99	2.56	3.17	3.86	4.41	4.81	5.16	6.00	7.14	7.97	8.54	9.04	9.40	9.75	9.84	9.84
17	0.05	0.32	0.76	1.28	1.77	2.30	2.93	3.65	4.17	4.55	4.94	5.74	6.90	7.77	8.38	8.89	9.25	9.79	9.86	9.86
18	0.04	0.26	0.66	1.12	1.57	2.09	2.70	3.37	3.89	4.27	4.62	5.43	6.62	7.54	8.20	8.64	9.01	9.70	9.80	9.80
19	0.05	0.28	0.63	1.00	1.39	1.89	2.50	3.19	3.72	4.12	4.49	5.35	6.59	7.51	8.22	8.66	9.07	9.81	9.86	9.86
20	0.05	0.26	0.59	0.94	1.29	1.71	2.29	2.99	3.51	3.93	4.30	5.15	6.42	7.45	8.23	8.66	9.00	9.80	9.85	9.85
21	0.05	0.30	0.65	1.02	1.38	1.77	2.34	2.97	3.43	3.83	4.21	5.09	6.36	7.50	8.26	8.67	9.03	9.72	9.80	9.80
22	0.04	0.23	0.54	0.90	1.28	1.66	2.20	2.82	3.29	3.69	4.08	5.04	6.35	7.35	8.10	8.54	9.42	9.73	9.85	9.85
23	0.05	0.27	0.58	0.91	1.26	1.64	2.19	2.78	3.21	3.60	4.19	5.16	6.47	7.46	8.20	8.67	9.43	9.75	9.85	9.85
24	0.05	0.24	0.52	0.86	1.25	1.63	2.15	2.71	3.09	3.52	4.01	5.03	6.36	7.50	8.25	8.65	9.30	9.74	9.86	9.86
25	0.05	0.23	0.47	0.77	1.15	1.56	2.05	2.59	2.94	3.21	3.74	4.80	6.20	7.34	8.08	8.53	9.35	9.70	9.80	9.80
26	0.05	0.20	0.45	0.78	1.17	1.58	2.08	2.63	2.99	3.40	3.95	5.02	6.39	7.44	8.21	8.66	9.48	9.80	9.86	9.86
27	0.05	0.22	0.48	0.79	1.16	1.56	2.03	2.56	2.91	3.29	3.86	4.93	6.32	7.50	8.44	8.85	9.66	9.85	9.86	9.86
28	0.04	0.17	0.40	0.74	1.10	1.52	1.88	2.39	2.76	3.04	3.46	4.54	5.99	7.07	7.90	8.75	9.45	9.80	9.80	9.80
29	0.03	0.16	0.47	0.89	1.19	1.51	1.79	2.27	2.68	3.01	3.41	4.53	5.85	6.76	7.68	8.62	9.38	9.75	9.86	9.86
30	0.01	0.13	0.45	0.92	1.19	1.45	1.69	2.23	2.75	3.13	3.50	4.58	5.81	6.66	7.54	8.47	9.27	9.67	9.81	9.81



# EDSS

Centres	Cumulative percents of agreement			
	ICC (95 % CI)	No difference	≤0.5 point difference	≤1.0 point difference
EDSS				
Basel	0.96 (0.93–0.99)	56.7	76.7	86.7
Bari	0.92 (0.87–0.98)	43.3	86.7	96.7
Florence	0.98 (0.95–1.00)	70.0	96.7	100.0
London	0.91 (0.80–1.00)	83.3	93.3	96.7
Lyon	0.84 (0.64–1.00)	46.7	80.0	90.0
Würzburg	0.97 (0.95–1.00)	53.3	96.7	100.0
All centres	Not appropriate	58.9	88.3	93.9

## NeuroStatus

- A modification of the original Kurtzke scale by Kappos
- Eliminates some ambiguities
- In general use in clinical trials
- On-line training & certification
- Basis for this session

## NeuroStatus

5 BOWEL AND BLADDER FUNCTIONS

**URINARY HESITANCY AND RETENTION**

1 **None**

2 **Mild**: no major impact on lifestyle

3 **Moderate**: urinary retention; frequent urinary tract infections

4 **Severe**: requires catheterisation

5 **Marked**: overflow incontinence

**URINARY URGENCY AND INCONTINENCE**

1 **None**

2 **Mild**: no major impact on lifestyle

3 **Moderate**: urge incontinence occurring no more than once a week; must wear pads

4 **Severe**: frequent incontinence occurring from several times a week to more than once a day; must wear pads or pants

5 **Marked**: loss of bladder control

**BLADDER CATHETERISATION**

1 **None**

2 **Mild**: intermittent with indwelling catheterisation

3 **Moderate**: catheterisation

**BOWEL DYSFUNCTION**

1 **None**

2 **Mild**: impact on lifestyle no more than mild; mild constipation

3 **Moderate**: requires laxatives or other measures to be near healthy

4 **Severe**: use of enemas or other measures to evacuate bowels

5 **Marked**: catheterisation

**\*SEXUAL DYSFUNCTION**

**Male**

1 **None**

2 **Mild**: difficulty to maintain erection during intercourse, but achieves erection and still has intercourse

3 **Moderate**: difficulty to achieve erection, decrease in libido, still has intercourse and reaches orgasm

4 **Severe**: marked decrease in libido, inability to achieve full erection, intercourse with difficulty and hypogonadism

5 **Marked**: hypogonadism

**Female**

1 **None**

2 **Mild**: mild lack of lubrication, still sexually active and reaches orgasm

3 **Moderate**: dyspareunia, hypogonadism, decrease in sexual activity

4 **Severe**: marked decrease in sexual activity, inorgasmia

5 **Marked**: hypogonadism

**NOTE**

When determining the EDSS step, the Bowel and Bladder FS score is converted to a lower score as follows:

Bowel and Bladder FS Score

Converted Bowel and Bladder FS Score

0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0

**FUNCTIONAL SYSTEM SCORE**

1 **None**

2 **Mild**: mild sensory/motor/brainstem/vegetative and/or incontinence

3 **Moderate**: mild sensory/motor/brainstem/vegetative and/or incontinence with mild urinary incontinence or mild constipation

4 **Severe**: moderate sensory/motor/brainstem/vegetative and/or incontinence with moderate urinary incontinence or moderate constipation

5 **Marked**: moderate sensory/motor/brainstem/vegetative and/or incontinence with moderate urinary incontinence or moderate constipation

6 **Severe**: severe sensory/motor/brainstem/vegetative and/or incontinence with severe urinary incontinence or severe constipation

7 **Marked**: severe sensory/motor/brainstem/vegetative and/or incontinence with severe urinary incontinence or severe constipation



## Functional Systems Scores

- Visual
- Pyramidal
- Cerebellar
- Sensory
- Bowel and Bladder
- Cerebral
- Other

## Visual

- 0- Normal
- 1- Disc pallor OR small scotoma OR 20/25 or better
- 2- Worse eye 20/30 to 20/59
- 3- Large scotoma or moderate field defect  
OR  
Worse eye 20/60 to 20/99
- 4- Marked field defect  
OR  
Worse eye 20/100 to 20/200  
OR  
Worse eye 20/60 to 20/99 and better eye  $\leq$  20/60

## Visual

- 5- Worse eye  $\leq 20/200$   
OR  
Worse eye 20/100 to 20/200 and better eye  $\leq 20/60$
- 6- Worse eye  $\leq 20/200$   
AND  
Better eye  $\leq 20/60$

## Vision Corrected Scores

Score	Corrected score
0	0
1	1
2	2
3	2
4	3
5	3
6	4



## Visual

- 4 worse eye with marked decrease of fields and/or maximal visual acuity (corrected) of 20 / 100 to 20 / 200 (0.2 – 0.1);  
grade 3 plus maximal acuity of better eye of 20 / 60 (0.33) or less
- 5 worse eye with maximal visual acuity (corrected) less than 20 / 200 (0.1);  
grade 4 plus maximal acuity of better eye of 20 / 60 (0.33) or less
- 6 grade 5 plus maximal visual acuity of better eye of 20 / 60 (0.33) or less

## Visual

		Worse eye	Better eye	Fields	Scotoma	Pallor
0	0	20/20	20/20			Absent
1	1	> 20/30			Small	Present
2	2	20/30-20/59				
3	2	20/60-20/99		Moderate defect	Large	
4	3	20/100-20/200		Complete hemi		
4	3	20/60-20/99	AND ≤20/60			
5	3	< 20/200				
5	3	20/100-20/200	AND ≤ 20/60			
6	4	< 20/200	AND ≤ 20/60			

## Question 1

- The patient has a left homonymous hemianopsia. Visual acuity is 20/30 in the intact field of both eyes.

## Question 1

- The Corrected Visual FSS is:
  - A. 1
  - B. 2
  - C. 3
  - D. 4

### Question 1

The Corrected Visual FSS is:

- A. 1
- B. 2
- C. 3
- D. 4

10

### Visual

		Worse eye	Better eye	Fields	Scotoma	Pallor
0	0	20/20	20/20			Absent
1	1	> 20/30			Small	Present
2	2	20/30-20/59				
3	2	20/60-20/99		Moderate defect	Large	
4	3	20/100-20/200		Complete hemi		
4	3	20/60-20/99	AND ≤ 20/60			
5	3	< 20/200				
5	3	20/100-20/200	AND ≤ 20/60			
6	4	< 20/200	AND ≤ 20/60			

## Question 2

- There is disc pallor of the right eye. The acuity is 20/20 bilaterally.

