

## FAQ

How can I interpret my patient's CB&M score?

The most frequently asked question that we receive about the CB&M is regarding the meaning or interpretation of the patient's score. The CB&M is designed to evaluate balance in higher functioning people and therefore most of the items are more challenging than the tasks in other clinical balance scales in order to discriminate amongst individuals at higher levels of ability. Therefore unlike other clinical measures, the purpose of the CB&M is not to indicate the need or type of walking aid, fall risk or discharge placement. Instead, the CB&M items reflect the balance and mobility skills necessary for full participation in the community and an association between CB&M scores and community integrations has been determined (as described below). The CB&M scores can also be referenced to age-related values to identify balance control issues in a higher functioning patient which may otherwise go undetected. Additionally, unpublished work has established both the standard error of measurement and minimal detectable change score which aids the therapist in determining whether actual change beyond measurement error has occurred between assessments.

### ***Standard error of measurement and minimal detectable change score***

Using data from the first phase of our research, we have calculated both the standard error of measurement (SEM) and the minimal detectable change (MDC) of the CB&M using the values from both internal consistency (Cronbach's alpha) and immediate test-retest reliability (intra-class correlation co-efficient (ICC)) (unpublished).

$$SEM = S * \sqrt{1 - r_x}$$

where S = standard deviation of the baseline scores and  $r_x$  = reliability of the outcome measure using internal consistency Cronbach's alpha value of 0.96 or immediate test-retest reliability ICC of 0.975.

$$\text{SEM using Cronbach's alpha value} = 20.5 * \sqrt{1 - 0.96} = 20.5 * \sqrt{0.04} = 20.5 * 0.2 = \mathbf{4.1}$$

$$\text{SEM using test-retest ICC} = 20.5 * \sqrt{1 - 0.975} = 20.5 * \sqrt{0.025} = 20.5 * 0.16 = \mathbf{3.2}$$

Using the SEM, we calculated the  $MDC_{90}$  which sets the minimal detectable change at a 90% confidence interval.

$$\mathbf{MDC_{90}} = SEM * \sqrt{2} * 1.65 = \mathbf{9.6} \text{ (using Cronbach's alpha value)}$$

$$\mathbf{MDC_{90}} = SEM * \sqrt{2} * 1.65 = \mathbf{7.5} \text{ (using test-retest ICC values)}$$

We suggest that a therapist could interpret a CB&M change score of 8 points or more in the patient as indicative of true change beyond measurement error. Further research is required to determine the minimal clinically important difference.

### ***Relationship to community integration***

Scores on the Community Integration Questionnaire (CIQ) were collected as an indicator of community participation during all phases of our research. Our hypothesis was that people with decreased postural control/balance would also tend to be those who demonstrate

reduced participation in their communities. In a data set of 47 people with TBI, we found that there is support for this idea as there is an association between CB&M and CIQ scores ( $r=0.54$ ,  $p<0.001$ ) and those with a CB&M score less than 45 had a lower and more limited range of CIQ scores (Inness et al 2011). A CB&M score less than 45 may be a threshold below which community integration could be at risk. Although needing further investigation/confirmation, the findings suggest that people with lower CB&M scores, that is reduced balance and mobility skills, are also those that tend to experience reduced community integration.

***Relationship to age-related reference values among those without impairment***

It is often useful to compare a patient’s score with the score of an individual in a similar age group with a normal neuromusculoskeletal system. Therefore, the chart below contains the CB&M scores for 121 healthy individuals across the decades (Zbarsky et al 2010).

Community Balance and Mobility Scale (CB&M): Healthy Age-Related Reference Values

| Age Group | N  | Mean* | SD   | 95% CI      |
|-----------|----|-------|------|-------------|
| 20-29     | 24 | 88.71 | 3.53 | 87.2 - 90.2 |
| 30-39     | 27 | 86.33 | 5.78 | 84.1 - 88.6 |
| 40-49     | 23 | 84.35 | 4.03 | 82.6 - 86.1 |
| 50-59**   | 26 | 77.43 | 6.55 | 75.0 - 79.9 |
| 60-69**   | 17 | 64.94 | 8.22 | 60.7 - 69.2 |
| 70-79**   | 4  | 49.75 | 6.95 | 38.7- 60.8  |

\*CB&M scored out of 96

\*\*Significant difference from the group in the previous decade.

We suggest using the 95% confidence intervals in this table to compare your patient’s score with the CB&M scores of healthy individuals at each decade. A patient’s score falling below the range for his/her age group would be indicative of impaired balance control. Please note that because the 70-79 year old age group has a very small sample size, the values should be used with caution.