

## Introduction and User Information

The purpose of the **Manual Ability Classification System (MACS)** is to provide a systematic method to classify how children with cerebral palsy use their hands **when handling objects in daily activities**. MACS is based upon self-initiated manual ability, with a particular emphasis on handling objects in an individual's personal space (the space immediately close to one's body, as distinct from objects that are not within reach).

The focus of MACS is on determining which level best represents the **child's usual performance** in home, school and community settings. Accordingly, the level must be determined by asking someone who knows the child well and not by conducting a specific assessment. MACS is not designed to classify best capacity and does not mean to distinguish different capacities between the two hands. MACS does not intend to explain the underlying reasons for limitations of performance or to classify types of cerebral palsy.

Distinctions between the levels are based on the child's **ability to handle objects** and their **need for assistance or adaptations** to perform manual tasks in everyday life. The objects in question are those that are relevant and age appropriate for the child, used for example in eating, dressing, playing, writing, as distinct from objects used in advanced specially skilled activities, like playing a musical instrument.

MACS can be used for children of different ages, but some interpretation is needed regarding the age of the child. Obviously, children handle **different objects** at four years of age, compared to when they are adolescents. The same point concerns **independence**, as a young child needs more help and supervision than an older child. Classification of a child should be made with reference to children of the same age.

A child's motivation and cognitive ability influence their ability to handle objects and thereby their MACS level. If the child's motivation to perform activities is low, if they do not understand the task or continuously ask for help and support from adults, they should be classified based on their actual performance, even if they are thought to have a higher capacity.

As a general principle, if a child's manual ability fits within a particular level the child will probably be classified either at or above that level. Children who do not perform the functions of a particular level will almost certainly be classified below that level. Level I includes children with cerebral palsy with, at most, minor limitations compared to typically developing children, and where the limitations, if any, barely influence their performance of daily life tasks.

In MACS five levels are described. Distinctions between each pair of levels are also provided to assist in determining the level that most closely resembles a child's manual abilities.

The scale is ordinal, with no intent that the distances between levels should be considered equal, or that children with cerebral palsy are equally distributed across the five levels.

E-mail: [ann-christin.eliasson@ki.se](mailto:ann-christin.eliasson@ki.se); [www.macs.nu](http://www.macs.nu)

Eliasson AC, Krumlinde Sundholm L, Rösblad B, Beckung E, Arner M, Öhrvall AM, Rosenbaum P. The Manual Ability Classification System (MACS) for children with cerebral palsy: scale development and evidence of validity and reliability *Developmental Medicine and Child Neurology* 2006 48:549-554



## Manual Ability Classification System for Children with Cerebral Palsy 4-18 years

March 2005

**MACS is a system to classify children's ability to handle objects in daily activities**

- **MACS** intends to describe which level best represents the child's usual performance in home, school and community settings.
- **MACS** level must be determined based on knowledge about the child's actual performance in daily life. It should not be done by conducting a specific assessment but by asking someone who knows the child and how that child performs typically.
- To determine the level of **MACS**, the child's ability to handle objects needs to be considered from an age-related perspective.
- **MACS** intends to report the participation of both hands in activities, not an assessment of each hand separately.



## What do you need to know to use MACS?

The child's ability to handle objects in important daily activities, for example during play and leisure, eating and dressing.

In which situation is the child independent and to what extent do they need support and adaptation?

- I. **Handles objects easily and successfully.** At most, limitations in the ease of performing manual tasks requiring speed and accuracy. However, any limitations in manual abilities do not restrict independence in daily activities.
- II. **Handles most objects but with somewhat reduced quality and/or speed of achievement.** Certain activities may be avoided or be achieved with some difficulty; alternative ways of performance might be used but manual abilities do not usually restrict independence in daily activities.
- III. **Handles objects with difficulty; needs help to prepare and/or modify activities.** The performance is slow and achieved with limited success regarding quality and quantity. Activities are performed independently if they have been set up or adapted.
- IV. **Handles a limited selection of easily managed objects in adapted situations.** Performs parts of activities with effort and with limited success. Requires continuous support and assistance and/or adapted equipment, for even partial achievement of the activity.
- V. **Does not handle objects and has severely limited ability to perform even simple actions.** Requires total assistance.

### Distinctions between Levels I and II

Children in Level I may have limitations in handling very small, heavy or fragile objects which demand detailed fine motor control, or efficient coordination between hands. Limitations may also involve performance in new and unfamiliar situations. Children in Level II perform almost the same activities as children in Level I but the quality of performance is decreased, or the performance is slower. Functional differences between hands can limit effectiveness of performance. Children in Level II commonly try to simplify handling of objects, for example by using a surface for support instead of handling objects with both hands.

### Distinctions between Levels II and III

Children in Level II handle most objects, although slowly or with reduced quality of performance. Children in Level III commonly need help to prepare the activity and/or require adjustments to be made to the environment since their ability to reach or handle objects is limited. They cannot perform certain activities and their degree of independence is related to the supportiveness of the environmental context.

### Distinctions between Levels III and IV

Children in Level III can perform selected activities if the situation is prearranged and if they get supervision and plenty of time. Children in Level IV need continuous help during the activity and can at best participate meaningfully in only parts of an activity.

### Distinctions between Levels IV and V

Children in Level IV perform part of an activity, however, they need help continuously. Children in Level V might at best participate with a simple movement in special situations, e.g. by pushing a simple button.