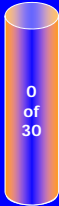
## Question 2


- The corrected visual FSS is:
  - A. 0
  - B. 1
  - C. 2

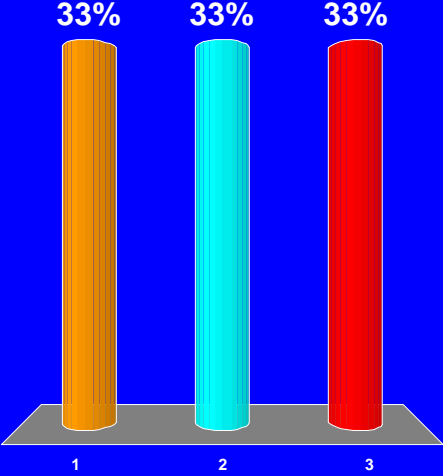
### Question 2

The corrected visual FSS is:

- A. 0
- B. 1
- C. 2


  
0 of 30


  
10


  
33% 33% 33%

### Visual

		Worse eye	Better eye	Fields	Scotoma	Pallor
0	0	20/20	20/20			Absent
1	1	> 20/30			Small	Present
2	2	20/30-20/59				
3	2	20/60-20/99		Moderate defect	Large	
4	3	20/100-20/200		Complete hemi		
4	3	20/60-20/99	AND ≤ 20/60			
5	3	< 20/200				
5	3	20/100-20/200	AND ≤ 20/60			
6	4	< 20/200	AND ≤ 20/60			

### Question 3

- The patient is blind in the left eye and has acuity of 20/100 in the right eye.

### Question 3

- The corrected visual FSS is:
  - A. 3
  - B. 4
  - C. 5
  - D. 6

### Question 3

The corrected visual FSS is:

- A. 3
- B. 4
- C. 5
- D. 6

### Visual

		Worse eye	Better eye	Fields	Scotoma	Pallor
0	0	20/20	20/20			Absent
1	1	> 20/30			Small	Present
2	2	20/30-20/59				
3	2	20/60-20/99		Moderate defect	Large	
4	3	20/100-20/200		Complete hemi		
4	3	20/60-20/99	AND $\leq 20/60$			
5	3	< 20/200				
5	3	20/100-20/200	AND $\leq 20/60$			
6	④	< 20/200	AND $\leq 20/60$			

## Brainstem

- 0- Normal
- 1- Signs only
- 2- Moderate nystagmus  
OR  
moderate EOM impairment  
OR  
other mild disability

## Brainstem

- 3- Severe nystagmus  
OR  
Marked extraocular weakness  
OR  
Moderate disability of other cranial  
nerves



## Brainstem

- 4- Marked dysarthria or other marked disability
- 5- Unable to swallow or speak

## Brainstem EOM

- 0- Normal
- 1- Signs only: subtle and patient without complaints
- 2- Mild: Subtle and patient aware OR  
obvious and incomplete but patient unaware
- 3- Moderate: Obvious, incomplete and  
patient aware OR  
single complete
- 4- Marked: Complete paralysis of >1 muscle

## Brainstem Nystagmus

- 0- None
- 1- Signs only or mild (only beyond 30°)
- 2- Moderate: at 30° but not in primary position
- 3- Severe: in primary position or interfering with vision

## Brainstem Trigeminal

- 0- None
- 1- Signs only
- 2- Mild: Detectable (patient aware)
- 3- Moderate: Impaired sharp/dull OR trigeminal neuralgia
- 4- Marked: No discrimination of sharp/dull

## Brainstem Facial

- 0- None
- 1- Signs only
- 2- Mild: Detectible, patient aware
- 3- Moderate: Incomplete eye closure or mouth closure with symptoms
- 4- Marked: Complete palsy

## Brainstem Hearing

- 0- No loss
- 1- Signs only: Decreased finger rub OR lateralizing Weber, patient unaware
- 2- Mild: 1, but patient aware
- 3- Moderate: Absent finger rub OR impaired word discrimination
- 4- Marked: Cannot hear whisper

## Brainstem Dysarthria

- 0- None
- 1- Signs only
- 2- Mild: Clinically detectible
- 3- Moderate: Impaired comprehensibility
- 4- Marked: Incomprehensible speech
- 5- Inability to speak

## Brainstem Dysphagia

- 0- None
- 1- Signs only
- 2- Mild: Difficulty with liquids
- 3- Moderate: Difficulty with solids and liquids
- 4- Marked: Sustained difficulty, required modified diet
- 5- Unable to swallow

## Brainstem

Score	EOM	Nystagmus	CN V	CN VII	Hearing	Dysarthria	Dysphagia
0							
1	Signs only OR Mild	Signs only OR Mild	Signs only	Signs only	Signs only	Signs only	Signs only
2	Mod	Mod	Mild	Mild	Mild	Mild	Mild
3	Marked	Severe	Mod	Mod	Mod	Mod	Mod
4			Marked	Marked	Marked	Marked	Marked
5						Unable	Unable

## Question 4

- The patient has abduction nystagmus of the left eye but does not complain of diplopia. There is mild loss of sensation on the left side of the face, of which she is not aware.

## Question 4

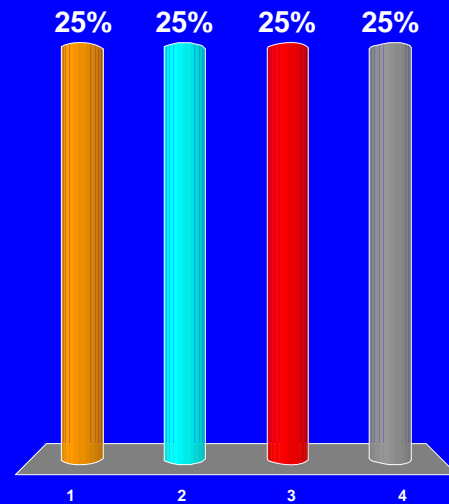
- The Brainstem FSS is:
  - A. 1
  - B. 2
  - C. 3
  - D. 4

## Question 4

The Brainstem FSS is:

- A. 1
- B. 2
- C. 3
- D. 4

10



## Brainstem

Score	EOM	Nystagmus	CN V	CN VII	Hearing	Dysarthria	Dysphagia
0							
1	Signs only OR Mild	Signs only OR Mild	Signs only	Signs only	Signs only	Signs only	Signs only
2	Mod	Mod	Mild	Mild	Mild	Mild	Mild
3	Marked	Severe	Mod	Mod	Mod	Mod	Mod
4			Marked	Marked	Marked	Marked	Marked
5						Unable	Unable

## Question 5

- The patient complains of diplopia on far rightward gaze but eye movements are not obviously impaired. There is incomplete closure of the right eye and mild dysarthria which does not impair comprehensibility.

## Question 5

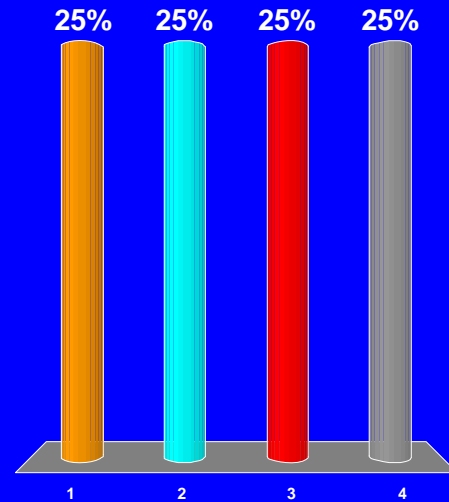
- The brainstem FSS is:
  - A. 1
  - B. 2
  - C. 3
  - D. 4

## Question 5

The brainstem FSS is:

- A. 1
- B. 2
- C. 3
- D. 4

10





## Brainstem

Score	EOM	Nystagmus	CN V	CN VII	Hearing	Dysarthria	Dysphagia
0							
1	Signs only OR Mild	Signs only OR Mild	Signs only	Signs only	Signs only	Signs only	Signs only
2	Mod	Mod	Mild	Mild	Mild	Mild	Mild
3	Marked	Severe	Mod	Mod	Mod	Mod	Mod
4			Marked	Marked	Marked	Marked	Marked
5						Unable	Unable

## Question 6

- The patient has speech which is difficult to understand. He complains of intermittent choking on both solids and liquids. There is nystagmus in all directions of gaze, but not in primary gaze.

