OVERVIEW OF THE GROSS MOTOR FUNCTION MEASURE (GMFM)

What is the GMFM?
- The Gross Motor Function Measure (GMFM) is a clinical measure designed and validated to evaluate changes in the gross motor function in children with cerebral palsy (CP).
- There are two versions of the GMFM: the original 88-item measure (GMFM-88) and the 66-item measure (GMFM-66). These items are administered in the same way—the difference between the two versions simply concerns which of the items (from the full pool of 88 possible items) are included in GMFM-66.
- There are three methods of administering the GMFM to obtain a GMFM-66 score. All three methods require the Gross Motor Ability Estimator (GMAE-2) scoring software to convert the item data into a GMFM-66 score. Administration methods include the following: (1) GMFM-66: administer all 66 items; (2) GMFM-66-Item Sets (GMFM-66-IS): use a scoring algorithm to identify a subset of items to administer; and (3) GMFM-66 Basal & Ceiling (GMFM-66-B&C): use a basal/ceiling approach to identify a subset of items.

Items on the GMFM-88 span aspects of what the World Health Organization’s International Classification of Functioning, Disability and Health refers to as gross motor ‘activity’, ranging from activities such as lying and rolling to walking, running and jumping skills. The GMFM-66 consists of a subset of the 88 items that has been shown to be unidimensional.

Which version of the GMFM should I use?
- The GMFM version you should use depends upon the purpose of the assessment and the population. The GMFM-88 could be used when you want a detailed description of a child’s current motor abilities, for which more items may be useful. This version might be the best choice for children with CP who are very young (functioning primarily in prone and supine) or are functioning in the Gross Motor Function Classification System (GMFCS) Level V. The GMFM-88 must be used if the child tested is wearing shoes or orthoses or using a mobility aid. This is the most suitable version (with appropriate validation) for children who may have motor difficulties resulting from other motor impairments (e.g. Down syndrome and acquired brain injury [ABI]).
- The GMFM-66 provides a GMFM score for children with CP by using fewer items. Because it was based specifically and exclusively on patterns of motor development
observed in a large population of children with CP, and because the items are weighted according to difficulty (given the interval properties of the GMFM-66), it is a more valid measure to assess changes over time in children with CP. It is not recommended to be used for children other than those with CP, as the item weights are likely to vary by population.

• If there is a need for a briefer method to obtain a GMFM-66 score, then either the GMFM-66-IS or the GMFM-66-B&C approach can be used. However, the GMFM-66-IS is preferred over the GMFM-66-B&C for children with unilateral CP when assessing changes. These brief methods are discussed in detail in Chapter 5.

• Whatever version one chooses to administer, the same version should be applied consistently over time to a particular child. It is strongly recommended not to alternate between methods, as this may increase the variability in scores and make the detection of ‘real’ change more difficult.

How is the GMFM administered?
• The GMFM requires the child to demonstrate various gross motor skills, as outlined in the GMFM administration and scoring guidelines in Chapter 6.

• Prior to administering the GMFM, it is important to know which administration method is being used and to ensure that the appropriate score sheets, administration and scoring guidelines, and equipment are available.

Who is the GMFM appropriate for?
• While the measure was designed and validated for children with CP, there is evidence that the GMFM-88 version of the measure is also valid for use with children with Down syndrome and ABI.

• Because the GMFM samples motor skills that are typical of normal developmental milestones, it may be useful to assess current motor activities for children other than for those with whom it has been validated; however, because the detailed measurement properties of the GMFM have not been established with other populations than children with CP, Down syndrome or ABI, the reliability and validity of the GMFM-88 should be established prior to using it with other groups of children.

• The original GMFM validation sample included children from 5 months to 16 years old. The GMFM would be appropriate for children whose motor skills were at or below those of a 5-year-old child without any motor disability.

How is the GMFM scored?
• There is a common 4-point scoring system for each item in the GMFM. Specific descriptors for each item are detailed in the administration and scoring guidelines for the GMFM-66 and GMFM-88 (see Chapter 6). The item scoring is the same for the GMFM-88 and GMFM-66. It is not recommended to report changes in individual item scores as these are not as reliable as total scores.

• The GMFM-88 item scores can be summed to calculate raw and percent scores for each of the five GMFM dimensions and a total GMFM-88 score. The five dimensions are A: Lying and Rolling; B: Sitting; C: Crawling and Kneeling; D: Standing; and E: Walking.
Overview of the Gross Motor Function Measure (GMFM)

Running and Jumping. Goal total scores have been used to target goal areas and may be useful when assessing children when the GMFM-66 is not appropriate (e.g. assessing children using aids/orthoses). However, with the development of the GMFM-66, the need for goal areas is no longer necessary for children with CP who are tested barefoot.

The GMFM-66 requires a user-friendly computer program (called the Gross Motor Ability Estimator [GMAE]) to enter individual item scores and convert them to an interval-level total score. The original GMAE program was updated in 2013 with the GMAE-2 scoring software available for downloading from the CanChild website (www.motorgrowth.canchild.ca/en/GMFM/gmae.asp). This URL will also give the user access to all the required score sheets, the GMFCS and the GMFCS Expanded and Revised version.

• New features of GMAE-2 allow the user to import data from the original GMAE software, download score sheets, and enter and calculate scores for the GMFM-88, GMFM-66, GMFM-66-IS and GMFM-66-B&C. It is also possible to plot GMFM-66 scores on centile curves by the GMFCS level and export data to csv files.

How long does it take?
• Administering the GMFM-88 may take 45 to 60 minutes for someone familiar with the measure, depending on the skill of the assessor, the ability level of the child, and the child’s level of cooperation and understanding.
• The GMFM-66 takes less time to administer, as there are fewer items. The GMFM-66-IS and the GMFM-66-B&C take on an average 20 to 30 minutes to administer.

Where should it be administered?
• The GMFM should be administered in an environment that is comfortable for the child and is large enough to hold the necessary equipment and allow the child to move freely (e.g. one item requires the child to run 4.5m [15ft] and return). The floor should be a smooth, firm surface.
• Because the GMFM was designed to measure changes over time, it is important to keep the environment and assessment conditions as consistent as possible for each successive assessment of the same child.

What equipment is needed to administer the GMFM?
• The equipment required is described in detail Chapter 6. Most of what is needed is standard equipment in a physiotherapy gym (e.g. mat, bench, toys). Access to stairs (with at least five steps) is also necessary.

What qualifications are required to administer and score the GMFM?
• The GMFM was designed for use by pediatric therapists who are familiar with assessing motor skills in children.
• Users should familiarize themselves with the GMFM guidelines and score sheet before assessing children. It may be helpful to practise on several children with and without motor disabilities prior to using it for clinical assessments.
• It is recommended that users assess their reliability with the GMFM prior to using it.