## Question 6

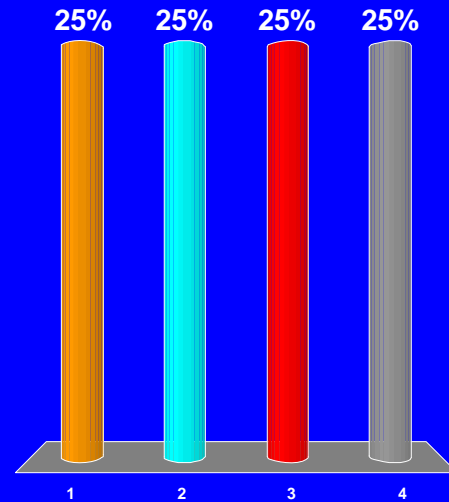
- The brainstem FSS is:
  - A. 1
  - B. 2
  - C. 3
  - D. 4

## Question 6

The brainstem FSS is:

- A. 1
- B. 2
- C. 3
- D. 4

10



## Brainstem

Score	EOM	Nystagmus	CN V	CN VII	Hearing	Dysarthria	Dysphagia
0							
1	Signs only OR Mild	Signs only OR Mild	Signs only	Signs only	Signs only	Signs only	Signs only
2	Mod	Mod	Mild	Mild	Mild	Mild	Mild
3	Marked	Severe	Mod	Mod	Mod	Mod	Mod
4			Marked	Marked	Marked	Marked	Marked
5						Unable	Unable

## Pyramidal

- 0- Normal
- 1- Abnormal signs only (hyperreflexia, Babinski sign)
- 2- Minimal disability- fatigability or 4/5 in one or 2 muscle groups
- 3- Mild to moderate paraparesis or hemiparesis- usually 4/5 in > 2 muscle groups  
OR severe monoparesis ( $\leq 2/5$ )

## Pyramidal

- 4- Marked paraparesis or hemiparesis
  - 3/5 in 3 or 4 limbs
  - 2/5 in 2 limbs
  - 1/5 in 1 limb
- 5- Paraplegia, hemiplegia or marked quadriparesis
  - $\leq 2/5$  in 3 or 4 limbs
  - 1/5 in at least 2 limbs
- 6- Quadriplegia

## Pyramidal

- Problems
  - “Muscle groups” versus “limbs”
  - Best interpretation: muscle groups = limbs (see rating of 3)
  - But NOT for rating of 2

## Pyramidal

	1 limb	2 limbs	3 limbs	4 limbs
0	Normal			
1	Signs only			
2	4/5			
3	2 or 3/5	3/5	4/5	4/5
4	0 or 1/5	2/5	3/5	3/5
5		0 or 1/5	2/5	2/5
6				0 or 1/5

## Question 7

- Strength is 4/5 in the right deltoids and right triceps. All other muscle groups are 5/5.

## Question 7

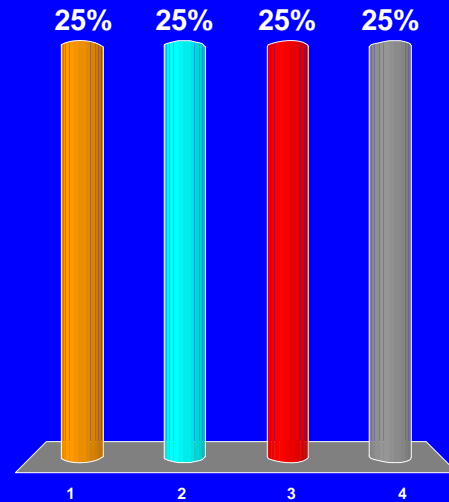
- The Pyramidal FSS is:
  - A. 2
  - B. 3
  - C. 4
  - D. 5

## Question 7

The Pyramidal FSS is:

- A. 2
- B. 3
- C. 4
- D. 5

10



## Pyramidal

	1 limb	2 limbs	3 limbs	4 limbs
0	Normal			
1	Signs only			
2	4/5			
3	2 or 3/5	3/5	4/5	4/5
4	0 or 1/5	2/5	3/5	3/5
5		0 or 1/5	2/5	2/5
6				0 or 1/5

## Question 8

- Strength on the right is deltoids 3/5, biceps 4/5, triceps 3/5, wrist extensors 4/5, iliopsoas 2/5, hamstrings 3/5, anterior tibials 3/5. All other groups are 5/5.

## Question 8

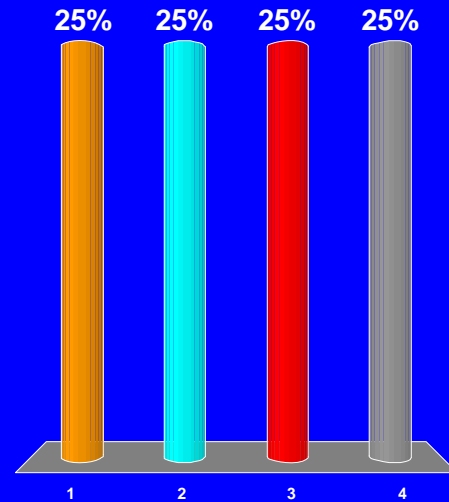
- The Pyramidal FSS is:
  - A. 2
  - B. 3
  - C. 4
  - D. 5

## Question 8

The Pyramidal FSS is:

- A. 2
- B. 3
- C. 4
- D. 5

10





## Pyramidal

	1 limb	2 limbs	3 limbs	4 limbs
0	Normal			
1	Signs only			
2	4/5			
③	2 or 3/5	3/5	4/5	4/5
4	0 or 1/5	2/5	3/5	3/5
5		0 or 1/5	2/5	2/5
6				0 or 1/5

## Question 9

- The strength in the left arm is deltoid 3/5, triceps 4/5, wrist extensors 4/5. In the legs iliopsoas are 2/5, hamstrings 3/5 and anterior tibials 2/5 bilaterally. All other muscle groups are at least 4/5.

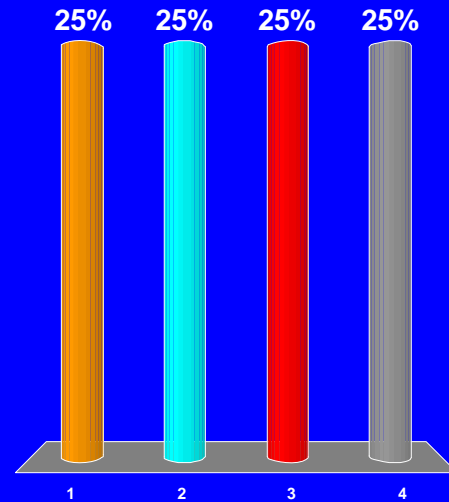
## Question 9

- The Pyramidal FSS is:
  - A. 2
  - B. 3
  - C. 4
  - D. 5

## Question 9

The Pyramidal FSS is:

- A. 2
- B. 3
- C. 4
- D. 5



10

## Pyramidal

	1 limb	2 limbs	3 limbs	4 limbs
0	Normal			
1	Signs only			
2	4/5			
3	2 or 3/5	3/5	4/5	4/5
4	0 or 1/5	2/5	3/5	3/5
5		0 or 1/5	2/5	2/5
6				0 or 1/5

## Cerebellar

- 0 normal
- 1 abnormal signs without disability
- 2 mild ataxia and/or moderate station ataxia (Romberg)
- 3 moderate truncal ataxia and / or moderate limb ataxia and / or moderate or severe gait/truncal ataxia
- 4 severe gait/truncal ataxia and severe ataxia in three or four limbs
- 5 unable to perform coordinated movements due to ataxia
- X pyramidal weakness (BMRC grade 3 or worse in limb strength) interferes with cerebellar testing

## Cerebellar

- Limb ataxia
  - 0 Normal
  - 1 Signs only
  - 2 Mild: Tremor or clumsiness easily seen, minor interference with function
  - 3 Moderate: Interference with function in all spheres
  - 4 Severe: Most functions very difficult

## Cerebellar

- Trunk
  - 0 Normal
  - 1 Signs only
  - 2 Mild: Sway with eyes closed
  - 3 Moderate: Sway with eyes open
  - 4 Severe: Requires assistance

## Cerebellar

- Gait
  - 0- Normal
  - 1- Signs only
  - 2- Mild: Balance problem recognized by patient or others
  - 3- Moderate: Abnormal on ordinary walking
  - 4- Severe: Unable to walk more than a few steps unassisted

## Cerebellar

- Problems:
  - Ambiguity of trunk/gait
  - Inconsistency in rating of 3:
    - moderate truncal ataxia and/or moderate limb ataxia
    - and/or moderate or severe gait/truncal ataxia
  - Use of Romberg for cerebellar testing

## Cerebellar

	Limb	Trunk/Stance	Gait
0	Normal	Normal	
1	Signs only	Signs only	
2	Mild	Positive Romberg	Mild
3	Moderate	Moderate/severe	Moderate/severe
4	Severe (3-4 limbs)	AND Severe	AND Severe
5	Action impossible		
X	Weakness interferes		

## Question 10

- The patient has bilateral intention tremor and has difficulty using eating utensils or buttoning clothes. Stance is normal with eyes open or closed. Tandem gait is impaired.

## Question 10

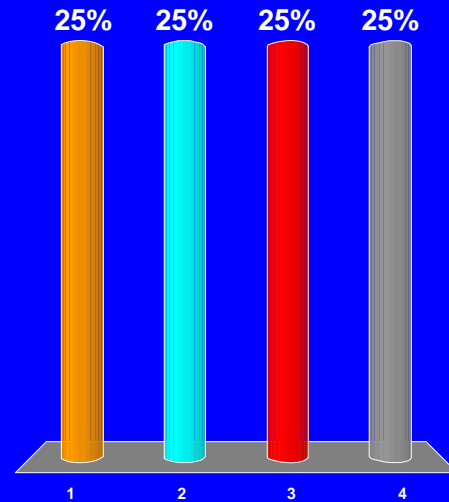
- The Cerebellar FSS is:
  - A. 1
  - B. 2
  - C. 3
  - D. 4

## Question 10

The Cerebellar FSS is:

- A. 1
- B. 2
- C. 3
- D. 4

10



## Cerebellar

	Limb	Trunk/Stance	Gait
0	Normal	Normal	
1	Signs only	Signs only	Signs only
2	Mild	Positive Romberg	Mild
3	Moderate	Moderate/severe	Moderate/severe
4	Severe (3-4 limbs)	AND Severe	AND Severe
5	Action impossible		
X	Weakness interferes		

## Question 11

- The patient has minimal dysmetria of the arms. She requires a cane to walk because of falls secondary to imbalance.



## Question 11

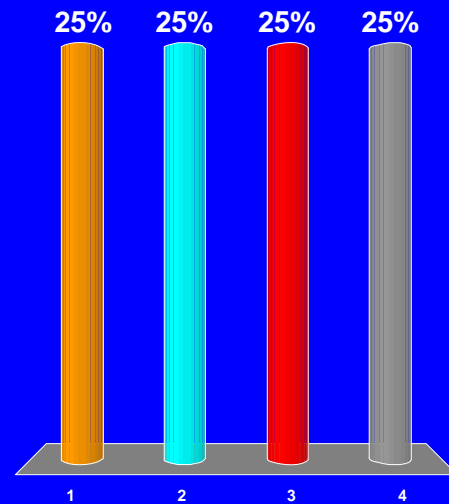
- The Cerebellar FSS is:
  - A. 1
  - B. 2
  - C. 3
  - D. 4

## Question 11

The Cerebellar FSS is:

- A. 1
- B. 2
- C. 3
- D. 4

10



## Cerebellar

	Limb	Trunk/Stance	Gait
0	Normal	Normal	
1	Signs only	Signs only	
2	Mild	Positive Romberg	Mild
3	Moderate	Moderate/severe	Moderate/severe
4	Severe (3-4 limbs)	AND Severe	AND Severe
5	Action impossible		
X	Weakness interferes		

## Question 12

- The patient has mild intention tremor which has a minor effect on her ADLs. She is plegic in the legs.

## Question 12

• The Cerebellar FSS is:

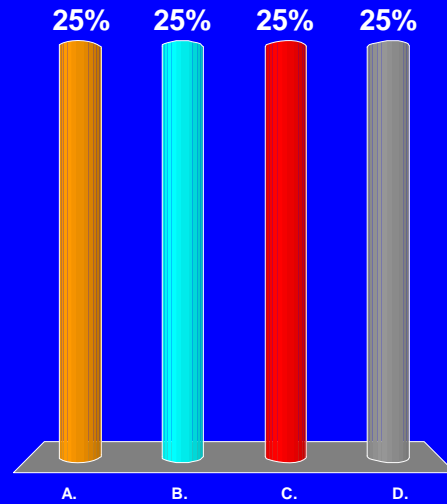
- A. 2
- B. 2X
- C. 3
- D. X

## Question 12

The Cerebellar FSS is:

- A. 2
- B. 2X
- C. 3
- D. X

10



## Cerebellar

	Limb	Trunk/Stance	Gait
0	Normal	Normal	
1	Signs only	Signs only	
2	Mild	Positive Romberg	Mild
3	Moderate	Moderate/severe	Moderate/severe
4	Severe (3-4 limbs)	AND Severe	AND Severe
5	Action impossible		
X	Weakness interferes		

## Sensory

- 0- Normal
- 1- Vibration or figure-writing decreased only in 1 or 2 limbs
- 2- Mild decreased in touch or pain or position sense  
OR  
Moderate decrease in vibration in 1 or 2 limbs  
OR  
Vibratory decrease alone in 3 or 4 limbs

## Sensory

- 3- Moderate decreased in touch, pain or position sense  
OR  
Lost vibration in 1 or 2 limbs  
OR Mild decrease in touch or pain  
OR  
Moderate decrease in proprioception in 3 or 4 limbs

## Sensory

- 4- Marked decrease in touch or pain  
OR  
loss of proprioception in 1 or 2 limbs  
OR Moderate decrease in touch or pain  
OR  
Severe decrease in proprioception in 3 or 4 limbs

## Sensory

- 5- Loss of sensation in 1 or 2 limbs  
OR  
Moderate decrease in touch or pain  
OR  
Severe decrease in proprioception in  
3 or 4 limbs (“Most of body below the head”)
- 6- Sensation essentially lost below the head

## Sensory

- Pain & light touch
  - 0 Normal
  - 1 Signs only: Abnormal but patient not aware
  - 2 Mild: Aware of deficit but discriminates sharp & dull
  - 3 Moderate: Impaired sharp-dull discrimination
  - 4 Marked: Absent discrimination
  - 5 Total loss

## Sensory

- Vibration
  - 0 Normal
  - 1 Mild: 5-7/8 or > 10 sec
  - 2 Moderate: 1-4/8 or 2-10 sec
  - 3 Marked: Complete loss

## Rydell-Seiffert Tuning Fork



## Sensory

- Position sense
  - 0 Normal
  - 1 Mild: 1-2 errors, only distal
  - 2 Moderate: Many errors, proximal joints affected
  - 3 Marked: Complete loss

## Sensory

- Problems:
  - “Marked” versus “severe”
  - “Proprioception” versus “all proprioceptive tests”
  - Not all severity ratings are represented in the FSS standards
  - Sensation “absent below the head” virtually never occurs



## Sensory

	Vib	Vib	Pain	Pain	JPS	JPS
	1-2	3-4	1-2	3-4	1-2	3-4
0						
1	Mild		NI		NI	
2	Mod	Mild	Mild		Mild	
3	Absent		Mod	Mild	Mod	
3		Mod		AND		Mod
4			Marked	Mod		
4		Marked		AND		Marked
5	Absent	AND	Absent	AND	Absent	
5*				Mod		
5*		Absent		AND		Absent
6		Absent	AND	Absent	AND	Absent

## Question 13

- Vibration is 7/8 in the fingers and 6/8 in the toes. There is mild decrease in joint position sense in the toes. Pin prick sensation is intact.

## Question 13

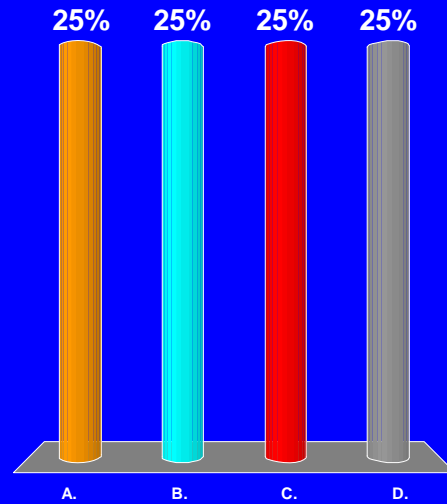
- The Sensory FSS is:  
  
A. 1  
B. 2  
C. 3  
D. 4

## Question 13

The Sensory FSS is:

- A. 1
- B. 2
- C. 3
- D. 4

10



## Sensory

	Vib	Vib	Pain	Pain	JPS	JPS
	1-2	3-4	1-2	3-4	1-2	3-4
0						
1	Mild		NI		NI	
2	Mod	Mild	Mild		Mild	
3	Absent		Mod	Mild	Mod	
3		Mod		AND		Mod
4			Marked	Mod		
4		Marked		AND		Marked
5	Absent	AND	Absent	AND	Absent	
5*				Mod		
5*		Absent		AND		Absent
6		Absent	AND	Absent	AND	Absent

## Question 14

- Vibration is 4/8 in the fingers and 3/8 in the toes. The patient makes 1 or 2 errors in joint position sense in the toes. Pin prick sensation is intact.

## Question 14

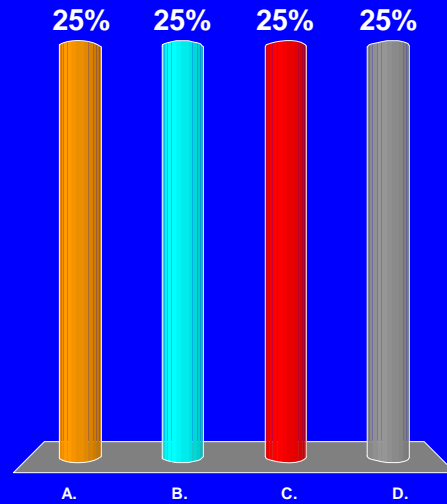
- The Sensory FSS is:  
  
A. 1  
B. 2  
C. 3  
D. 4

## Question 14

The Sensory FSS is:

- A. 1
- B. 2
- C. 3
- D. 4

10



## Rule of Thumb FSS

- If there is no rating listed for a particular function, find the next lower rating and add 1.
- For instance: “vibration moderately decreased in 4 limbs”
- Mild loss is rated 2.

## Sensory

	Vib	Vib	Pain	Pain	JPS	JPS
	1-2	3-4	1-2	3-4	1-2	3-4
0						
1	Mild		NI		NI	
2	Mod	Mild	Mild		Mild	
3	Absent	Mod	Mod	Mild	Mod	
3		Mod		AND		Mod
4			Marked	Mod		
4		Marked		AND		Marked
5	Absent	AND	Absent	AND	Absent	
5*				Mod		
5*		Absent		AND		Absent
6		Absent	AND	Absent	AND	Absent

## Rules of Thumb

- So the Sensory FS score is 3.

## Question 15

- Vibration and joint position sense are absent in all 4 limbs. There is impaired discrimination of sharp and dull in all 4 limbs.

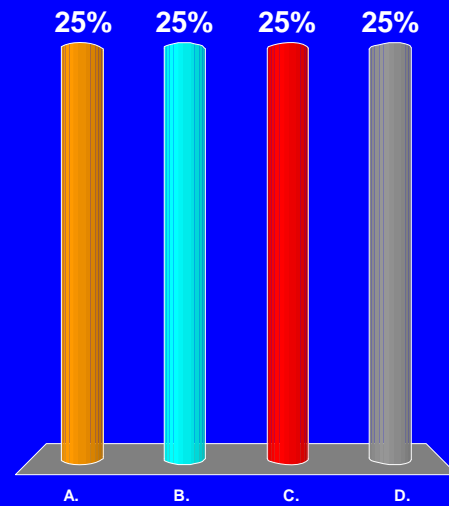
## Question 15

- The Sensory FSS is:  
  
A. 3  
B. 4  
C. 5  
D. 6

## Question 15 The Sensory FSS is:

- A. 3
- B. 4
- C. 5
- D. 6

10



## Sensory

	Vib	Vib	Pain	Pain	JPS	JPS
	1-2	3-4	1-2	3-4	1-2	3-4
0						
1	Mild		NI		NI	
2	Mod	Mild	Mild		Mild	
3	Absent		Mod	Mild	Mod	
3		Mod		AND		Mod
4			Marked	Mod		
4		Marked		AND		Marked
5	Absent	AND	Absent	AND	Absent	
5*				Mod		
5*		Absent		AND		Absent
6		Absent	AND	Absent	AND	Absent

## Question 16

- Vibration and joint position sense are absent in the feet and mildly decreased in the hands. Pin prick sensation is absent in the feet and impaired in the fingers.



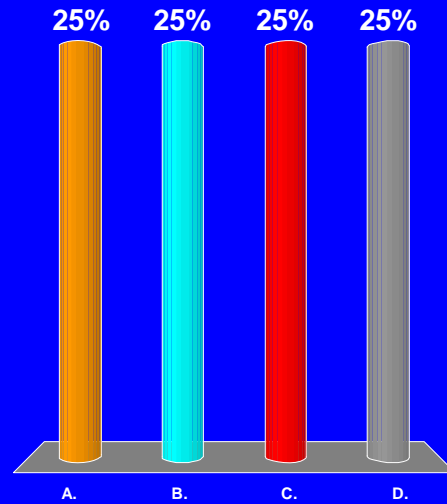
## Question 16

- The Sensory FSS is:  
  
A. 3  
B. 4  
C. 5  
D. 6

## Question 16 The Sensory FSS is:

- A. 3
- B. 4
- C. 5
- D. 6

10



## Sensory

	Vib	Vib	Pain	Pain	JPS	JPS
	1-2	3-4	1-2	3-4	1-2	3-4
0						
1	Mild		NI		NI	
2	Mod	Mild	Mild		Mild	
3	Absent		Mod	Mild	Mod	
3		Mod		AND		Mod
4			Marked	Mod		
4		Marked		AND		Marked
5	Absent	AND	Absent	AND	Absent	
5*				Mod		
5*		Absent		AND		Absent
6		Absent	AND	Absent	AND	Absent

## Bowel and Bladder

- 0- Normal
- 1- Mild urinary hesitancy, urgency or constipation
- 2- Moderate hesitancy, urgency  
OR  
Rare urinary incontinence  
OR  
Severe constipation

## Bowel and Bladder

- 3- Frequent urinary incontinence  
OR  
Intermittent self-catheterization  
OR  
Enemas or manual bowel evacuation
- 4- In need of almost constant catheterization
- 5- Loss of bladder function
- 6- Loss of bowel and bladder function

## Bowel & Bladder

Score	CS	Bladder/ Incontinence	Catheter	Bowel
0	0	NI		NI
1	1	Mild		Mild
2	2	Mod/Rare		Severe
3	3	--/Frequent	ISC	Enemas etc
4	3		“Almost constant”	
5	4	Absent	Constant	Absent
6	5	Absent AND		Absent

## Cerebral

- 0- Normal
- 1- Mood alteration only or mild fatigue
- 2- Mild decrease in mentation (history but not exam) or moderate to severe fatigue
- 3- Moderate decreased in mentation (O x 3)
- 4- Marked decrease in mentation (O x 1 or 2)
- 5- Dementia

## Cerebral

Score	Mentation	Fatigue
0	NI	NI
1	Mood only	Mild
2	Mild	Mod-severe
3	Mod	
4	Severe	
5	Dementia	

## Cerebral Corrected Scores

Score	Corrected Score
0	0
1	0 (Mood) or 1
2	2
3	3
4	4
5	5

## Other Functions

- Spasticity
  - 0- None
  - 1- Mild
  - 2- Moderate
  - 3- Severe

## Walking

- An orthosis is NOT “assistance” for purposes of the EDSS

## EDSS

- Below 4
  - Fully ambulatory ( $\geq 500$  m)
  - Defined exclusively by FS scores
- 4.0, 4.5 & 5.0
  - FS scores OR ambulation
  - More severe parameter governs
- 5.5 to 8.0
  - Ambulation or WC use only
- 8.5 and above
  - Self-care and communication

## EDSS

- Problems
  - Various exceptions to the ambulation distances ranges
    - >120 M with bilateral assistance
    - >50 M with unilateral assistance
  - “Combinations of lesser grades exceeding limits of previous steps”

## EDSS scoring by Functional systems

Number of Functional System Scores at Grades 0 - 5 (total = 7)						
# of G0	# of G1	# of G2	# of G3	# of G4	# of G5	EDSS
7						0
6	1	0	0	0	0	1.0
0-5	>=2	0	0	0	0	1.5
6	1	0	0	0	0	2.0
5	2	0	0	0	0	2.5
6	0	1	0	0	0	3.0
3, 4	3, 4	0	0	0	0	3.0
5	0	2	0	0	0	3.5
4, 5	1, 2	1	0	0	0	3.5
2	5	0	0	0	0	3.5
6	0	0	1	0	0	4.0
0, 1, 2, 3, 4	0, 1, 2, 3, 4	3-7	0	0	0	4.0
0, 1, 2, 3	1, 2, 3, 4, 5	2	0	0	0	4.0
0, 1, 2, 3	3, 4, 5, 6	1	0	0	0	4.0
0, 1	6, 7	0	0	0	0	4.0
1, 2, 3, 4, 5	1, 2, 3, 4, 5, 6	1	0	0	0	4.5
0	1, 2, 3	4, 5, 6	0	0	0	4.5
0	4	3	0	0	0	4.5
0	7	0	0	0	0	4.5
0-6	0	0	0	3 <sup>1</sup>	0	5.0
6	0	0	0	1	0	5.0
0-5	1, 2, 3, 4, 5, 6	0, 1	0	1	0	5.0
0, 1, 2, 3, 4		3 <sup>2</sup>	0	1	0	5.0
0-5			3 <sup>2</sup>	0	0	5.0

## EDSS scoring by ambulation

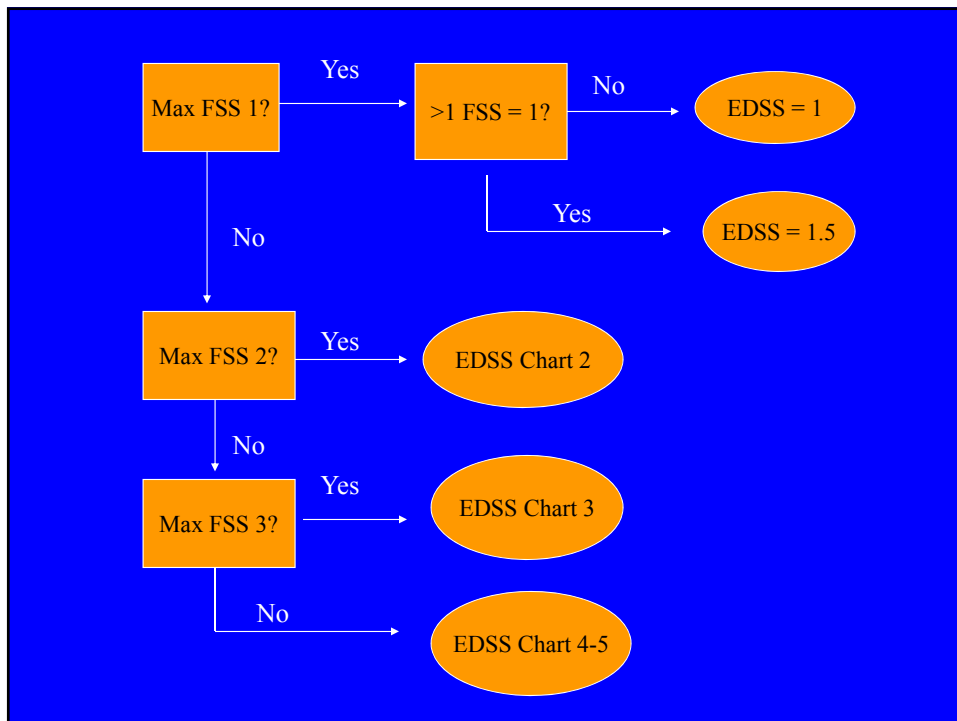
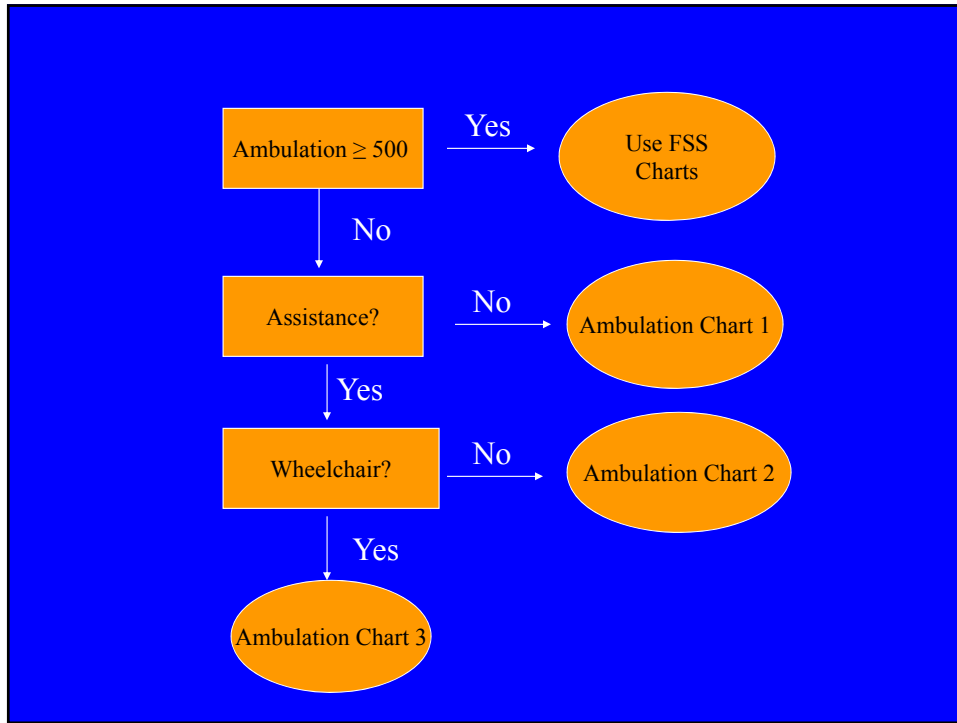
Ambulatory status	Kappos	Kurtzke
Walks unaided $\geq$ 500m, unrestricted	4.0	4.0
Walks unaided $\geq$ 300m, < 500m	4.5	4.5
Walks unaided $\geq$ 200m, < 300m	5.0	5.0
Walks unaided $\geq$ 100m, < 200m	5.5	5.5
Walks unaided <100m	?	?
Walks with aid $\geq$ 100m		6.0
Walks with unilateral aid for $\geq$ 100m (resting allowed)	6.0	
Walks with bilateral aid for >120m	6.0	
Walks with unilateral aid for >50m	6.0	
Walks with assistance $\geq$ 20m but not 100m		6.5
Walks with unilateral aid for <50m	6.5	
Walks with bilateral aid 10-120m	6.5	
Walks with bilateral aid for $\geq$ 20m (no rest allowed)	6.5	
Walks with bilateral aid >5m but <20m	?	close to 7.0
Walks with bilateral aid for >few steps but <5m	7.0	7.0
Walks with bilateral aid for only a few steps	7.5	7.5
Aid by another person equals bilateral assistance	X	
AFO uni or bilateral by itself is not considered aid	X	
Assignment is to that closest to his/her performance		X

\* Slightly modified from J.F. Kurtzke, Neurology 1983;33,1444-52  
 ©2007 Prof. L. Kappos, University Hospitals, Department of Neurology,  
 CH-4031 Basel, Switzerland; Version 04/07

## EDSS

- 1. Determine all FSS
- 2. Determine maximal walking distance and independence
- 3. If 2 is less than 500 m, go to “EDSS Ambulation” chart
- 4. If 2 is at least 500 m, determine highest FSS and go to appropriate chart





## EDSS $\leq 2$

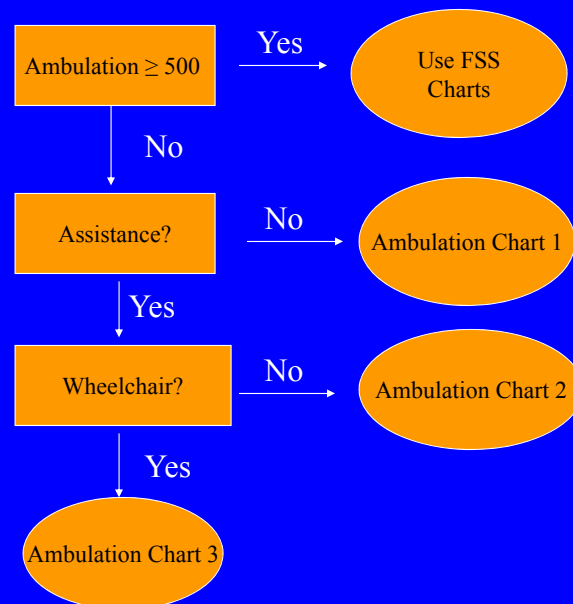
2	3	4	5	EDSS
1	-	-	-	2.0
2	-	-	-	2.5
3-4	-	-	-	3.0
5	-	-	-	3.5
6-7	-	-	-	4.0

## EDSS FSS $\leq 3$

2	3	4	5	EDSS
0	1	-	-	3.0
1-2	1	-	-	3.5
3-6	1	-	-	4.0
0	2	-	-	3.5
1-5	2	-	-	4.0
0	3	-	-	4.0
1-4	3	-	-	4.5
0	4-7	-	-	4.5*

## EDSS FSS 4-5

2	3	4	5	EDSS
0	0	1	-	4.0
0	0	2-7	-	4.5
0	0	0	1	5.0



## EDSS Ambulation 1

Distance	Restricted?	Assistance	EDSS
$\geq 500$ m	No	None	By FSS
$\geq 500$ m	Yes (Pyr or Cereb $\geq 2$ )	None	By FSS
300-499	-	None	4.5*
200-299	-	None	5.0
100-199	-	None	5.5

## EDSS Ambulation 2

Distance	Assistance	EDSS
$\geq 100$	Unilateral or Intermittent	6.0
50-99	Unilateral	6.0
20-49	Unilateral	6.5
$> 120$	Bilateral	6.0
10-120	Bilateral	6.5

## EDSS Ambulation 3

Ambulation	Wheelchair	Self-Care	EDSS
≤ 5 m, transfers	Standard chair	Yes	7.0
Few steps, Aid to transfer	Standard with assistance, motorized	Yes	7.5
OOB	-	“Many”	8.0
Bed	-	“Some”	8.5
Bed	-	None	9.0
Bed	-	None	9.5

## EDSS

Visual 0  
Brainstem 2  
Pyramidal 3  
Cerebellar 0  
Sensory 3  
Bowel/Bladder 1  
Cerebral 1  
Ambulation 500 m

	1	2	3	4	5	6	7
0	✘	✘					
1	✘	✘					
2	✘						
3	✘	✘					
4							
5							
6							

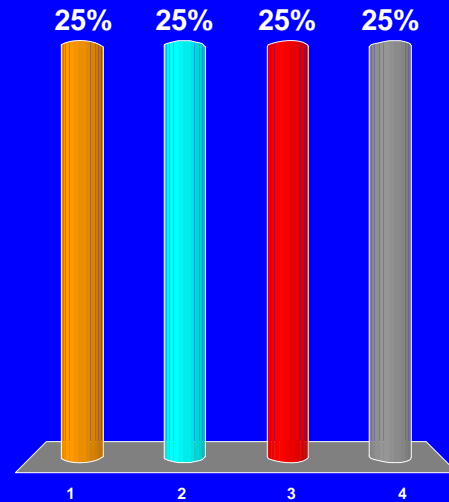
## Question 17

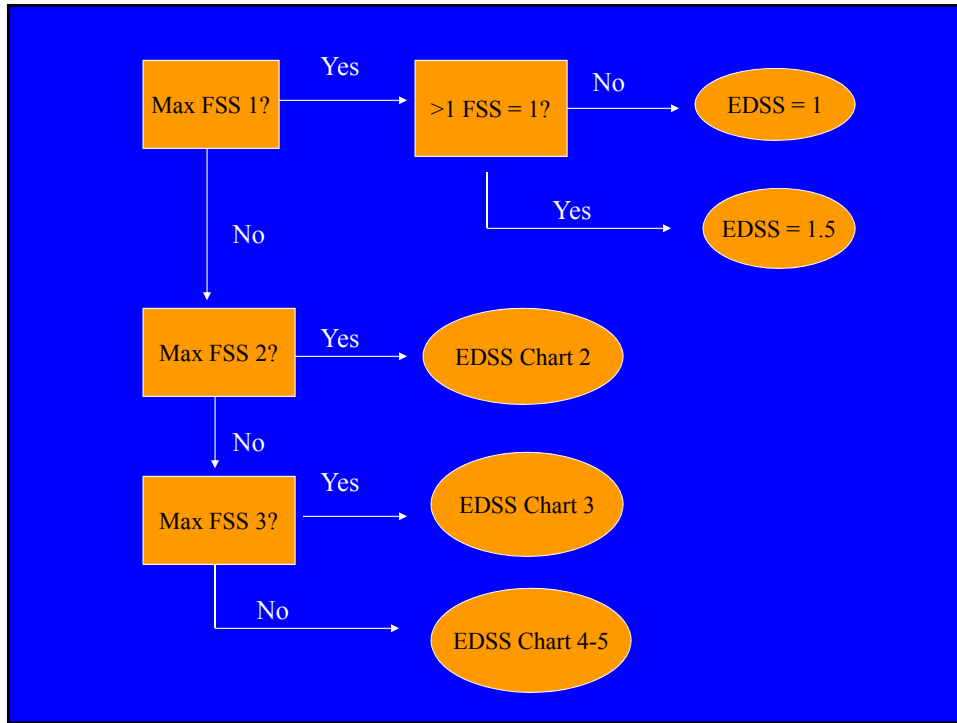
- What is the EDSS?
- A. 3.5
- B. 4.0
- C. 4.5
- D. 5.0

## Question 17 What is the EDSS?

- A. 3.5
- B. 4.0
- C. 4.5
- D. 5.0

10





**EDSS**  
**FSS ≤ 3**

2	3	4	5	EDSS
0	1	-	-	3.0
1-2	1	-	-	3.5
3-6	1	-	-	4.0
0	2	-	-	3.5
1-5	2	-	-	4.0
0	3	-	-	4.0
1-4	3	-	-	4.5
0	4-7	-	-	4.5*

## EDSS

Visual 0  
 Brainstem 3  
 Pyramidal 3  
 Cerebellar 1  
 Sensory 3  
 Bowel/Bladder 1  
 Cerebral 1  
 Ambulation 350 m, no  
 assistance

	1	2	3	4	5	6	7
0	×						
1	×	×	×				
2							
3	×	×	×				
4							
5							
6							

## Question 18

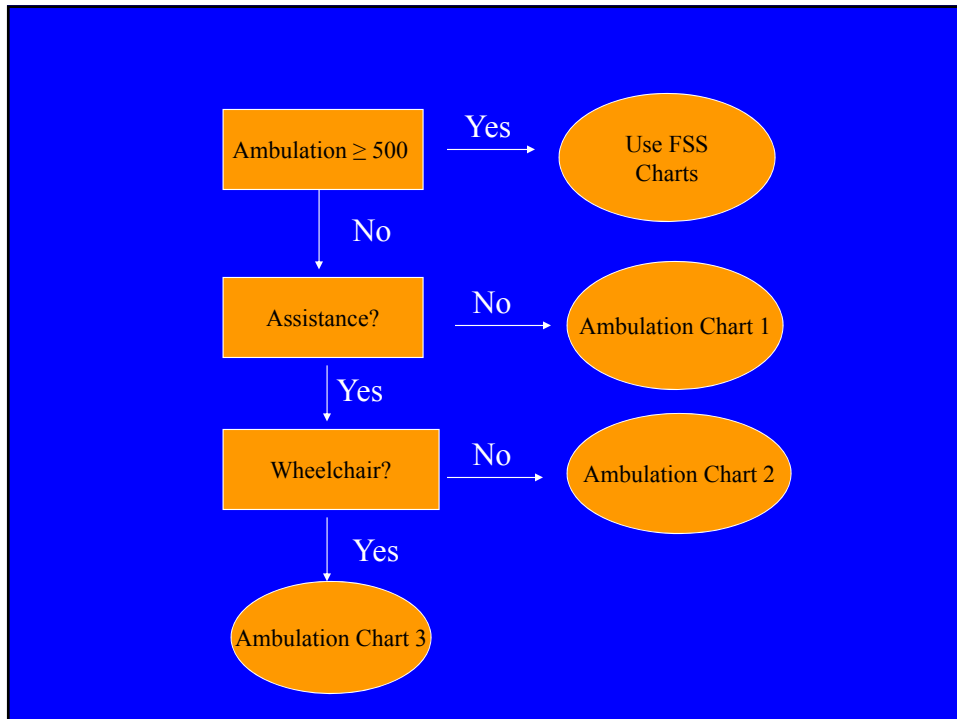
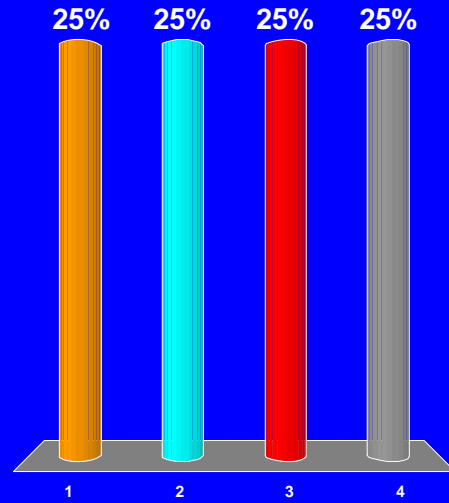
- What is the EDSS?
- A. 3.0
- B. 3.5
- C. 4.0
- D. 4.5



## Question 18 What is the EDSS?

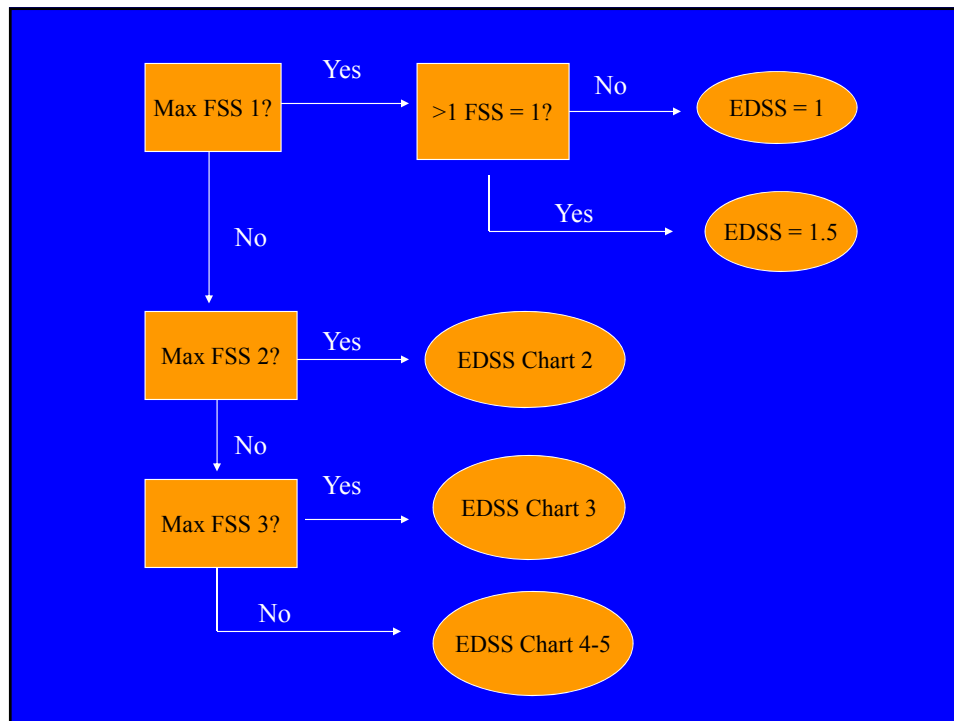
- A. 3.0
- B. 3.5
- C. 4.0
- D. 4.5

10



## EDSS Ambulation 1

Distance	Restricted?	Assistance	EDSS
$\geq 500$ m	No	None	By FSS
$\geq 500$ m	Yes (Pyr or Cereb $\geq 2$ )	None	By FSS
300-499	-	None	4.5*
200-299	-	None	5.0
100-199	-	None	5.5



## EDSS FSS $\leq 3$

2	3	4	5	EDSS
0	1	-	-	3.0
1-2	1	-	-	3.5
3-6	1	-	-	4.0
0	2	-	-	3.5
1-5	2	-	-	4.0
0	3	-	-	4.0
1-4	3	-	-	4.5
0	4-7	-	-	4.5*

## EDSS

Visual 0  
 Brainstem 2  
 Pyramidal 2  
 Cerebellar 1  
 Sensory 5  
 Bowel/Bladder 1  
 Cerebral 0  
 Ambulation 350 m, no  
 assistance

	1	2	3	4	5	6	7
0	×	×					
1	×	×					
2	×	×					
3							
4							
5	×						
6							

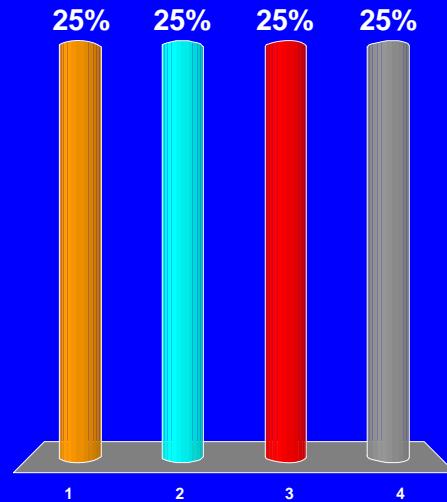
## Question 19

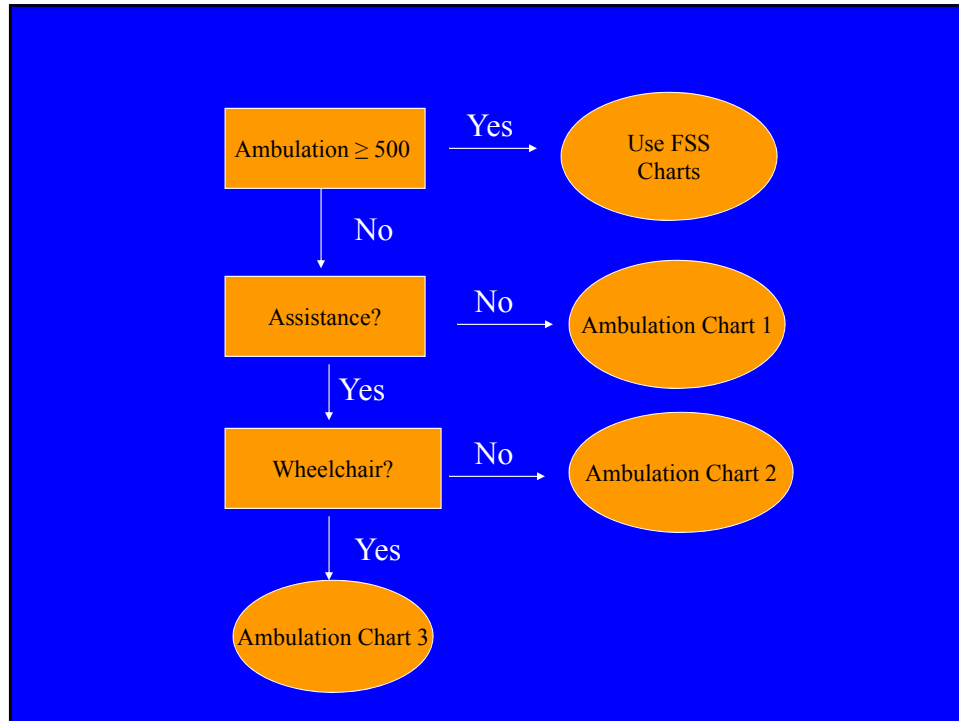
- What is the EDSS?
- A. 4.0
- B. 4.5
- C. 5.0
- D. 5.5

## Question 19 What is the EDSS?

- A. 4.0
- B. 4.5
- C. 5.0
- D. 5.5

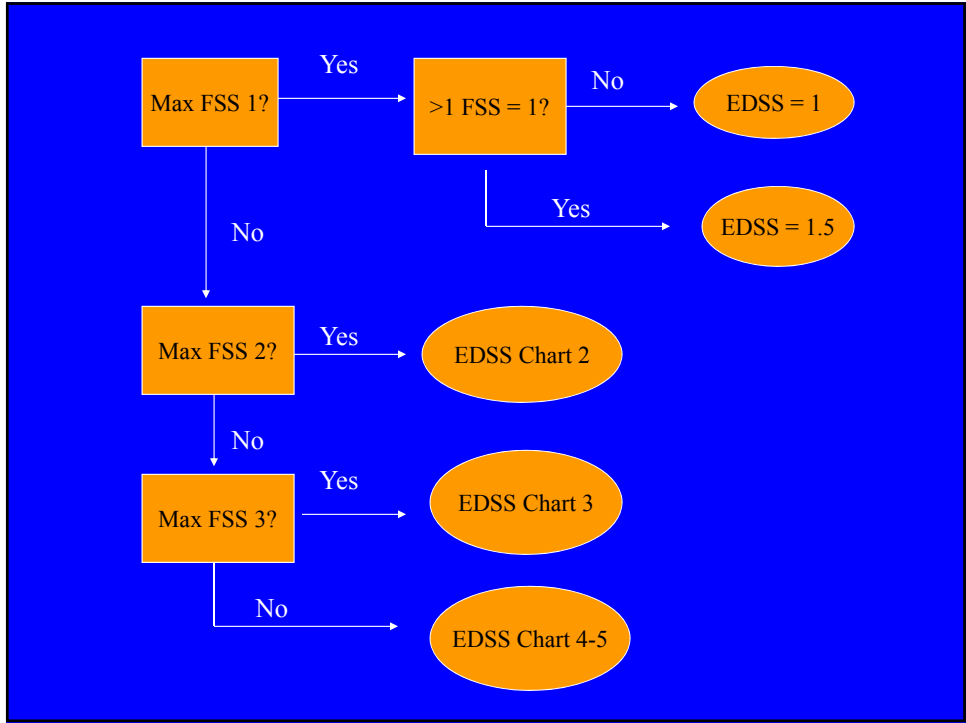
10





## EDSS Ambulation 1

Distance	Restricted?	Assistance	EDSS
≥ 500 m	No	None	By FSS
≥ 500 m	Yes (Pyr or Cereb ≥ 2)	None	By FSS
300-499	-	None	4.5*
200-299	-	None	5.0
100-199	-	None	5.5



## EDSS FSS 4-5

2	3	4	5	EDSS
0	0	1	-	4.0
0	0	2-7	-	4.5
0	0	0	1	5.0

## EDSS Rules of Thumb

- When the EDSS as determined by FS and by ambulation do not agree, choose the higher EDSS.

## Question 20

- The patient is able to walk 50 m by holding onto her husband's arm. She is too ataxic to use a cane.

## Question 20

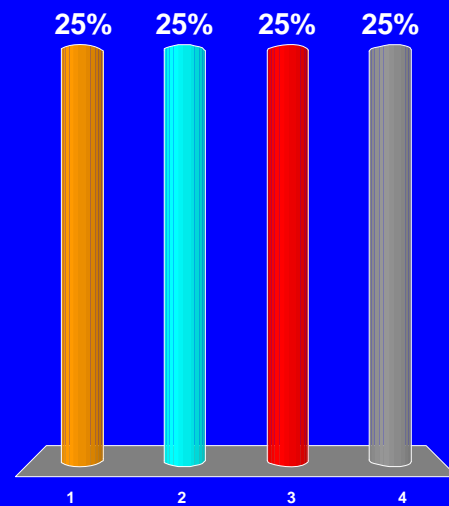
- What is the EDSS?
- A. 5.0
- B. 5.5
- C. 6.0
- D. 6.5

## Question 20

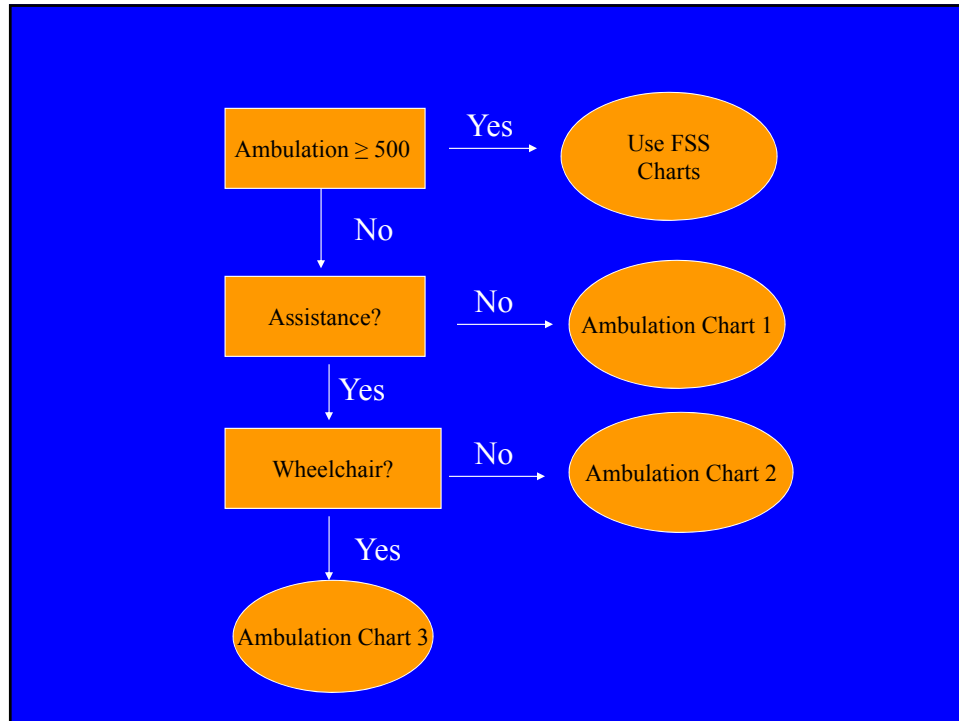
What is the EDSS?

- A. 5.0
- B. 5.5
- C. 6.0
- D. 6.5

10







## Rules of Thumb

- Assistance by person = bilateral assistance
- AFO is not unilateral assistance

## EDSS Ambulation 2

Distance	Assistance	EDSS
$\geq 100$	Unilateral or Intermittent	6.0
50-99	Unilateral	6.0
20-49	Unilateral	6.5
$> 120$	Bilateral	6.0
10-120	Bilateral	6.5

## Neurostatus Training

- <http://www.neurostatus.net/index.php>